Appendix A. 2017 Record of Decision – CD Only

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RECORD OF DECISION

AMERICAN CREOSOTE WORKS SUPERFUND SITE

PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CERCLIS ID: FLD008161994

PREPARED BY:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

AUGUST 2017

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RECORD OF DECISION

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ACRONYMS AND ABBREVIATIONS

%	percent
ACW	American Creosote Works
AROD	ROD Amendments
ADD	average daily dose
amsl	above mean sea level
AR	Administrative Record
ARAR	Applicable or Relevant and Appropriate Requirement
BaP	benzo(a)pyrene
Black & Veatch	Black & Veatch Special Projects Corp.
bls	below land surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMZ	Contaminated Media Zone
COC	chemical(s) of concern
CSF	cancer slope factor
CSM	Conceptual Site Model
CTL	Cleanup Target Level
CY	cubic yards
DNAPL	dense non-aqueous phase liquid
DPT	direct push technology
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	Ecological Risk assessment
ESD	Explanation of Significant Difference
ESI	Expanded Site Investigation
ETC	Escambia Wood Treating Company
FDEP	Florida Department of Environmental Protection
FFS	Focused Feasibility Study
FL	Florida
FRI	Focused Remedial Investigation
FS	Feasibility Study
ft	foot or feet
FYR	Five-Year Review
GCTL	Groundwater Cleanup Target Level
HAP	hazardous air pollutants
HH&E	Human health and the environment
HHRA	Human Health risk Assessment
HI	hazard index
HQ	hazard quotient
IC	institutional control(s)

IRIS	Integrated Risk Information System
ISCO	*In Situ* Chemical Oxidation
ISEB	*in situ* enhanced bioremediation
IUR	Inhalation Unit Risk
LADD	lifetime average daily dose
LDA	large diameter auger
LDR	land disposal restrictions
LS	Lower Sand
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
mg/kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
MPE	multi-phase extraction
NAPL	non-aqueous phase liquid
NCP	National Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
P&T	pump and treat
PAH	polycyclic aromatic hydrocarbon
PCP	pentachlorophenol
pg/kg-day	picograms per kilogram-day
ppt	parts per trillion
PRA	Probability Risk Assessment
PRG	Preliminary Remedial Goal
PTW	Principal Threat Waste
PYC	Pensacola Yacht Club
RA	remedial action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision
ROW	right-of-way
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAPS	Site Characterization and Analysis Penetrometer System
SCTL	soil cleanup target levels
SDWA	Safe Drinking Water Act
SE	Southeast
SEAR	surfactant enhanced aquifer remediation
SEE	steam-enhanced extraction

SESD	Science and Ecological Support Division
Site	American Creosote Works Superfund Site
SRC	Syracuse Research Corporation
S/S	solidification/stabilization
SSL	Soil Screening Level
SSM	shallow soil mixing
SVOC	semi-volatile organic compound(s)
TarGOST®	Tar-specific Green Optical Screening Tool
TBC	To Be Considered
TCDD	Tetrachlorodibenzo-p-dioxin
TEQ	toxicity equivalent
T/M/V	toxicity/mobility/volume
T/V	toxicity/volume
USACE	U.S. Army Corps of Engineers
US	Upper Sand
USGS	U.S. Geological Society
VOC	volatile organic compound

PART 1: DECLARATION

1.0 Site Name and Location

This Record of Decision (ROD) is for the site-wide remedial action (RA) at American Creosote Works (ACW) Superfund Site (the Site) located in Pensacola, Escambia County, Florida (FL). The Site's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number is: FLD008161994. The Site was listed on the National Priorities List (NPL) on September 8, 1983.

The ACW Pensacola Site is located in a moderately dense commercial and residential district of Pensacola, Florida. The former ACW facility is approximately 18 acres in size and is located one block south of the intersection between Main Street and Barrancas Avenue, between L and F Street, about 500 yards north of Bayou Chico in Pensacola Bay. Several businesses are located north and west of the former ACW facility, including a lumber company, an auto body shop, and an appliance sales and repair shop. Residential areas included as part of the ACW Site, border the former ACW facility on the east and south, with the nearest residence within 50 feet (ft) of the former facility.

2.0 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the site-wide RA at the Site which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 42 U.S.C. Section 9601 et seq., and, to the extent practicable, the National Contingency Plan (NCP) 40 Code of Federal Regulations (CFR) Part 300. This decision is based on the Administrative Record (AR) for the Site. This decision represents the final remedy selected for the Site's OU1 and OU3 and following completion of the RA, the Site will be ready for reuse. The remedy selected for OU2 is an interim remedy.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), is the support agency. In accordance with 40 CFR Sec 300.430(e)(9)(iii)(H), FDEP has provided input during the remedy selection process including review and comment on the RI/FS and supports the selected remedy.

3.0 Assessment of the Site

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances to the environment; and pollutants or contaminants from this Site which may present an imminent and substantial endangerment to public health or welfare.

4.0 Description of Selected Remedy

Due to the complexity of the Site, it was divided into five separate contaminated media zones (CMZs) in order to aid in the screening, evaluation and selection of remedies. CMZs are generically defined as a medium, volume or area that has common characteristics, which effect the remedial alternative selection. The dimensions and characteristics of a defined CMZ are essential parameters for selecting and comparing remedial alternatives because of their impact on

remedial costs and technology feasibility. For example, the depth of contamination, whether it is within or outside the boundaries of the property, the presence of Dense Non-Aqueous Phase Liquid (DNAPL), the specific lithologic unit, and the concentrations of specific chemicals of concern (COCs [e.g. dioxin]) were the factors used in delineating a CMZ for the ACW Site.

Contaminated Media Zone	Operable Units
CMZ-1 Main Source Area	OU1/2 – DNAPL Source/PTW
CMZ-2A Extended DNAPL Plume - On Facility	OU1/2 – DNAPL Source
CMZ-2B Extended DNAPL Plume – Off Facility	OU1/2 – DNAPL Source
CMZ-3 Secondary Source Zone/Adsorbed Phase Zone – On Facility	OU2 – Groundwater
CMZ-4A On facility Surface Soil Contamination	OU1 – Soil, sludge and sediments
CMZ-4B Off facility Surface Soil Contamination	OU3 – Offsite dioxin soil
CMZ-5 Extended Dissolved Groundwater Plume	OU2 – Groundwater

The NCP establishes an expectation that the U.S. Environmental Protection Agency will use treatment to address the principal threats posed by a site whenever practicable (NCP §300.430(a)(1)(iii)(A)). The NCP defines Principal Threat Waste (PTW) as source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present significant risk to human health or the environment should exposure occur. NAPL and DNAPL are considered a principal threat wastes under EPA guidance and there is an expectation in the NCP to treat such wastes wherever practicable unless EPA determines that such wastes can be reliably contained. Highly contaminated soil can also be PTW when considered highly toxic, or would present significant risk to human health should exposure occur, or it acts as reservoir for mobile contaminants. Containment alternatives, such as capping, have been demonstrated to be reliable for this type of contamination commonly found at former wood treater sites. The major components of this Selected Remedy are listed below in the order of their expected implementation during construction; however, it is expected that some of these phases can proceed on simultaneous tracks:

Phase	Action
I	Implementation of groundwater sampling at OU2/CMZ-5 will provide baseline on the marine surface water quality in the Bay and Bayou Chico
II	Excavation of CMZ-4B surficial soil to protect against the direct contact threat to the surrounding community. Soil exceeding residential cleanup would be placed onsite in a lined cell until the soils can be placed in the excavation created by CMZ-4A (over CMZ-2A/3) and covered with a temporary cover.
III	Complete 2-ft soil cover over CMZ-4B soil on ACW property
IV	Construction and implementation of the *In Situ* Chemical Oxidation (ISCO)/ *In situ* enhanced bioremediation (ISEB) barriers in CMZ-3 and OU2/CMZ-5

Phase	Action
V	Construction of barrier wall at CMZ-1 to 110-ft below land surface (bls) using the cutter soil mixer technique to isolate the highest percentage of mass
VI	Excavation of CMZ-4A PTW soil for inclusion in the CMZ-1 containment cell; if not considered PTW then the soil is to be included in vault overlying CMZ-3
VII	Install Cap/Cover at CMZ-1
VIII	Place CMZ-4B excavated soil in the excavation created by CMZ-4A (over to CMZ-2A/3) and cover with a 2-ft protective soil cover. This phase would also include 35,000 CY stockpile that currently exists on the former facility and would remain in the CM-2A/3 area
VIII	Installation and Implementation of steam-enhanced extraction (SEE) on CMZ-2A
IX	Installation and Implementation of SEE on CMZ-2B
X	Performance Monitoring for Remedy Effectiveness in CMZ-2B and OU2/CMZ-5.

The Selected Remedy is compatible with anticipated and existing Site reuse. The Site will have institutional controls (ICs) for industrial/commercial uses only, which also includes recreational. The City of Pensacola has the property zoned conservation and would like to turn it into a park.

5.0 Statutory Determinations

Based on the information currently available, the EPA believes the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. In compliance with CERCLA Section 121(b) and Section 121(d), the Selected Remedy is protective of human health and the environment, complies with Federal and any more stringent State requirements that are applicable or relevant and appropriate to the RAs, is cost effective, and utilizes permanent solutions and treatment technologies to the maximum extent practicable.

The Selected Remedies for CMZ-2A, CMZ-2B, CMZ-3, and CMZ-5 satisfy the statutory preference for remedies that employ treatment to reduce toxicity (T) or volume (V) or mobility as a principal element. For CMZ-1, CMZ-4A, and CMZ-4B treatment alternatives to reduce T/V for the creosote dense non-aqueous phase liquid (DNAPL) and dioxins were evaluated and it was determined to be either cost prohibitive or unproven technologies which would likely fail to meet criteria to reduce T/V. Isolation/containment reduces mobility, but will not reduce toxicity or volume of the PTW/DNAPL or contaminated soil; however, it does eliminate the risk exposure pathways of ingestion or inhalation to humans and animals. The removal and on-facility disposal will reduce mobility.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on the Site above levels that would allow for unlimited use and unrestricted exposure, a CERCLA Section 121(c) statutory review will be conducted every five years after initiation of the RA to ensure that the remedy remains protective of human health and the environment, inclusive of the applicable ICs. If results of the five-year reviews reveal that remedy integrity is compromised and protection of human health is insufficient, then additional remedial actions will be evaluated by the EPA and FDEP. The statutory five-year reviews will be conducted in accordance with EPA policy and guidance.

6.0 Data Certification Checklist

The following information is included in the Decision Summary Section of this ROD. Additional information can be found in the AR file for this Site.

- COCs and their respective cleanup levels (Sections 7 and 8; **Tables 11**)
- Baseline risk represented by the COC (Section 7; **Tables 1** through **10**)
- Cleanup levels established for COC and the basis for these levels (Section 8; **Tables 11**)
- How source materials constituting principal threats are addressed (Section 11)
- Current and reasonably anticipated future land use assumptions (Section 6)
- Potential land use that will be available at the Site as a result of the Selected Remedy (Section 6)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 12; **Table 15**)
- Key factors that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing criteria, highlighting criteria key to the decision) (Sections 12 and 13).

7.0 Authorizing Signature

Franklin E. Hill, Director
Superfund Division

9/7/17
Date

PART 2: THE DECISION SUMMARY

1.0 Site Name, Location, and Brief Description

This Record of Decision (ROD) is for the American Creosote Works (ACW) Superfund Site (Site; U.S. Environmental Protection Agency [EPA] ID: FLD008161994) Pensacola, Escambia County, Florida (FL) is approximately 18 acres in size and is located one block south of the intersection between Main Street and Barrancas Avenue, between L and F Street, about 500 yards north of Bayou Chico in Pensacola Bay (**Figure 1**). The Site is a former wood treatment facility in a moderately dense commercial and residential district (**Figure 2**). Several businesses are located north and west of the former ACW facility, including a lumber company, an auto body shop, and an appliance sales and repair shop. Residential areas included as part of the ACW Site, border the former ACW facility on the east and south, with the nearest residence within 50 feet (ft) of the former facility. Currently, the ACW facility is secured by a perimeter fence. A building that previously housed the non-aqueous phase liquid (NAPL) recovery and groundwater treatment system, an office building and several storage tanks exist on the western portion of the facility. Relict building foundations and previous removal action soil debris piles are located in the central portion of the former facility property. Water from the main and overflow ponds, located adjacent to L Street, was pumped out and treated in 1983. Once the water from the ponds was removed, the sludge was solidified and covered with a clay cap.

The ACW Pensacola Superfund Site operated until 1981 when the company filed for bankruptcy. Major contaminants in the soil, sediments and groundwater released as a consequence of the former wood treating processes are semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), and dioxin.

The Site was divided into three operable units (OUs) to facilitate EPA's response actions in addressing the cleanup of various media contaminated by the former facility wood treating and preserving operations. OU1 addresses the soils, sediments and sludges on the former facility and in associated storm water drainage ditches to the east and south of the property. OU2 encompasses the subsurface NAPL (i.e., creosote product), contiguous soil, and the dissolved groundwater contamination. OU3 is the off-facility site-related residual dioxin and SVOC surface soil contamination. In September 2011, the EPA combined OU1, OU2, and OU3 based on further evaluations of the Site conditions, newer and more innovative remedial alternatives, and the current status of the remedies selected in the previous OU1 and OU2 RODs and ROD Amendments (ARODs). This action was the spur that led to the development, screening, and evaluations of remedial alternatives in the Site-wide Feasibility Study (FS) that recommended a final remedy for the OU1/OU3 action and an interim remedy for OU2.

The EPA is the lead agency for the cleanup of the Site and the Florida Department of Environmental Protection (FDEP) is the support agency. To date, EPA has used the Superfund Trust Fund to finance activities at the Site, including several Removal Response Actions, an Expanded Site Investigation (ESI), the Remedial Investigation (RI)/FS, and several remedial actions (RAs) under previous RODs.

2.0 Site History and Activities

2.1 Site Operational History

Wood-preserving operations were conducted at the ACW facility from 1902 until December 1981. Prior to 1950, creosote was used exclusively to treat wood poles. ACW began pressure-treating the lumber, using PCP and Number 2 fuel oil mixture in 1950. This process increased during the later years of the ACW operations. The dioxin/furan contamination present at the Site resulted from the use of PCP as a wood treating chemical, because dioxins/furans are a common impurity in commercial grade PCP and are released when the PCP is heated.

Four surface impoundments were located in the western portion of the ACW facility (**Figure 2**). The Main and Overflow ponds, located adjacent to L Street, were used for disposal of process wastes. During operations, ACW discharged liquid process wastes into the two unlined surface impoundments. Prior to 1970, waste water in these ponds was allowed to overflow through a spillway, then flow through the streets and storm drains into a ditch on the PYC property and then into Bayou Chico and Pensacola Bay. In later years, liquid wastes were drawn off the larger lagoons and collected in the smaller Railroad Impoundment and Holding Pond or were spread out on the ground in designated "Spillage Areas" on the facility. Additional discharges occurred during periods of heavy rainfall and flooding when the ponds overflowed the containment dikes.

2.2 Regulatory and Investigation History

In 1980, the City of Pensacola found oily creosote-like material in the groundwater near the intersection of L Street and Cypress Street. The EPA placed the ACW facility on the National Priorities List (NPL) on September 8, 1983.

In 1983, EPA initiated an immediate removal action. Water from the main and overflow ponds was pumped out and treated. Once the water from the ponds was removed, the sludge was solidified and covered with a clay cap.

In 1985, EPA completed a RI and FS that indicated that on-facility and off-facility surface soil, the PYC drainage ditch, and nearby groundwater were contaminated with SVOCs, phenols, and volatile organic compounds (VOCs).

EPA signed a ROD in 1985 which selected a remedy for all contaminated surface soils, sludges, and sediments to be placed in an on-facility containment cell. A groundwater remedy was not included in the 1985 ROD. In 1988, the EPA initiated a Post-ROD RI to provide additional information on the extent of surface soil contamination. Following a supplemental RI/FS, EPA signed a ROD Amendment which selected bioremediation for treatment of surface soils. This remedy required treatability studies to determine the most effective biological treatment. The studies indicated that neither the slurry-phase bio-treatment nor land farming would be effective at destroying the PCP and some PAHs.

From 1990-1993 EPA completed 3 more investigations to address the groundwater, solidified sludge, and subsurface soil. Results indicated elevated concentrations of numerous SVOCs and VOCs, as well as dioxins/furans in the soil, surface water, groundwater, and sediments. EPA

completed a BRA in August 1993 to evaluate potential risks associated with groundwater, solidified sludge, and subsurface soils.

In 1994, EPA signed the OU2 ROD which selected direct pumping of NAPL from wells with subsequent recycling of the NAPL as Phase I of the remedy, followed by biological treatment of contaminated groundwater for Phase II. Construction of the NAPL recovery system was completed in September 1998 and the system operated until EPA terminated its operations in 2011. At the time of the system shut down, approximately 190,000 gallons of creosote NAPL had been recovered from the subsurface at the Site. At the end of the long-term RA period, the pump and treat (P&T) system was not capable of removing the remaining dense non-aqueous phase liquid (DNAPL). Therefore, remedy failure was declared.

In 1999, the EPA signed the OU1 AROD that selected construction of a low-permeability cap over the stabilized surface impoundments and other contaminated areas of the ACW facility. Drainage channels were installed around the perimeter of the cap to manage storm water runoff. Groundwater monitoring, in addition to that required as part of the OU2 groundwater remedy, was incorporated to evaluate whether contaminated soils remaining at the facility were leaching into the groundwater.

In 2006, the EPA established OU3 to further address residual surface soil contamination in the neighboring properties. A previous investigation had been performed by EPA in the neighborhood in 1997 to determine the presence of site-related contamination. The State of Florida promulgated introduced soil cleanup target levels (SCTLs) and some of the concentrations found in the residential area were above these new cleanup numbers.

Date Complete	**Scope**
1978	Spill due to heavy rain fall
1979	Spill due to heavy rain fall
1980	Creosote discovered in groundwater by City of Pensacola
Jul-81	U.S. Geological Society (USGS) installs nine groundwater monitoring wells near the Site
8-Sep-1983	Site placed on the NPL
1983	EPA investigation detects PAHs in soil and groundwater
Late 1983	Emergency clean out, solidification and capping of lagoon sludge
1985	EPA conducted a RI/FS which confirms PAH, phenol, and VOC contamination of soil and groundwater
30-Sep-1985	EPA signs ROD
1986	State of Florida signs letter of non-concurrence of the ROD
1988	EPA conducts Supplemental RI
1989	EPA completes Supplemental FS
28-Sep-1989	EPA signs Amended ROD
Aug-1990	EPA issued Explanation of Significant Difference (ESD) Fact Sheet, addressing site preparation, fence repair, drum sampling, analysis and

Date Complete	Scope
	disposal, demolition of buildings, debris removal, well closure, cap repair, and revegetation
Sep-1990	EPA completed a Phase II Post RI
Feb-1991	Initiated tasks in ESD
May-1991	Completed tasks in ESD, triggered Five-Year Review (FYR) requirement
Aug-1991	Phase III Post RI
Sep-1991	Dye Dispersion and Sediment Sampling Study
19-Sep-1991	Interim RA Report, Roy F. Weston
25-Sep-1991	EPA accepted RA Report by Weston
Nov-1991	Supplemental Site Characterization Sampling and Treatability Study
Aug-1993	Baseline Risk Assessment (BRA)
Nov-1993	Supplemental Risk Assessment and FS
3-Feb-1994	EPA signs OU2 ROD
Feb-1994	Phase IV Post RI (EPA); Focused OU2 Groundwater Investigation
1994	EPA streamlines project by assigning all solid media to OU1 and groundwater to OU2
Sep-1996	Final Design Investigation Report, Bechtel Environmental, Inc.
Nov-1996	Pilot Test Treatability Report, Bechtel Environmental, Inc.
1997	Final Remedial Design (RD) Documents
Dec-1997	Sanders Beach Community Area Surface Soil Study, Black & Veatch Special Projects Corp. (Black & Veatch).
Sep-1998	NAPL Recovery System installed
21-May-1999	EPA signed Amended OU1 ROD
25-Sep-2001	Initial FYR conducted
May-2003	Initiate excavation of off-facility soils, transport excavated soils to facility stockpile
Dec-2003	Completed off-facility soil excavation
Jan-2004	Initiate quarterly Groundwater Monitoring
Sep-2004	Hurricane Ivan destroys the NAPL recovery system
Jan-2005	End quarterly Groundwater Monitoring
Sep-2006	2nd FYR conducted
Dec-2006	EPA established OU3 to address off-facility dioxin and PAH contamination
2007	NAPL recovery system operational; Quarterly groundwater monitoring resumes
Apr-2007	OU3 Focused RI initiated by EPA
Mar-2007	EPA installed 10 Groundwater Monitoring Well clusters; Site Characterization and Analysis Penetrometer System (SCAPS) NAPL assessment (U.S. Army Corps of Engineers; USACE)
Dec-2007	OU3 RI field investigation (off-facility surface soil sampling)

Date Complete	Scope
Jan-2008	Groundwater Monitoring Event (USACE)
Apr-2009	OU3 Focused RI (FRI) submitted
Jun-2009	OU3 FRI approved, Black & Veatch Special Projects Corp.
Sep-2009	EPA initiated Focused Feasibility Study (FFS)
Dec-2009	EPA performed additional soil removal in Southeast (SE) Ditch
Feb-2010	OU3 supplemental off-facility soil investigation
Dec-2010	EPA combined OU1 (on-facility soil and NAPL Main Source Zone) into OU3
Jan-2011	OU3 on-facility soil investigation
Jan-2011	Groundwater Monitoring Event (Science and Ecological Support Division [SESD])
Sep-2011	EPA combined OU1, OU2, and OU3 in order to complete evaluation and selection of a Site-wide Remedy
Sep-2011	EPA terminated operations of the NAPL recovery system
Oct-2011	OU3 NAPL and subsurface soil investigation
Jan-2012	Groundwater Monitoring Event (SESD)
Jan-2012	PYC Ditch Stormwater Rerouted (City of Pensacola)
Mar-2013	Completed Groundwater Transport Model (OU2)
Jan-2014	Groundwater Monitoring Event (SESD)
Mar-2014	Supplemental Human Health Risk Assessment (HHRA) Addendum completed
Mar-2014	Draft Site-wide FS and National Remedy Review Board Briefing
Jan-2015	Groundwater Monitoring Event (SESD)
Feb-2016	Groundwater Monitoring Event (SESD)
July-2016	EPA excavated and backfilled the PYC ditch
Dec-2016	Final Site-wide FS Submitted; Black & Veatch Special Projects Corp.

3.0 Community Participation

Site documents including the RI, FS Reports and Proposed Plan for the ACW Site were made available to the public on April 22, 2017 in the Administrative Record (AR) repositories. The AR repositories are located at the EPA Region 4 Superfund Records Center (61 Forsyth Street, Atlanta, GA 30303) and the EPA local repository located at the West Florida Genealogy Branch located at 5740 N 9th Avenue, Pensacola, Florida. A Notice of Availability was published in the Pensacola News Journal on April 23 and 24, 2017. A public comment period on the Proposed Plan was held from April 22 to May 22, 2017.

On April 26, 2017, the EPA hosted a Proposed Plan meeting at the Sanders Beach-Corinne Jones Resource Center. During the meeting the EPA presented a description of the Proposed Plan and schedule for remedy implementation and allowed nearby residents and interested parties to comment and ask questions of EPA officials. Approximately 45 people attended the meeting; a transcript of the meeting is included as **Appendix B.**

There were a number of comments and questions raised during the public meeting and representatives of EPA responded to them during the meeting. EPA responses to written comments received during this comment period are included in the Responsiveness Summary, Part 3, of this ROD.

4.0 Scope and Role of the Response Action

Several off-facility soil removal actions have been performed since 1999, with the excavated soil currently stockpiled on the ACW facility (approximately 35,000 cubic yards [CY]). These former actions, in conjunction with the Selected Remedy in this ROD, will achieve the overall Site goal of eliminating human and ecological exposure to contaminants in soil, sediment, and groundwater and protecting surface water in Pensacola Bay/Bayou Chico and its associated tributaries. The Selected Remedy is compatible with the planned and existing use of the Site.

This ROD presents the final CERCLA action for OU1 and OU3 at the ACW Site. CERCLA action for OU2 groundwater is an interim remedy. The actions in this ROD include:

- Implementation of groundwater sampling at OU2/Contaminated Media Zone (CMZ)-5 will provide baseline data on the marine surface water quality in the Bay and Bayou Chico
- Construction and implementation of the *In Situ* Chemical Oxidation (ISCO)/ *In Situ* enhanced bioremediation (ISEB) barriers in CMZ-3 and OU2/CMZ-5 to prevent any future impact to Pensacola Bay.
- Construction of a barrier wall at CMZ-1 to 110-ft bls using the cutter soil mixer technique to isolate the highest percentage of contaminated soil mass and prevent any future contamination of the aquifer from this zone.
- Excavation of CMZ-4A and 4B Principal Threat Waste (PTW) soil for inclusion in the CMZ-1 containment cell or placement within an encapsulated cell within CMZ-3
- Install Cap/Cover at CMZ-1
- Excavation of CMZ-4B residential surficial soil to protect against the direct contact threat to the surrounding community. Soil exceeding residential cleanup RGOs would be placed in the excavation created by CMZ-4A (over CMZ-2A/3) and covered with a 2-ft protective soil cover. The 35,000 CY soil stockpile that currently exists on the former facility would also be placed over CMZ-2A/3.
- Complete 2-ft soil cover over the CMZ-4B soil on the ACW property
- Installation and implementation of steam-enhanced extraction (SEE) on CMZ-2A to remove all DNAPL and creosote stained soils.
- Installation and implementation of SEE on CMZ-2B to remove all DNAPL and creosote stained soils.
- Performance monitoring for effectiveness in OU2/CMZ-5/5-Yr Review.

5.0 Site Characteristics

5.1 Conceptual Site Model

The Conceptual Site Model (CSM) incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human and ecological receptors. In this way, it illustrates the physical, chemical, and biological relationships between contaminant sources and affected resources. Two CSMs were developed for the HHRA and Ecological Risk Assessment (ERA) and serve as the basis for interpretations of contaminant fate and transport and assessments of risk to human and ecological receptors. The HHRA CSM presented as **Figure 3** illustrates that the primary release mechanisms were spills/leaks and discharge of waste from former storage and treatment operations. Secondary release mechanisms include surface runoff and infiltration. Surface runoff resulted in spreading of contaminants to surface soil beyond the confines of the process area. Percolation of rainwater through contaminant source areas and other contaminated subsurface soils resulted in contaminants that leached into the subsurface soil. **Figure 4** illustrates the ERA CSM for potential terrestrial and aquatic receptor exposure scenarios associated with direct contact and/or ingestion of site-related contaminants due to stormwater runoff/erosion and overland flow/transport from the contaminated source to the former PYC Ditch and subsequent discharge to Pensacola Bay. In addition, contaminants that leach into shallow groundwater may discharge to Pensacola Bay.

The Site's CSMs show two major mechanisms for transportation of contamination from the Site to soil on off-facility properties; vehicular traffic and overland flow. The Site had two open creosote dipping ponds on the far western side of the facility. During large rainfall events, these dipping ponds would overflow south to Pensacola Bay. The water would eventually enter the former PYC ditch, leaving contamination on the surface soil between the former facility dipping ponds and the former PYC ditch. Figure 5 depicts the exposure area where overland flow from the facility contributed to off-site migration of dioxin and PAH contamination to surface soil in the adjacent properties.

Trucks leaving the facility would be loaded with creosote treated wood poles. These trucks would leave via the main entrance of South J Street driving down Pine Street or down J Street to get to Cypress Street with dirt and dust from the facility on them. Distribution of dioxin-contaminated soil is consistent with the route of vehicular traffic. Figure 6 shows the exposure area where vehicular and foot traffic on and off the former facility resulted in dioxin and PAH contamination transport into the neighboring community's surface soil (0-2 ft).

EPA had a congener evaluation performed by two different experts who were provided the dioxin data with no maps. The two experts agreed on all 40 data points that were site related except one. The pattern of dioxin concentrations that were Site related was a major factor in how the exposure units were formed.

All off-facility soil contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, the contaminated soil

is removed to attain a cleanup level for direct exposure based upon Florida's residential SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's residential SCTL, which is 7 ppt for dioxin.

5.2 Overview of the Site

The ACW Superfund Site is an inactive wood-treating facility that operated facility from 1902 until 1981 when the company filed for bankruptcy. The facility covers approximately 18 acres of land located approximately ¼-mile north of the confluence of Bayou Chico and Pensacola Bay (**Figure 2**). The facility is located in a moderately dense commercial and residential district.

5.2.1 Geologic, Hydrogeologic, and Topographic Information

Topography: The area surrounding the ACW facility is generally flat, with elevations ranging between 12 and 14 ft above mean sea level (amsl). The land slopes southward at about 25 ft per mile toward Pensacola Bay.

Geology/Hydrogeology: The groundwater in the vicinity of the Site contains three major aquifers: a shallow aquifer which is locally both confined and unconfined (the Sand-and-Gravel aquifer), and two deep confined aquifers (the upper and lower limestone of the Floridan aquifer). The Sand-and-Gravel aquifer a nd upper limestone of the Floridan aquifer are separated by a thick section of relatively impermeable clay called the Pensacola Clay. The Sand-and-Gravel aquifer is the only freshwater aquifer in central and southern Escambia County and is the public water supply source for the area, including the City of Pensacola.

The Sand-and-Gravel aquifer underlying the ACW facility is composed primarily of sand with many interbedded layers and lenses of clay and sandy clay. These clay layers and lenses range from less than one inch to approximately 38 ft in thickness. Based on characteristics of the sands in these areas, the water-bearing zones have been divided into two distinct strata; the Upper and Lower Sand (US and LS) units. The water-bearing US unit extends to a depth of approximately 25 ft below land surface (bls) and varies in grain size from fine to coarse.

The water-bearing LS unit (greater than 25 ft bls to a depth of about 200 ft) is predominantly a very dense sand, usually fine to medium grained, with variable amounts of silt. Discontinuous clay and sandy clay nodules and lenses occur throughout the deep sand. Clay lenses can form local confining beds; however, since the clay lenses at the Site are not continuous they do not prevent vertical migration of contamination.

Two principle clay formations exist in the water-bearing zone at the Site. One clay layer is directly under the former ACW waste ponds at a depth of about 100 ft bls. This clay has been shown to be continuous under this area, although it does pinch out south of the ACW facility. South of the ACW facility, a second extensive clay layer approximately 38 ft thick underlies the PYC property at a depth of about 20 ft bls and extends south to the Pensacola Bay. This second clay pinches out to the north before reaching the ACW facility.

The direction of groundwater flow is to the south and discharges to Pensacola Bay. The aquifer is recharged by local rainfall, with relatively high infiltration rates because of the sandy nature of

the aquifer and overlying soils. Annual recharge to the aquifer is up to 10 inches per year. Prior to 2011, portions of the shallow groundwater along with area storm water discharged into a drainage ditch on the PYC property which led to the mouth of the Bayou Chico and Pensacola Bay. Stormwater was rerouted by the City in 2011. Contaminated sediment in the PYC ditch was excavated and the ditch backfilled to ground surface in 2016.

5.2.2 Surface and Subsurface Features

During operations, four surface impoundments were located on the western portion of the ACW facility (**Figure 2**). The Main and Overflow ponds, located adjacent to L Street, were used for disposal of process wastes. During operations, ACW discharged liquid process wastes into the two unlined surface impoundments. Prior to 1970, waste water in these ponds was allowed to overflow through a spillway, flow through the streets and storm drains into a ditch on the PYC property into Bayou Chico and Pensacola Bay. In later years, liquid wastes were drawn off the larger lagoons and collected in the smaller Railroad Impoundment and Holding Pond or were spread out on the ground in designated "Spillage Areas" on the facility. Additional discharges occurred during periods of heavy rainfall and flooding when the ponds overflowed the containment dikes.

Several off-facility soil removal actions have been performed since 1999, with the excavated soil currently stockpiled on the ACW facility (approximately 35,000 CY). Most recently, approximately 4,000 CY of soil/sediments in the PYC ditch (to a maximum depth of 3 ft) were excavated in July 2016 and stockpiled at the ACW facility.

Currently, the ACW facility is secured by a perimeter fence. A building that previously housed the NAPL recovery and groundwater treatment system, an office building and several storage tanks exist on the western portion of the facility. Relict building foundations and previous removal action soil debris piles are located in the central portion of the former facility property.

5.3 Sampling Strategy

Multi-media sampling was guided by the CSMs that were refined as understanding of the Site increased over time. Samples were collected and evaluated to determine the nature and extent of soil, sediment, surface water and groundwater contamination, support assessment of risks, improve hydrogeologic understanding, and evaluate potential remedy alternatives and treatment options.

Surface and subsurface soil samples were collected in February 2010, January 2011, and October 2011 as part of three supplemental FS investigations. Samples were collected from the ACW facility, the PYC Ditch, and the Southeast Ditch and were analyzed for SVOCs, phenols, and dioxin/furans. Groundwater samples have been collected annually by EPA Region 4 SESD. The additional investigations also included visual screening for DNAPL using direct push technology (DPT) and completion of a Tar-specific Green Optical Screening Tool (TarGOST®) investigation.

5.4 Known or Suspected Sources of Contamination

The observed contamination at the Site is attributable to one or more of the following known or suspected sources:

- On-facility DAPL in the subsurface as a result of the waste lagoons and dipping ponds over many years of operation.
- Off-facility creosote in the subsurface as a result of the overflow through a drainage course into Bayou Chico and Pensacola Bay.
- On-facility soil contamination across the Site as a result of preserved wood storage prior to shipment off the Site by rail.
- On and off facility soil contamination as a result of previous discharges to, and overflow of the lagoons and ponds on the former ACW facility.
- On-facility dissolved groundwater contamination as a result of the NAPL in the subsurface.
- Off-facility dissolved groundwater contamination as a result off-facility NAPL in the subsurface soil due to overflow through a drainage course into Bayou Chico and Pensacola Bay.
- On an off facility dissolved groundwater contamination as a result of previous discharges to, and overflow of the lagoons and ponds on the former ACW facility.
- Off-facility dioxin soil contamination not related to previous operations at the ACW facility, such as: another wood treater point source (i.e., Pensacola Wood Treating Company); backyard burning of wood and/or trash; vehicle exhaust emissions; rail transport of treated wood along the former right-of-ways (ROWs) from the ACW facility and other facilities; house fires; and fireplaces.

The present and historical site-specific potential migration pathways and release mechanisms at the Site include:

- treated lumber storage on the former facility,
- holding and dipping ponds used in the wood treatment process,
- storm water drainage and runoff,
- rail transportation of treated lumber, and
- vehicular and foot traffic out of the facility.

5.5 Nature and Extent of Contamination

The Site was divided into CMZs in order to aid in the screening, evaluation and selection of the remedies. Remedial alternatives were developed for each CMZ that would be successful at meeting the RAOs and that meet the requirements of CERCLA and the National Contingency Plan (NCP). CMZs are generically defined as a medium, volume or area that has common characteristics which effect the remedial alternative selection. The dimensions and characteristics of a defined CMZ are essential parameters for selecting and comparing remedial alternatives because of their impact on remedial costs and technology feasibility. For example,

the depth of contamination, whether it is on or off the boundaries of the property, the presence of NAPL, the specific lithologic unit, and concentrations of specific chemicals of concern (COCs; e.g. dioxin) were the factors used in delineating the CMZs for the ACW Site. Five CMZs have been developed for the ACW Site. **Figure 7** illustrates the location of these zones.

CMZ-1 – Main Source Zone
This zone incorporates the western portion of the ACW facility property that is inclusive of the former impoundments and main process facilities. CMZ-1 was defined based on three characteristics:

1. Located entirely on the facility property;
2. High mass of contaminants as represented by a large volume of DNAPL and residual creosote, creosote-stained soil, and heavy creosote odors; and
3. Presence of a competent clay confining layer beneath the zone to a depth of 100 ft bls.

This CMZ was configured to represent the largest mass of significantly contaminated soil that could be practically isolated and confined. This zone has been well documented as the primary source area for the Site and has high volumes of NAPL. No surface obstructions are currently present in this zone. The lithology for this zone is predominantly sand, silty sand, some clay lenses and is underlain by approximately 10-ft of homogenous, low permeability clay at approximately 110 ft bls. CMZ-1 has creosote-impacted soil from 3 to 100 ft bls with an estimated volume of approximately 325,001 CY. This total volume includes 231,111 CY of DNAPL-saturated soil and 93,890 CY of creosote-stained soil.

CMZ-2A - Extended NAPL Contamination – On-facility
This CMZ lies immediately south and southeast of CMZ-1 and was defined based on four characteristics:

1. Located almost entirely on the ACW property;
2. High mass of contaminants as represented by a large volume of DNAPL and residual creosote, creosote-stained soil, and heavy creosote odors;
3. Deepest zone of NAPL contamination (e.g. 136 ft bls); and
4. The absence of a competent clay confining layer beneath the zone.

This CMZ was configured to represent the remaining DNAPL source area that is not underlain by a practical lithologic confining unit. CMZ-2A has also been well documented as a source area for the Site and has high volumes of NAPL. No surface obstructions are currently present in this zone. The lithology for CMZ-2A is similar to CMZ-1, but lacks the deeper clay confining unit found in CMZ-1. A lower permeability layer at approximately 25 ft bls was encountered in just the western portion of CMZ-2A. CMZ-2A has an estimated creosote-impacted soil volume of 158,791 CY. This total volume includes 130,347 CY of DNAPL-saturated soil and 28,444 CY of creosote-stained soil.

CMZ-2B Extended NAPL Plume – Off-facility
This CMZ represents the remaining areas of free-phase liquid and residual NAPL located entirely off-facility. The zone is based on three characteristics:

1. Located entirely off the former facility directly to the south;
2. High mass of contaminants as represented by a large volume of free-phase NAPL and residual creosote, creosote-stained soil, and heavy creosote odors located above the shallow clay layer (approximately 20 ft bls). This lithologic unit (shallow clay) is considered the vertical limit of contamination for CMZ-2B.
3. The locations of DNAPL are typically represented more as stringers than fully saturated lithologic layers.

This CMZ was configured to represent all off-facility source areas and is generally a shallow zone. Some deeper NAPL stringers were documented. These stringers may represent lateral movement under the lower permeability layer extending south from the CMZ-1 and CMZ-2A source areas. The bulk of NAPL impacts in CMZ-2B are attributed to the movement of contamination by storm water drainage along the former PYC drainage ditch. This zone represents the third greatest mass of contamination. A critical aspect of this CMZ is the presence of overlying buildings, roads, and utilities, along with its close proximity to Bayou Chico. CMZ 2B has a creosote-impacted soil volume of approximately 133,239 CY. This total volume includes an estimated 73,766 CY DNAPL-saturated soil and 59,473 CY creosote-stained soil from 3 to 60 ft bls.

CMZ-3 Secondary Source Zone/Adsorbed Phase Zone – On-facility/OU2
This CMZ represents on-facility contamination with lower levels of creosote impacted soil; e.g., NAPL stained soil or soil with moderate odors. The present CSM predicts that the soil contamination extends from less than 10 - 20 ft bls on the eastern portion of the former facility to approximately 60 ft bls in the central portion. CMZ-3 has NAPL stained soil as well as leachable soil concentrations of SVOCs, PCP, and dioxins. Additional PCP characterization will be performed in the RD on the western side of the PCP plume. No buildings or utilities exist in this zone. This zone represents the fourth greatest mass of contamination, predominantly in the adsorbed soil. CMZ-3 has a calculated volume of soil contamination of 262,224 CY. A 4-ft tall 35,000 CY stockpile of dioxin- and SVOC- contaminated soil and debris generated from previous off-facility excavations is present and encompasses a large portion of this zone.

CMZ-4A/4B On-facility/Off-facility Surface Soil Contamination
This CMZ represents the surface soil contamination on-facility (CMZ-4A) and off-facility residential (CMZ-4B). The primary COCs in these zones are dioxin and SVOCs (PAHs) in the soil from 0-3 ft on-facility and 0-2 ft off-facility.

Significant dioxin soil contamination is present on the former ACW property from 0 to 3 ft bls, with an estimated total volume of 86,429 CY. CMZ-4A comprises approximately 61,794 CY of the total volume of contaminated surficial soil on the former ACW property (excluding CMZ-1). The majority of surficial soils (minus the debris and stockpiles) have significant concentrations of dioxins and other SVOCs are considered PTW.

The total volume of off-facility residential contaminated surficial soil in CMZ-4B is approximately 53,617 CY (0-2 ft bls). In addition, there is off-facility surface soil in the Pine

Street and Gimble Street ROWs. This volume has been estimated at 9,208 CY and will be considered as PTW, because it exceeds the LDR.

OU2/CMZ-5 Extended Dissolved Groundwater Plume

CMZ-5 is analogous to OU2, the groundwater dissolved plume that extends beneath the Source Zones (CMZ-1, 2A, 2B), along the southern perimeter and downgradient of the Source Zones. While there are dissolved contaminate concentrations in groundwater in this zone; no NAPL stained soils or appreciable odors have been observed. The dissolved plume extends off-facility from the western portion of the former ACW property south towards Pensacola Bay and consists mostly of naphthalene, PCP, and lower levels of additional SVOCs (including methylnaphthalene, acenaphthene, methylphenol) and benzene. CMZ-5 extends to over 180 ft deep and encompasses a total of approximately 35 acres. Several buildings, roads, and utilities exist in this zone. The PCP plume is principally located on the eastern portion of the Site between the facility and the Bay. This PCP plume will be further investigated and delineated during the Remedial Design phase.

5.5.1 DNAPL/Creosote Contamination

Two zones of DNAPL have been identified under the former waste ponds, in the US unit at approximately 30 ft bls and also in the LS unit at 75 to 100 ft bls (**Figures 8 and 9**). Prior Site investigations indicated that DNAPL beneath the former facility waste ponds was limited to depths of 20 to 100 ft bls; however, in October 2011, DNAPL was observed at a depth of 136 ft bls as a thin stringer of creosote in an area immediately east of the former waste ponds. This is the deepest recorded observation of DNAPL at the Site. The lateral extent of observed DNAPL in the LS Unit is limited to within the facility boundaries (CMZ-1 and CMZ-2A). DNAPL in the US unit extends south along the pathway of the former PYC Ditch (CMZ-2B) to a depth of 49 ft bls **(Figure 8)**. DNAPL and DNAPL saturated soils are considered to be PTW. **Figures 8 and 9** identify the extent and vertical range of the DNAPL in the subsurface. The DNAPL extent was determined using a combination of TarGOST® data and soil boring logs.

5.5.2 Soil Contamination

CMZ-4 represents the surface soil contamination on-facility (CMZ-4A) and off-facility (CMZ-4B). The primary COCs in these zones are dioxin and SVOCs (PAHs) in the soil from 0-3 ft on-facility and 0-2 ft off-facility. Soil contamination does exist below 3 ft, the water table is encountered between 3- 5 ft bls, and impacted soils below the water table are considered an ongoing source for the dissolved contamination. SVOCs are measured using a benzo(a)pyrene (BaP) total equivalent (TEQ). Likewise, the numerous congeners of dioxin are measured using a dioxin total equivalent (dioxin TEQ). The most likely transport mechanisms for the soil contamination are: historical facility processes, overland flow, stormwater runoff, vehicular and foot traffic. Soil that exceeds LDRs are considered to be PTW.

5.5.3 Groundwater Contamination

Elevated levels of SVOCs (including naphthalene and carbazole), benzene, and PCP have been detected across the ACW Site. The deepest documented extent of naphthalene and PCP were detected in the 167-177 ft interval at monitoring well CW9 and in the 182-192 ft interval at monitoring well MW4. CW9 is located 900 ft south of the southern ACW facility boundary and

MW4 is located just southwest of the former waste ponds. The most likely transport mechanisms for the groundwater contamination are a result of the NAPL in the subsurface; overland flow, stormwater runoff, and historical facility processes.

6.0 Current and Potential Future Land and Water Uses

6.1 Land Uses

The former ACW facility is currently abandoned, and all structures associated with the past operations have been demolished. The Site has been fenced to prevent unauthorized access. The Site is located in a moderately densely populated commercial and residential district of Pensacola, Escambia County, Florida. As presented in **Figure 2,** the Site is primarily surrounded by residential areas to the south and west with commercial/industrial entities to the north and east.

Reasonably anticipated future land use of the Site is recreational. The City of Pensacola is planning to turn the property into a park. The properties surrounding the Site are expected to remain residential to the south and west with commercial/industrial entities to the north and east.

6.2 Ground and Surface Water Uses

The groundwater beneath the Site and surrounding area is classified as a potential drinking water aquifer (Class G-II) by the State of Florida. Therefore, the future final groundwater ROD will identify the selected remedy for OU2 and include the appropriate remedial action objectives and groundwater cleanup standards. Drinking water for the surrounding area is provided by the City of Pensacola and is drawn from the Sand-and-Gravel aquifer.

A potable well survey performed in 2011 identified no wells within the area of the Site plume. A well is known to exist at the Ice House, located a couple blocks upgradient to the north, but is not in use.

Most surface water drainage in the area is by overland sheet flow through the streets and storm drains south of the ACW facility into Bayou Chico/Pensacola Bay. Pensacola Bay is separated from the Gulf of Mexico by a long narrow island that forms a natural breakwater for the harbor (**Figure 1**).

7.0 Summary of Site Risks

The response action selected in this ROD is necessary to protect public health and the environment from actual or threatened releases of hazardous substances, contamination and pollutants into the environment. Baseline risks to human health and ecological receptors exposed to contaminants at the Site have been evaluated separately for OU1 (EBASCO, 1989), OU2 (Black & Veatch, 1993) and OU3 (Black & Veatch, 2009). In addition, an updated site wide HHRA (Black & Veatch, 2014) was prepared to support the site-wide FS and this ROD. All human health and ecological risk posed by PYC ditch was eliminated by the removal and backfilling of the ditch as documented in the Remedial Action Report dated September 14, 2016.

7.1 Summary of the Human Health Risk Assessment

Human health risks associated with the ACW Site have been evaluated in the following reports:

1. The OU1 1989 HHRA (EBASCO, 1989) evaluated the risks associated with surface soil at the ACW facility, in residential areas and in the PYC Ditch sediments.
2. The 1993 OU2 HHRA (Black & Veatch, 1993) evaluated risks associated with groundwater.
3. The 2009 OU3 HHRA (Black & Veatch, 2009) evaluated potential risks to human health due to exposure to dioxins and furans in off-site residential/industrial areas adjacent to the former ACW facility.
4. The Site Wide HHRA Addendum (Black & Veatch, 2014) updated the risks associated with the Site using the analytical data for soil, sediment and groundwater collected at the Site in 2007 through 2013 for all on- and off-facility affected areas.

A summary of the Site Wide HHRA Addendum is provided in the following subsections.

7.1.1 Identification of Chemicals of Concern

The Site Wide HHRA Addendum evaluated exposure to soil and groundwater based on data collected in 2007 through 2013. Data from previous investigations were not deemed acceptable for inclusion in the HHRA. In addition, sample data from media locations that no longer exist due to various removal actions were not included.

Positively identified chemicals were screened to identify COCs that are important in terms of potential human health effects. The screening was conducted in accordance with EPA Region 4 Human Health Risk Assessment Supplemental Guidance. The COCs identified in soil and groundwater at the Site are listed in **Table 1** and **Table 2**, respectively. The COCs include 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) TEQ, VOCs such as benzene, ethylbenzene and xylene, and SVOCs such as BaP TEQ, other PAHs, and PCP.

7.1.2 Exposure Assessment

Based on an understanding of the fate and transport properties of the contaminants, and the potential for human contact to soil/dry sediment and groundwater, the receptors evaluated included residents, industrial/commercial workers, and recreational users. **Figure 3** presents the CSM for the HHRA.

Potentially complete exposure pathways examined for the site were:

- Incidental ingestion of soil/dry sediment, inhalation of dust released from soil, and dermal contact with soil/dry sediment.
- Routes of exposure with groundwater included ingestion, dermal contact, and inhalation of vapors

Note that only the highest risks and hazards for exposures to soil and groundwater are presented in this summary as they justify implementation of the selected remedy. The risks and hazards associated with the other current and future receptors/media combinations can be found in the

HHRA. The soil and groundwater exposure point concentrations (EPCs) for the COCs were calculated in accordance with EPA Region 4 Human Health Risk Assessment Supplemental Guidance and are shown in **Tables 1 and 2**, respectively.

Human intakes were calculated for each COC and receptor using the EPCs. Estimates of human intake, expressed in terms of mass of chemical per unit body weight per time (milligrams per kilogram per day [mg/kg/day]), were calculated differently depending on whether the COC is a non-carcinogen or a carcinogen. For non-carcinogens, intake was averaged over the duration of exposure and is referred to as the average daily dose (ADD). For carcinogens, intake was averaged over the average lifespan of a person (70 years) and is referred to as the lifetime average daily dose (LADD). The Human Health Risk Assessment considered the contaminants of concern that act via a mutagenic mode of action and that cancer risks were estimated using age-dependent adjustment factors, that are consistent with cancer guidelines and supplemental guidance.

7.1.3 Toxicity Assessment

EPA toxicity assessments and the resultant toxicity criteria were used in the ACW HHRA Addendum to determine both carcinogenic and non-carcinogenic risks associated with each COC and route of exposure. EPA toxicity values that were used in the 2014 HHRA Addendum were:

- Chronic Reference Dose (RfD) and Reference Concentration (RfC) values for non-carcinogenic effects, and
- Oral Cancer Slope Factors (CSFs) and Inhalation Unit Risk (IUR) values for carcinogenic effects.

On Feb. 17, 2012, the EPA released the final non-cancer dioxin reassessment, and established a non-cancer toxicity value, or RfD, for dioxin in EPA's Integrated Risk Information System (IRIS) toxicological database. The dioxin RfD is used at Superfund sites to ensure protection of human health. The action level calculated using the new RfD of 0.7 picograms per kilogram-day (pg/kg-day) is 50 ppt dioxin TEQ for residential soil and 720 ppt dioxin TEQ for commercial / industrial soil. These dioxin levels are the risk-based acceptable levels for exposure to soil based on a hazard quotient (HQ) of 1 and are within EPA's acceptable cancer risk range of between one in 10,000 (1E-04) and one in a million (1E-06).

7.1.4 Risk Characterization

Risk characterization integrates the results of the exposure and toxicity assessments to estimate potential non-cancer hazards and cancer risks. To characterize the overall potential for non-carcinogenic effects associated with exposure to multiple chemicals, the EPA uses a HI approach. This approach assumes that simultaneous sub-threshold chronic exposures to multiple chemicals that affect the same target organ are additive and could result in an adverse health effect. The HI is calculated as follows:

$$HI = ADD1 / RfD1 + ADD2 / RfD2 + ... ADDi / RfDi$$

where:

ADDi = Average Daily Dose for the ith toxicant
RfDi = RfD for the ith toxicant

The term ADDi/RfDi is referred to as the hazard quotient.

Calculation of an HI in excess of unity indicates the potential for adverse health effects. Indices greater than one are generated when intake for any of the COCs exceeds its RfD or RfC. However, given a sufficient number of chemicals under consideration, it is also possible to generate an HI greater than one even if none of the individual chemical intakes exceeds its respective RfD or RfC.

Carcinogenic risk is expressed as a probability of developing cancer as a result of lifetime exposure. For a given chemical and route of exposure, excess lifetime cancer risk is calculated as follows:

$$\text{Risk} = \text{LADD} \times \text{CSF}$$

These risks are probabilities that are generally expressed in scientific notation (e.g., 1E-06). An excess lifetime cancer risk (ELCR) of 1E-06 indicates that, as a plausible upper-bound, an individual has a one-in-one-million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at the Site. For exposures to multiple carcinogens, the EPA assumes that the risk associated with multiple exposures is equivalent to the sum of their individual risks. Increased cancer risks less than 1E-06 indicate no action is required. Cancer risks between 1E-06 and 1E-04 generally do not warrant cleanup unless dictated by site-specific circumstances or other considerations. Increased cancer risks greater than 1E-04 indicate some type of action needs to be considered.

The results of the HHRA for soil and groundwater at the ACW Site indicate that residential, industrial/ commercial worker, and recreational exposures result in unacceptable cancer risks and non-cancer hazards (see **Tables 3 through 10**).

As presented in **Table 3**, excess cancer risks exceeding 1E-04 were calculated for current/future residents exposed to the COCs in surface soil/sediment at the off-site residential area at SS114 (2.0E-04) and the ROW (1.2E-03). Excess cancer risks exceeding 1E-04 were also calculated for current/future industrial/commercial workers (**Table 5**) exposed to on site surface soil (2.7E-04); and current/future recreational users (**Table 7**) exposed to on site surface soil (2.7E-04).

As presented in **Table 4**, non-cancer hazard indices greater than one were calculated for the current/future child resident exposed to the COCs in surface soil/sediment at the off-site residential areas at SS119, SS121, SS145 (HIs ranging from 1 to 3), the PYC Area (HI=3), the ROW (HI=85), the Industrial Area West (HI=3), and the Industrial Area North (HI=3). Non-cancer hazard indices greater than one were also calculated for current/future industrial/commercial workers (**Table 6**) and recreational users (**Table 8**) exposed to on site surface soil (HIs of 6 and 13, respectively). The critical target organ of concern associated with all hazard threshold exceedances is the reproductive system.

As presented in **Table 9**, excess cancer risks exceeding 1E-04 were calculated for future residents exposed to the COCs in shallow groundwater (4.1E-02), intermediate groundwater (3.8E-02), and deep groundwater (1.7E-02). As presented in **Table 10**, non-cancer hazard indices greater than one were calculated for future residents exposed to the COCs in shallow groundwater (982), intermediate groundwater (958), and deep groundwater (430). The critical target organs of concern include effects on the liver, blood, kidney, body weight, motor coordination, growth and body fat, lethargy and prostration, as well as effects of the reproductive, respiratory and central nervous systems.

The results of the HHRA for soil/sediment and groundwater at the ACW Site indicate that residential, industrial/commercial, and recreational exposures result in unacceptable cancer risks and non-cancer hazards. Therefore, action under CERCLA is warranted. The COCs and a range of cleanup goals for soil/sediment and groundwater at the ACW Site are listed in **Tables 11 and 12.**

7.1.5 Uncertainties

The calculations presented in the HHRA are meant to assist the EPA remedial project manager with information on which to base risk management decisions. A combination of site-specific exposure information, standard default assumptions, and professional judgment were used to select exposure units and develop exposure assumptions for the various receptors evaluated in the HHRA. For each of these exposure assumptions (or exposure parameters) a single numerical value (or point estimate) is selected from the range of possible values for a given parameter. For example, an exposure frequency of 350 days per year was used to represent the number of days spent at home each year for the residential scenario evaluated in the HHRA. As shown in this example, all the point estimate values are chosen so as not to underestimate potential exposures. When these point estimates are combined in a risk equation, the result is conservative and is likely to overestimate hazards and risks.

An uncertainty evaluation was conducted using a Probabilistic Risk Assessment (PRA) that evaluated residential exposures to TCDD in soil at the ACW Site to characterize the variability and uncertainty in the HHRA risk estimates and to assist with the development of a technically defensible and health-protective target concentration. A PRA is a mathematical technique that incorporates information on the full range and likelihood of possible values for one or more exposure parameter (e.g., body weight) in a risk equation, rather than a single value. For example, exposure parameters in a PRA are mathematically defined by a "probability distribution" that is based on a central tendency value (e.g., mean or median) and at least one other value that provides information on the spread of the values in the distribution (e.g., standard deviation or upper percentile). In a PRA, the risk equation is "solved" thousands of times, each time a new value is selected for each parameter based on its underlying probability distribution. The output of a PRA is a probability distribution of risks experienced by the receptors.

The PRA-based uncertainty evaluation resulted in a TCDD concentration of 37 nanograms per kilogram (ng/kg) in residential soil, which represents an ELCR of 1E-06 at the 90th percentile of the final exposure/risk distribution. This PRA-based TCDD soil target concentration can be

compared to EPA's default risk-based RGO of 50 ng/kg (which corresponds to a non-cancer Hazard Quotient of 1 and an ELCR of approximately 1E-05), and to FDEP's default SCTL of 7 ng/kg (which corresponds to an ELCR of 1E-06). FDEP also performed a site-specific bioavailability study on ACW's dioxin. The result of this site-specific dioxin study showed the relative bioavailability of dioxin in soil was 59 percent (%). FDEP replaced its standard SCTL assumption on bioavailability in its deterministic formula to calculate a SCTL with this site-specific bioavailability value. This resulted in a site-specific residential soil FDEP cleanup number of 15 ng/kg. The reason for including these numbers in the uncertainty section is only for information purposes to demonstrate that other suggested cleanup values can be calculated using additional site specific information that, like the default SCTLs, also achieve a 10-6 risk level. This number along with EPA's probabilistic value discussed in the section indicate a broader range of cleanup values beyond 7 ppt that are still protective for residents.

It is important to note that several conservative assumptions were retained in the development of probability distributions to maintain a high level of confidence that the selected SCTL cleanup goal is protective of human health, including sensitive subpopulations. A recent literature review and data analysis conducted on behalf of the EPA indicates that the relative bioavailability of dioxin may be considerably less than 100% (Syracuse Research Corporation [SRC], 2010). If bioavailability was incorporated into this analysis, it would likely result in an incremental increase in the PRA-based soil target concentration developed for TCDD. All EPA calculations used 100% relative bioavailability.

7.2 Summary of the Ecological Risk Assessment

The potential impact of ACW related contaminants on ecological receptors has been evaluated in three separate ERAs. Environmental impacts associated with the transport of contaminants from the Site (erosion of site soil and movement of contaminants via overland flow and groundwater into Pensacola Bay) were evaluated as part of the risk assessment for OU1 in 1989. An evaluation of the potential risks to terrestrial and aquatic receptors associated with contaminated soil and groundwater was included in the risk assessment for OU2 in 1993. In addition, an ERA was conducted for OU3 in 2009, and included an evaluation of the potential risk to ecological receptors associated with exposure to dioxins and furans in the offsite commercial/residential areas at the Site.

7.2.1 Problem Formulation

The CSM developed for the ERA is presented in **Figure 4**. The chemicals of potential ecological concern include PAHs and dioxins/furans in soils and sediments. The chemicals of potential ecological concern in groundwater include dioxins/furans, VOCs, and SVOCs. The primary contaminant transport mechanisms at the site are: 1) erosion and runoff from source areas to Pensacola Bay; and 2) leaching of contaminants into shallow groundwater that may discharge to Pensacola Bay.

The ACW Site and offsite area consist of two major types of ecosystems (terrestrial and aquatic). There are two terrestrial habitats at the Site. The first habitat consists of grasslands or field areas over the majority of the center of the Site. To the east and south of the Site the second habitat consists of a wooded or forested area. Aquatic habitat does not exist on the ACW site; however,

offsite aquatic habitats located in Pensacola Bay may be impacted by the movement of contaminants from the Site. Exposure routes to ecological receptors in these habitats are direct contact with contaminated soil, sediments and surface water, and bioaccumulation through the food web. Because several PAHs and dioxins/furans are readily transferred through the food web, the evaluation considered potential effects to upper-trophic level mammals and birds that ingest contaminated prey from the Site.

The assessment endpoints (ecological resources to be protected) selected for the ACW site are:

- Protection of soil organisms and terrestrial wildlife.
- Protection of aquatic life in the Pensacola Bay

Site data and/or measurement endpoints needed to evaluate ecological risks to the above assessment endpoints included:

- Use of existing soil screening levels and/or benchmarks to assess exposure and risks to terrestrial wildlife.
- Use of existing water quality standards and/or benchmarks and sediment quality values to assess exposure and risks to aquatic life.

7.2.2 Risks to Terrestrial Receptors

The Site is located in an urban residential and light industrial/commercial setting adjacent to Pensacola Bay. There are no unique terrestrial habitats or open-space lands of suitable size within or near the area. The Site is approximately 3 miles from several state and national preserve areas. Seventeen wildlife species which are either state or national endangered or threatened species are found in the ACW area; however, none of these species have been documented on-site. Ecological receptors in this area consist primarily of urban-tolerant song birds, a few gulls, and small rodents such as mice. Neighborhood dogs and cats are common.

There are no site-specific terrestrial toxicity test data available for this Site. The residual dioxin concentrations that exist across most of the Site are quite low and would not constitute an adverse risk to local wildlife. Based on EPA's Soil Screening Level (SSL) for PAHs, there are a few isolated locations where BaP TEQ concentrations exceed the Eco SSL for high molecular weight PAHs. However, the residual concentrations of PAHs across most of the Site are less than the SSL and would not constitute an adverse risk to local wildlife.

7.2.3 Risks to Aquatic Receptors

Aquatic receptors are not present on the ACW Site. There currently is no pathway from the Site to nearby Pensacola Bay, which does support a variety of reptiles, fish, mammals, crustaceans, mollusks, insects, and plants.

For the Bay, an ecological risk evaluation was performed by the EPA Science Ecosystem Support Division (SESD) in February 2010 that evaluated the sediment, pore water and surface water samples at the site. That study reviewed 13 different sampling locations in Bayou Chico, Pensacola Bay and PYC Ditch and found there is minimal risk from dioxin/furans to mammals

and birds in this area, which were considered to be the most sensitive receptors to the dioxins. The low dioxin concentrations and the small level of exceedences over the mammalian screening value as reported for Bayou Chico and Pensacola Bay samples is not likely to cause significant adverse effects to mammalian (or avian or aquatic) receptors, especially because it has been stated that the sediments in the shoreline areas are "mucky". This implies a fairly high organic matter content, which would serve to make the residual dioxins in the sediment less bioavailable. Given that the risk assessment performed for the Bay found no unacceptable risk to ecological receptors for the aquatic areas, and the remedial actions planned for the terrestrial areas, the Region believes ecological risk has been adequately addressed for this site.

Contaminated shallow groundwater flows south toward Pensacola Bay. There are no site-specific aquatic toxicity test data available for this Site. Information on the effects of several chemicals detected in the groundwater to various aquatic receptors was unavailable. TCDD is reported to cause mortality in fish at 2.3 ppm. Benzene, carbon disulfide, styrene, trichlorobenzene, and xylene are known to be highly toxic to aquatic life.

Maximum concentrations of chemicals detected in the shallow groundwater exceed Florida Marine surface water quality criteria for Class 3 Marine Surface Water (Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife). However, the impact of the shallow aquifer on aquatic life in Pensacola Bay is likely to be minimal because of the low flow volumes to the Bay, tidal mixing, continued infiltration of precipitation, and the current low level of contamination of the shallow aquifer south of the Site near the point of discharge to the Bay.

7.2.4 Summary

The potential for ecological risk associated with the ACW Site was evaluated for both terrestrial and aquatic receptors. The residual concentrations of dioxins and PAHs in soil across most of the ACW Site and offsite area are not expected to result in an adverse risk to terrestrial wildlife. Concentrations of chemicals detected in the shallow groundwater may discharge to Pensacola Bay. The impact of the shallow aquifer on aquatic life in the bay is likely to be minimal mainly due to low water volumes and extensive tidal mixing.

8.0 Remedial Action Objectives

To satisfy requirements of CERCLA and based on previous Site investigations, Remedial Action Objectives (RAOs) have been developed for the Site. The RAOs were developed to protect human health and the environment. The objectives specify the contaminants and media of concern, the exposure route(s) and receptor(s), and the acceptable contaminant levels or range of levels for each exposure route. The following Site-specific RAOs were developed for the ACW Site:

- Prevent human (adult and child resident) exposure (ingestion, inhalation, dermal) to site-related contaminated soil at concentrations above regulatory direct exposure contaminant levels.
- Prevent ingestion of groundwater that contains concentrations of compounds representing a total excess cancer risk greater than 10-6, a non-carcinogenic HI greater than 1, or

concentrations which exceed Federal and State Applicable or Relevant and Appropriate Requirements (ARARs).

- Reduce or eliminate the long-term leachability of soil COCs into the groundwater.
- Provide protection of marine surface waters from migration of contaminated groundwater into Pensacola Bay/Bayou Chico.
- Reduce residual and free-phase NAPL materials to the maximum extent practicable.

8.1 Cleanup Levels

EPA has adopted the remedial goals (PRGs) identified in the Proposed Plan as the final cleanup levels. PRGs are the concentrations for individual COCs in the distinct media above, which must be achieved in order for the remedy to achieve RAOs. The PRGs for the ACW Site were developed during the FS and are based on specific chemical-based ARARs and risk evaluations. The cleanup levels for the COCs at the Site are provided in **Tables 11**.

Soil cleanup levels were determined for the soil COCs in consideration of Florida's CTLs for residential and commercial/industrial exposure scenarios.

Groundwater PRGs are provided in **Table 12**. Groundwater cleanup levels will be determined once a final remedy is selected for the ACW site.

9.0 Description of Alternatives

9.1 Description of the Main Source Zone (CMZ-1) Remedy Alternatives

The five remedial alternatives developed for CMZ-1 are:

9.1.1 CMZ-1 Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual Operation and Maintenance (O&M) Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

Section 300.430(e)(6) of the NCP directs that a "No Action Alternative" be evaluated to provide a baseline scenario to compare all other alternatives against. The No Action Alternative can typically only include compliance monitoring. In general, the alternative is applicable when there is no current or potential threat to human health and the environment or when CERCLA exclusions preclude taking an action. Under No Action Alternatives, no funds are expended for control or remediation of the contaminated media. Funds are required for the statutory FYRs of the Site for Site visits, minimal compliance sampling and analyses of select contaminated media, review of regulatory changes, and report preparation.

This CMZ would remain in its present condition. Minimal periodic sampling and analysis of COCs in surface water, sediments, or soil would be used to track contaminant concentrations

over the course of a 30-year monitoring period. This information will facilitate evaluation of the conditions at the CMZ for the FYR.

9.1.2 CMZ-1 Alternative 2: Barrier Wall Containment and Cap

Estimated Capital Costs: $4,822,503
Estimated Annual O&M Costs: $12,000
Estimated Present Worth Costs: $5,067,800
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

Alternative CMZ-1 #2 consists of constructing a barrier wall to completely surround the CMZ-1 zone, extending from the ground surface down to and keyed into the underlying continuous clay layer approximately 100 ft bls. At the surface, the entire area will be covered with a geosynthetic clay layer (GCL), low density polyethylene (LDPE) or high density polyethylene (HDPE) liner, or a combination of these to contain the PTW and with a 2-foot clean layer of fill on top that is vegetated cover to prevent rainwater from infiltrating into the containment system. The alternative would contain the primary source of contamination at the site including DNAPL, residual DNAPL and creosote contaminated statured soils.

9.1.3 CMZ-1 Alternative 3: Surfactant Enhanced Aquifer Remediation with multi-phase extraction (MPE); ISCO/ISEB

Estimated Capital Costs: $36,254,769
Estimated Annual O&M Costs: $343,900
Estimated Present Worth Costs: $38,143,500
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 years

Alternative CMZ-1 #3 includes surfactant enhanced aquifer remediation (SEAR) with a NAPL recovery system to remove creosote directly from the saturated soil. The NAPL would be separated from the extracted NAPL/groundwater for subsequent recycling. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.1.4 CMZ-1 Alternative 4: SEE; ISCO/ISEB

Estimated Capital Costs: $23,296,431
Estimated Annual O&M Costs: $343,900
Estimated Present Worth Costs: $25,185,200
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 years

Alternative CMZ-1 #4 includes the combination of thermal-enhanced NAPL recovery using steam stripping with an overlapping multiphase extraction (MPE) capture zone. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.1.5 CMZ-1 Alternative 5: Solidification/Stabilization (S/S) with Large Diameter Augers (LDA); SEE (Deep); ISCO/ISEB

Estimated Capital Costs: $27,562,410
Estimated Annual O&M Costs: $343,900
Estimated Present Worth Costs: $29,451,100
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 years

Alternative CMZ-1 #5 consists of an in situ treatment scenario using LDAs for soil mixing and stabilization with a cement slurry followed by the application of SEE for deeper soil that cannot be cost effectively stabilized with the LDA method. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.2 Description of the Extended NAPL Plume – On-facility (CMZ-2A) Remedy Alternatives

The four remedial alternatives developed for CMZ-2A are:

9.2.1 CMZ-2A Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

This remedy is analogous to the No Action Alternative CMZ-1.

9.2.2 CMZ-2A Alternative 2: SEAR with MPE

Estimated Capital Costs: $18,270,358
Estimated Annual O&M Costs: $214,600
Estimated Present Worth Costs: $18,555,800
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 7 years

Alternative CMZ-2A #2 consists of an application of SEAR for NAPL recovery, equivalent to the approach outlined for CMZ-1, Alternative #3. SEAR would be applied to the DNAPL-impacted soil.

9.2.3 CMZ-2A Alternative 3: SEE

Estimated Capital Costs: $10,993,334
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $10,993,300
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 1 year

Alternative CMZ-2A #3 includes thermal-enhanced NAPL recovery using SEE steam stripping with an overlapping MPE capture zone. SEE would be applied to the DNAPL and creosote-impacted soil.

9.2.4 CMZ-2A Alternative 4: S/S with LDA; SEE (Deep)

Estimated Capital Costs: $13,307,320
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $13,307,300
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 months

Alternative CMZ-2A #4 is an in situ treatment scenario which includes soil mixing and stabilization with a cement slurry followed by the application of SEE for deeper soil that cannot be cost effectively stabilized by the LDA method.

9.3 Description of the Extended NAPL Plume – Off-facility (CMZ-2B) Remedy Alternatives

The four remedial alternatives developed for CMZ-2B are:

9.3.1 CMZ-2B Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-2B No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.3.2 CMZ-2B Alternative 2: SEAR with MPE

Estimated Capital Costs: $6,551,780
Estimated Annual O&M Costs: $214,600
Estimated Present Worth Costs: $7,329,000
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 4 years

Alternative CMZ-2B #2 consists of the application of SEAR for NAPL recovery equivalent to the approach outlined for CMZ-1, Alternative #3. SEAR would be applied to the shallow creosote impacted soil. The recovered DNAPL will be contained and shipped off for total destruction at concrete kiln. The groundwater will be treated onsite and discharged to an onsite infiltration gallery.

9.3.3 CMZ-2B Alternative 3: SEE

Estimated Capital Costs: $5,002,200

Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $5,002,200
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 1 year

Alternative CMZ-2B #3 includes thermal-enhanced NAPL recovery using SEE steam stripping with an overlapping multiphase extraction capture zone. SEE would be applied to the DNAPL and creosote-impacted soil. The recovered DNAPL will be contained and shipped off for total destruction at concrete kiln. The groundwater will be treated onsite and discharged to an onsite infiltration gallery.

9.3.4 CMZ-2B Alternative 4: S/S with LDA; ISCO

Estimated Capital Costs: $3,718,915
Estimated Annual O&M Costs: $214,600
Estimated Present Worth Costs: $4,469,200
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 2 years

Alternative CMZ-2B #4 includes an in situ treatment scenario, which includes S/S for shallow soil impacts. S/S would be applied to the creosote-impacted soil to a depth of 20-ft. Areas not accessible by LDA (roads, buildings, and utilities) would be addressed with ISCO.

9.4 Description of the Secondary Source Zone/Adsorbed Phase Zone – On-facility (CMZ-3) Remedy Alternatives

The four remedial alternatives developed for CMZ-3 are:

9.4.1 CMZ-3 Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-3 No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.4.2 CMZ-3 Alternative 2: ISCO/ISEB Barriers

Capital Costs: $2,731,942
Estimated Annual O&M Costs: $125,000
Estimated Present Worth Costs: $3,182,200
Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs/Cleanup Levels: 6 years

This alternative includes an upgradient ISEB treatment zone to be installed along the northern CMZ-3 boundary and combined ISCO/ISEB treatment barrier along the southern edge of

CMZ-3.

9.4.3 CMZ-3 Alternative 3: S/S with Shallow Soil Mixing (SSM); ISCO/ISEB

Capital Costs: $8,891,262
Estimated Annual O&M Costs: $125,000
Estimated Present Worth Costs: $9,341,500
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 6 years

This alternative includes an in situ treatment which includes S/S for shallow soil impacts. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.4.4 CMZ-3 Alternative 4: ISEB

Capital Costs: $2,076,531
Estimated Annual O&M Costs: $85,000
Estimated Present Worth Costs: $2,566,000
Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs/Cleanup Levels: 6 years

This alternative includes an upgradient ISEB treatment zone that would be installed along the northern CMZ-3 boundary along with a second barrier to be deployed across the center of the CMZ-3 area.

9.5 Description of the On-facility Surface Soil Contamination (CMZ-4A) Remedy Alternatives

The five remedial alternatives developed for CMZ-4A are:

9.5.1 CMZ-4A Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-4A No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.5.2 CMZ-4A Alternative 2: Excavation, Encapsulate On-Facility in Barrier Wall (CMZ-1)

Capital Costs: $2,005,471
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $2,005,500
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve RAOs/Cleanup Levels: 8 months

This alternative includes excavation of all unsaturated contaminated surficial soil on the former facility in CMZ-2A and CMZ-3 from 0 to 3-ft bls. These CMZ-4A soils with the exception of soils that currently overlay CMZ-3 would be placed inside the CMZ-1 Alternative #2 barrier wall and capped for long-term isolation. The CMZ-4A soils overlying CMZ-3 will be placed within an encapsulated cell within CMZ-3. At the surface, the entire on-facility area (excluding CMZ-1) will be covered with a multi-component cover consisting of 18 inches of clean fill, 6 inches of enriched soil and then hydro seeding.

9.5.3 CMZ-4A Alternative 3: Excavation with Off-facility Incineration

Capital Costs: $44,431,853
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $44,431,900
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve RAOs/Cleanup Levels: 8 months

This alternative includes excavation of all the soil on the ACW property from 0-3 ft bls, from CMZs-1, 2A, and 3 with transport and treatment by incineration at a Texas-based facility. Excavated areas would be used as capacity for depositing the CMZ-4B residential soil and/or be graded to land surface with clean fill, enriched soil, and hydro seeded.

9.5.4 CMZ-4A Alternative 4: Excavation, *Ex situ* S/S, Place On-facility

Capital Costs: $8,155,458
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $8,155,500
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 months

Excavated soil from CMZ-1, -2A, and -3 would be solidified in an aboveground pug mill. Soil processing would include excavation, screening, cement reagent addition and transport by dump truck to various locations on the property for emplacement by a bulldozer. The treated soil would be covered with a nominal 2-ft soil/sod cover.

9.5.5 CMZ-4A Alternative 5: *In situ* S/S

Capital Costs: $6,602,394
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $6,602,400
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 months

This remedy is an in situ treatment scenario using Shallow Soil Mixing (SSM) to stabilize the contaminated surface soil from 0-3 ft bls in CMZ-1, 2A, and 3. A 2-ft clean fill cover, followed by hydro seeding would be placed over the soil to protect the stabilized soil and to prevent direct contact exposure with the soil.

9.6 Description of the Off-facility Surface Soil Contamination (CMZ-4B) Remedy Alternatives

The five remedial alternatives developed for CMZ-4B are:

9.6.1 CMZ-4B Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-4B No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.6.2 CMZ-4B Alternative 2: Encapsulate On-facility in Barrier Wall (CMZ-1)

Capital Costs: $4,949,989
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $4,950,000
Estimated Construction Timeframe: 12-18 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative includes excavation of all unsaturated contaminated residential surficial soil from off-facility at depths ranging from 6 inches to a maximum depth of 3-ft bls (top of the average water table), plus excavation of the 35,000 CY stockpile. The excavated soil would be placed inside the CMZ-1 Alternative #2 barrier wall and capped for long-term isolation. At the surface, the entire area would be covered with a multi-component cover consisting of 18 inches of clean fill, 6 inches of enriched soil and then hydro seeding.

9.6.3 CMZ-4B Alternative 3a: Excavation, Off-facility Disposal to Subtitle D Landfill

Capital Costs: $10,507,439
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $10,507,400
Estimated Construction Timeframe: 12-18 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative consists of excavation of the surficial soil from the neighborhood, plus the 35,000 CY stockpile with subsequent transportation and disposal to a local Subtitle D landfill.

9.6.4 CMZ-4B Alternative 3b: Excavation, Off-facility Disposal at Escambia Wood Treating Company (ETC) Superfund Site

Capital Costs: $4,975,193
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $4,975,200
Estimated Construction Timeframe: 12-18 months

Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative consists of excavation of the same volume of surficial soil as in Alternative #3a with subsequent transportation and disposal of the soil in an engineered vault at the ETC Superfund Site, 5-miles north of ACW in Pensacola, FL.

9.6.5 CMZ-4B Alternative 4: Excavation/Disposal On-facility Over CMZ-2A/3 Areas

Capital Costs: $5,426,436
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $5,426,400
Estimated Construction Timeframe: 12-18 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative is identical to CMZ-4B Alternative #2, except that the off-facility soil along with the 35,000 CY stockpile would be placed over the CMZ-2A and CMZ-3 areas for long term isolation. PTW soils on Pine and Gimble Street would be brought onsite and placed within the CMZ-1 containment unit. At the surface, the entire CMZ-2A and CMZ-3 areas will be covered with a protective soil cover.

9.7 Description of the Extended Dissolved Groundwater Plume (CMZ-5) Remedy Alternatives

The three remedial alternatives developed for CMZ-5 are:

9.7.1 CMZ-5 Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-5 No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.7.2 CMZ-5 Alternative 2: Hydraulic Containment

Capital Costs: $266,459
Estimated Annual O&M Costs: $194,560
Estimated Annual Groundwater Sampling Costs: $141,500
Estimated Present Worth Costs: $3,289,300
Estimated Construction Timeframe: 8 months

Estimated Time to Achieve RAOs/Cleanup Levels: 15 years*
* Because this is an interim remedy, the timeframe is estimated.

This alternative would rely upon the use of a series of groundwater recovery wells to intercept the downgradient dissolved SVOC and PCP contaminant plumes. Recovered groundwater would be conveyed to the facility for treatment and subsequent discharge to on-facility infiltration galleries.

9.7.3 CMZ-5 Alternative 3: ISCO/ISEB Treatment Barrier

Capital Costs: $926,521
Estimated Annual O&M Costs: $150,300
Estimated Annual Groundwater Sampling Costs: $141,500
Estimated Present Worth Costs: $3,409,300
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve RAOs/Cleanup Levels: 10 years*
* Because this is an interim remedy, the timeframe is estimated.

This alternative is an extension of CMZ-3 Alternative #2 (ISCO/ISEB Barriers). An additional ISCO/ISEB treatment barrier would be installed along the Pensacola Bay shoreline to protect the Bay.

9.8 Common Elements of Each Alternative

With the exception of Alternative 1: No Action, all of the individual alternatives evaluated would include; (1) institutional controls (ICs) to restrict access and land use to prohibit intrusive activities below 2-ft, and (2) periodic monitoring of the Site to document the effectiveness and continued protectiveness of the remedy. Since these components are common elements of all alternatives, they are described at this point in the document to prevent repetition, and are not included under each remedial alternative description in the following section. The costs of these common elements are included in the remedy cost estimates.

9.8.1 Institutional Controls

ICs will be required for all the alternatives since waste will remain in place. The following generally describes those ICs to be considered for implementation at the Site to achieve the performance objectives:

- Prohibit intrusive activities in the area of the barrier wall and cap to be installed as stated for the Selected Remedy
- Property record notices could be implemented to inform anyone performing a search of property records to important information about contamination and response actions on the Site.
- Restrictive covenants could be executed by the property owners that outline the prohibition of any residential, industrial, or recreational reuse of the property unless prior written approval is obtained from EPA and FDEP. The covenant could also prohibit interference with the integrity of any existing or future monitoring or remediation system without prior EPA and FDEP approval. Notice of the application of ICs to the Site via the restrictive covenant would be provided to the local regulatory agencies.
- Regulatory restrictions including Chapter 62-524, F.A.C., "Delineated Areas rule."

Should any IC fail, EPA and FDEP will ensure that appropriate actions are taken to reestablish the remedy's protectiveness.

9.9 Distinguishing Features of Each Alternative

The following chart lists the advantages and disadvantages of each of the alternatives.

Criteria	Analysis	
Alternative: No Action for all Alternatives		**All**
Advantages	• Low cost, no site disruption	
Disadvantages	• Site would remain in current condition, no additive protection of human health and the environment • The potential for ingestion or direct contact with deeper contaminated soil would remain	
CMZ-1 Alternative #2: Barrier Wall Containment with Cap		**CMZ-1**
Advantages	• Common construction practice on CERCLA sites • Eliminates direct contact hazard • Cap prevents flushing and recharged leaching • Implementation in less than one year	
Disadvantages	• Containment and isolation only, no reduction of toxicity and volume through treatment • Potential for slow leaching of dissolved COCs through wall via diffusion • Potential for transport or leaching through inconsistencies in basal clay • French drain may be required to redirect aquifer flow around barrier • Hydraulic control system may be required within barrier w/ long term intermittent operation	
CMZ-1 Alternative #3: SEAR w/MPE; ISCO/ISEB		**CMZ-1**
Advantages	• SEAR greatly accelerates NAPL removal rates and quantity • Implementation in less than one year • Can use existing NAPL recovery wells (with additional wells) • MPE provides strong hydraulic controls • Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Offers a high degree of operational flexibility to optimize treatment • Both ISCO/ISEB will be effective in predominantly sandy lithology • Well proven technologies for wood treating sites • ISCO/ISEB Particularly compatible with *in situ* thermal enhancement	
Disadvantages	• High volume of surfactant chemical required in CMZ-1 • Potential for COC dissolved mobilization, even vertically • Complex chemistry highly dependent upon bench and pilot scale testing • Treatment of extracted groundwater is complex and costly • Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants • Appreciable residual NAPL would consume large volumes of oxidant • Potentially longer timeframe for ISEB treatment • ISEB is less certain with PCP contamination	
CMZ-1 Alternative #4: SEE; ISCO/ISEB		**CMZ-1**

Criteria		Analysis
Advantages		◦ Greatly accelerates NAPL removal rates and quantity ◦ High mass reduction efficiency rates (typically greater than 90-95 percent). ◦ Implementation in less than one year ◦ Can use existing NAPL recovery wells (with additions) ◦ SEE reduces leachability of residual COCs ◦ SEE enhances aerobic bioremediation on periphery ◦ SEE complimentary with ISCO/ISEB approaches ◦ Combination of ISCO and ISEB are amenable to COCs (except dioxin) ◦ Offers a high degree of operational flexibility to optimize treatment ◦ Both ISCO/ISEB will be effective in predominantly sandy lithology ◦ Well proven technologies for wood treating sites ◦ ISCO/ISEB particularly compatible with *in situ* thermal enhancement
Disadvantages		◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Treatment of extracted groundwater and vapors is extensive and costly ◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants ◦ Appreciable residual NAPL would consume large volumes of oxidant ◦ ISCO/ISEB application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested ◦ Potentially longer timeframe for ISEB treatment ◦ ISEB is less certain with PCP contamination
CMZ-1 Alternative #5: S/S with LDA and SEE (Deep); ISCO/ISEB		**CMZ-1**
Advantages	S/S	◦ S/S should effectively bind NAPL and prevent significant leachate. ◦ Successfully applied at other sites ◦ Lower vapor phase emissions to be treated ◦ No chance of increased mobilization; not lithology dependent ◦ Can easily bind residual dioxin levels ◦ Good soil bearing capacity for future land development ◦ Rapid application (less than a year)
	SEE	◦ Greatly accelerates NAPL removal rates and quantity ◦ High mass reduction efficiency rates (typically greater than 90-95 percent) ◦ Implementation in less than one year ◦ Can use existing NAPL recovery wells (with additions) ◦ Reduces leachability of residual COCs ◦ Enhances aerobic bioremediation on periphery ◦ Complimentary with ISCO and ISEB approaches
	ISCO/ ISEB	◦ Combination of ISCO and ISEB are amenable to COCs (except dioxin) ◦ Offers a high degree of operational flexibility to optimize treatment ◦ Both ISCO/ISEB will be effective in predominantly sandy lithology ◦ Well proven technologies for wood treating sites ◦ Particularly compatible with *in situ* thermal enhancement. ◦ No contaminated vapors to treat and minimal equipment
Disadvantages	S/S	◦ No destruction of COCs ◦ Long term care of cap; inspections/maintenance required ◦ Potential for large volumes and pore space percentages of NAPL to be too rich for satisfactory stabilization
	SEE	◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Treatment of extracted groundwater and vapors is costly
	ISCO/ ISEB	◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants

Criteria		Analysis
		• Appreciable residual NAPL would consume large volumes of oxidant • Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment • ISEB is less certain with PCP contamination
CMZ-2A Alternative #2: SEAR w/MPE		**CMZ-2A**
Advantages		• Greatly accelerates NAPL removal rates and quantity • Implementation in less than one year • Can use existing NAPL recovery wells (with additional wells) • MPE provides strong hydraulic controls
Disadvantages		• Potential for COC dissolved mobilization, even vertically • Complex chemistry highly dependent upon bench and pilot scale testing • High volume of surfactant chemical required in CMZ-2A • Treatment of extracted groundwater is complex and costly • More difficult to extract multi-phase fluids with depth. • Robust approach relative to RAO for protection of Bay
CMZ-2A Alternative #3: SEE		**CMZ-2A**
Advantages		• Greatly accelerates NAPL removal rates and quantity • Technology can be applied effectively in deeper soil • High mass reduction efficiency rates (typically greater than 90-95 percent) • Implementation in less than one year • Suitable lithology • Can use two existing NAPL recovery wells (with additions) • Reduces leachability of residual COCs • Enhances aerobic bioremediation on periphery • Wellheads, manifolds, and equipment can be remobilized to treat other CMZs (e.g. CMZ-2B) or for potential use on other CERCLA wood-treating sites
Disadvantages		• Potential for creosote mobilization at creosote front (mitigation through MPE) • Treatment of extracted groundwater and vapors is extensive and costly • Robust approach relative to RAO for protection of Bay
CMZ-2A Alternative #4: S/S with LDA and SEE (Deep)		**CMZ-2A**
Advantages	S/S	• S/S should effectively bind NAPL and prevent significant leachate. • Successfully applied at other sites • Lower vapor phase emissions to be treated • No chance of increased mobilization; not lithology dependent • Can easily bound residual dioxin levels • Good soil bearing capacity for future land development • Rapid application (less than a year)
	SEE	• SEE treatment is focused on smaller areal extent • Greatly accelerates NAPL removal rates and quantity • High mass reduction efficiency rates (typically greater than 90-95 percent). • Implementation in less than one year • Can use two existing NAPL recovery wells (with additions) • Reduces leachability of residual COCs. • Enhances aerobic bioremediation on periphery
Disadvantages	S/S	• No destruction of COCs • Long term care of cap; inspections/maintenance required • Potential for large volumes and pore space percentages of NAPL to be too rich for satisfactory stabilization • Robust approach relative to RAO for protection of the Bay

Criteria		Analysis
	SEE	◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Treatment of extracted groundwater and vapors is costly • Applying secondary major technology within same CMZ
CMZ-2B Alternative #2: SEAR w/MPE		**CMZ-2B**
Advantages		◦ Greatly accelerates NAPL removal rates and quantity • Implementation in less than one year ◦ MPE provides strong hydraulic controls ◦ More NAPL stringers and less saturated NAPL will require less surfactant than source areas ◦ Can be applied under existing roads and buildings
Disadvantages		◦ Potential for COC dissolved mobilization, even vertically, particularly significant close to the Bay ◦ Complex chemistry highly dependent upon bench and pilot scale testing ◦ Treatment of extracted groundwater is complex and costly
CMZ-2B Alternative #3: SEE		**CMZ-2B**
Advantages		◦ Greatly accelerates NAPL removal rates and quantity ◦ High mass reduction efficiency rates (typically greater than 90-95 percent) • Implementation in less than one year ◦ Suitable lithology ◦ Reduces leachability of residual COCs ◦ Enhances aerobic bioremediation on periphery
Disadvantages		◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Cannot be easily used around roads and buildings ◦ Potentially greater community concerns with technology and treatment equipment off-facility • Treatment of extracted groundwater and vapors is extensive and costly
CMZ-2B Alternative #4: S/S with LDA; ISCO		**CMZ-2B**
Advantages		• S/S should effectively bind NAPL and prevent significant leachate ◦ Successfully applied at other sites ◦ Lower vapor phase emissions to be treated ◦ No chance of increased mobilization; not lithology dependent • S/S can easily bind residual dioxin levels ◦ S/S good soil bearing capacity for future land development ◦ Rapid application (less than a year) ◦ ISCO can effectively treat under obstructions • Offers a high degree of operational flexibility to optimize treatment • ISCO will be effective in predominantly sandy lithology ◦ Proven technologies for wood treating sites ◦ No contaminated vapors to treat and minimal equipment
Disadvantages		◦ No destruction of COCs with S/S ◦ Long term care of cap and inspections/maintenance required ◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants ◦ Appreciable residual NAPL would consume large volumes of oxidant ◦ ISCO Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested
CMZ-3 Alternative #2: ISCO/ISEB Barriers		**CMZ-3**
Advantages		• Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Offers a high degree of operational flexibility to optimize treatment

Criteria	Analysis
	• Both technologies will be effective in predominantly sandy lithology • ISEB is the most cost effective approach • Well proven technologies for wood treating sites • No contaminated vapors to treat and minimal equipment • Eliminates over 90 percent of off-facility PCP flux • Relies on sustainable solar power for slow release ISCO treatment well mixing
Disadvantages	• Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants • Application contingent upon successful bench scale testing; Unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment • Slow release oxidant wells is an emerging technology application • No direct oxidation of PCP source area or high concentrations of SVOCs on the soil • Appreciable residual NAPL would consume large volumes of oxidant • ISEB is less certain with PCP contamination
CMZ-3 Alternative #3: S/S with SSM; ISCO/ISEB	**CMZ-3**
Advantages	• S/S should effectively bind COCs in surficial soil; ISCO and ISEB capable of mass destruction of deeper COCs • Successfully applied at other sites • No chance of increased mobilization; not lithology dependent • Can easily bind dioxin • Good soil bearing capacity for future land development • Rapid application • Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Offers a high degree of operational flexibility to optimize treatment • Well proven technologies for wood treating sites • Applies both technologies to remediation of presumed PCP source area • No contaminated vapors to treat and minimal equipment • Both ISCO/ISEB will be effective in predominantly sandy lithology
Disadvantages	• No destruction of COCs with S/S • S/S and cap will be partially disrupted by repeat ISCO treatments • Long term care of cap and inspections/maintenance required • Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants • Appreciable residual NAPL would consume large volumes of oxidant • Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment • ISEB is less certain with PCP contamination
CMZ-3 Alternative #4: ISEB	**CMZ-3**
Advantages	• ISEB can be configured to treat SVOCs and PCP (but not dioxin) • Offers a high degree of operational flexibility to optimize treatment • Effective in predominantly sandy lithology on-facility • Well proven technology for wood treating sites; less proven with PCP component • No contaminated vapors to treat and minimal equipment
Disadvantages	• Application contingent upon successful bench scale testing

Criteria	Analysis	
	◦ ISEB not optimum technology if creosote stringers are present (appreciable residual NAPL would consume large volumes of oxidant) ◦ Potentially long timeframe for treatment ◦ May require bioaugmentation with no commercially available strains currently present ◦ No direct oxidation of PCP source area or high concentrations of SVOCs on the soil ◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants ◦ ISEB is less certain with PCP contamination	
CMZ-4A Alternative #2: Excavation/Encapsulate On-facility in Barrier Wall (CMZ-1)		**CMZ-4A**
Advantages	◦ Soils with highest level of dioxin contamination are isolated	
Disadvantages	◦ Soils are not treated ◦ Resultant addition to mound height at CMZ-1	
CMZ-4A Alternative #3: Excavation with Off-facility Incineration		**CMZ-4A**
Advantages	◦ All dioxin contamination soil on-facility are treated to regulatory acceptable standards. Incinerator must meet 99.99 percent destruction efficiency ◦ No addition to height of soil on property ◦ Treatment process is approved by the EPA	
Disadvantages	◦ Disruption for Site and community due to off-site transport ◦ Very high treatment costs	
CMZ-4A Alternative #4: Excavation, *Ex situ* S/S, Replace On-facility		**CMZ-4A**
Advantages	◦ S/S should effectively bind COCs in surficial soil ◦ Suitable lithology present ◦ Can easily bind dioxin ◦ Good soil bearing capacity for future land development ◦ Rapid application ◦ *Ex situ* application should have improved QA/QC and mixture consistency	
Disadvantages	◦ No destruction of COCs ◦ Long term care of cap and inspections/maintenance required ◦ Needs further regulatory clarification but acceptable precedents exist for S/S	
CMZ-4A Alternative #5: *In situ* S/S On-facility		**CMZ-4A**
Advantages	◦ S/S should effectively bind COCs in surficial soil ◦ Suitable lithology present, easily mixed for shallow depth ◦ Can easily bind dioxin ◦ Good soil bearing capacity for future land development ◦ Rapid application ◦ Less soil handling and associated Site disruptions and short-term impacts	
Disadvantages	◦ No destruction of COCs ◦ Long term care of cap and inspections/maintenance required ◦ Needs further regulatory clarification but acceptable precedents do exist for S/S	
CMZ-4B Alternative #2: Excavation/Encapsulate On-facility in Barrier Wall (CMZ-1)		**CMZ-4B**
Advantages	◦ Soils with highest level of off-facility dioxin contamination are securely isolated ◦ No long-term soil liability with off-facility landfill disposal	
Disadvantages	◦ Soils are not treated ◦ Resultant addition to height of grade on-facility	

Criteria	Analysis	
	• All CMZ-4B alternatives will have high direct impacts on surrounding properties due to construction activity	
CMZ-4B Alternatives #3a and3b: Excavation, Off-facility Disposal to Subtitle D Landfill (3a) or Off-facility Disposal to ETC Superfund Site (3b)		**CMZ-4B**
Advantages	• Soils with highest level of off-facility dioxin contamination are removed from the Site. No increase in surface elevation on the facility	
Disadvantages	• Soils are not treated • All CMZ-4B alternatives will have high direct impacts on surrounding properties. • Some long-term liability with off-site landfill disposal • Would require coordination between the ETC and ACW RA implementations	
CMZ-4B Alternative #4: Excavation/Disposal On-facility over CMZ-2A/3 Areas		**CMZ-4B**
Advantages	• Soils with highest level of off-facility dioxin contamination are securely isolated • No long-term soil liability with off-facility landfill disposal	
Disadvantages	• Soils are not treated • Resultant addition to height of soil on-facility (minimal) • All CMZ-4B alternatives will have high direct impacts on surrounding properties due to construction activity	
OU2/CMZ-5 Alternative #2: Hydraulic Containment		**CMZ-5**
Advantages	• This remedy is proven and reliable • Complete capture of the facility dissolved COCs along with additional sentry protection of the Bay • COCs are readily treated *ex situ* • No adverse impacts on the Bay • Sufficient room for well installation	
Disadvantages	• Off-facility treatment system required • Does not address higher mass of contamination on adsorbed phase • Will require long-term O&M, in particular for submersible pumps • Permission to obtain effluent discharge to POTW may be difficult	
OU2/CMZ-5 Alternative #3: ISCO/ISEB Treatment Barriers		**CMZ-5**
Advantages	• Flexible and robust approach for groundwater treatment • ISCO is proven technology for PCP destruction • No adverse impacts on the Bay • Sufficient room for well installation • Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Both ISCO/ISEB will be effective in predominantly sandy lithology • No contaminated vapors to treat and minimal equipment	
Disadvantages	• Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies • Rebound can occur from back-diffusion of COCs • More complex system; may require additional O&M • Bench scale testing needed to finalize approach and to demonstrate the efficacy of ISEB for PCP • Appreciable residual NAPL would consume large volumes of oxidant • Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment	

10.0 Comparative Analysis of Alternatives

The NCP establishes a framework of nine criteria for evaluating remedial alternatives. These nine criteria were used to evaluate the remedial alternatives individually and against each other to identify the Selected Remedy. If an alternative does not meet the first two threshold criteria; Overall Protection of Human Health and the Environment and Compliance with ARARs, EPA does not consider the alternative for further evaluation.

10.1 Overall Protection of Human Health and the Environment (HH&E)

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through exposure pathway are eliminated, reduced or controlled, through treatment, engineering controls and/or ICs.

All of the CMZ alternatives, except the No Action alternatives, are protective of human health and the environment by eliminating, reducing, or controlling risks posed by Site COCs through treatment/isolation of the contaminants, removal, engineering controls, and/or ICs.

CMZ-1 Alternative #4 (SEE with ISCO/ISEB) is expected to provide the highest level of protection for HH&E as it provides the most complete level of treatment for the COCs. Alternative #2 (Barrier Wall Containment with Cap) provides complete isolation and containment of the large mass of NAPL and stained soil. This alternative also provides a repository for additional high level dioxin contaminated soil.

CMZ-2A Alternative #3 (SEE) is expected to provide the highest level of protection for HH&E as it provides the most aggressive and complete level of treatment for the COCs.

CMZ-2B All of the alternatives, with exception to Alternative #1 (No Action), are considered equivalent for protection of HH&E. The shallow depth and significantly lower estimated volume of NAPL improves the viability of these remedies. SEE will be very protective due to its aggressiveness and COC treatment. S/S should be more effective in the NAPL stringers but still provides only isolation of COCs. SEAR should be considered marginally less protective due to the potential for leaving larger zones of residual soil contamination that has to be treated with ISCO and ISEB.

CMZ-3 Alternative #3 (S/S with SSM; ISCO/ISEB) is expected to provide the highest level of protection for HH&E as it provides the most aggressive remedial option, providing isolation and treatment.

CMZ-4A Alternative #3 (Excavation with Off-site Incineration) is expected to provide the highest level of protection for HH&E as it provides complete treatment for the COCs.

CMZ-4B All of the alternatives scored equal for protection of HH&E, largely through complete isolation or removal of COCs. Alternative #2 (Excavate/Encapsulate On-Facility in Barrier Wall) will be highly protective and consolidate the contaminant mass on a smaller portion of the Site. Off-site disposal for Alternative #3A and #3B is very protective of the local community

and environment but leaves a long-term liability. In particular, transport of wastes to the ETC Superfund Site merely relocates the COCs to an equivalent setting. None of the alternatives provides treatment of COCs.

CMZ-5 Alternatives #2 (Hydraulic Containment) and #3 (ISCO/ISEB Treatment Barrier) provide the highest level of protection for HH&E as can reliably be expected to safeguard the Bay and meet GCTLs and/or MCTLs.

10.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that RAs at CERCLA sites attain legally applicable or relevant and appropriate federal and more stringent state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements, are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site.

ARARs do not include occupational safety or worker protection requirements. Compliance with Occupational Safety and Health Administration (OSHA) standards is separately required by 40 Code of Federal Regulation (CFR) §300.150.

Under CERCLA Section 121(e)(1), federal, state, or local permits are not required for the portion of any removal or RA conducted entirely 'on-site' as defined in 40 CFR §300.5. See also 40 CFR §300.400(e)(1) & (2). Also, CERCLA response actions must only comply with the "substantive requirements," not the administrative requirements of a regulation or law. Administrative requirements include permit applications, reporting, record keeping, inspections, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is often recommended for determining compliance with certain requirements such as those typically identified as location-specific ARARs. See EPA, Office of Solid Waste and Emergency Response (OSWER) Directives No. 9234.1-01 and 9234.1-02, CERCLA Compliance with Other Laws Manual: Parts 1 and Part II.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release that may be useful in developing Superfund remedies. See 40 CFR §300.400(g)(3). The "to-be-considered" (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may assist in determining, for example health-based levels for a particular contaminant for which there are no ARARs or the appropriate method for conducting an action. TBCs are not considered legally enforceable and, therefore, are not considered to be applicable for a site but typically are evaluated along with Chemical-specific ARARs as part of the risk

assessment to determine protective cleanup levels. See EPA, OSWER Directives No. 9234.1-01 and 9234.1-02, CERCLA Compliance with Other Laws Manual: Parts 1 and Part II, Section 1.4.

For purposes of ease of identification, the EPA has created three categories of ARARs: Chemical-, Location- and Action-Specific. Under 40 CFR §300.400(g)(5), the lead and support agencies shall identify their specific ARARs for a particular site and notify each other in a timely manner as described in 40 CFR §300.515(d).

Chemical-Specific ARARs/TBC Guidance
Chemical-specific ARARs are usually health or risk-based numerical values limiting the amount or concentration of a chemical that may be found in, or discharged to, the environment. The chemical-specific ARARs for the Selected Remedy are identified in **Table 13.**

Location-Specific ARARs/TBC Guidance
Location-specific requirements establish restrictions on permissible concentrations of hazardous substances or establish requirements for how activities will be conducted because they are in special locations (e.g., wetlands, floodplains, critical habitats, streams). There are no location-specific ARARs for the COCs at the ACW Site.

Action-Specific ARARs/TBC Guidance
Action-specific ARARs are usually technology-based or activity-based requirements or limitations that control actions taken at hazardous waste sites. Action-specific requirements often include performance, design and controls, or restrictions on particular kinds of activities related to management of hazardous substances. Action-specific ARARs are triggered by the types of remedial activities and types of wastes that are generated, stored, treated, disposed, emitted, discharged, or otherwise managed. Potential action-specific ARARs include federal and state requirements for discharge of treated wastewater from an on-facility treatment plant; general construction management requirements, and RCRA waste characterization, treatment, storage and disposal requirements. The action-specific ARARs for the Selected Remedy are identified in **Table 14.**

Compliance with Identified ARARs
In accordance with 40 CFR §300.400(g), EPA and FDEP have identified the potential ARARs and TBCs for the evaluated alternatives.

CMZ-1 Alternative #4 (SEE with ISCO/ISEB) is the most aggressive treatment alternative and is expected to have the most comprehensive success at reducing the mass and concentration of contaminants, and should do so in a short timeframe. Alternative #3 (SEAR with MPE; ISCO/ISEB) is also an aggressive treatment alternative, but there is a risk of the plume spreading. Containment and S/S remedies (Alternatives #2 and #5, respectively) do not achieve chemical-specific ARARs in the short term in the contaminated media. Alternative #3 and Alternative #4 will comply with ARARs.

CMZ-2A All of the alternatives, except the No Action alternative, meet the ARARs.

CMZ-2B All of the alternatives, except the No Action alternative, meet the ARARs.

CMZ-3 All of the alternatives, except the No Action alternative, meet the ARARs. Alternative #3 (S/S with SSM; ISCO/ISEB) was considered the most reliable approach in addition to being complimentary with CMZ-4A Alternative #5 (In Situ S/S On-Facility). Alternative #2 (ISCO/ISEB Barriers) should be effective at meeting RAOs both on the facility and downgradient.

CMZ-4A All of the alternatives, except the No Action alternative, meet the ARARs. Alternative #3 (Excavate with off-Site Incineration) may be harder to obtain a permit for the off-facility incineration of the hazardous soil and it will be difficult to gain public acceptance of this alternative.

CMZ-4B All of the alternatives, except the No Action alternative, meet the ARARs. Alternative #2 was ranked the highest because it does not involve ARARs for transportation and off-facility disposal. Disposal at the ETC Superfund Site transfers the long-term liability for isolation to the ETC site.

CMZ-5 Alternatives #2 (Hydraulic Containment) and #3 (ISCO/ISEB Treatment Barrier) meet the ARARs. Alternative #1 (No Action) lacks treatment.

10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

All of the alternatives, except the No Action alternatives, provide some degree of long-term protection. Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of all of the alternatives.

CMZ-1 The thermal remedial approach (Alternative #4) is expected to provide uniform contact and be a robust option that will provide long-term effectiveness by a short-term mass reduction. Containment-based remedial alternatives (Alternatives #2 and #5) will meet this criterion if the engineered remedy is stable and complete. Alternative #5 is considered less effective due to potential gaps including uncertainty of S/S to fully immobilize the high NAPL percentage. The surfactant enhanced remediation (Alternative #3) is considered the least effective active remedy due to the potential for the injected surfactants/polymers to be non-uniformly distributed due to the variability in soil permeability. This could result in not achieving necessary contact to facilitate desorption and effective enhanced recovery in ongoing desorption of contaminants.

CMZ-2A Alternative #3 (SEE) will provide the best long-term effectiveness because it is expected to reduce the mass of leachable COCs the most. Alternative #4 (S/S with LDA and SEE) is considered less effective because of the uncertainty of S/S to fully immobilize the NAPL mass. The surfactant enhanced remediation (Alternative #2) is considered potentially less effective than SEE due to the possibility of not achieving necessary contact resulting in

continued desorption and subsequent uncontrolled migration of contaminants. The No Action alternative is considered the least effective due to the magnitude of risk.

CMZ-2B The best long-term effectiveness will be offered by the SEE thermal remedial approach (Alternative #3) which is expected to reduce the mass of leachable COCs the most. Alternative #4 (SS with LDA; ISCO) is considered as effective as Alternative #3, but does have some uncertainty relative to the inability to assure treatment beneath and adjacent to roads and buildings. The surfactant-enhanced remediation (Alternative #2) is considered the least effective due to the potential for not achieving adequate distribution of the injected amendments in the heterogeneous soils.

CMZ-3 The best long-term effectiveness will be offered by the remedial approach combining S/S with ISCO/ISEB (Alternative #3). This alternative is expected to bind the majority of leachable mass of COCs in the upper 8 ft bls to the soil-cement matrix. The ISCO/ISEB component of this alternative would be used to provide oxidation of deeper contamination hot spots or areas under roads and buildings followed by long-term in situ bioremediation to any remaining contaminants with ISCO/ISEB. Alternatives #2 (ISCO/ISEB Barriers) is a less aggressive approach. Alternative #4 (ISEB) could be less effective due to the uncertainty of complete treatment for all SVOCs and because ISEB is not an optimal approach if residual NAPL is present.

CMZ-4A The best long-term effectiveness is Alternative #3 (Excavate with off-facility Incineration) because the material will be treated/disposed of off-site effectively eliminating post-remedial risks. Alternatives #4 (Excavation, Ex Situ S/S, Replace On-Facility) and #5 (In Situ S/S On-Facility) are considered less effective than Alternative #3 because the treated contaminated soil will remain on the facility. Alternative #2 was considered as the least effective active remedy because the contaminated soil will be encapsulated on-facility, but will not be treated.

CMZ-4B The best long-term effectiveness will be achieved under Alternatives #3a (Excavate/Disposal Off-facility at Subtitle D Landfill) and #3b (Excavate/Disposal Off-facility at ETC Superfund Site) because these alternatives will excavate and dispose of all contaminated soil off-facility thereby effectively risks at the Site. Alternatives #2 and #4 include relocation of the contaminated soil onto the ACW property.

CMZ-5 The long-term effectiveness of Alternative #3 (ISCO/ISEB Treatment Barrier) and Alternative #2 (Hydraulic Containment) were considered nearly equivalent. Alternative #3 was deemed slightly more advantageous because it provides contaminate reduction.

10.4 Reduce Toxicity, Mobility or Volume through Treatment

Reduction of toxicity, mobility or volume (T/M/V) through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

CMZ-1 Alternative #4 (SEE with ISCO/ISEB) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants, and does so in a short timeframe (less than one year). Alternative #5 (S/S with LDA and SEE [Deep]; ISCO/ISEB) is

expected to have good T/M/V reduction. Alternative #3 (SEAR with MPE; ISCO/ISEB) was considered equivalent to Alternative #4 (SEE with ISCO/ISEB), however; due to concerns for the effect of the increased plume mobility on the overall volume, it scored lower despite the mass reduction potential for the technology. The containment alternative (Alternative #2) is considered less effective because it does not include an active treatment component, but it does totally hydraulically isolate CMZ-1.

CMZ-2A With the exception of Alternative #1 (No Action), all of the remedial alternatives evaluated for CMZ-2A involve active treatment. The SEE thermal remedial approach (Alternative #3) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants; this alternative is also more practical for the deeper soil contamination. Alternatives #2 (SEAR with MPE) and #4 (S/S with LDA and SEE [Deep]) are also expected to have good T/M/V reduction. The SEAR application has a higher potential for increased contaminant mobility. Alternative #4 does not provide toxicity or volume reduction using the S/S treatment component.

CMZ-2B With the exception of Alternative #1 (No Action), all of the remedial alternatives evaluated for CMZ-2B involve active treatment. The SEE thermal remedial approach (Alternative #3) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants. Alternatives #2 (SEAR with MPE) and #4 (S/S with LDA and SEE [Deep]; ISCO) are also expected to have good T/M/V reduction. The SEAR application has a higher potential for increased contaminant mobility. Alternative #4 does not provide toxicity or volume reduction using the S/S treatment component.

CMZ-3 With the exception of Alternative #1 (No Action), all of the remedial alternatives evaluated for CMZ-3 involve active treatment. The combined S/S with ISCO/ISEB remedial approach (Alternative #3) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants. Alternatives 2 (ISCO/ISEB) and 4 (ISEB) are also expected to have good T/M/V reduction.

CMZ-4A Alternative #3 (Excavate with off-site Incineration) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants. The remaining alternatives are expected to effectively reduce mobility through stabilization or encapsulation.

CMZ-4B None of the remedial alternatives evaluated for CMZ-4B involve active treatment; however, the mobility of the contaminants will be greatly reduced through containment and isolation. Except for Alternative #1 (No Action), all of the alternatives are considered equal for reduction of T/M/V with little differentiation between them.

CMZ-5 Alternative #3 (ISCO/ISEB treatment) offers a better combination of T/M/V reduction than Alternative #2 (Hydraulic Containment). Neither alternative will significantly impact the volume of COCs across the Site in the short term. The No Action alternative offers no T/M/V reduction.

10.5 Short-Term Effectiveness

Short-term effective addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

CMZ-1 Alternatives #4 (SEE; ISCO/ISEB) and #5 (S/S with LDA and SEE; ISCO/ISEB) are considered the most effective because they are thought to have the smallest impact on the community and construction workers. Alternative #3 (SEAR with MPE; ISCO/ISEB) is considered the least effective of active remedies because of the potential of mobilizing the contaminants to surface water if leachate is not contained Alternative #2 (Barrier Wall) is protective of the community and environment in the short term but has an undesignated timeframe to meet RAOs for contaminant reduction.

CMZ-2A Alternatives #3 (SEE) and #4 (S/S with LDA and SEE) are considered the most effective because they are thought to have the smallest impact on the community and construction workers. Alternative #2 (SEAR with MPE) is considered the least effective active remedy because of the potential of mobilizing the contaminants to surface water if leachate is not contained.

CMZ-2B Alternatives #3 (SEE) and #4 (S/S with LDA and SEE) are considered the most effective because they should have the smallest impact on the community and construction workers. Alternative #2 (SEAR with MPE) is considered the least effective active remedy because of the potential of mobilizing the contaminants to surface water if leachate is not contained.

CMZ-3 Alternatives #2 (ISCO/ISEB Barriers) and #4 (ISEB) have a slight edge over Alternative #3 (S/S with SSM; ISCO/ISEB) due to remedy duration because they should have the smallest impact on the community and construction workers. Alternative #3 ranks lower also due to the noise, visibility, and monitoring of dust emissions from soil stabilization, although these can be minimized with adequate engineering controls.

CMZ-4A All alternatives, with the exception of the No Action Alternative are considered equivalent for short-term effectiveness; however, there are differences. Alternative #5 (In Situ S/S On-facility) is an in situ remedy that should have the smallest impact on the community and construction workers. Alternatives #2, #3, and #4 includes the contaminated material being transported off-site over public roads.

CMZ-4B Except for Alternative #1 (No Action), all of the alternatives are considered effective with little differentiation between them. All of the alternatives involve excavating contaminated soil from off-facility areas.

CMZ-5 Alternative #2 (Hydraulic Containment) and #3 (ISCO/ISEB Treatment Barrier) will have a distinguishable difference in community impacts or worker protection. Alternative #3 is more intrusive to the community and requires more worker protection. Both options are protective of the Bay and have equivalent uncertainties regarding the overall remedial timeframe.

Once the CMZ-1 and CMZ-2 remedies have been implemented the CMZ-5 groundwater plume definition will be obtained through monitoring.

10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

CMZ-1 Of the active remedies, Alternative #4 (SEE; ISCO/ISEB) can be installed and operated in a short time frame, with minor site disruption, and with limited potential technical difficulties due to the Site layout or lithology. Alternative #2 is a commonly used containment alternative and implementable, with appropriate assessment to confirm the presence of the clay upon which to anchor the slurry wall. Alternative #3 (SEAR with MPE; ISCO/ISEB) also is more susceptible to technology reliability issues given the large volume of NAPL and more innovative/complex attributes of the remedy. Alternative #5 is considered the least implementable based on the uncertainty of the effectiveness of the S/S to treat the high percentage of NAPL in this zone.

CMZ-2A All of the alternatives evaluated for CMZ-2A are implementable with only minor issues and there is little differentiation. The technology reliability of SEAR (Alternative #2) is more uncertain given the volume and extended depth of NAPL in CMZ-2A. Lack of adequate control of the surfactant/polymer could result in an expansion of dissolved SVOC contamination at depth.

CMZ-2B All of the alternatives evaluated for CMZ-2B are generally implementable. Alternative #4, shallow S/S with LDA, was considered easy to implement due to its small relative footprint and its effectiveness at a shallow depth. Alternative #3 (SEE) has implementation concerns due to the off-facility surface obstructions and utilities. The technology reliability and ability to monitor and control contaminant mobility using SEAR (Alternative #2) close to Pensacola Bay and Bayou Chico was considered a potential liability as the surfactants/polymer could contaminate the Bay if groundwater extraction controls were inadequate or not maintained long enough.

CMZ-3 All of the alternatives evaluated for CMZ-3 are implementable with little difference between them. The open area and shallow depth is favorable for using Alternative #3 (S/S with SSM; ISCO/ISEB).

CMZ-4A All of the alternatives evaluated for CMZ-4A are implementable. Alternative #3 (Excavation with Off-site Incineration) ranked the lowest because there are a limited number of hazardous waste incinerators in the southeast United States.

CMZ-4B All of the alternatives evaluated for CMZ-4B are implementable essentially all being variations on soil excavation and disposal. Travel distance was less of a concern with relocation of the soils to the ACW facility property.

CMZ-5 All of the alternatives evaluated for CMZ-5 are implementable and equivalent in comparison. The Hydraulic Containment alternative will require connection and permitting of treated effluent to the POTW or off-site access for an infiltration gallery. The ISCO/ISEB alternative is likely to have higher operational complexity, but a marginally shorter implementation period.

10.7 Cost

Cost estimates, including capital costs and long-term operating costs, were prepared for each alternative. There are no capital costs associated with the No Action Alternatives; present worth costs for this alternative to conduct FYRs, monitor ICs, and maintain the Site property are estimated at $241,600 for an estimated 30 years of monitoring. The No Action Alternative would not be protective of human health and the environment.

The CMZ-1 alternatives range from $5M to $38M, with Alternative #3; SEAR with MPE; ISCO/ISEB as the most costly alternative. The CMZ-2A alternatives are all comparable in costs ranging from $11M to $19M. The CMZ-2B alternatives range from $4M to $7M. The CMZ-3 costs range from $3M to $9M. The CMZ-4A costs range from $1M to $44M, with Alternative #3; Excavation with Off-site Incineration as the most costly alternative. The CMZ-4B costs range from $5M to $11M. The CMZ-5 costs are both approximately $3M. Detailed cost estimates of each alternative are included in the FS Report, Revision 3.

10.8 State Acceptance

The State of Florida has been involved actively in the process of determining and evaluating the ACW cleanup alternatives. The state has expressed support of a combination of Alternatives:

- CMZ-1 Alternative #2 - Barrier Wall Containment with Cap
- CMZ-2A Alternative #3 (SEE)
- CMZ-2B Alternative #3 (SEE)
- CMZ-3 Alternative #2 (ISCO/ISEB Barriers)
- CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1])
- CMZ-4B Alternative #4 (Excavation/ Disposal On-facility Over CMZ-2A/3 Areas)
- OU2/CMZ-5 Interim Alternative #3 (ISCO/ISEB Treatment Barriers)
- Site-wide activities including long-term groundwater monitoring, FYRs, placement of ICs on the Site to provide increased public awareness of the Site's hazards and to minimize the potential for exposure to contaminated groundwater.

State correspondence is included in **Appendix D**.

10.9 Community Acceptance

During the public comment period, the community did not express opposition to the remedial strategy selected which was the combination of CMZ-1 #2, CMZ-2A #3, CMZ-2B #3, CMZ-3 #2, CMZ-4A #2, CMZ-4B #4, and interim remedy CMZ-5 #3.

11.0 Principal Threat Waste (PTW)

The NCP establishes an expectation that the EPA will address the principal threats posed by a site through treatment or to the maximum extent practicable (NCP§121(b)(1), NCP §300.430(a)(1)(iii)(A)). PTW is defined on a site-specific basis for source material with toxicity and mobility characteristics that combine to pose a potential risk several orders of magnitude greater than the risk level that is acceptable for the current or reasonably anticipated future land use, given realistic exposure scenarios. In general, the priority for treatment for PTW is placed on source materials considered to be liquid, highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. If the selected remedy does not comply with this preference, the EPA must publish an explanation as to why a treatment remedy was not selected. The soil containing visual evidence of NAPL and the high soil concentrations of dioxin (e.g., exceeding levels that require further treatment prior to land disposal) would be considered PTW at the ACW site.

As stated in the preamble to the NCP (55 FR at 8703, March 8, 1990) and in Superfund Publication 9380.3-06FS, "A Guide to Principal Threat and Low Level Threat Wastes", there may be situations where wastes identified as constituting PTW may be effectively and reliably contained rather than treated due to inherent difficulties in treating the wastes. Specific situations that may limit the use of treatment include:

- Treatment technologies are not technically feasible or are not available within a reasonable time frame;
- The extraordinary volume of materials or complexity of the Site make implementation of treatment technologies impracticable;
- Implementation of a treatment-based remedy would result in greater overall risk to human health and the environment due to risks posed to workers or the surrounding community during implementation; or
- Severe effects across environmental media resulting from implementation would occur.

Conversely, there may be situations where the same treatment remedy will be selected for both PTWs and low level threat wastes. For example, once a decision has been made to treat some wastes (e.g., in an on-facility incinerator) economies of scale may make it cost effective to treat all materials including low level threat wastes to alleviate or minimize the need for engineering controls or ICs.

Where EPA determines that it is impracticable to use treatment to address PTW, the material may be transported off-site, consistent with the Off-Site Rule, 40 CFR 300.440, or managed safely on-site consistent with all ARARs. Engineering controls, such as containment and consolidation in a cell that has a secure liner system, may be used for such wastes that pose a relatively low long-term threat or where treatment is deemed impracticable. In demonstrating impracticability, EPA considers factors such as the media involved, the volume and concentration of contamination, the size and depth of the area impacted, whether containment is even possible, whether groundwater is or is likely to be impacted, the accessibility to the waste material, the on-site containment costs, the availability of effective ICs and engineering controls

and the likely threat of exposure over time. Applying these considerations to the portions of the ACW Site that contain PTW, the EPA believes it can prevent exposure over the long-term through the selected remedy.

As discussed in Section 12, PTW materials at this Site will be addressed effectively through containment and capping (CMZ-1) and isolated in the on-site barrier wall and capped (CMZ-4B). Containment is one of the presumptive remedies for wood treaters with NAPL.

12.0 Selected Remedy

12.1 Summary of the Rationale for the Selected Remedy

Using the above information/assumptions, the Preferred Alternative for the ACW Pensacola Site is a combination of the following alternatives:

- CMZ-1 Alternative #2 - Barrier Wall Containment with Cap
- CMZ-2A Alternative #3 (SEE)
- CMZ-2B Alternative #3 (SEE)
- CMZ-3 Alternative #2 (ISCO/ISEB Barriers)
- CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1])
- CMZ-4B Alternative #4 (Excavation/ Disposal On-facility Over CMZ-2A/3 Areas)
- OU2/CMZ-5 Interim Alternative #3 (ISCO/ISEB Treatment Barriers)
- Site-wide activities including long-term groundwater monitoring, five-year reviews, placement of ICs on the Site to provide increased public awareness of the Site's hazards and to minimize the potential for exposure to contaminated groundwater.

These alternatives were chosen based on the comparative analysis of all of the alternatives. The Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to balancing and modifying criteria.

Based on the information available at this time, EPA and FDEP believe that the Selected Remedy combination satisfies the following statutory requirements of CERCLA Section 121(b) and Section 121(d): 1) protects human health and the environment; 2) complies with ARARs; 3) is cost effective; 4) utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfies the preference for treatment as a principal element. The listed alternatives in combination and conjunction with the previous several off-facility soil removal actions performed since 1999, will achieve substantial risk reduction to all potential exposures routes in a reasonable time frame.

12.2 Description of the Selected Remedy

12.2.1 CMZ-1 Alternative #2 - Barrier Wall Containment with Cap

Alternative #2 for CMZ-1 consists of a barrier wall constructed using a cutter soil mixer technology completely surrounding the zone and a low permeability cap and cover. This alternative would provide physical isolation and hydraulic containment of the top, base, and side boundaries of the zone. The cutter soil mixer wall would be installed to a depth of approximately 110 ft below the nominal ground surface. The isolation cell created offers an additional advantage to this remedy, as it will provide isolation of additional deeper soil that may have lower but appreciable levels of contamination. The cutter soil mixer method would result in a wall thickness of approximately 3-ft. The entire area will be covered with a GCL, LDPE or HDPE liner, or a combination of these to contain the PTW and with a 2-foot clean layer of fill on top that is vegetated cover to prevent rainwater from infiltrating into the containment system. The composite cap will also eliminate human exposure pathways, prevent infiltration of surface water and subsequent leaching of the COCs.

12.2.2 CMZ-2A Alternative #3 (SEE)

CMZ-2A Alternative #3 includes thermal-enhanced DNAPL recovery using SEE steam stripping. SEE would be applied through injection wells to the DNAPL creosote-impacted soil. Assuming an effective steam influence and an overlapping MPE capture zone of 25-ft (42-ft spacing) from each well cluster, approximately 45 steam injection well cluster locations and a total of (120) 20-ft injection intervals would be needed to implement this approach.

An additional goal of using SEE in CMZ-2A will be to reduce the groundwater contaminants to a subsurface level that will be able to detect leakage/failure of the containment remedy of CMZ-1. This level will be determined in the remedial design phase.

12.2.3 CMZ-2B Alternative #3 (SEE)

CMZ-2B Alternative #3 includes thermal-enhanced NAPL recovery using SEE steam stripping. Assuming an effective steam influence and an overlapping MPE capture zone of 25-ft (42-ft spacing) from each well cluster, approximately 62 steam injection well locations and a 15-ft injection interval would be needed to implement this approach.

Groundwater monitoring below the shallow clay (approximately 20 ft bls) is recommended to assess the effectiveness of the remedy in this zone.

12.2.4 CMZ-3 Alternative #2 (ISCO/ISEB Barriers)

CMZ-3 Alternative #2 entails the use of an upgradient ISEB treatment zone along the northern CMZ-3 facility boundary and a combined ISCO/ISEB treatment barrier along the southern edge of the CMZ. The upgradient ISEB barrier will be created though injection points and will provide a flush of infused oxygen to sweep the CMZ, providing enhanced aerobic bioremediation of PAHs and PCP. The ISCO/ISEB barrier will provide immediate relief from this contamination, effectively isolating the onsite secondary source from the downgradient plume and potential impacts on Pensacola Bay.

The CMZ-3 north ISEB treatment zone would consist of 24 two-depth cluster wells for oxygen infusion. These cluster wells would be screened from 5 to 40 ft bls and 45 to 80 ft bls, respectively. The treatment line will extend laterally along CMZ-3 for approximately 700 ft with ISEB clusters spaced by 30-ft. Two ISEB equipment trailers are anticipated; each delivering 90 percent infused oxygen gas to a network of buried manifolds and headers. The CMZ-3 southwest ISEB barrier will be constructed in a similar fashion, with 10 cluster wells along a 300-foot lateral treatment length. A programmable logic controller is used to operate and monitor the treatment process.

The south ISCO barrier is configured as an application of a slow release (SR) oxidant through groundwater wells to provide long-term treatment. This barrier is primarily designed to address the dissolved PCP contamination near OW-9. PCP in particular is amenable to treatment with oxidation, although the treatment wall will also reduce any PAHs in the groundwater mass discharge heading downgradient towards the Bay. The slow release ISCO treatment line is envisioned as potassium permanganate 'candles' which are porous wax cylinders manufactured by Carus Corporation. These candles are stacked in groundwater wells across the treatment interval. They are designed to release the permanganate slowly into the aquifer and will be designed to correspond with the mass flux of PCP contamination predicted for CMZ-3. The SR oxidation wells will be placed in two parallel rows that extend laterally for approximately 575-ft along the southern CMZ-3 boundary. An estimated 114 wells will be required with a spacing of 10-ft on each row. The rows will alternate spacing, effectively creating a 5-ft net spacing of the SR oxidant wells. The barrier is conceptually configured to extend from 20 to 80–ft bls. Prior to placement of the candles, a one-time injection of approximately 208,000 pounds of potassium permanganate was assumed to reduce the overall soil oxidant demand in the vicinity of the SR oxidant barrier. Supplemental mixing may be employed using several solar-powered compressors to enhance mixing and distribution at each SR oxidant well.

The optimal application of this remedy will be contingent upon successful bench scale or pilot scale testing. The current uncertainty and need for additional assessment data also factored into this recommendation. It is assumed that the remedy will be reduced in scope following additional Site investigation to be performed as part of the RD.

In addition, the removal of the upper 3 feet of soil as part of the CMZ-4A remedy will remove a significant quantity of the leachable source soil.

12.2.5 CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1])

CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1]) includes excavation of all unsaturated contaminated surficial soil on the former facility and surficial soils in CMZ-2A from 0 to 3-ft bls. All of this soil would be placed inside the CMZ-1 Alternative #2 barrier wall and capped for long-term isolation. A total of 61,794 cy of soil is estimated for this alternative, plus the 9,208 cy of soil that exceeds the LDR criteria from Pine and Gimble Streets. The resulting cap would be sloped at a 2:1 horizontal/vertical angle and completed as described in CMZ-1 with a multi-component cap consisting of 18 inches of clean fill, 6 inches of enriched soil and then hydro seeding. Excavation and placement would include all appropriate engineering controls for dust control and monitoring.

All CMZ-4A soils with the exception of soils that currently overlays CMZ-3 would be placed inside the CMZ-1 Alternative #2 Barrier Wall and capped for long-term isolation. The soil currently overlying CMZ-3 will be placed within a new encapsulated cell within CMZ-3.

12.2.6 CMZ-4B Alternative #4 (Excavation/ Disposal On-facility Over CMZ-2A/3 Areas)

CMZ-4B Alternative #4 (Excavation/Disposal On-facility Over CMZ-2A/3 Areas) was chosen as the recommended remedy for this zone. This Alternative includes excavation of all unsaturated contaminated surficial soil located off-facility at depths ranging from 6 inches to a maximum depth of 3-ft bls (top of the average water table). The soil would be spread over the CMZ-2A and CMZ-3 areas for long-term isolation. The resulting cap would be sloped at a 2:1 horizontal/vertical angle and completed with a 2-ft multi-component cap and soil cover and then hydro seeded. Excavation and placement would include all appropriate engineering controls for dust control and monitoring. The 35,000 CY soil stockpile that currently exists on the former ACW facility would also be spread over the CMZ-2A/3 areas. The encapsulation of the CMZ-2A/3 areas to provide further protection of the groundwater and will level out the heights of these two capped areas.

12.2.7 OU2/CMZ-5 Interim Alternative #3 (ISCO/ISEB Treatment Barriers)

The Interim Remedy recommended for OU2/CMZ-5 is the ISCO/ISEB Treatment Barriers remedy (Alternative #3) for addressing the dissolved PCP groundwater plume on the eastern part of the Site. This alternative is an extension of the ISCO/ISEB biobarrier concept that was selected for CMZ-3 (Alternative #2). PCP is amenable to treatment with various oxidants and can be aerobically or anaerobically biodegraded. Aerobic biodegradation is likely to be more successful, especially given the current aquifer geochemistry. The ISCO/ISEB barrier cluster wells would be installed along the Pensacola Bay shoreline. This location will intercept any existing or future dissolved PCP contamination before it can impact the Bay.

Injection wells would be used for the addition of either a liquid or gaseous oxidant or oxygen for both areas. The wells would be screened from 30 to 70 ft bls to correspond with the existing layer of dissolved phase contamination and the hydraulic profile of the Bay. Alternately, horizontally drilled wells could be used to accomplish the same function. Approximately 21 ISCO/ISEB wells would be installed along a 800-ft lateral treatment barrier. Wells would be spaced at 40-ft (typical) intervals. Bench scale or pilot scale testing will be required to validate these assumptions.

The treatment barrier will also be successful for treatment of advected PAHs, most notably naphthalene. The use of injected oxygen for bioremediation of naphthalene has been successfully pilot tested at the nearby ETC Site using a horizontally screened well and the infusion of 90 percent oxygen.

Groundwater monitoring will be conducted to assess the effectiveness of the DNAPL source treatment in reducing the naphthalene/SVOC plume on the west side of the Site. This recommendation reflects a consideration that active treatment at the foot of the Bay should not be necessary if source and contaminant flux reduction on-facility abates the dissolved

naphthalene plume sufficiently in a 5-year timeframe following implementation of CMZ-1, 2A and 2B remedies.

The future selection of this alternative as the final remedy is highly contingent upon a thorough review of the initial post CMZ-1, -2A and -3 RA response actions. The needs for any additional groundwater actions will be accessed during the first Five Year Reviews of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will be evaluated. If significant decreasing trends are present at the first Five Year Review a final groundwater ROD could be written at that time. Should groundwater monitoring not show progress towards meeting the CTLs in OU2/CMZ-5, a remedy screening and evaluation of other possible remedies will be completed at that time so a final remedy can eventually be selected and documented in a final ROD for OU2/CMZ-5.

Figure 11 illustrates the Selected Remedy major components and the volumes of soil to be handled and contained or removed from the Site.

12.3 Cost Estimate for the Selected Remedy

The estimated total net present worth cost for the Selected Remedy is $35.3 million. The cost estimate for the Selected Remedy is included in **Table 14.** Detailed cost breakdown sheets of the components for each alternative are included in **Appendix C**. The cost estimate is based on the available information regarding the anticipated scope of the remedial action. Changes in the cost elements are likely to occur as a result of new information and data collected during the remedial design phase. Major changes may be documented in the form of a memorandum to the AR file, an ESD, or a ROD Amendment. The projected cost is based on an order-of-magnitude engineering cost estimate that is expected to be within +50 or -30 percent of the actual project cost. Costs are based on the conservative estimate of a 30-year timeframe until all cleanup levels are met.

12.4 Estimated Outcomes of the Selected Remedy

The Selected Remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risks at the Site through excavation and consolidation of contamination by isolation/containment, physical removal of waste from areas of access by receptors, monitoring of engineering controls, and implementation of the ICs. The ICs will include restrictive covenants for soil and groundwater to protect the remedy and prevent any future exposure routes. Future land use of the Site property is anticipated to continue to be industrial/commercial with the containment area to remain as undeveloped land (or a park). Future land use at the Site property is anticipated to be industrial /commercial. The Site property may also be used for recreation (park) with appropriate ICs and engineering controls consisting of the cap over the entire area which would prevent exposure to underlying contaminated soils.

Implementation of the Selected Remedy and achievement of the final cleanup levels will achieve the final RAOs for the Site. The final cleanup levels determined for this remedy are the same as those determined during the FS, and are shown in **Tables 4** and **5**.

13.0 Statutory Determination

Based on the information currently available, EPA believes the chosen Selected Remedy for each of the CMZs meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying Criteria. EPA expects the Selected Remedy will satisfy the following statutory requirements of CERCLA Section 121(b):

- Be protective of human health and the environment.
- Comply with ARARs;
- Be cost effective; and
- Use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

13.1 Protection of Human Health and the Environment (HH&E)

Protection of human health and the environment will be achieved by the containment and thermal treatment of the residual and free-phase DNAPL and creosote impacted soil, containment of contaminated surface soil, and in situ treatment of the dissolved groundwater plume that will prevent future migration of hazardous substances into Chico Bayou/Pensacola Bay. Encapsulating and treating the NAPL and contaminated surface soil will eliminate the potential risk to HH&E from these COCs.

13.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate federal and more stringent state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). The Selected Remedy will comply with all ARARs and To Be Considered guidance presented in **Tables 13 and 14**.

Removal of impacted surface soil removes a source of contamination and attains ARARs. Compliance with ARARs will be achieved through containment and encapsulation of PTW high level dioxin soil and isolation and treatment of NAPL.

13.3 Cost Effectiveness

EPA has determined that the Selected Remedy is cost-effective and that the overall protectiveness of the remedy is proportional to the overall cost. As specified 40 CFR §300.430(f)(1)(ii)(D), the cost-effectiveness of the Selected Remedy was assessed by comparing the protectiveness of human-health and the environment in relation to three balancing criteria (i.e., long-term effectiveness and permanence; reduction in T/M/V; and short-term effectiveness) with the other alternatives considered.

The basis for EPA's determination of cost-effectiveness is summarized in **Table 15**. While more than one remedial alternative can be considered cost-effective, CERCLA does not mandate that the most cost-effective or least expensive remedy be selected. The estimated total cost (i.e., capital plus present worth of O&M costs) of the Selected Remedy is $35.3M at a five percent

discount rate. A table with five percent and seven percent discount rates can be found in Table 15.

13.4 Use of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of tradeoffs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, bias against off-site treatment and disposal, and considering State and community acceptance.

EPA recommends development of at least one alternative that would eliminate the need for long-term management at the Site. Thermal treatment is a proven treatment method to remediate creosote NAPL. No other feasible permanent remedial alternatives were identified due to the prohibitive cost to handle the large volume of contaminated soil remaining at the Site. Additionally, treatment options for dioxin contaminated soil are limited and costly. On-facility encapsulation is the best balanced option to remediate this COC and protect potential receptors.

Long term effectiveness and permanence will be attained by long term containment/isolation, encapsulation and treatment of NAPL and contaminated soil. The barrier wall and geosynthetic clay layer (GCL), low density polyethylene (LDPE) or high density polyethylene (HDPE) liners are proven remedial treatment methods for this type of waste and have long life cycles. Implementability is easily achieved for these alternatives. There are physical obstructions to the thermal and off-facility removal remedies such as buildings, roads, utilities, etc. A competent clay layer will serve as the bottom of the isolation/containment cell in CMZ-1. While, reduction in toxicity, mobility, or volume is achievable with these alternatives, isolation via containment reduces mobility and effectively eliminates the risk of a completed exposure pathway.

13.5 Preference for Treatment as a Principal Element

The NCP at 40 CFR §300.430(a)(I)(iii)(A) establishes an expectation that treatment will be used to address PTW posed by a site wherever practicable. In general, the priority for treatment for PTW is placed on source materials considered to be liquid, highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur.

As stated in the preamble to the NCP (55 FR at 8703, March 8, 1990) and in Superfund Publication 9380.3-06FS, "A Guide to Principal Threat and Low Level Threat Wastes"), there may be situations where wastes identified as constituting a PTW may be effectively contained (e.g. isolated) rather than treated due to inherent difficulties in treating the wastes. Thus, this allows for situations where the same treatment remedy will be selected for both PTWs and low level threat wastes.

The Selected Remedies for CMZ-2A, CMZ-2B, CMZ-3, and CMZ-5 satisfy the statutory preference for remedies that employ treatment to reduce toxicity or volume as a principal element. For CMZ-1, CMZ-4A, and CMZ-4B, treatment alternatives to reduce toxicity or volume for the creosote DNAPL and dioxins were evaluated and determined to be either cost prohibitive or involve unproven technologies which would likely fail to meet criteria to reduce toxicity or volume.

13.6 Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the RA to ensure that the Selected Remedy is, or will be, protective of human health and the environment. EPA will conduct a FYR until levels that allow for unlimited use and unrestricted exposures are achieved.

13.7 Documentation of Significant Changes

Pursuant to CERCLA 117(b) and NCP §300.430(f)(3)(ii), the ROD must document any significant changes made to the Preferred Alternative discussed in the Proposed Plan. The Proposed Plan, which was released for public comment in April 2017, identified the following Alternatives in combination and conjunction with the Removal Response Actions that have been conducted, as the site-wide Preferred Remedy for the ACW site.

CMZ	Alternative #	Description
1	Alt. #2	Barrier Wall Containment with Cap
2A	Alt. #3	SEE
2B	Alt. #3	SEE
3	Alt. #2	ISCO/ISEB Barriers
4A	Alt. #2	Excavation/Encapsulate On-facility in Barrier Wall (CMZ-1)
4B	Alt. #4	Excavation/Disposal On-facility over CMZ-2A/3 Areas
5/OU2	Alt. #3	ISCO/ISEB Treatment Barriers

ICs to restrict land use and prevent disturbance of on-site engineering controls (e.g., capped area) are included in the Selected Remedy. The ICs may also include restrictive covenants, property deed notices, and governmental controls such as local ordinances or zoning restrictions.

EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

14.0 References

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PART 3: RESPONSIVENESS SUMMARY

The Responsiveness Summary for the Site has been prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (NCP), 40 CFR §300.430(0- EPA's responses to comments received on the Proposed Plan during the public comment period are included in **Appendix A.**

The Proposed Plan for the Site was issued on April 22, 2017. On April 26, 2017, the EPA hosted a Proposed Plan meeting at the Sanders Beach-Corinne Jones Resource Center. Site documents including the RI, FS Reports and Proposed Plan for the American Creosote Works Site were made available to the public on April 22, 2017 in the Administrative Record (AR) repositories. The AR repositories are located at the EPA Region 4 Superfund Records Center (61 Forsyth Street, Atlanta, GA 30303) and the EPA local repository located at the West Florida Genealogy Branch located at 5740 N 9th Avenue, Pensacola, Florida. A Notice of Availability was published in the Pensacola News Journal on April 23 and 24, 2017. A public comment period on the Proposed Plan was held from April 22 to May 22, 2017. The comment period ended on May 22, 2017. EPA's responses to comments are included in Appendix A. Several questions were asked during the public meeting by the attendees after the presentation. EPA's responses to these questions are documented in the meeting transcript, which is included in **Appendix B.**

TABLES

Table 1: Occurrence, Distribution, and Selection of Chemicals of Concern in Soil (2014 HHRA Addendum)

Chemical of Concern	Exposure Unit	Min Conc.[1] (µg/kg)	Max Conc.[1] (µg/kg)	Mean Conc. (µg/kg)	95% UCL of Mean (µg/kg)	Exposure Point Conc. (µg/kg)	Background Conc. (µg/kg)	Screening Toxicity Value (µg/kg)
BaP TEQ	On Site	148.3	14,882	5,031	NC	14,882	ND	15
	Off Site at SS114	3,844.7	3,844.7	3,844.7	NC	3,844.7		
	Right-of-Way	198.3	3,353.3	1,331	NC	3,353.3		
Pentachlorophenol	Right-of-Way	58	960	367.2	NC	960	ND	890
2-Methylnaphthalene	On Site	6.8	77,000	10,159	NC	77,000	ND	23000
2,3,7,8- TCDD Dioxin TEQ	On Site	0.0022	12	1.718	4.201	4.201	ND	0.0045
	Off Site at SS119	0.019	0.14	0.08	NC	0.14		
	Off Site at SS121	0.062	0.092	0.077	NC	0.092		
	Off Site at SS126	0.013	0.061	0.037	NC	0.061		
	Off Site at SS128	0.015	0.060	0.0375	NC	0.060		
	Off Site at SS145	0.023	0.086	0.0593	NC	0.086		
	PYC Area	0.0033	0.16	0.033	NC	0.16		
	Right-of-Way	0.049	4.1	0.9898	NC	4.1		
	Industrial Area West	0.0064	0.130	0.035	NC	0.130		
	Industrial Area North	0.011	0.130	0.047	NC	0.130		

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
[1] Minimum/maximum detected concentration in soil
NA = None available
UCL = Upper Confidence Limit
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
µg/kg = micrograms per kilogram
NC = Not calculated due to small sample size
ND = Not Detected

Table 2: Occurrence, Distribution, and Selection of Chemicals of Concern in Groundwater (2014 HHRA Addendum)

Chemical of Concern	Exposure Area	Min Conc.[1] (µg/L)	Max Conc.[1] (µg/L)	Mean Conc. (µg/L)	95% UCL of Mean (µg/L)	Exposure Point Conc. (µg/L)	Background Conc. (µg/L)	Screening Toxicity Value (µg/L)
2378-TCDD TEQ	Shallow	0.0000032	0.000026	0.000011	NA	0.000011	ND	0.00000052
	Intermediate	0.00000049	0.0037	0.000236	NA	0.000236		
	Deep	0.00000091	0.000013	0.00000561	NA	0.00000561		
Benzene	Shallow	3.4	170	60.97	NA	60.97	ND	0.39
	Intermediate	3.4	190	82.87	NA	82.87		
	Deep	1.6	51	16.86	NA	16.86		
Ethylbenzene	Shallow	1.2	66	33.11	NA	33.11	ND	1.3
	Intermediate	1.2	74	45.08	NA	45.08		
	Deep	6.1	47	19.54	NA	19.54		
Xylenes	Shallow	3.4	213	102	NA	102	ND	190
	Intermediate	3.4	222	119.4	NA	119.4		
	Deep	11	111	37.16	NA	37.16		
Acenaphthene	Shallow	6.2	870	291.5	NA	291.5	ND	400
	Intermediate	6.2	520	185.4	NA	185.4		
	Deep	1.9	320	135.8	NA	135.8		
Benzo(a) Anthracene	Shallow	1.1	120	14.7	NA	14.7	ND	0.029
	Intermediate	1.1	12	1.879	NA	1.879		
Benzo(a)Pyrene	Shallow	42	45	42.19	NA	42.19	ND	0.0029
Benzo(b) Fluoranthene	Shallow	2.1	52	6.805	NA	6.805	ND	0.029
	Intermediate	2.1	2.1	2.1	NA	2.1		
Benzo(k) Fluoranthene	Shallow	48	50	48.1	NA	48.1	ND	0.29
Carbazole	Shallow	8.7	740	303	NA	303	ND	NA
	Intermediate	8.7	740	264.6	NA	264.6		
	Deep	130	300	201.4	NA	201.4		
Chrysene	Shallow	1.2	100	11.2	NA	11.2	ND	2.9
Dibenzofuran	Shallow	3.1	530	161.1	NA	161.1	ND	5.8
	Intermediate	3.4	310	97.46	NA	97.46		
	Deep	48	150	80.5	NA	80.5		
Fluoranthene	Shallow	22.7	690	67.9	NA	67.9	ND	630
Fluorene	Shallow	4.1	690	165.4	NA	165.4	ND	220
	Intermediate	4.1	280	91.37	NA	91.37		
	Deep	43	120	70.93	NA	70.93		

Table 2: Occurrence, Distribution, and Selection of Chemicals of Concern in Groundwater (2014 HHRA Addendum)

Chemical of Concern	Exposure Area	Min Conc.[1] (µg/L)	Max Conc.[1] (µg/L)	Mean Conc. (µg/L)	95% UCL of Mean (µg/L)	Exposure Point Conc. (µg/L)	Background Conc. (µg/L)	Screening Toxicity Value (µg/L)
Naphthalene	Shallow	1.3	11000	5180	NA	5180	ND	0.14
	Intermediate	300	15000	5100	NA	5100		
	Deep	1300	4800	2400	NA	2400		
2-Methyl Naphthalene	Shallow	11	1100	511.5	NA	511.5	ND	27
	Intermediate	11	830	366.2	NA	366.2		
	Deep	45	250	134.2	NA	134.2		
Phenanthrene	Shallow	5.9	1700	211.1	NA	211.1	ND	87
	Intermediate	5.9	280	65.08	NA	65.08		
	Deep	25	69	45.67	NA	45.67		
Pyrene	Shallow	1.8	3900	180.8	NA	180.8	ND	87
1,1-Biphenyl	Shallow	1.5	260	74.03	NA	74.03	ND	0.83
	Intermediate	1.5	120	47.79	NA	47.79		
	Deep	14	38	24.58	NA	24.58		
1,2,4-Trichloro Benzene	Intermediate	50	50	50	NA	50	ND	0.99
2,4,6-Trichloro Phenol	Shallow	10	12	10.43	NA	10.43	ND	3.5
2,4-Dimethyl Phenol	Shallow	81	16000	3525	NA	3525	ND	270
	Intermediate	1.2	13000	2542	NA	2542		
	Deep	29	150	45.92	NA	45.92		
2-Methylphenol (o-Cresol)	Shallow	3.8	7900	1950	NA	1950	ND	720
	Intermediate	2.4	7100	1092	NA	1092		
3-Methylphenol (m-Cresol)	Shallow	6.3	24000	5034	NA	5034	ND	720
	Intermediate	40	19000	2502	NA	2502		
4-Methylphenol (p-Cresol)	Shallow	6.3	24000	5034	NA	5034	ND	1400
	Intermediate	40	19000	2502	NA	2502		
Pentachlorophenol	Shallow	7.5	310	54.26	NA	54.26	ND	0.035
	Intermediate	59	2600	432.9	NA	432.9		
Phenol	Shallow	6.7	6800	1580	NA	1580	ND	4500
	Intermediate	18	6600	717.7	NA	717.7		

Key
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
µg/L = micrograms per Liter
[1] Minimum/maximum detected concentration in groundwater
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

ND = Not detected
NC = Not calculated due to small sample size
NA = Not applicable

Table 3 Risk Characterization Summary – Carcinogens in Surface Soil - Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Off-Site SS114	BaP TEQ	4.4E-05	1.3E-09	1.5E-04	2.0E-04
						Soil Risk Total =	**2.0E-04**
		Off-Site SS119	2,3,7,8-TCDD TEQ	2.8E-05	1.9E-09	7.7E-06	3.6E-05
						Soil Risk Total =	3.6E-05
		Off-Site SS121	2,3,7,8-TCDD TEQ	1.9E-05	1.1E-09	5.0E-06	2.4E-05
						Soil Risk Total =	2.4E-05
		Off-Site SS126	2,3,7,8-TCDD TEQ	1.2E-05	7.0E-10	3.3E-06	1.6E-05
						Soil Risk Total =	1.6E-05
		Off-Site SS128	2,3,7,8-TCDD TEQ	1.2E-05	6.9E-010	3.3E-06	1.5E-05
						Soil Risk Total =	1.5E-05
		Off-Site SS145	2,3,7,8-TCDD TEQ	1.8E-05	9.9E-10	4.7E-06	2.2E-05
						Soil Risk Total =	2.2E-05
		PYC Area	2,3,7,8-TCDD TEQ	3.3E-05	1.8E-09	8.8E-06	4.1E-05
						Soil Risk Total =	4.1E-05
		Right-Of-Way	BaP TEQ	3.8E-05	1.1E-09	1.3E-04	1.7E-04
			Pentachlorophenol	6.0E-07	1.5E-12	4.0E-06	4.6E-06
			2,3,7,8-TCDD TEQ	8.3E-04	4.7E-08	2.2E-04	1.1E-03
						Soil Risk Total =	**1.2E-03**
		Industrial Area West	2,3,7,8-TCDD TEQ	2.6E-05	1.5E-09	7.1E-06	3.4E-05
						Soil Risk Total =	3.4E-05
		Industrial Area North	2,3,7,8-TCDD TEQ	2.6E-05	1.5E-09	7.1E-06	3.4E-05
						Soil Risk Total =	3.4E-05

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
Bold values indicates cancer risks are greater than 1E-04 upper bound risk
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

Table 4 Risk Characterization Summary – Non-carcinogens in Surface Soil - Current/Future Child Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Off-Site SS114	BaP TEQ	NC	NC	NC	NC
						Soil HI Total =	NC
		Off-Site SS119	2,3,7,8-TCDD TEQ	3	0.000002	0.4	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**
		Off-Site SS121	2,3,7,8-TCDD TEQ	2	0.000002	0.2	2
						Soil HI Total =	2
						Total Reproduction HI =	**2**
		Off-Site SS126	2,3,7,8-TCDD TEQ	1	0.000001	0.2	1
						Soil HI Total =	1
						Total Reproduction HI =	**1**
		Off-Site SS128	2,3,7,8-TCDD TEQ	1	0.000001	0.2	1
						Soil HI Total =	1
						Total Reproduction HI =	**1**
		Off-Site SS145	2,3,7,8-TCDD TEQ	2	0.000002	0.2	2
						Soil HI Total =	2
						Total Reproduction HI =	**2**
		PYC Area	2,3,7,8-TCDD TEQ	3	0.000003	0.4	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**
		Right-Of-Way	2,3,7,8-TCDD TEQ	75	0.00007	10	85
			BaP TEQ	NC	NC	NC	NC
						Soil HI Total =	85
						Total Reproduction HI =	**85**

Table 4 Risk Characterization Summary – Non-carcinogens in Surface Soil/Dry Sediment - Current/Future Child Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
		Industrial Area West	2,3,7,8-TCDD TEQ	2	0.000002	0.3	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**
		Industrial Area North	2,3,7,8-TCDD TEQ	2	0.000002	0.3	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
HI = Hazard Index
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014).

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available.

Table 5 Risk Characterization Summary – Carcinogens in Surface Soil Current/Future Industrial Worker (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	**Surface Soil**	On Site	2,3,7,8-TCDD TEQ	1.9E-04	2.9E-08	1.3E-05	2.0E-04
			BaP TEQ	3.8E-05	2.9E-09	3.3E-05	7.1E-05
						Soil Risk Total =	**2.7E-04**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
Bold values indicate cancer risk ≥ 1E-04 upper bound risk
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent

Table 6 Risk Characterization Summary – Non-carcinogens in Surface Soil Current/Future Industrial Worker (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	On Site	2,3,7,8-TCDD TEQ	6	0.00005	0.4	6
			BaP TEQ	NC	NC	NC	NC
						Soil Total HI =	6
						Total Reproduction HI =	**6**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
HI = Hazard Index
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available

Table 7 Risk Characterization Summary – Carcinogens in Surface Soil Current/Future Recreational User (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	On Site	2,3,7,8-TCDD TEQ	1.3E-04	7.2E-09	3.4E-05	1.6E-04
			BaP TEQ	2.5E-05	7.3E-10	8.8E-05	1.1E-04
			2-Methyl Naphthalene	NC	NC	NC	NC
						Soil Risk Total =	**2.7E-04**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
Bold values indicate cancer risk ≥ 1E-04 upper bound risk

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not calculated. . Cancer toxicity criteria not available

Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

Table 8 Risk Characterization Summary – Non-Carcinogens in Surface Soil Current/Future Recreational User (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil/	On Site	2,3,7,8-TCDD TEQ	11	0.00001	2	13
			BaP TEQ	NC	NC	NC	NC
			2-Methyl Naphthalene	.04	NC	.07	0.1
						Soil Total HI =	13
						Total Reproduction HI =	**13**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
HI = Hazard Index
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available.

Table 9 Risk Characterization Summary – Carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks		
				Ingestion	Inhalation and Dermal	Exposure Routes Total
Groundwater	Shallow Groundwater	Shallow Groundwater	2,3,7,8-TCDD TEQ	2.1E-05	NE	2.1E-05
			Benzene	5.0E-05	9.8E-05	1.5E-04
			Ethylbenzene	5.4E-06	1.7E-05	2.2E-05
			Xylenes	NC	NC	NC
			Acenaphthene	NC	NC	NC
			Benzo(a)Anthracene	1.6E-04	NE	1.6E-04
			Benzo(a)Pyrene	4.6E-03	NE	4.6E-03
			Benzo(b)Fluoranthene	7.4E-05	NE	7.4E-05
			Benzo(k)Fluoranthene	5.2E-05	NE	5.2E-05
			Carbazole	NC	NC	NC
			Chrysene	1.2E-06	NE	1.2E-06
			Dibenzofuran	NC	NC	NC
			Fluoranthene	NC	NC	NC
			Fluorene	NC	NC	NC
			Naphthalene	NC	3.6E-02	3.6E-02
			2-Methylnaphthalene	NC	NC	NC
			Phenanthrene	NC	NC	NC
			Pyrene	NC	NC	NC
			1,1-Biphenyl	8.8E-06	NE	8.8E-06
			2,4,6-Trichlorophenol	1.7E-06	NE	1.7E-06
			2,4-Dimethylphenol	NC	NC	NC
			2-Methylphenol	NC	NC	NC
			3-Methylphenol	NC	NC	NC
			4-Methylphenol	NC	NC	NC
			Pentachlorophenol	3.2E-04	NE	3.2E-04
			Phenol	NC	NC	NC
					Shallow Groundwater Risk Total =	**4.1E-02**

Table 9 Risk Characterization Summary – Carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks		
				Ingestion	Inhalation and Dermal	Exposure Routes Total
	Intermediate Groundwater	Intermediate Groundwater	2,3,7,8-TCDD TEQ	4.6E-04	NE	4.6E-04
			Benzene	6.8E-05	1.3E-04	2.0E-04
			Ethylbenzene	7.4E-06	2.3E-05	3.1E-05
			Xylenes	NC	NC	NC
			Acenaphthene	NC	NC	NC
			Benzo(a)Anthracene	2.0E-05	NE	2.0E-05
			Benzo(b)Fluoranthene	2.3E-05	NE	2.3E-05
			Carbazole	NC	NC	NC
			Dibenzofuran	NC	NC	NC
			Fluorene	NC	NC	NC
			Naphthalene	NC	3.5E-02	3.5E-02
			2-Methylnaphthalene	NC	NC	NC
			Phenanthrene	NC	NC	NC
			1,1-Biphenyl	5.7E-06	NE	5.7E-06
			1,2,4-Trichlorobenzene	2.2E-05	NE	2.2E-5
			2,4-Dimethylphenol	NC	NC	NC
			2-Methylphenol	NC	NC	NC
			3-Methylphenol	NC	NC	NC
			4-Methylphenol	NC	NC	NC
			Pentachlorophenol	2.6E-03	NE	2.6E-03
			Phenol	NC	NC	NC
			Intermediate Groundwater Risk Total =			**3.8E-02**

Table 9 Risk Characterization Summary – Carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks		
				Ingestion	Inhalation and Dermal	Exposure Routes Total
Deep Groundwater	Deep Groundwater	Deep Groundwater	2,3,7,8-TCDD TEQ	1.1E-05	NE	1.1E-05
			Benzene	1.4E-05	2.7E-05	4.1E-05
			Ethylbenzene	3.2E-06	1.0E-05	1.3E-05
			Xylenes	NC	NC	NC
			Acenaphthene	NC	NC	NC
			Carbazole	NC	NC	NC
			Dibenzofuran	NC	NC	NC
			Fluorene	NC	NC	NC
			Naphthalene	NC	1.7E-02	1.7E-02
			2-Methylnaphthalene	NC	NC	NC
			Phenanthrene	NC	NC	NC
			1,1-Biphenyl	2.9E-06	NE	2.9E-06
			2,4-Dimethylphenol	NC	NC	NC
					Deep Groundwater Risk Total =	**1.7E-02**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
NE = Not evaluated
Bold values indicate cancer risk ≥ 1E-04 upper bound risk
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Cancer toxicity criteria not available.

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
Groundwater	Shallow Groundwater	Shallow Groundwater	2,3,7,8-TCDD TEQ	1	NE	1
			Benzene	1	1	2
			Ethylbenzene	0.02	0.02	0.04
			Xylenes	0.03	0.5	0.5
			Acenaphthene	0.3	NE	0.3
			Benzo(a)Anthracene	NC	NC	NC
			Benzo(a)Pyrene	NC	NC	NC
			Benzo(b)Fluoranthene	NC	NC	NC
			Benzo(k)Fluoranthene	NC	NC	NC
			Carbazole	NC	NC	NC
			Chrysene	NC	NC	NC
			Dibenzofuran	10	NE	10
			Fluoranthene	0.1	NE	0.1
			Fluorene	0.3	NE	0.3
			Naphthalene	17	828	844
			2-Methylnaphthalene	8	NE	8
			Phenanthrene	0.4	NE	0.4
			Pyrene	0.4	NE	0.4
			1,1-Biphenyl	.009	89	89
			2,4,6-Trichlorophenol	0.7	NE	0.7
			2,4-Dimethylphenol	11	NE	11
			2-Methylphenol	2	NE	2
			3-Methylphenol	6	NE	6
			4-Methylphenol	3	NE	3
			Pentachlorophenol	0.7	NE	0.7
			Phenol	0.3	NE	0.3
					Shallow Groundwater Total HI =	982

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
	Shallow Groundwater	Shallow Groundwater			Total Liver HI =	90
					Total Reproduction HI =	2
					Total Respiratory HI =	928
					Total Blood HI =	13
					Total Kidney HI =	90
					Total Body Weight HI =	26
					Total Motor Coordination HI =	12
					Total Growth and Body Fat HI =	10
					Total Lethargy and Prostration HI =	11
					Total CNS HI =	10
	Intermediate Groundwater	Intermediate Groundwater	2,3,7,8-TCDD TEQ	22	NE	22
			Benzene	1	1	3
			Ethylbenzene	0.03	0.02	0.05
			Xylenes	0.04	0.6	0.6
			Acenaphthene	0.2	NE	0.2
			Benzo(a)Anthracene	NC	NC	NC
			Benzo(b)Fluoranthene	NC	NC	NC
			Carbazole	NC	NC	NC
			Dibenzofuran	6	NE	6
			Fluorene	0.1	NE	0.1
			Naphthalene	16	815	831
			2-Methylnaphthalene	6	NE	6
			Phenanthrene	0.1	NE	0.1
			1,1-Biphenyl	0.006	57	57
			1,2,4-Trichlorobenzene	0.3	12	12
			2,4-Dimethylphenol	8	NE	8
			2-Methylphenol	1	NE	1
			3-Methylphenol	3	NE	3

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index Ingestion	Inhalation Dermal	Exposure Routes Total
	Intermediate Groundwater	Intermediate Groundwater	4-Methylphenol	2	NE	2
			Pentachlorophenol	6	NE	6
			Phenol	0.2	NE	0.2
					Intermediate Groundwater Total HI =	958
					Total Liver HI =	**63**
					Total Reproduction HI =	**22**
					Total Respiratory HI =	**892**
					Total Blood HI =	**11**
					Total Kidney HI =	**57**
					Total Body Weight HI =	**21**
					Total Motor Coordination HI =	**9**
					Total Growth and Body Fat HI =	**6**
					Total Lethargy and Prostration HI =	**8**
					Total CNS HI =	**5**
	Deep Groundwater	Deep Groundwater	2,3,7,8-TCDD TEQ	0.5	NE	0.5
			Benzene	0.3	0.3	0.5
			Ethylbenzene	0.01	0.009	0.02
			Xylenes	0.01	0.2	0.2
			Acenaphthene	0.1	NE	0.1
			Carbazole	NC	NC	NC
			Dibenzofuran	5	NE	5
			Fluorene	0.1	NE	0.1
			Naphthalene	8	384	391
			2-Methylnaphthalene	2	NE	2
			Phenanthrene	0.1	NE	0.1
			1,1-Biphenyl	0.003	29	29
			2,4-Dimethylphenol	0.1	NE	0.1
					Deep Groundwater Total HI =	430

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
	Deep Groundwater	Deep Groundwater			Total Liver HI =	30
					Total Respiratory HI =	415
					Total Kidney HI =	30
					Total Body Weight HI =	8
					Total Growth and Body Fat HI =	5

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
NE = Not evaluated
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available.

Table 11 Cleanup Levels for Soil Chemicals of Concern

Chemical of Concern	Residential Cleanup Goal[1]	Commercial/Industrial Cleanup Goal[1]	Basis
BaP TEQ	0.1 mg/kg	0.7 mg/kg	FDEP SCTL[1]
Pentachlorophenol	7.2 mg/kg	28 mg/kg	FDEP SCTL[1]
2-Methylnaphthalene	210 mg/kg	2,100 mg/kg	FDEP SCTL[1]
2,3,7,8 TCDD TEQ (dioxin)	7 ng/kg	30 ng/kg	FDEP SCTL[1]

Key:
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
mg/kg = milligrams per kilogram
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
ng/kg = nanograms per kilogram
[1] FDEP Soil Cleanup Target Level (SCTL) based on 1E-06 cancer risk or hazard index of 1
Naphthalene concentrations onsite exceed the State Commercial -SCTL for naphthalene was screened out as a COC by the risk assessment. The Site remedy includes engineering controls (caps or 2 ft thick soil covers) throughout the Site property, which will effectively address these naphthalene concentrations."

Table 12 PRGs for Groundwater Chemicals of Concern

Chemical of Concern	Medium	Residential Lifetime (10^{-6} Risk) (µg/L)	Residential Child (HQ=1) (µg/L)	EPA MCL (µg/L)	FDEP GCTL (µg/L)
2,3,7,8 TCDD TEQ (dioxin)	Groundwater	5.2E-07	1.1E-05	3.00E-05	3.00E-05
Benzene	Groundwater	6.2E-04	3.1E+01	5.00E+00	1.0E+00
Ethylbenzene	Groundwater	2.0E-03	NA	7.00E+02	3.0E+01
Xylenes	Groundwater	NA	2.0E+02	1.00E+04	2.0E+01
Acenaphthene	Groundwater	NA	9.4E+02	NE	2.0E+01
Benzo(a)anthracene	Groundwater	3.6E-02	NA	NE	5.0E-02
Benzo(a)pyrene (BaP)	Groundwater	3.6E-03	NA	2.0E-01	2.0E-01
Benzo(b)fluoranthene	Groundwater	3.6E-02	NA	NE	5.0E-02
Benzo(k)fluoranthene	Groundwater	3.6E-01	NA	NE	5.0E-01
Carbazole	Groundwater	NA	NA	NE	1.8E+00
Chrysene	Groundwater	3.6E+00	NA	NE	4.8E+00
Dibenzofuran	Groundwater	NA	1.6E+01	NE	2.8E+01
Fluoranthene	Groundwater	NA	6.3E+02	NE	2.8E+02
Fluorene	Groundwater	NA	6.3E+02	NE	2.8E+02
Naphthalene	Groundwater	5.2E-03	6.1E+00	NE	1.4E+01
2-Methylnaphthalene	Groundwater	NA	6.3E+01	NE	2.8E+01
Phenanthrene	Groundwater	NA	4.7E+02	NE	2.1E+02
Pyrene	Groundwater	NA	4.7E+02	NE	2.1E+02
1,1-Biphenyl	Groundwater	8.4E+00	8.3E-01	NE	5.0E-01
1,2,4-Trichlorobenzene	Groundwater	2.3E+00	4.1E+00	7.0E+01	7.0E+01
2,4,6-Trichlorophenol	Groundwater	6.1E+00	4.1E+00	NE	3.2E+00
2-Methylphenol o-cresol	Groundwater	NA	1.6E+01	NE	3.5E+01
3-Methylphenol m-cresol	Groundwater	NA	3.1E+02	NE	3.5E+01

Table 12 PRGs for Groundwater Chemicals of Concern

Chemical of Concern	Medium	Residential Lifetime (10^{-6} Risk) (µg/L)	Residential Child (HQ=1) (µg/L)	EPA MCL (µg/L)	FDEP GCTL (µg/L)
4-Methylphenol p-cresol	Groundwater	NA	7.8E+02	NE	3.5E+01
2,4-Dimethylphenol	Groundwater	NA	1.6E+03	NE	3.5E+00
Pentachlorophenol	Groundwater	1.7E-01	7.8E+01	1.00E+00	1.0E+00
Phenol	Groundwater	NA	4.7E+03	NE	1.0E+01

Key:
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
µg/L is micrograms per liter
[1] EPA Site Specific Remedial Action Level (SS-RAL) based 10^{-5} cancer risk
FDEP's GCTL are the presumptive remedial goals.
MCL - Maximum Contaminant Level
NA = Not Applicable; constituent not a concern for cancer risk or non-cancer hazard
NE = Not Established

Table 13 Potential Chemical-specific ARARs

Chemical–Specific ARARs			
Action/Media	**Requirement**	**Prerequisite**	**Citation**
Protection of surface water from recharge of contaminated groundwater	All surface waters of the State shall at all places and at all times be free from: (a) Domestic, industrial, agricultural, or other man-induced non-thermal components of discharges, which, alone or in combination with other substances or in combination with other components of discharges (whether thermal or non-thermal): 1. Settle to form putrescent deposits or otherwise create a nuisance; or 2. Float as debris, scum, oil, or other matter in such amounts as to form nuisances; or 3. Produce color, odor, taste, turbidity, or other conditions in such a degree as to create a nuisance; or 4. Are acutely toxic; or 5. Are present in concentrations which are carcinogenic, mutagenic, or teratogenic to human beings or to significant, locally occurring, wildlife or aquatic species, unless specific standards are established for such components in subsection 62-302.500(2) or Rule 62-302.530, F.A.C.; or 6. Pose a serious danger to the public health, safety, or welfare.	Presence of pollutant in Waters of the State of Florida as defined in Section 403.031(13), F.S. – **Relevant and Appropriate**	F.A.C. 62-302.500(1)(a)1-6 Minimum Criteria for Surface Waters
	Shall not exceed the surface water quality criteria for the pollutants listed in Table entitled *Surface Water Quality Standards*.	Presence of pollutant in Waters of the State of Florida as defined in Section 403.031(13), F.S. – **Relevant and Appropriate**	F.A.C. 62-302.530 Surface Water Quality Criteria.
Removal of contaminated *surface* soil for Commercial/Industrial use	Specifies Default Soil Cleanup Target Levels (CTLs) for site rehabilitation. F.A.C. 62-777 Table II lists the cleanup levels for Commercial/Industrial Direct Exposure. • See ROD Table 11 Surface Soil Remedial Cleanup Levels for list of the COCs and corresponding CTL	Rehabilitation (i.e., remediation) of site contaminated soil and sediment – **Relevant and Appropriate**	F.A.C. 62-777, Table II Soil Cleanup Target Levels

Chemical-Specific ARARs

Action/Media	Requirement	Prerequisite	Citation
Removal of contaminated *surface* soil for Residential use	Specifies Soil Contaminant Cleanup Target Levels (CTLs) for site rehabilitation. FAC 62-777 Table II lists the cleanup levels for Residential Direct Exposure. • See ROD Table 11 Surface Soil Remedial Cleanup Levels for list of the COCs and corresponding CTL	Rehabilitation (i.e., remediation) of site contaminated soil and sediment – **Relevant and Appropriate**	F.A.C. 62-777, Table II Soil Cleanup Target Levels

ARAR = applicable *or* relevant and appropriate requirement
CFR = Code of Federal Regulations
COCs = contaminants of concern
CTL = cleanup target level
F.A.C. = Florida Administrative Code, Chapters as specified
F.S. = Florida Statutes
ROD = Record of Decision
TBC = To Be Considered guidance

Table 14 Potential Action-specific ARARs

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
General Construction Standards — All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)			
Control of storm water runoff from soil disturbing activities	Must comply with the substantive provisions in the "Generic Permit for Stormwater Discharge from Large and Small Construction Activities," document number 62-621.300(4)(a), issued by the FDEP and effective February 17, 2009. Requires development storm water pollution prevention plan and implementation of best management practices and erosion and sedimentation controls for stormwater runoff to ensure protection of the surface waters of the state. *NOTE*: Plan would be part of CERCLA document such as Remedial Design or Remedial Action Work Plan.	Stormwater discharges from large and small construction activities to surface waters of the State as defined in Section 403.031, F.S. – **Applicable**	F.A.C. 62-621.300(4)(a) *Generic Permit for Stormwater Discharge from Large and Small Construction Activities*
Control of storm water runoff from soil disturbing activities	No discharge from a stormwater discharge facility shall cause or contribute to a violation of water quality standards in waters of the state.	Construction activity (e.g., alteration of land contours or land clearing) that results in creation *of stormwater management system* as defined in F.AC. 62-25.020(15) – **Applicable**	F.A.C. 62-25.025 *Regulation of Stormwater Discharge*
	Erosion and sediment control best management practices shall be used as necessary during construction activity to retain sediment on site. These practices shall be designed by an engineer or other competent professional experienced in the fields of soil conservation or sediment control according to specific site conditions and shall be shown or noted on the plans of the stormwater management system. *NOTE*: Plan would be part of CERCLA document such as Remedial Design or Remedial Action Work Plan.		F.A.C. 62-25.025 (7)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Control of Fugitive Dust	No person shall cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any activity, including vehicular movement; transportation of materials; construction, alteration, demolition or wrecking; or industrially related activities such as loading, unloading, storing or handling; without taking reasonable precautions to prevent such emissions.	Land disturbing activity that has potential for unconfined emissions of particulate matter – **Applicable**	F.A.C. 62-296.320(4)(c) General Pollutant Emission Limiting Standards
Groundwater Monitoring and Extraction Wells – Installation, Operation, and Abandonment			
Groundwater Monitoring Well Installation	Provides detailed guidance to assist in monitoring well design and material specifications for construction of groundwater monitoring well.	Installation of groundwater monitoring well to detect migration of contaminants – **To Be Considered**	FDEP, Monitoring Well Design and Construction Guidance Manual (2008)
Construction and repair of groundwater well	Construction of water well shall be in accordance with the substantive requirements specified in F.A.C. 62-532.500(1)(a) through(i) as appropriate.	Installation of water well as defined in F.A.C. 62-532.200 – **Relevant and Appropriate**	F.A.C. 62-532.500(1) Well Casing, Liner Pipe, Coupling and Well Screen Requirements
	Wells shall be constructed to meet the following construction criteria specified in F.A.C. 62-532.500(3)(a), (b), (e), (f), (g), (h) and (i) as appropriate.		F.A.C. 62-532.500(3) Well Construction Criteria
Well Covers and Upper Terminus	Wells shall be covered with a tamper resistant cover when there is an interruption in work and meet the criteria specified in F.A.C. 62-532.500(4)(a) and (b) as appropriate.		F.A.C. 62-532.500(4) Top of the Well
Plugging and abandonment of groundwater wells	All abandoned wells shall be plugged by filling them from bottom to top with neat cement grout or bentonite and capped with a minimum of one foot of neat cement grout. An alternate method providing equivalent protection shall be approved by the Department and EPA.	Abandonment of water well as defined in F.A.C. 62-532.200 – **Relevant and Appropriate**	F.A.C. 62-532.500(5)
Plugging and abandonment of groundwater wells *con't*	In the abandonment of a water well, caution shall be taken to minimize the potential entrance of contaminants into the bore hole and ground water resource.	Abandonment of water well as defined in F.A.C. 62-532.200 – **Relevant and Appropriate**	F.A.C. 62-532.500(3)(f)

Action-Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
	Only water from a potable water source shall be used in the abandonment of a water well.		F.A.C. 62-532.500(3)(g)
Underground Injection Wells for Groundwater Treatment – Installation, Operation, and Abandonment			
Injection of In-Situ Bio-augmentation agents into groundwater	An injection activity cannot allow the movement of fluid containing any contaminant into USDWs, if the presence of that contaminant may cause a violation of the primary drinking water standards under 40 CFR part 141, other health based standards, or may otherwise adversely affect the health of persons. This prohibition applies to well construction, operation, maintenance, conversion, plugging, closure, or any other injection activity.	Class V wells [as defined in 40 CFR § 144.6(e)] – **Relevant and Appropriate**	40 CFR § 144.82(a)(1)
Abandonment for Class V wells	Wells must be closed in a manner that complies with the above prohibition of fluid movement. Also, any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well must be disposed or otherwise managed in accordance with substantive applicable Federal, State, and local regulations and requirements.	Class V wells [as defined in 40 CFR § 144.6(e)] – **Relevant and Appropriate**	40 CFR § 144.82(b)
General Criteria for Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	A well shall be designed and constructed for its intended use, in accordance with good engineering practices.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.605(1)
	May not cause or allow fluids to migrate into underground source of drinking water which may cause a violation of a primary or secondary drinking water standard contained in Chapter 62-550, F.A.C., or minimum criteria contained in Rule 62-520.400, F.A.C., or may cause fluids of significantly differing water quality to migrate between underground sources of drinking water.		F.A.C. 62-528.605(2)
Construction of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	Shall be constructed so that their intended use does not violate the water quality standards of Chapter 62-520. F.A.C., at the point of discharge, except where specifically allowed in subsection65-522.300(2), F.A.C.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.605(3)

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
	All drilled wells shall, at a minimum, meet the casing and cementing requirements for water well construction set forth in Chapter 62-532, F.A.C.		F.A.C. 62-528.605(7)
Operation of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	Shall be used or operated in a manner that it does not present a hazard to an underground source of water.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.610(1)
	Pretreatment for fluids injected through existing wells shall be performed if necessary to ensure the injected fluid does not violate applicable water quality standards in Chapter 52-520, F.A.C.		F.A.C. 62-528.610(3)
Monitoring of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	The need for monitoring shall be determined by the type of well, nature of injected fluid, and the water quality of the receiving and overlying aquifers. *Note:* The monitoring parameters and frequency will be specified in a CERCLA document such as Remedial or Removal Action Work Plan.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.615(1) and (2)
Plugging and abandonment of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	Prior to abandoning Class V wells, the well shall be plugged with cement in a manner that will not allow movement of fluids between underground sources of water. Placement of the cement shall be accomplished by any recognized and approved method.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate.**	F.A.C. 62-528.625(3)
Reinjection of treated contaminated groundwater or treatment agent	No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 *CFR* Part 142 or may otherwise adversely affect the health or persons.	Underground injection into an underground source of drinking water – **Relevant and Appropriate**	40 CFR 144.12(a)
Operation of Groundwater Treatment Systems (e.g., Steam Enhanced Extraction, ISCO and ISEB)			

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Operation and Monitoring of groundwater treatment system	A separate air permit will not be required if the total air emissions from all on-site remediation equipment system(s) do not exceed 5.5lbs/day for any single HAP or 13.7 lbs/day for total HAPs. *Note*: Although permit not required under CERCLA 121(e)(1) for on-site response actions, the specified thresholds are relevant to application of other air emissions requirements.	Operation of an active remediation system that emits contaminants into the air – **Relevant and Appropriate**	F.A.C. 62-780.700(3)(f)(3.)
Operation and Monitoring of groundwater treatment system including groundwater monitoring wells	Unless otherwise provided in CERCLA Remedial/Removal Action Work Plan, the following shall be obtained or determined during the active remediation: • Water level data collected from all designated wells, piezometers, and staff gauge locations each time monitoring and recovery wells are sampled (water-level measurements shall be made within 24-hour period) • Total volume of any free product recovered and the thickness and horizontal extent of free product • Total volume of groundwater recovered from each recovery well • Concentrations of applicable contaminants based on analyses performed on the effluent from the groundwater treatment system • Concentrations of applicable contaminants based on analyses performed on the untreated groundwater from select recovery wells	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(a) through (e)
Operation and Monitoring of groundwater treatment system	Concentrations of recovered vapors from a vacuum extraction system and post-treatment air emissions if air emissions treatment is provided, must be conducted weekly for the first month, monthly for the next two months, and quarterly thereafter. Additional sampling may be performed based upon the estimated time of breakthrough as follows: 1. Concentrations of recovered vapors from individual wells shall be determined using an organic vapor analyzer with a flame ionization	Operation of an active remediation system utilizing activated carbon off-gas treatment – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(i)(1.)(2.) and (3.)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
	detector, or other applicable field detection device in order to optimize airflow rate and contaminant recovery; 2. The influent and effluent samples shall be collected using appropriate air sampling protocols and shall be analyzed using an analytical method. 3. The samples shall be collected using appropriate air sampling protocols as specified in FAC 62-160. *NOTE*: Monitoring frequency, sampling and analysis methods will be specified in CERCLA Remedial Action Work Plan.		
Florida active remediation regulation for groundwater bioremediation systems	Specifies that operational parameters for bioremediation systems should include measurements of dissolved oxygen at representative monitoring locations; rates of biological, chemical, or nutrient enhancement additions, an any other indicators of biological activity. Conducted weekly for the first month, monthly for the next two months, and quarterly thereafter or at approved alternative frequency. *NOTE*: Monitoring frequency, sampling and analysis methods will be specified in CERCLA Remedial Action Work Plan.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(h)
Florida active remediation regulation for groundwater in-situ systems	Specifies that operations parameters for in-situ systems should include measurements of biological, chemical, or physical indicators that will verify the radius of influence at representative monitoring locations. Conducted weekly for the first month, monthly for the next two months, and quarterly for the first two years and semi-annually thereafter. *NOTE*: Monitoring frequency, sampling and analysis methods will be specified in CERCLA Remedial Action Work Plan.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(g)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Corrective action for leaks during operation of groundwater treatment system	If effluent concentrations or air concentrations exceed specified or prescribed levels or plume migration occurs during remediation system start-up of during operation of the treatment systems, then corrective actions shall be taken.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(13)
Post-Active Remediation Monitoring for groundwater treatment system	Unless otherwise provided in CERCLA Remedial Action Work Plan, the following shall be performed as follows: • A minimum of two monitoring wells is required with at least one located at the downgradient edge of the plume; and at least one located in the area(s) of highest groundwater contamination or directly adjacent; • Designated monitoring wells shall be sampled quarterly for contaminants that were present; • Water-level measurements in all designated wells and piezometers shall be made within 24-hour of initiating each sampling event.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.750(4)(a) through (c)
General standards for process vents used in treatment of VOC contaminated groundwater	Select and meet the requirements under one of the options specified below: • Control HAP emissions from the affected process vents according to the applicable standards specified in §§ 63.7890 through 63.7893. • Determine for the remediation material treated or managed by the process vented through the affected process vents that the average total volatile organic hazardous air pollutant (VOHAP) concentration, as defined in § 63.7957, of this material is less than 10 (ppmw). Determination of VOHAP concentration will be made using procedures specified in § 63.7943. Control HAP emissions from affected process vents subject to another subpart under 40 CFR part 61 or 40 CFR part 63 in compliance with the standards specified in the applicable subpart.	Process vents as defined in 40 CFR § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAP) listed in Table 1 of Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 CFR §63.7885(c)(1) – **Relevant and Appropriate**	40 CFR § 63.7885(b) F.A.C. 62-204.800(11)(b)(59)
Emission limitations for process vents used in treatment of VOC	Meet the requirements under one of the options specified below: • Reduce from all affected process vents the total emissions of the HAP to a level less than 1.4 kilograms per hour (kg/hr) and 2.8 Mg/yr (3.0 pounds per hour (lb/hr) and 3.1 tpy);	Process vents as defined in 40 CFR § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAP) listed in Table 1 of	40 CFR § 63.7890(b)(1)-(4)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
contaminated groundwater	• Reduce from all affected process vents the emissions of total organic compounds (TOC) (minus methane and ethane) to a level below 1.4 kg/hr and 2.8 Mg/yr (3.0 lb/hr and 3.1 tpy); • Reduce from all affected process vents the total emissions of the HAP by 95 percent by weight or more; or • Reduce from all affected process vents the emissions of TOC (minus methane and ethane) by 95 percent by weight or more.	Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 CFR § 63.7885(c)(1) – **Relevant and Appropriate**	F.A.C. 62-204.800(11)(b)(59)
Standards for closed vent systems and control devices used in treatment of VOC contaminated groundwater	For each closed vent system and control device you use to comply with the requirements above, you must meet the operating limit requirements and work practice standards in Sec. 63.7925(d) through (j) that apply to the closed vent system and control device. *NOTE:* EPA approval to use alternate work practices under paragraph (j) in 40 CFR § 63.7925 will be obtained in a CERCLA document	Closed vent system and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7890(c) F.A.C. 62-204.800(11)(b)(59)
Monitoring of closed vent systems and control devices used in treatment of VOC contaminated groundwater	Must monitor and inspect the closed vent system and control device according to the requirements in 40 CFR § 63.7927 that apply to the affected source. *NOTE:* Monitoring program will be developed as part of the CERCLA process and included in an appropriate CERCLA document.	Closed vent system and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7892 F.A.C. 62-204.800(11)(b)(59)
Treatment in Miscellaneous Treatment Units (with air emissions)	Unit must be located, designed, constructed, operated and maintained, and closed in a manner that will ensure protection of human health and the environment.	Treatment of RCRA hazardous waste in miscellaneous units, except as provided in 40 CFR 264.1 – **Relevant and Appropriate**	40 CFR 264.601
	Protection of human health and the environment includes, but is not limited to, prevention of any release that may have adverse effects due to migration of waste constituents in the air considering the factors listed in 40 CFR 264.601(C)(1)-(7).		40 CFR 264.601(c)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
	The requirements of RCRA Subpart A, Air Emission Standards for Process Vents do not apply to process vents that would otherwise be subject to this subpart when equipped with emission controls and operated in accordance with an applicable Clean Air Act regulation codified under 40 CFR Part 60, Part 61 or Part 63.	Process vents associated with the air or steam stripping operations that manage hazardous wastes with organic concentrations of at least 10 ppm – **Relevant and Appropriate**	40 CFR 264.1030(e)
	The requirements of RCRA Subpart CC, Air Emission Standards for Tanks, Surface Impoundments and Containers do not apply to a waste management unit that is solely used for on-site treatment or storage of hazardous waste that is placed in the unit as a result of implementing remedial activities required under RCRA 3004(u) and (v) or 3008(h), or CERCLA authorities.	Air pollutant emissions with volatile organics from a hazardous waste tank, surface impoundment or container – **Relevant and Appropriate**	40 CFR 264.1080(a)(5)
Wastewater Treatment and Disposal — Contaminated Groundwater			
Discharge of treated groundwater to a Wastewater Facility	An industrial user shall not introduce into a Wastewater faciility (WWF) any pollutant which causes pass through or interference.	Discharge pollutants into a "Wastewater Facility" as defined in F.A.C. 62-625.200(29) by an industrial user (i.e., source of discharge) – **Applicable**	F.A.C. 62-625.400(1)(a) General Prohibitions
Discharge of treated groundwater to a Wastewater Facility	The following pollutants shall not be introduced into a WWF: • Pollutants which create a fire or explosion hazard in the WWF • Pollutants which will cause corrosive structural damage to the WWF, but in no case discharges with pH lower than 5.0, unless the WWF is specifically designed to accommodate such discharges; • Solid or viscous pollutants in amounts which will cause obstruction to the flow in the WWF resulting in interference; • Any pollutant, including oxygen demanding pollutants, released in a discharge at a flow rate or pollutant concentration which will cause interference with the WWF; • Heat in amounts which will inhibit biological activity in the WWF resulting in interference, but in no case heat in such quantities that result in the discharge from the treatment plant having a temperature that exceeds 40° C (104° F) unless the Department, upon request of	Discharge pollutants into a "Wastewater Facility" as defined in F.A.C. 62-625.200(29) by an industrial user (i.e., source of discharge) – **Applicable**	F.A.C. 62-625.400(2)(a)-(h) Specific Prohibitions

Action-Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
	the control authority, approves alternate temperature limits in accordance with Rule 62-302.520, F.A.C.; • Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through; • Pollutants which result in the presence of toxic gases, vapors, or fumes within the WWF in a quantity that will cause acute worker health and safety problems; or • Any trucked or hauled pollutants, except at discharge points designated by the control authority.		
	Local Limits: Where specific prohibitions or limits on pollutants or pollutant parameters are developed by a public utility in accordance with F.A.C. 62-625.400(3), such limits shall be deemed to be pretreetment standards.	Discharge pollutants into a "Wastewater Facility" as defined in F.A.C. 62-625.200(29) by an industrial user (i.e., source of discharge) – **Applicable**	F.A.C. 62-625.400(4)
Waste Characterization – Primary Waste (e.g., excavated waste and contaminated soil, purged ground water) and Secondary Wastes (e.g., contaminated equipment or treatment residuals)			
Characterization of ***solid waste*** (all primary and secondary wastes)	Must determine if solid waste is a hazardous waste using the following method: • Should first determine if waste is excluded from regulation under 40 CFR 261.4; and • Must then determine if waste is listed as a hazardous waste under subpart D 40 CFR Part 261.	Generation of solid waste as defined in 40 CFR 261.2 – **Applicable**	40 CFR 262.11(a) and (b) F.A.C. 62-730.160
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261by either: (1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or	Generation of solid waste which is not excluded under 40 CFR 261.4(a) – **Applicable**	40 CFR 262.11(c) F.A.C. 62-730.160

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
	(2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste – **Applicable**	40 CFR 262.11(d) F.A.C. 62-730.160
Characterization of ***hazardous waste*** (all primary and secondary wastes)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR 264 and 268.	Generation of RCRA hazardous waste for storage, treatment or disposal – **Applicable**	40 CFR 264.13(a)(1) F.A.C. 62-730.180(1)
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 et seq. Note: This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment or disposal – **Applicable**	40 CFR 268.9(a) F.A.C. 62-730.183
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non –wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – **Applicable**	40 CFR 268.9(a) F.A.C. 62-730.183
Determinations for management of hazardous waste	Must determine if the hazardous waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste.	Generation of hazardous waste for storage, treatment or disposal – **Applicable**	40 CFR 268.7(a) F.A.C. 62-730.183

Action-Specific ARARs

Action	Requirement	Prerequisite	Citation
	Note: This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.		
	Must comply with the special requirements of 40 CFR 268.9 in addition to any applicable requirements in CFR 268.7.	Generation of waste or soil that displays a hazardous characteristic of ignitability, corrosivity, reactivity, or toxicity for storage, treatment or disposal – **Applicable**	40 CFR 268.7(a) F.A.C. 62-730.183
Waste Storage – Primary Waste (e.g., excavated waste and contaminated soil) and Secondary Wastes (e.g., contaminated equipment or treatment residuals)			
Temporary on-site storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that: • waste is placed in containers that comply with 40 CFR 265.171 –173; and • the date upon which accumulation begins is clearly marked and visible for inspection on each container; • container is marked with the words "hazardous waste"; or	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 – **Applicable**	40 CFR 262.34(a); 40 CFR 262.34(a)(1)(i); 40 CFR 262.34(a)(2) and (3) F.A.C. 62-730.160
	• container may be marked with other words that identify the contents.	Accumulation of 55 gal. or less of RCRA hazardous waste or one quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – **Applicable**	40 CFR 262.34(c)(1) F.A.C. 62-730.160
Use and management of hazardous waste in containers	If container is not in good condition (e.g. severe rusting, structural defects) or if it begins to leak, must transfer waste from this container to a container that is in good condition.	Storage of RCRA hazardous waste in containers – **Applicable**	40 CFR 265.171 F.A.C. 62-730.180(2)
	Must use container made or lined with materials compatible with waste to be stored so that the ability of the container to contain is not impaired.		40 CFR 265.172

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
			F.A.C. 62-730.180(2)
	Containers must be closed during storage, except when necessary to add/remove waste. Container must not opened, handled and stored in a manner that may rupture the container or cause it to leak.		40 CFR 265.173(a) and (b) F.A.C. 62-730.180(2)
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 CFR 264.175(b)	Storage of RCRA hazardous waste in containers with *free liquids* – **Applicable**	40 CFR 264.175(a) F.A.C. 62-730.180(1)
	Area must be sloped or otherwise designed and operated to drain liquid resulting from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA–hazardous waste in containers *that do not contain free liquids* (other than F020, F021, F022, F023,F026 and F027) – **Applicable**	40 CFR 264.175(c)(1) and (2) F.A.C. 62-730.180(1)
Closure of RCRA container storage unit	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit with a containment system – **Applicable**	40 CFR 264.178 F.A.C. 62-730.180(1)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Storage and processing of non-hazardous waste	No person shall store, process, or dispose of solid waste except as authorized at a permitted solid waste management facility or a facility exempt from permitting under this chapter. No person shall store, process, or dispose of solid waste in a manner or location that causes air quality standards to be violated or water quality standards or criteria of receiving waters to be violated.	Management and storage of solid waste – **Applicable**	F.A.C. 62 701.300(1)(a) and (b)
Temporary on –site storage of remediation waste in staging pile (e.g., excavated soils)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated. For purposes of this section, storage includes mixing, sizing, blending or other similar physical operations so long as intended to prepare the wastes for subsequent management or treatment.	Accumulation of ***solid non–flowing hazardous remediation waste*** (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR 260.10 – **Applicable**	40 CFR § 264.554(a)(1) F.A.C. 62- 730.180(1)
Performance criteria for staging pile	Staging pile must: • facilitate a reliable, effective and protective remedy; be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, • and minimize or adequately control cross–media transfer as necessary to protect human health and the environment (e.g. use of liners, covers, run–off/run–on controls).	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(1)(i) and (ii) F.A.C. 62- 730.180(1)
Operation of a staging pile	Must not operate for more than 2 years, except when an operating term extension under 40 CFR 264.554(i) is granted. *Note:* Must measure the 2-year limit (or other operating term specified) from first time remediation waste placed in staging pile	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(1)(iii) F.A.C. 62-730.180(1)
	Must not use staging pile longer than the length of time designated by EPA in the appropriate decision document		40 CFR § 264.554(h)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
	Extension of up to an additional 180 days beyond the operating term limit may be granted provided the continued operation of the staging pile will not pose a threat to human health and the environment; and is necessary to ensure timely and efficient implementation of remedial actions at the facility.		40 CFR § 264.554(i)(1)(i) and (ii)
Management of staging pile	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that:	Storage of ignitable or reactive remediation waste in staging pile – **Applicable**	40 C.F.R. §264.554(e)
	• The remediation waste no longer meets the definition of ignitable or reactive under 40 C.F.R. 261.21 or 40 C.F.R. 261.23; and		40 C.F.R. §264.554(e)(1)(i)
	• You have complied with 40 C.F.R. §264.17(b); or		40 C.F.R. §264.554(e)(1)(ii)
	• Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.		40 C.F.R. §264.554(e)(2)
	Must not place in the same staging pile unless you have complied with 40 C.F.R. § 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 C.F.R. § 260.10) in staging pile – **Applicable**	40 C.F.R. §264.554(f)(1)
	Must separate the incompatible waste or materials or protect them from one another by using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units – **Applicable**	40 C.F.R. §264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless you have sufficiently decontaminated the base to comply with 40 C.F.R. § 264.17(b).		40 C.F.R. §264.554(f)(3)

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
Design criteria for staging pile	In setting standards and design criteria must consider the following factors: • Length of time pile will be in operation; • Volumes of waste you intend to store in the pile; • Physical and chemical characteristics of the wastes to be stored in the unit; • Potential for releases from the unit; • Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • Potential for human and environmental exposure to potential releases from the unit.	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(2)(i) –(vi) F.A.C. 62- 730.180(1)
Closure of staging pile of remediation waste	Must be closed within 180 days after the operating term by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate. Must decontaminate contaminated sub-soils in a manner that EPA determines will protect human and the environment.	Storage of remediation waste in staging pile in ***previously contaminated area*** – **Applicable**	40 CFR § 264.554(j)(1) and (2) F.A.C. 62- 730.180(1)
	Must be closed within 180 days after the operating term according to 40 CFR 264.258(a) and 264.111 or 265.258(a) and 265.111.	Storage of remediation waste in staging pile ***in uncontaminated area*** – **Applicable**	40 CFR § 264.554(k) F.A.C. 62- 730.180(1)
Waste Treatment and Disposal – Secondary Wastes (e.g., contaminated equipment or treatment residuals)			
Disposal of RCRA hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA waste – **Applicable**	40 CFR 268.40(a) F.A.C. 62-730.183
	All underlying hazardous constituents [as defined in 40 CFR 268.2(i)] must meet the UTS, found in 40 CFR 268.48 Table UTS prior to land disposal	Land disposal of restricted RCRA characteristic wastes (D001 –D043) that are not managed in a wastewater	40 CFR 268.40(e) F.A.C. 62-730.183

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
		treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **Applicable**	
Disposal of RCRA hazardous waste in a land-based unit	To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards of 40 CFR 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentration in the waste extract or waste, or the generator may use knowledge of the waste. If the waste contains constituents (including UHCs in the characteristic wastes) in excess of the applicable UTS levels in 40 CFR 268.48, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.	Land disposal of RCRA toxicity characteristic wastes (D004 –D011) that are newly identified (i.e., wastes, soil, or debris identified by the TCLP but not the Extraction Procedure) – **Applicable**	40 CFR 268.34(f) F.A.C. 62-730.183
Disposal of RCRA characteristic wastewaters in a POTW	Are not prohibited, if wastes are treated for purposes of the pretreatment requirements of Section 307 of the CWA, unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR 268.40, or are D003 reactive cyanide.	Land disposal of hazardous wastewaters that are hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 CFR 268 – **Applicable**	40 CFR 268.49(b) F.A.C. 62-730.183
Capping Waste in Place – Closure and Post-Closure Care			
RCRA C Landfill closure performance standard	Must close the unit in a manner that: • minimizes the need for further maintenance; and • controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post –closure escape of hazardous waste, hazardous constituents, leachate, contaminated run –off, or hazardous waste decomposition products to ground or surface waters or to the atmosphere; and	Closure of a RCRA hazardous waste management unit – **Relevant and Appropriate**	40 CFR 264.111(a) – (c)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
	• complies with the relevant closure and post –closure requirements of 40 CFR 264.310.		
RCRA C Landfill cover design and construction	Must cover the landfill or cell with a final cover designed and constructed to: • provide long –term minimization of migration of liquids through the closed landfill; • function with minimum maintenance; • promote drainage and minimize erosion or abrasion of the cover; • accommodate settling and subsidence so that the cover=s integrity is maintained; and • have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	Closure of a RCRA hazardous waste management unit – **Relevant and Appropriate**	40 CFR 264.310(a)(1)–(5)
	This document recommends and describes a design for landfill covers that will meet the requirements of RCRA regulations. It is a multilayered system consisting, from the top down, of: • a top layer of at least 60 cm of soil, either vegetated or armored at the surface; • a granular or geosynthetic drainage layer with a hydraulic transmissivity no less than 3 x 10"5 cm /sec; and • a two–component low permeability layer comprised of (1) a flexible membrane liner installed directly on (2) a compacted soil component with an hydraulic conductivity no greater than 1 x 10–7 cm/sec. Optional layers may be added, e.g., a biotic barrier layer or a gas vent layer, depending on the need.	Construction of a RCRA hazardous waste landfill final cover –**TBC**	*EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments,* EPA OSWER 530 – SW –89 –047, (July 1989)
Run–on/run–off control systems for RCRA C landfill	Run–on control system must be capable of preventing flow onto the active portion of the landfill during peak discharge from a 25–year storm event.	Construction of a RCRA hazardous waste landfill cover – **Relevant and Appropriate**	40 CFR 264.301(g)
	Run–off management system must be able to collect and control the water volume from a runoff resulting from a 24–hour, 25–year storm event.		40 CFR 264.301(h)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Protection of closed RCRA C landfill	Post–closure use of property must never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system or the facility's monitoring system unless necessary to reduce a threat to human health or the environment.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.117(c)
General post–closure care for closed RCRA C landfill	Owner or operator must: • maintain the effectiveness and integrity of the final cover including making repairs to the cap as necessary to correct effects of settling, erosion, etc.; • prevent run–on and run–off from eroding or otherwise damaging final cover; and • protect and maintain surveyed benchmarks used to locate waste cells.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.310(b)(1), (5) and (6)
Post–closure notices for closed RCRA C landfill	Must submit to the local zoning authority a record of the type, location, and quantity of hazardous wastes disposed of within each cell of the unit.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.119(a)
	Must record, in accordance with State law, a notation on the deed to the facility property or on some other instrument which is normally examined during a title search – that will in perpetuity notify any potential purchaser of the property that: • land has been used to manage hazardous wastes; • its use is restricted under 40 CFR Part 264 Subpart G regulations; and • the survey plat and record of the type, location, and quantity of hazardous wastes disposed within each cell or other hazardous waste disposal unit of the facility required by Sections 264.116 and 264.119(a) have been filed with the local zoning authority and with the EPA Regional Administrator.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.119(b)(1)(i)-(iii)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
General Criteria for FL Landfills	A landfill shall be designed, constructed, operated, maintained, closed, and monitored throughout its design period to control the movement of waste and waste constituents into the environment so that water quality standards and criteria and air quality standards will not be violated.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.340(1)
FL Solid Waste Landfill cover design and construction	Landfills shall have a final cover designed to minimize infiltration and erosion, which shall include a barrier layer consisting of a soil layer, a geomembrane, or a combination of a geomembrane with a low permeability material.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(3)(g)(1)
	All geosynthetic and soil components used in the final cover shall meet the [substantive] standards and specifications contained in subparagraphs 62-701.400(3)(d)1. and 2., (3)(d)5.-11., paragraph (e), and (f), F.A.C.		F.A.C. 62-701.600(3)(g)(1)
	For unlined Class I landfills (i.e., unlined landfills containing "Class I waste"), the barrier layer shall have a permeability of 1×10^{-7} cm/sec or less. "Class I waste" means solid waste that is not hazardous waste, and that is not prohibited from disposal in a lined landfill under Rule 62-701.300, F.A.C. See F.A.C., 62-701.200(13).		F.A.C. 62-701.600(3)(g)(1)
FL Solid Waste Landfill cover design and construction (barrier layer)	• If the barrier layer consists only of soil, follow the design specifications provided in F.A.C. 62-701.600(3)(g)(2). • If the barrier layer consists only of a Geosynthetic Clay Liner (GCL), follow the design specifications provided in F.A.C. 62-701.600(3)(g)(3). • If a geomembrane is used in the barrier layer, follow the design specifications provided in F.A.C. 62-701.600(3)(g)(4).		F.A.C. 62-701.600(3)(g)(2) through (4).
FL Solid Waste Landfill cover design and construction (Alternate design)	One may use an alternate design for the barrier layer or parts of the barrier layer, or for the protective soil layer, upon a demonstration that the alternate design will result in a substantially equivalent rate of storm water infiltration through the final cover. *NOTE*: Remedial Design and Remedial Action Work Plan will document any approved alternative design.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(3)(g)(6)

Action-Specific ARARs

Action	Requirement	Prerequisite	Citation
FL Solid Waste Landfill cover design and construction (Stormwater control)	The closure design plan shall demonstrate how the stormwater management systems shall be operated and maintained as necessary to meet the requirements of subsection 62-701.400(9), F.A.C. *NOTE:* Remedial Design and Remedial Action Work Plan will include necessary information.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(3)(h)
FL Solid Waste Landfill cover design and construction (Access control)	The closure design plan shall show how access to the closed landfill shall be restricted to prevent any future waste dumping or use of the facility by unauthorized persons. *NOTE*: Remedial Design and Remedial Action Work Plan will include necessary information.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(i)
FL Solid Waste Landfill cover design and construction (Boundary markers)	Concrete monuments shall be installed to mark the boundaries of the landfill property and other permanent markers shall be installed to outline the general waste filled areas. These markers shall be tied to one or more of the boundary markers by a survey performed by an engineer or a Florida Licensed Professional Surveyor and Mapper. The location and elevation of all markers shall be shown on a site plan filed with the "Declaration to the Public" described in F.A.C. 62-701.600(7)	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) with a final elevation of less than 20 feet above the natural land surface – **Relevant and Appropriate**	F.A.C. 62-701.600(6)(a)
FL Solid Waste Landfill Deed Notice	Once closure construction has been completed, the landfill owner or operator shall file a declaration to the public in the deed records in the office of the county clerk of the county in which the landfill is located. The declaration shall include a legal description of the property on which the landfill is located and a site plan specifying the area actually filled with solid waste. The declaration shall also include a notice that any future owner or user of the site should consult with the FDEP prior to planning or initiating any activity involving the disturbance of the landfill cover, monitoring system or other control structures. A certified copy of the declaration shall be filed with the FDEP.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(7)
FL Solid Waste Landfill cover design and construction	The final cover shall be vegetated to control erosion and provide a moisture infiltration seal, with species that are drought resistant and have roots that will not penetrate the final cover.	Closure of a Class I solid waste landfill as defined in F.A.C 62-	F.A.C. 62-701.600(3)(f)(2)

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
(Vegetation and Grading)		701.340(2)(a) – **Relevant and Appropriate**	
	Top gradients of final cover on landfill areas shall be graded to maximize runoff and minimize erosion, considering total fill height and expected subsidence caused by decomposing waste, and shall be designed to prevent ponding or low spots.		F.A.C. 62-701.600(3)(f)(3)
Warning Signs at Hazardous Waste Sites	Shall place warning signs pursuant to Chaper 62-730, F.A.C.	Site located in Florida where risk of exposure to the public exists due to contaminated soil and sediment– **Relevant and Appropriate**	F.A.C. 62-780.220(5)
Waste Transportation – Primary and Secondary Wastes			
Transportation of hazardous waste *on–site*	The generator manifesting requirements of 40 CFR 262.20–262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right–of–way.	Transportation of hazardous wastes on a public or private right–of–way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right–of–way – **Applicable**	40 CFR 262.20(f) F.A.C. 62-730.160
Transportation of hazardous waste *off–site*	Must comply with the generator standards of Part 262 including 40 CFR 262.20–23 for manifesting, Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding,	Preparation and initiation of shipment of hazardous waste off–site – **Applicable**	40 CFR 262.10(h); F.A.C. 62-730.160
Transportation of *hazardous materials*	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 CFR 171–180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in	49 CFR 171.1(c)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
		commerce," or causes to be transported or shipped, a hazardous material – **Applicable**	
Transportation of samples (i.e. contaminated soils and wastewaters)	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: • the sample is being transported to a laboratory for the purpose of testing; or • the sample is being transported back to the sample collector after testing; • the sample is being stored by sample collector before transport to a lab for testing	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – **Applicable**	40 CFR 261.4(d)(1)(i)–(iii) F.A.C. 62-730.030

ARAR = applicable *or* relevant and appropriate requirement
CFR = Code of Federal Regulations
CWA = Clean Water Act
F.A.C. = Florida Administrative Code, Chapters as specified
FDEP = Florida Department of Environmental Protection
F.S. = Florida Statutes
HAP = hazardous air pollutant
HMTA = Hazardous Materials Transportation Act
HMR = Hazardous Materials Regulations
RCRA = Resource Conservation and Recovery Act
TCLP = toxicity characteristic leaching procedure
UHCs = underlying hazardous constituents
USDW = Underground Sources of Drinking Water
UTS = Universal Treatment Standards
VOC = volatile organic compound

Table 15 Selected Remedy Cost Estimate Summary

CMZ Selected Alternative		Capital Cost	Estimated Annual O&M Costs*	Estimated Present Worth Cost (5% Discount Rate)	Estimated Present Worth Cost (7% Discount Rate)	Estimated Construction Timeframe	Estimated Time to Achieve RAO/Cleanup Levels (years)
	CMZ-1 Main Source Area (On-Facility)						
Alternative 2	Barrier Wall Containment with Cap	$4,822,503	$12,000	**$5,067,800**	**$5,020,600**	12 months	30
	CMZ-2A Extended NAPL Plume (On-Facility)						
Alternative 3	SEE	$10,993,334	$0*	**$10,993,300**	**$10,993,300**	12 months	1
	CMZ-2B Extended NAPL Plume (Off-Facility)						
Alternative 3	SEE	$5,002,200	$0*	**$5,002,200**	**$5,002,200**	12 months	1
	CMZ-3 Secondary Source Area/Absorbed Phase (On-Facility)						
Alternative 2	ISCO/ISEB Barriers	$2,731,942	$125,000	**$3,182,200**	**$3,161,000**	6 months	6
	CMZ-4A On-Facility Surface Soil Contamination						
Alternative 2	Excavation, Encapsulate On-Facility in Barrier Wall on top of CMZ-1	$1,502,736	$0	**$2,006,200**	**$2,006,200**	8 months	1
	CMZ-4B Off-Facility Surface Soil Contamination						
Alternative 4	Excavation/Disposal On-Facility Over CMZ-2A/-3 Areas	$4,064,746	$0*	**$5,426,400**	**$5,426,400**	12-18 months	1
	CMZ-5 Dissolved Groundwater Plume						
Alternative 3	ISCO/ISEB Treatment Barrier	$926,521	$150,300	**$3,409,300**	**$3,138,000**	8 months	10
	Site-wide Costs						
Statutory Costs	Institutional Controls, Five-Year Reviews	$28,400	$213,307	**$241,600**	**$241,600**	NA	30
Total Costs:		**$35,329,000**			**$34,989,300**		

Notes: * - Long term O&M costs included in Site-wide Statutory Costs

Figure 1 Site Location Map

Figure 2 Site Layout

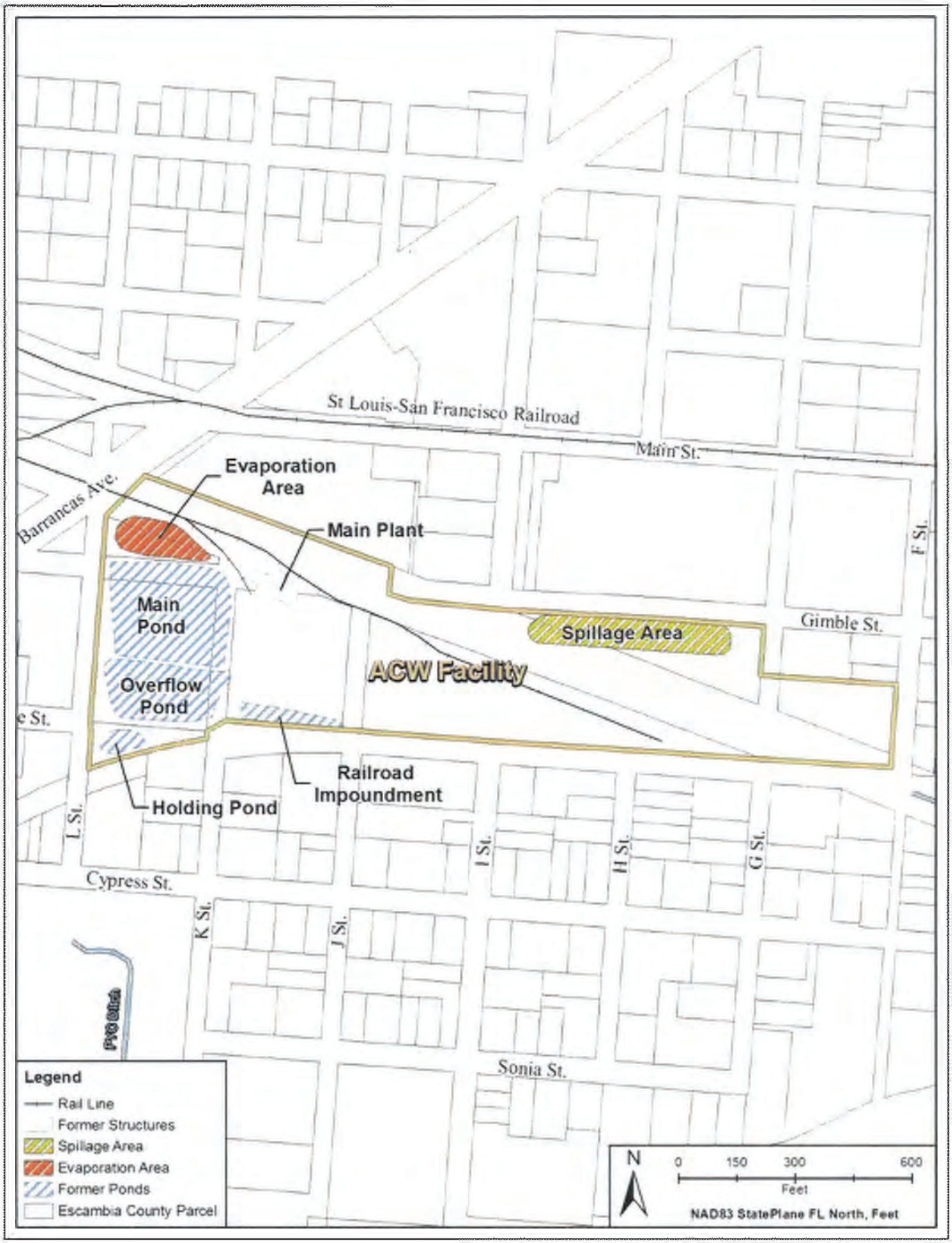
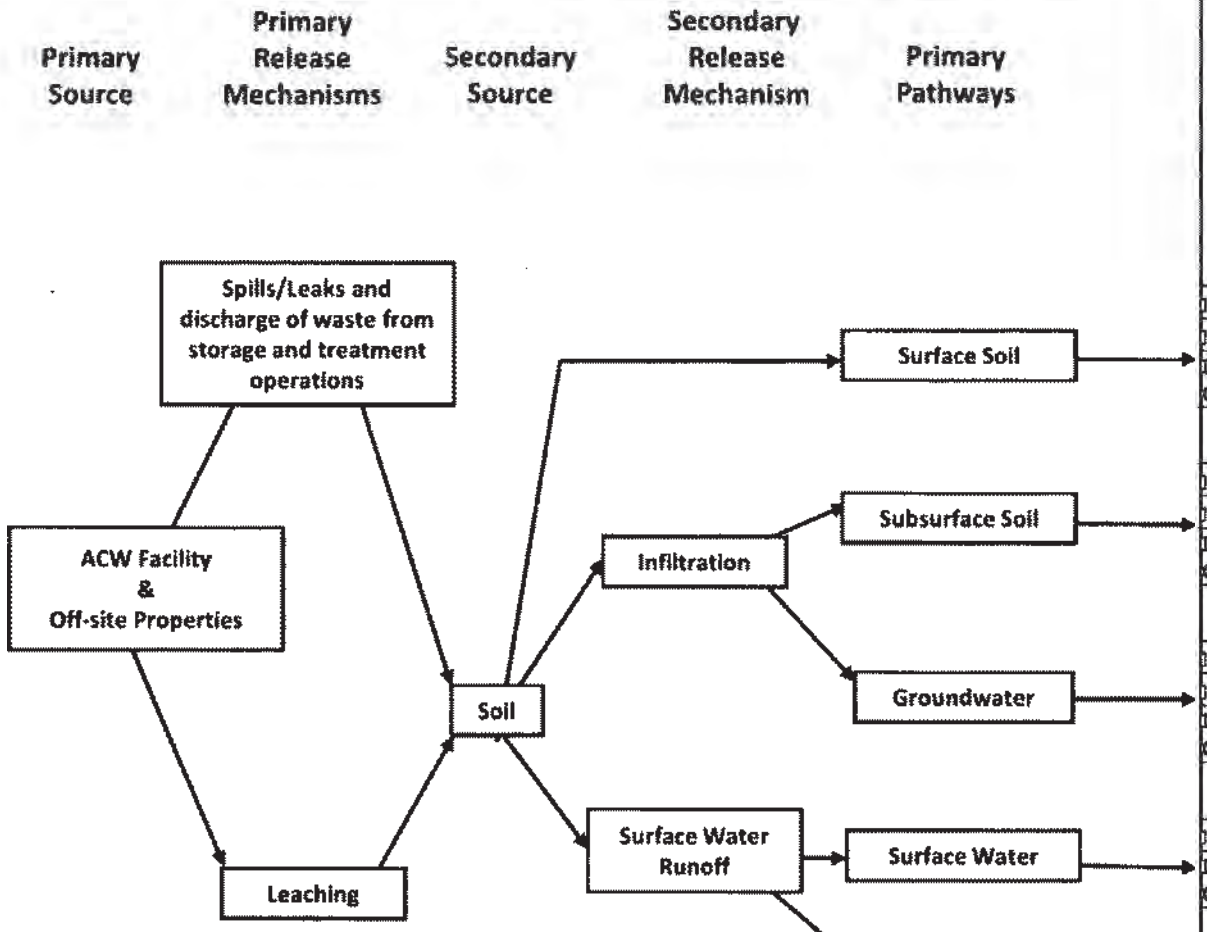


Figure 3
Human Health Conceptual Site Model
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida



X Pathway was quantitatively evaluated
NA Not applicable

Potential Human Receptors

Exposure Route	Current			Future		
	Industrial/Commercial Worker	Resident (Lifetime & Child)	Recreational User (Lifetime & Child)	Industrial/Commercial Worker	Resident (Lifetime & Child)	Recreational User (Lifetime & Child)
Ingestion	X	X	X	X	X	X
Inhalation	X	X	X	X	X	X
Dermal Contact	X	X	X	X	X	X
Ingestion	NA	NA	NA	NA	NA	NA
Inhalation	NA	NA	NA	NA	NA	NA
Dermal Contact	NA	NA	NA	NA	NA	NA
Ingestion	NA	NA	NA	NA	X	NA
Inhalation	NA	NA	NA	NA	X	NA
Dermal Contact	NA	NA	NA	NA	X	NA
Ingestion	NA	NA	NA	NA	NA	NA
Dermal Contact	NA	NA	NA	NA	NA	NA
Ingestion	NA	X	X	NA	X	X
Dermal Contact	NA	X	X	NA	X	X

Figure 4
Ecological Conceptual Site Model
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida

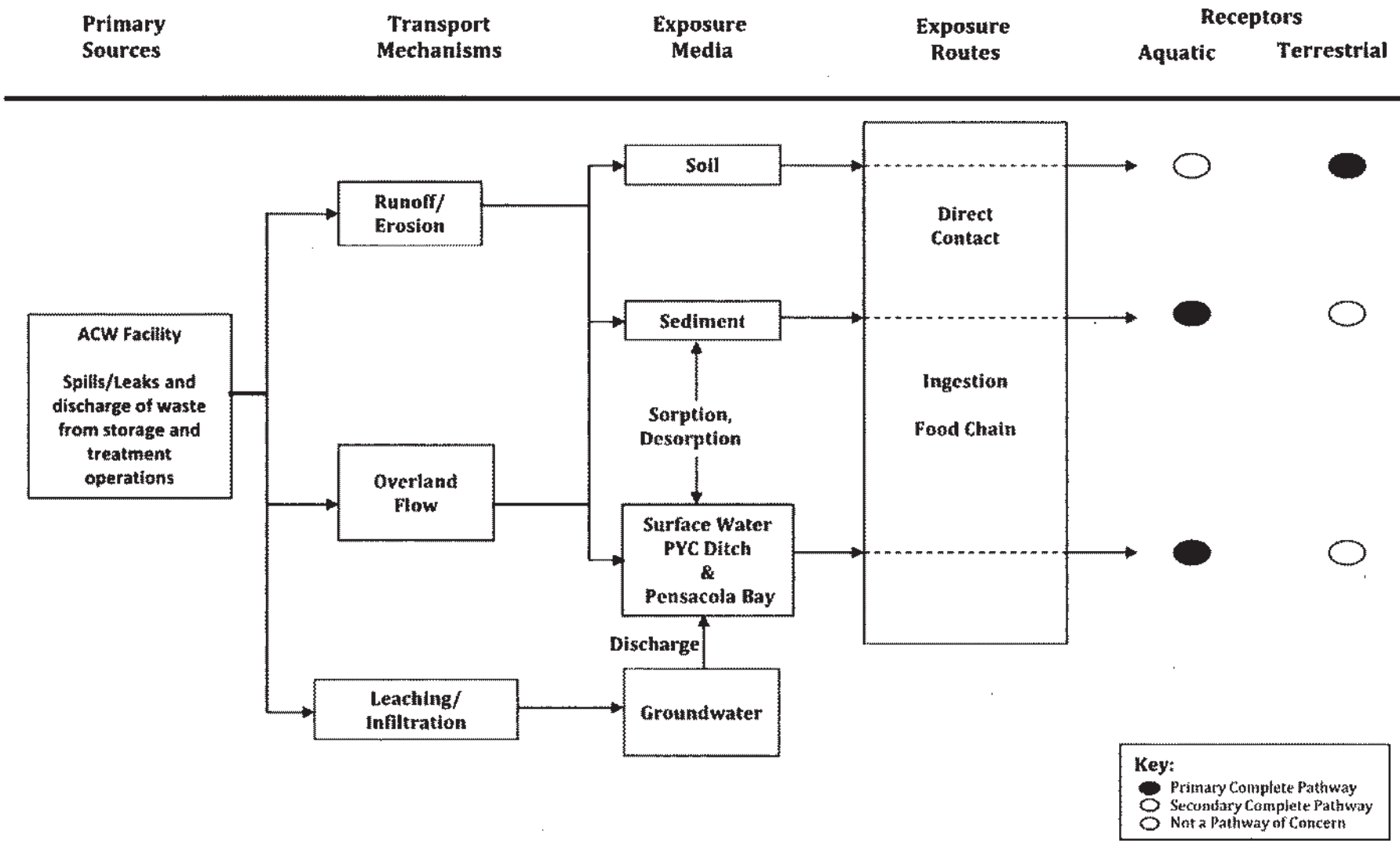


Figure 5 Dioxin Exposure Units Due to Overland Flow

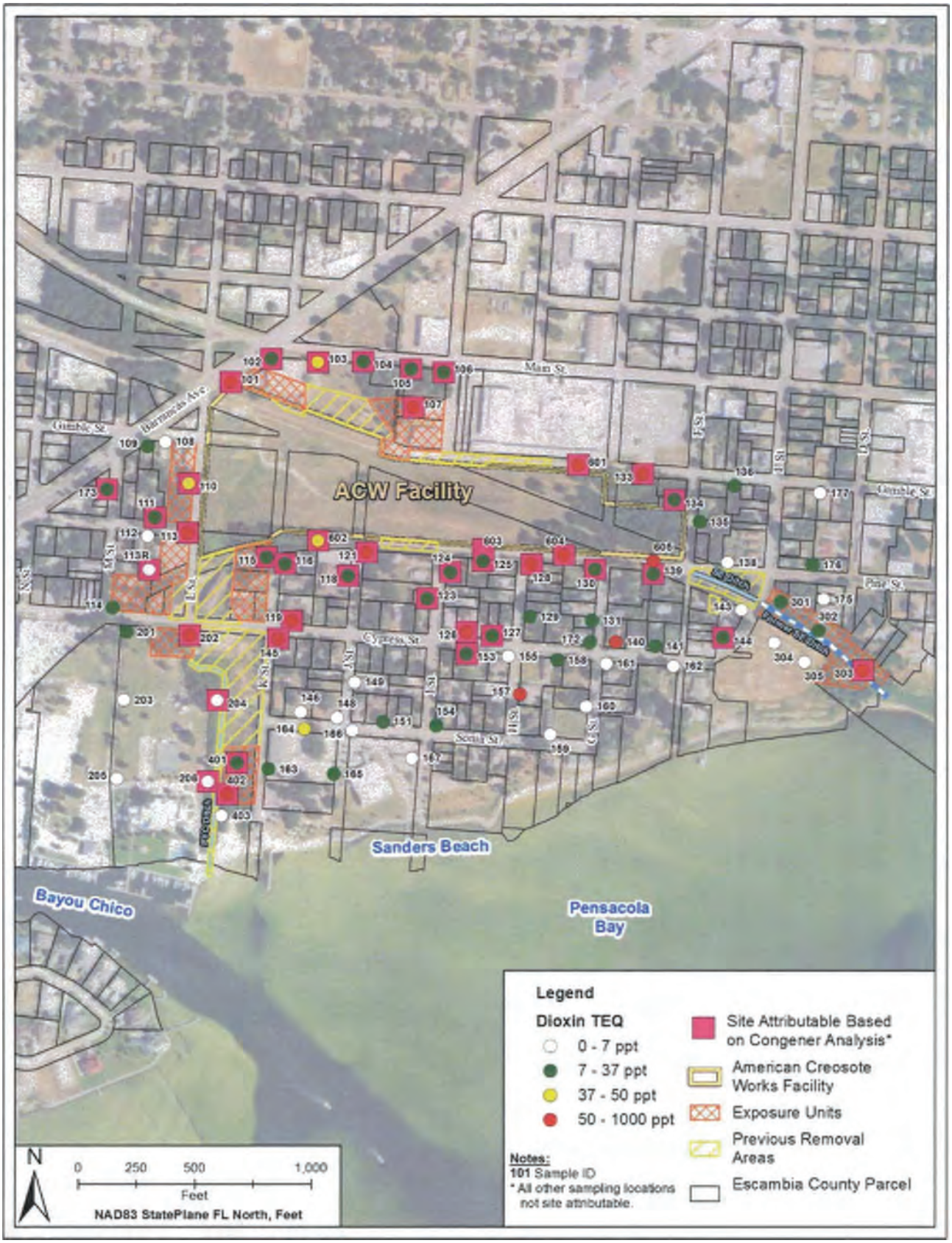


Figure 6 Dioxin Exposure Units Due to Vehicular Traffic

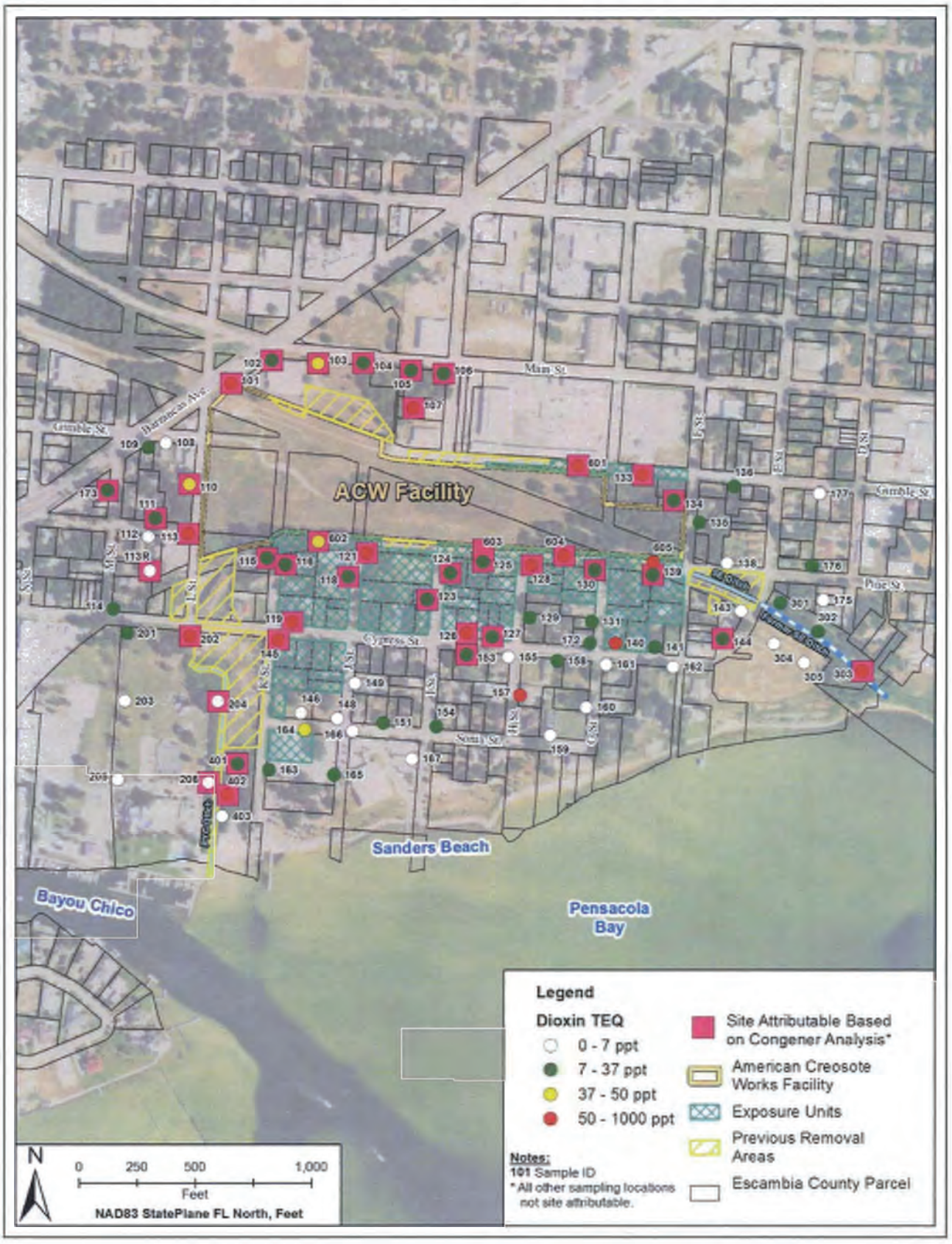


Figure 7 Contaminated Media Zones

Figure 8 Approximate Extent of NAPL in Upper Sand – November 2011

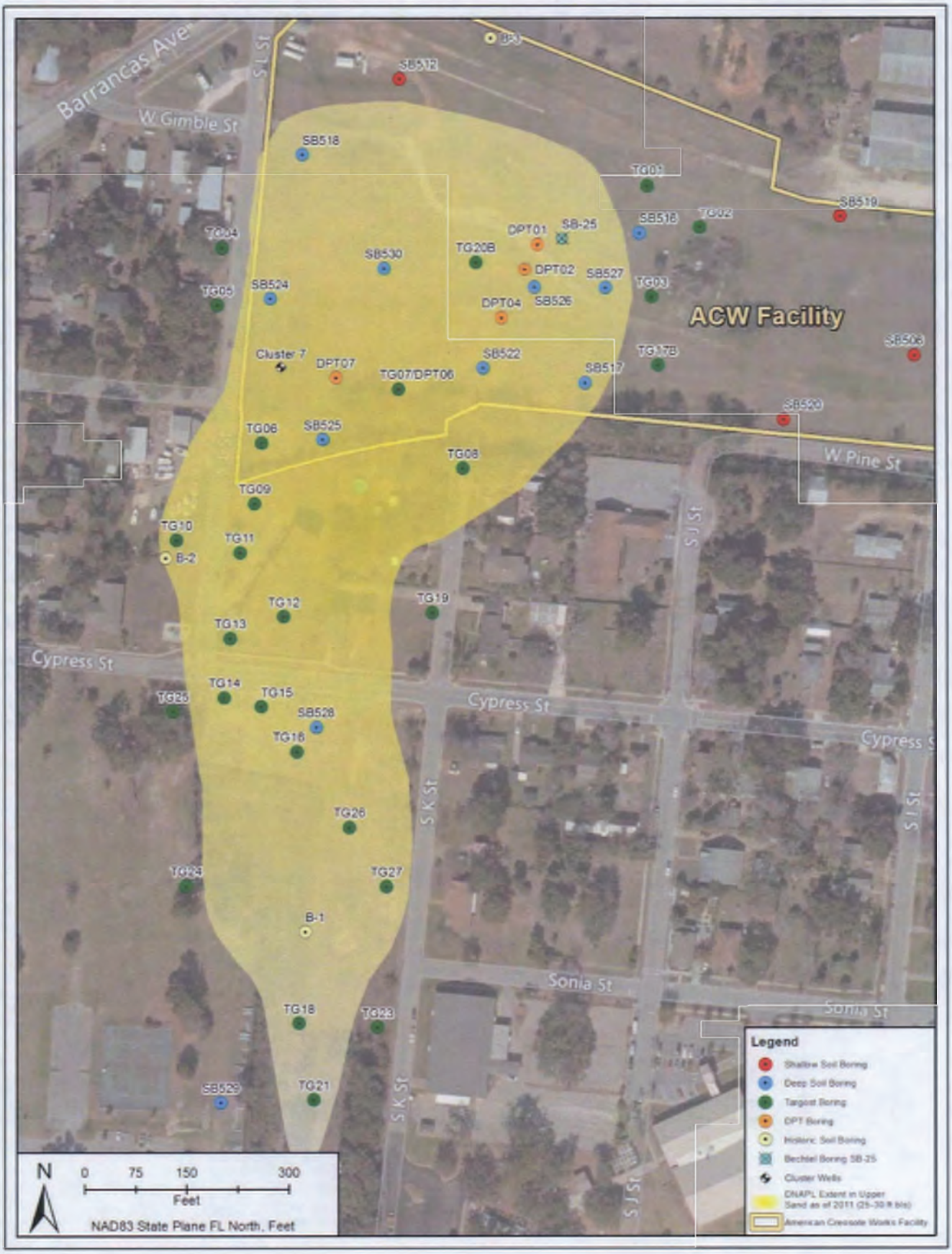


Figure 9 Approximate Extent of NAPL in Lower Sand – November 2011

Figure 10 Preferred Remedial Alternatives

Remedial Alternative Summary

CMZ	Recommended Alternative	Description
1	Barrier Wall Containment w/Cap	Encapsulate soils to ~110-ft bls in barrier wall keyed in clay; Includes soils from CMZ-2A, 4A from 0-3 ft bls; includes 9,208 bcy of soil that exceeds LDR criteria from CMZ-4B
2A	Steam Enhanced Extraction	Steam injection via wells; thermal enhanced NAPL recovery, extraction of groundwater, and stripped gasses
2B	Steam Enhanced Extraction	
3	ISCO / ISEB Barriers	Oxygen infused biobarriers to 80-ft bls; ISCO barrier on south edge for treating PCP plume
4A	Excavation/Encapsulate On-Facility in Barrier Wall (CMZ-1)	All CMZ-4A (except from CMZ-3)soils moved to CMZ-1; 20,870 bcy added
4B	Excavation/Encapsulate On-Facility Over CMZ-2A/3 Areas	Soil under LDR placed in Area CMZ-2A/3/4A and covered with 2-ft soil cover
5	ISCO/ISEB Treatment Barriers	ISCO/ISEB barriers to protect Bay

APPENDIX A
RESPONSE TO COMMENTS

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
Dorothy Bishop (b) (6)	I was born in Pensacola in 1934. I clearly recall riding over the viaduct looking down on the Black Lake of creosote with floating telephone poles. I purchased my home at (b) (6) (b) (6) My first thought was to put in my deep well pump. The installer said not to drink the water or let my granddaughter swim in a kiddy pool. Only to water flowers. It didn't happen. Everything I planted died. Having lived in all areas of Pensacola I assumed anything I planted would leap out of the soil. The existing plants died after a few years. Now, if I want flowers (or trees) I have to use a pot with my own created soil. I have lots of flowers, all of them in pots. It's very depressing, I'm 83 my pleasures are few. But, it's not planting anything – trees, shrubs, perennials, cut flowers. I'm hoping you can help me in my last years, doing what I love. There are many extenuating circumstances. Thank you, Sincerely,	Your address of (b) (6) Street is 800 feet up gradient and north of the site. The is no evidence of any ACW related groundwater contamination flowing up gradient to this address. The nearest well cluster is cluster number 10 located north of Pine Street. Cluster number 10 is approximately 1000 feet to the Southeast of your property. It was most recently sampled in 2015. The groundwater was sampled and analyzed. It showed no contamination in the groundwater. There is no evidence that contamination from ACW would migrate up gradient by 800 feet to your address. If you do have issues with your soil it could be related to other non-ACW sources.
Ashton J. Hayward, Mayor Jewel Cannada-Wynn, Councilwoman Dist. 7	This letter is in response to the solicitation for comments and to state our support of the Proposed Cleanup Plan for the American Creosote Works (ACW) Superfund Site. ACW is situated immediately adjacent to the Sanders Beach neighborhood as well as in close proximity to Pensacola Bay. Sanders Beach is within the City's Westside Redevelopment Area which suffers from a high degree of economic distress. Fifty percent of the structures are in dilapidated to slightly deteriorated condition. Fifty-five percent of these structures were built prior to 1950. Thirty percent of the families live below the poverty level.	EPA is moving forward with remediating the entire site with this sitewide record of decision (ROD). Once the cleanup has been completed, there will be no exposure routes to the public from soil exposure. The groundwater remedy is an interim remedy. There will be a lot of groundwater remediation included in this ROD. Once the final groundwater ROD is signed, all groundwater risk will be eliminated as well. All contamination will be destroyed, removed or contained. EPA shares the City's

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
	However, recently the City and private sector efforts to alleviate those conditions are resulting in a promising turn around. Two significant commercial enterprises have relocated to the area and housing rehab is beginning to occur. The major limitation to a successful turnaround and economic stimulus is the presence of this 19-acre contaminated, orphan industrial site. For decades, the site freely spilled creosote and its derivatives into Pensacola Bay at a popular neighborhood swimming beach and park. Contaminated groundwater seeped out into Pensacola Bay and Bayou Chico. Pensacola Bay is designated as a 303d listed impaired water body by EPA and Bayou Chico is the first body of water in Escambia County to be addressed through a Basin Management Action Plan resulting from industrial contaminants and septic seepage. Much progress has been made to improve the water quality of both bodies but stopping the discharge of industrial contaminated groundwater is paramount to providing a safe and ecologically sound waterfront. EPA has worked on this cleanup for over 30years and is now only four years away from completion. The community can sense success. Now is the time to continue funding and to proceed with the federal effort in abating this very public and ecological health threat. Sincerely,	need to get the site cleaned up and put back into a productive reuse. EPA also looks forward to working with the City on turning the site into a park.
Kenneth J. Kelson Sr. (b) (6) Dixie & Mike Wilkinson	Grew up at the corner of (b) (6). My father still lives there. We bought our house in 1990 located (b) (6) Unfortunately, I along with many children grew up during the	In the short-term, the fence will remain up and the grass will be cut. EPA is moving forward with remediating the entire site

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
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(b) (6)	time the ACW was most active. We played in it, we breathed it, and washed our dogs and cats that fell into the pools. I myself had (b) (6) at the age of 34. I guess my point is, we need you (EPA) to make it safe for the neighborhood. No matter how much soil you bring in, there is no way all the poisons will be removed. It's better than it was, but it's still obvious the groundwater, the drainage lines still smell like creosote. My suggestion, just keep it fenced and the grass cut and we can live with that, or if a park, just a leisure park for walking & sitting. Thank you for your time.	with this sitewide ROD. Once the cleanup has been completed, there will be no exposure routes to the public from soil exposure. The groundwater remedy is an interim remedy. There will be a lot of groundwater remediation included in this ROD. Once the final groundwater ROD is signed, all groundwater risk will be eliminated as well.
Robert Neiger Chairman Emeritus, Sanders Beach Community Association	Thank you for your April 2017 American Creosote Works presentation to the neighbors living most nearly adjacent to the superfund site. As Chairman of Sanders Beach Community Association through 2010 I've worked with and participated with the EPA on American Creosote Works Pensacola since we organized in 2001. Other neighbors were involved with Project Manager Mark Fite since the site was fenced in 1981. So, when do all the talking, meetings, discussions, RODs, ROD amendments, etc., end and actual, REAL ACW site cap installation begin? Can EPA provide Sanders Beach assurance there will be money provided to complete site cleanup and capping? Where does American Creosote Works Pensacola fall on a list of spending priorities? Other questions include: 1) How effective will monitoring wells placed on and around the site be in ensuring site contamination will be kept isolated	After the ROD and remedial design, EPA Region 4 can't guarantee that funding will definitely be available for remedial action. The EPA funding levels are determined by Congress. Remedial action money will be allotted in the future after the remedial design. 1) There are shallow groundwater wells near the Bay. Those monitoring wells show no unacceptable levels of contamination in them. This is the water that could potentially "day light" out in the middle of the Bay. Creosote/DNAPL sinks over time so most of the contamination is found deeper in the aquifer. More monitoring wells will be installed during the remedial design to further our understanding.

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	away from the Sanders Beach Community and Pensacola Bay, where people use the boat ramp facilities very regularly? 2) Has the EPA plan provided for additional site work regarding creosote deposits (pool(s)) that might become known after EPA has deemed their work here "complete"? Would there be any provision for treatment of offshore sediment testing in Pensacola Bay south of the Sanders Beach Community at that point? 3) Will the EPA be the final word for governing future land use? Will the Sanders Beach Community be advised of any and all possible uses proposed by the City of Pensacola and/or Escambia County, and various private owners, as final cap construction is decided? Installed controls have been referred to by the EPA as "long term"; exactly what does the EPA consider "long term"? 4) Many in the Sanders Beach Community, in working together on this 36-year+ old EPA Superfund Site, have concerns that the City, County and private owners will work to find ways to override neighborhood wants regarding the site; what safeguards can be offered by the EPA to ensure that such by-passing doesn't occur? I look forward to your reply	2) The groundwater portion of this cleanup is an interim remedy. EPA will need to write an additional final ROD for the groundwater at some point in the future. If a pool of creosote is discovered between now and the future final groundwater ROD, the cleanup of that creosote pool would be addressed. The sediments directly outside of the former PYC ditch mouth were sampled in a 2008 United States Corps of Engineers report. The results show no evidence of site related contamination in the sediment. There are no plans for sampling the sediment in relation to ACW. 3) EPA does not approve or reject specific uses of the property. That is a local government issue. Institutional Controls are part of the remedy. ICs will have restrictions on the types of property uses that are compatible with the remedy. ICs remain in place forever. Restrictive covenants, a type of ICs, could be executed by the property owners that outline the prohibition of any residential, industrial, or recreational reuse of the property unless prior written approval is obtained from EPA and FDEP. The covenant could also prohibit interference with the integrity of any existing or future monitoring

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		or remediation system without prior EPA and FDEP approval. Notice of the application of ICs to the site through restrictive covenant would be provided to the local regulatory agencies. Should any IC fail, EPA and FDEP will ensure that appropriate actions are taken to reestablish the remedy's protectiveness and may initiate legal action to either compel action by a third party and/or to recover costs for remedying any discovered IC violations. 4) EPA doesn't control site redevelopment. It would appear from all indications that the City is planning on turning the site into a park. The site is currently zoned conservation so the zoning would need to be changed for another reuse purpose.
Nancy Neiger, SBC Historian	Thank you for your April 2017 American Creosote Works presentation to the neighbors living most nearly adjacent to the superfund site. We appreciate the EPA's willingness to make such presentations. I personally have worked with and participated with the EPA on American Creosote Works Pensacola since 2001. Other neighbors were involved since the FIRST go-round on the site with Project Manager Mark Fite. So, my first and foremost comment is: when do all the meetings, discussions, RODs, ROD amendments, etc., end and actual, REAL ACW site cap	With no unexpected delays or funding issues, the remedial design would start in September 2017 and last for approximately 12 to 18 months. The remedial action of moving soil would start between September 2018 and March 2019. There is a ranking process for which Superfund sites get remedial action funding called the Priority Panel. All of the sites from the EPA 10 Regions will be compared and evaluated for funding through this process. The sites are

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	installation begin? If there is an EPA site ranking process that will precede the appropriation of money for site cleanup, please provide a description of that process, including the "points of entry" for commentary by the affected community. Additionally, we'd appreciate learning where American Creosote Works Pensacola falls on such a list. 1) Will there be "paired" monitor wells placed inside and outside the containment wall proposed for the western end of the site? The purpose of these paired wells would be to allow for "performance monitoring" of the containment wall during the remediation that occurs within the containment wall (and ensure the absence of hydraulic continuity between affected horizons inside and outside of the containment wall). 2) What will the EPA plan provide concerning the recovery of "free liquid" creosote deposits (pool(s)) that underlie the western end of the Sanders Beach neighborhood? If the EPA has determined that such pools or deposits might have dissipated in the intervening 30+ years, what proof is there of such dissipation (e.g., perhaps owing to offshore sediment testing in Pensacola Bay south of the Sanders Beach Community)? 3) What "institutional controls" will the EPA impose to govern future land use? Will those controls ultimately be the "governing" controls and conditions, even overriding City of Pensacola, Escambia County, and various private owner proposals? The controls have been referred to by the EPA as "long term"; exactly what duration does the EPA have in mind when it references them as "long term"? 4) Many in the Sanders Beach Community, in working together on this 36-year+ old EPA Superfund Site, have	usually ranked by risk to the human health and the environment. There is no mechanism for public input at the Priority Panel. 1) Yes, there will be paired monitoring wells placed inside and outside the containment wall. The paired wells will be monitored to ensure there is no hydraulic connection between inside and outside the containment wall. 2) There is little to no evidence that the free product on the westerns side of the site has dissipated. It has been relatively stable. EPA does not plan on recovering the DNAPL. Instead, it plans on installing a slurry wall around the majority of the free product creosote. This will not destroy or recover the DNAPL, but it will hydraulically isolate the contamination inside the slurry wall. 3) EPA does not approve or reject specific uses of the property. Institutional Controls are part of the remedy. ICs will place restrictions on the types of uses that are compatible with the remedy and could override certain public and private use options. ICs remain in place forever. 4) EPA doesn't control site redevelopment, which is a local government issue. It would appear from all indications that the City is

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
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	concerns that the City, County and private owners will work to find ways to override neighborhood wants regarding the site; what safeguards can be offered by the EPA to ensure that such by-passing doesn't occur? I look forward to your reply	planning on turning the site into a park. EPA supports this reuse option. The site is zoned conservation so the zoning would need to be changed to implement any other reuse purpose.
Thad Quinlan (b) (6)	Hello Mr. Thorpe, Thank you for your informative session with the neighborhood. My name is Thad Quinlan, I asked you about a couple of points at the meeting. The actual owner of the property I reside at is (b) (6) He's in Miami and asked me to represent his interests. Two properties, (b) (6) I would like to know if these were tested, can they be retested and may I have my own testing done? Thank you.	Neither of these properties have been sampled by EPA. There are four soil sample points near those property addresses. All four sample points had dioxin results well below EPA's trigger for dioxin cleanup of 50 parts per trillion. The highest dioxin concentration found between all four samples locations was 9.8 parts per trillion. These properties are not included in the two exposure units with site-related dioxin contamination because there is no evidence to support it. There is no plan to sample these locations in the future. You are welcome to have your soil tested by a laboratory.

APPENDIX B
TRANSCRIPT OF APRIL 2017 PUBLIC MEETING

U.S. ENVIRONMENTAL PROTECTION AGENCY

AMERICAN CREOSOTE WORKS SITE

PENSACOLA, FLORIDA

PUBLIC MEETING TO

DISCUSS THE PROPOSED CLEANUP PLAN

WEDNESDAY, APRIL 26, 2017

AT 6:00 P.M.

SANDERS BEACH-CORINNE JONES RESOURCE CENTER

913 SOUTH I STREET

PENSACOLA, FLORIDA

Reported by: Rebecca T. Fussell

APPEARANCES:

PETER THORPE,
EPA REMEDIAL PROJECT MANAGER

L'TONYA SPENCER,
EPA COMMUNITY INVOLVEMENT COORDINATOR

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PROCEEDINGS

MR. THORPE: Let's get started. We have a good bit of material to go through, so I just want to make sure everyone has a chance to talk and ask questions, everyone's questions are answered.

If you will look upfront. I apologize that I don't have the bigger screen like I usually do. We have to go by this. So if you want to move up closer to the front, feel free. Hopefully, you can still read it off of that TV screen.

And L'Tonya Spencer, my Community Involvement Coordinator, she's not here yet. Once she gets here, she will pass around a sign-in sheet and make it available to everybody.

And she will also have some -- I think everyone got the fact sheet, the Proposed Plan Fact Sheet. It's eight pages long. Excellent, okay. And she will have additional copies of those Proposed Plan Fact Sheets if anyone didn't have one or is missing theirs. They will be there, some more additional ones for you guys.

So today we are here for the Proposed Plan meeting for ACW.

Okay.

UNKNOWN SPEAKER: I just wanted to know are these going to be online at any point on your Web Site? I have somebody that wants --

MR. THORPE: I'm going to try to. Our Web sites didn't upload and refresh, but I will try to.

UNKNOWN SPEAKER: Because I got somebody who wants to have a copy, but she's not right here right now in the immediate area.

MR. THORPE: Okay. Does she have an e-mail? I can e-mail it to her.

UNKNOWN SPEAKER: Yes.

MR. THORPE: Okay. I'll e-mail it to her.

And, additionally, we wanted to have -- these are the fact sheets, the condensed version. There is also the Proposed -- the actual Proposed Plan, which is about 35 pages. It goes into more detail. It has more figures.

We were supposed to have those copies here tonight to hand out. There was a mixup at the hotel with L'Tonya, and we don't have them.

What I'm going to do from here on out is I'm going to have a stack of them here at the community center here. So if anyone wants to come by and pick it up.

And, also, leave your mailing address on the sign-in sheet, and we will mail you a copy if you want. Okay?

UNKNOWN SPEAKER: What about if we already got the pink sheet?

MR. THORPE: If that's all you want, that's cool.

UNKNOWN SPEAKER: But I mean, you already got our address for it.

MR. THORPE: Yeah. But if you want the longer, more detailed version.

So now on to the meeting. So we are here for the Proposed Plan meeting. The purpose of this meeting is for the EPA to present what we think are the best technologies at the ACW Site.

It's a complicated site. There are a lot of different areas. There is different contamination located in different areas. And we propose different technologies for each one of those.

And the main thing tonight is either I want to hear what your comments are, what you feel about those remedies we are going to put in place.

Also, I want to -- if you're shy and don't want to talk about it today, on the back of that fact sheet, there is a little area where you can write in your comments and mail them to me. That's fine, too. Either one.

And at the end of the day when I get all of those comments -- the comment period is open right now from April 22nd to May 22nd. And then at the end of May 22nd, I will look at all of your comments, respond to each one individually. And that will be recorded in the Record of Decision that will be filed in the fall of this year.

So what I will be talking about today is I want to get a little bit background about the site, what has been going on, what our remedial objectives are going forward with this new clean-up, what the remedial alternatives were that we looked at, as far as what would address each section of the site. Then at the end of the day, what we are proposing is the

preferred alternative for the site.

ACW was an 18-acre site that operated as a wood treater for approximately 80 years. There is soil contamination on-site and off-site. There is groundwater contamination on-site and off-site with COCs, pH's, PCPs and creosote and dioxin.

It's a funding site. Right now there are no responsible parties. So the taxpayers are paying for it right now.

The site has been broken out over the years into three different operable units. OU1 is the sludge, soils and sediments. That was done back in '99. OU2 is the groundwater. It was done in '94. OU3 was the off-site dioxin that was done in 2007.

The goal right now with this Proposed Plan and this Record of Decision going in in the fall will be to write a site-wide ROD for all three of them. That means all of the media, all of the groundwater, all of those as well will be addressed in the upcoming cleanup.

OU2 will be an interim remedy. I will talk about that a little bit later.

Here is a historical photo of ACW.

This is the east. This is the west. You can see where the wood would come in from the east, and the logs would be debarked. And then you would see them going farther west. They would dip them into the pond and set them up over there to dry out.

You have two large unlined creosote pits sitting over there. And during large rainfall events, those would fill up and flow over land directly south. And you can see the stain, the stain on the road. That is creosote. Then it will go farther south into the Pensacola Yacht Club ditch and out to the bay. And that's what historically operated at the site.

Here's what it looks like today. You will see that it's residential on the east, south and to the west. You have commercial and industrial to the north of the property.

I will talk about this a little bit later, but we have done various removals throughout the neighborhood. And we brought that soil back to the site. That is where this soccer pitch looking place is right here. And we brought in more soil after this photo was

taken over here.

Before I get into the operable units, each one of the operable units, I wanted to address what we have done historically at ACW up until now.

When we initially came out to the scene when it was DEP and EPA, we stabilized and covered the dipping ponds. There will be no farther migration into the groundwater.

In '98, we started up a groundwater pump and treat system that recovered just under 200,000 gallons of DNAPL.

In 2003, we excavated properties to the north, part of a road, the apartment complex, part of the Pensacola Yacht Club ditch property, all of those were excavated in 2003.

In 2010, we remediated the southeast ditch over on -- over by Pine. Then in 2012, we assisted the City of Pensacola with rerouting the storm water out of the Pensacola Yacht Club ditch.

Then in the summer of last year, we excavated that entire 1,000 length of the Pensacola Yacht Club ditch and brought that soil back to the property and capped it.

OU1, the RODS in place were signed in '99. It was a ROD amendment. And, basically, the objective of that was to prevent risks posed by injection and inhalation of direct soils, sludge and sediment and to take care of that by digging it up and bringing it back to the site.

And all of the areas that were supposed to be remediated by this ROD had been completed, except for the site itself. That was the only place that wasn't. The ROD wasn't fully implemented.

OU2, this was done in '94. EPA selected an alternative cleanup limit. The goal was to protect discharge into the bay, not to let any contaminated groundwater go out into the Pensacola Bay.

And, basically, we divided that ROD into two phases. Phase I is to extract all of the DNAPL that was underneath former dipping ponds. Then II was to address the dissolved plume.

Phase I, we -- it operated very well for awhile. Like I said, we excavated almost -- we extracted almost 200,000 gallons of

DNAPL.

We had some problems. Hurricane Ivan took it out of commission for awhile. Also, the creosote was not compatible with most piping materials. We had to find Chouinard, which was the only type of material that would actually stand up to the creosote. So that operated for 10 or 12 years very successfully.

Here's -- OU2 is the groundwater. This is directly below where the dipping ponds are. We have basically just straight DNAPL from -- DNAPL is creosote -- from 20 feet down to 80 feet down. We recovered some of it through the recovery system, but most of it is still there.

And I said in that previous slide, here's the creosote in the upper sand. This is more shallow, 20 to 30 feet. This is some of the creosote that would have flowed over land during the hard rainfall events and so percolated down to the land.

OU3, this was created in 2007 in response to Florida's Soil Cleanup Target Levels. It was a new cleanup standard that Florida had put in place.

At the time, our cleanup number for dioxin was a 1,000. Florida is a 7. So it kind of -- we had to go back to the drawing board as far as what was considered -- what are we going to do with soil in the area of ACW, kind of introduce the large volume of soil that we hadn't planned on before.

We went out and sampled all of the yards, not all of the yards. We sampled some of the yards in the neighborhood in 2008, 2009 and 2010.

This is the remedial action objectives for our current site-wide ROD. The first one is to prevent human exposure to circulate contaminated soil above the appropriate levels in federal and state levels.

Number two is to prevent congestion of groundwater that contains concentrations of compounds representing a total cancer risks greater than 10 to the negative six for an HI greater than one or meeting all of the state and federal rules and regulations.

Number three is to prevent or eliminate long-term leachability of soil contaminants of concern into the groundwater.

And the last one is to protect Bayou Chico and Pensacola Bay by not letting any contaminated groundwater migrate into the bay.

The preliminary remedial goals for this is where we are going to clean up to our clean-up standards. Soil is basically Florida's Soil Cleanup Target Levels. That will be what we'll be using. Those are in table form. You can find them on the DEP Web site.

For groundwater, OU2 is going to be an interim remedy. It's not final, so it doesn't have cleanup numbers associated with it. The reason we are making it a non-final remedy for that is that -- we're going to talk about all of the technologies that we are going to do to address the source area, the dissolved plume and what we think it's going to drastically remove. A lot of contamination of groundwater will be done in five years. It will be cleaned up.

But in case that's not the case and we have to do something more aggressive, I'm leaving it open that way so that we can go in and do something more aggressive later on.

But like I said, I'll talk about all of the technologies that are going to be employed in that. The State will be cleaned up in five or ten years. We can come back and do a final ROD for the groundwater doing something as simple as monitored natural attenuation where we just sample the monitoring wells.

Okay. So I have broken the site out to the different areas because each different area has different characteristics.

CMZ-1, the red area, that's the main source area. This is an area where the vast majority of creosote that is below the surface, is 20 to 80 feet of just pure creosote. That is where that is located.

That area also has a marine clay located 100 feet down, which is very important. CMZ-2A, which is the orange part, that is still on-site, but there is no marine clay below that to tie into. Marine clay is like a thick ten-foot clay layer that will act as a good confining area.

2B, that's the shallow creosote that I talked about 20 to 30 feet below the surface. It's off the property. That is a different

contaminated media zone. This is all groundwater.

CMZ-3 is a secondary source here. We have a small PCP plume over there that is shallow, 20 to 30 feet down. That is the groundwater issue over there.

And 4A, this purple area over here, that is basically the entire site but for soil. That is the on-site soil for ACW.

We also have 4B, which is all the off-site residential soils.

And then CMZ-5, that is the dissolved plume. Anything that is not free product and still has contaminants in it, that is CMZ-5.

Here's a recap of what I just talked about that I have broken down into these different areas. Let me just go right into it.

This is CMZ-1. The preferred technology that we are going to implement for CMZ-1 is the barrier wall. We basically will use a large cutter like this, which actually goes down into the subsurface, grinds down 100 feet down and ties into that marine clay layer.

Once it hits contact with that clay

layer, it will back out and inject the concrete slurry, which will be impervious to groundwater. It won't be able to pass through it. So once that happens, it will form a box. We will have a slurry wall all the way around that will run the perimeter of that CMZ-1. It will tie into the marine clay at the bottom. And then we will put a cap on top. It will be a box where no water can get out. No contamination -- no water can get in, and no contamination can get out.

And we do this on a lot of our wood treaters in the Southeast throughout the country. It's the default technology for using for wood treaters.

This is CMZ-2A, so this is still on-site but no marine clay below, so we can't tie it into anything. The clay is gone. This has still a lot of creosote but not as -- but not as grossly contaminated. And it's much deeper. It goes down to 120 or 140 feet.

And when you get down that far, it will be clean, but there will be a little finger of creosote sticking around. And our goal is to get rid of all of that creosote.

So we chose thermal excavation, where basically you heat up water until it's a steam. You inject it into the creosote. Creosote is very thick and viscous. It's not very easily pumped out. So we heat the steam up and make it more pump-able, and we basically just put a vacuum on it and pull it out of the ground.

This is also very successful when it's so deep. This is a successful technology that we have used before.

2B, this is the stuff that is shallow, off-facility, 20 or 30 feet down.

We ranked all the different technologies, and thermal and large-diameter stabilization came out pretty much the same. Large-diameter stabilization is basically where you take a big six-foot auger, and you drill down. And when you get down toward the creosote, just back it out and pump it full of concrete. You basically make a giant model of the concrete.

And that would have stabilized it. It would have made it mobile. It would have made impervious to any more groundwater contamination. But we went with thermal for 2B

because we already have one contractor on 2A using thermal, so we have cost savings there. And thermal is more aggressive. You don't get the concrete there. It just will be gone. So we went with thermal for 2B.

CMZ-3, this is the stuff that's -- the small PCP plume that is on the eastern side of the property where we need to do a little more investigation during remedial design to figure out a little more of where the PCP plume is going. We have an idea. We have a couple of wells but nothing in between. We will do that during remedial design.

So what we selected would probably address either whether it's a larger-scale problem or a smaller-scale problem, which is chemical oxidation and bioremediation.

Here is a picture of chemical oxidation where basically you inject a -- and we would have to do treatability studies to see what we would actually inject. You can inject hydrogen peroxide, permanganate. There is a whole suite of things you can inject into the ground to actually destroy the PCP and the contamination of groundwater, so it will be

gone.

The bioremediation, that might be helpful as well. That's where you actually either -- if it's anaerobic bacteria, you inject oxygen in there and kind of give it a little food boost. Or if it's anaerobic, you give them some more food substance, like vegetable oil or a lactated milk, which they eat up, and it fuels the bugs that are already down there eating the contamination up. It just gives them a little energy boost, a little Monster Drink.

Okay. Here's 4A. This is the excavation of the on-facility soils. And, basically, there aren't many options. We are just going to dig it up and capsulate it right there in place and put a -- you know, we are going to put a liner of contaminated soil, another liner on top and clean-clean soil on top of that. And then we will be able to turn it into a park or whatever, whatever we see fit.

4B, this is the off-facility soil. This is residential properties. It's basically the same thing. We are going to dig up the

properties one by one. Once we are done with it, we will restore it the way we found it. If we have to take out a fence, we will put the fence backup. If we dig up a shrub, we will put a new shrub in there. But we will leave it the way we found it.

We will dig up all of the yards, bring that back to the site, and we cap -- put that into the cap of all the other soil.

UNKNOWN SPEAKER: How deep? How deep are you talking?

MR. THORPE: On residential properties, no more than two feet.

UNKNOWN SPEAKER: Two feet?

MR. THORPE: Yeah. But it depends on what the contamination is. Some yards might just be six inches. It might be a foot but no more than two feet.

UNKNOWN SPEAKER: The water table around here is only two feet.

MR. THORPE: Yeah.

UNKNOWN SPEAKER: And stinky slush.

MR. THORPE: That's one of the reasons that I went more than two feet is the water table.

UNKNOWN SPEAKER: Thank you.

MR. THORPE: This is CMZ-5. This is the dissolved plume, not the free product. It's a little bit less. It's the stuff that as the water passes through the creosote, it takes like little pieces of naphtha and some of the contaminants and passes through.

This is what is heading out toward Pensacola Bay. We are going to do the same thing, chemical and bioremediation, or we are going to do probably an oxygen shield where we will inject oxygen right there where it enters the bay. That will actively destroy any of the -- it will get the bugs out into eat up all the contamination before it goes to the bay.

And the entire price tag for all of these is 34.1 million dollars. That includes long-term five-year reviews, putting ICs in place, everything.

So here's the perimetry in one incapsulated area. We are talking about CMZ-1, the main source area, a barrier wall, capped on top and marine clay on the bottom.

2A and 2B, this is stuff that is on facility deep down, thermal. CMZ-2B, off

facility, kind of shallow, we would do thermal there as well.

3, the PCP plume and leaches on the property, chemical and bioremediation.

4A, excavate and bring it back to the site. 4B, excavate and bring it back to the site.

CMZ-5, chemical oxidation and bio.

We will also be doing site-wide activities, including a long-term groundwater monitoring and five-year reviews. We will do placements of ICs on the property so that we won't come back in five years and see someone digging up their calf and stuff like that.

This is a map of -- the one I showed you before with all of the technologies on it to be selected.

And now this is what your guys are interested in, the next steps forward. Where are we going from here?

The comment period, that started April 22nd. Like I said, at the beginning, everyone got their Proposed Plan Fact Sheets. At the back of that, there is a page for writing comments. Send them to me. I want to

hear from you guys. That ends May 22nd.

I'll get all of those comments. I'll get the transcript of the meeting tonight, and I will respond to all of the comments you guys tell me today or e-mail them into me.

After that, we will move on with the Record of Decision. I'll respond to all of the comments I get today. In the Record of Decision, there will be a whole section called responsive summary.

So whether you tell me verbally, I will respond you verbally tonight. But, also, if you write one in, I'll write in the responsive summary what your comments are, what are response to them are.

MS. SPENCER: Hi, everybody. I'm sorry I'm late. I was at the hotel waiting on UPS, but they sent your documents back to EPA opposed to the hotel. So if anybody -- I think Pete is pretty much finished, but if you want copies of the fact sheet, I ran to Kinko's and made a couple of copies.

But if you would, please make sure you sign in, because the full document that Pete went through tonight is what I was having

delivered to the hotel, so we are just going to send them out e-mail.

MR. THORPE: I also told them I was going to have some mailed here.

MS. SPENCER: Okay.

MR. THORPE: So people who didn't make the meeting, if they weren't here and they want one, just come over here.

MS. SPENCER: Yes, that's fine. Sorry they sent it back to the EPA as opposed to the hotel.

MR. THORPE: So the Record of Decision will be finalized in August of this year. That will be -- basically, it's a proposed plan, what is in your hand and what is in the more detailed proposed plan.

But it's a more -- Record of Decision is just a more technical, detailed document where it just provides more details. It has a big, long list of what federal and state laws we're going to comply with. And it's just -- it's a lot more technical.

After that is signed in August of 2017, we will start with remedial design. Like I said, there is a little more work to do on

the PCP plume. We also have to do some treatability studies to determine what is the best injection to do, what is the best chemical injection to use in CMZ-3. Maybe we should do bio over there.

It should only take about a year while we do a couple of more test borings for the marine clay in CMZ-1. But that will take about a year to 15 months.

And then the remedial action starts. We start cleaning up the yards and bringing the soil back to the property, clean up the groundwater. That will take about two years. And so we will be done July 2021.

This is my contact information. During the comment period, after the comment period any time, call me, e-mail me. That's what I'm here for. Feel free to contact anytime.

MS. SPENCER: And, also, as we go into the questions and answers, because we have a transcription, if you would state your name and who you represent if you're a representative or an aide for the city or local government so that we can have it on file.

MR. THORPE: Oh, Keith.

MR. KEITH WILKINS: Keith Wilkins for the City of Pensacola.

For your timeline going forward, how much of that is dependent on funds not yet allocated or not yet approved? I mean, what steps do you have to go back and get money?

MR. THORPE: There is a funding process when it comes to remedial design or remedial action. The budget process right now is ongoing up in D.C., so I really can't comment on that.

I don't really know what the budgets will be when we get to each one of the stages right now.

MR. KEITH WILKINS: So is the -- and I won't ask a bunch of difficult questions. In August, I guess, of this year, how far into this are we funded now?

MR. THORPE: Oh, we are funded to remedial design. I mean, to the Record of Decision. I'm sorry.

MR. KEITH WILKINS: Okay. Okay.

MR. THORPE: So the Record of Decision, we are funded to that. We will need additional

funds for remedial design. Generally, those are easier to come by because it's a shorter -- you're only doing like a one-year project.

For remedial action, they don't usually approve you, unless you're going to have -- they know you're getting money for the whole thing. You can't start one and then stop in the middle. That's really bad.

UNKNOWN SPEAKER: (Inaudible.) How do they determine which yards are being dug up, and how would we know? How is that determined?

MR. THORPE: Well, I have a map with what yards we sampled. And, generally, when we get to that stage, we are going to -- in the Record of Decision, there will be two maps where there's -- we have looked at how the soil -- how the contamination came off the property.

There is one large area adjacent to the property where it was overland flow. And it's basically a large section of property to the west and to the south of it. It's an exposure unit. Anything inside that exposure unit is going to be cleaned up if it's above seven parts per trillion.

MR. RICK MILLER: What area is that? What

street are you in?

MS. SPENCER: Can you state your name, please, for the transcriptionist?

MR. RICK MILLER: It's Rick Miller. I'm a property owner.

MR. THORPE: The red areas, the orange areas are ones that are closer to the property. And these are all areas that we did a dioxin analysis, where we did a fingerprint analysis. Dioxin is not just one chemical. It's not just naphthalene. It's a whole suite of things.

So we looked at what chemicals came from ACW and which ones didn't. There is other natural occurring -- you can create dioxin by burning trash, by diesel exhaust. Anytime you have barbecues, those all create dioxins.

So the fingerprint analysis, anything that had an orange or purple box around it, that was site related from ACW. So those boxes that were site related, this was -- it came off from the facility. We're not -- we can't clean up stuff that is not site related. It's regulated by law.

This is the overland flow exposure unit, and this is vehicular traffic. The main

entrance to the site was back over here. So a lot of this stuff, you know, dust that was on the facility, came off the facility by trucks going in and out all the time. Those yards will be cleaned up.

If anything was above seven parts per trillion, which is Florida's SCTL for dioxin, and this is a residential neighborhood, so it's seven, will be cleaned up.

Does that answer your question?

MR. RICK MILLER: Yes, mostly. I live across the street from where it's purple. How do I know that my yard is not seven parts per trillion? The box literally goes around my house.

MR. THORPE: We might -- we might sample your yard, and it might be below seven. And that's why. A lot of these -- a lot of the areas where it was a seven, either it's -- it was really low levels, below seven. Or if it was -- it had a purple box next to it, it's not site related. You can't clean it up. It's not related to ACW.

MR. RICK MILLER: My concern is mine is 6.9, and across the street, it's seven. So how

did you get to that level? Why is it seven parts per trillion?

MR. THORPE: It's state law.

MR. RICK MILLER: Thank you.

MR. THORPE: Yes, sir.

MR. STEVE STEWART: Hi. I'm Steve Stewart. I own the property in the Cypress and K Street area.

What is the expectancy of us living in our homes or whatever while this cleanup, two feet of dirt coming out of there? For those of us that live with our dogs, we have animals.

MR. THORPE: Yes, I understand.

MR. STEVE STEWART: Where do we stand? I mean, what do we do?

MR. THORPE: I understand your concern. What we would do is, if it were amenable to you, we would come in and put you in a hotel for a week or however long it takes. It probably won't take a week, but a couple of days. We would move you out, board your dog.

This is what we have done on other public properties. They would come in and clean up your dirt, backfill it, put the sod

down. We would leave it the way we found it. Then you would come back to your house.

MR. STEVE STEWART: I have 14 lots, and I have all of my family living around me in these houses. I'm not going to live with anybody in my family. Wouldn't that be interesting to see?

MR. THORPE: We are not going to do, like, a whole block at a time. We would just do one yard, so there would be minimal disruption to the neighborhood.

MR. STEVE STEWART: Well, I'm 400 foot from the pond site. I'm right there on "K" in that area.

A motel?

MR. THORPE: Yes.

MR. STEVE STEWART: No pets?

MR. THORPE: No. The pets would be boarded.

MR. STEVE STEWART: I'm sorry?

MR. THORPE: The pets would probably be boarded, unless we can find a hotel where it's pet friendly.

MR. STEVE STEWART: That would probably be a problem right there.

MR. THORPE: If we can find a hotel where pets are welcome.

MR. STEVE STEWART: Is this mandatory? Is it going to be mandatory?

MR. THORPE: Well, if your property was selected to be cleaned up and there is contamination in your yard, I would encourage you to go forward with it and have your yard cleaned up.

MR. STEVE STEWART: We'll see.

MR. THORPE: Nancy?

MS. NANCY NEIGER: Hi. I'm Nancy Neiger. I'm a resident here at Sanders Beach.

Kind of adding on to Mr. Stewart, if we decide to sell a house, is there something that the EPA will provide once the cleanups are done that says you're now clean or free of liability or any responsibility?

MR. THORPE: Rudy.

MR. RUDY TANASIJEVICH: The proposed cleanup plan, there will be a document that will document all of the work that the EPA has done and what the status of that is. And on the residential cleanups, it will identify the yards, like Pete said, that were contaminated

and needed cleaned up. And there will be documentation showing what was done in those yards and where we got consent from the property owners.

So it kind of goes back to your question, Mr. Stewart. It's not mandatory. But like Pete says, it's highly encouraged.

MR. STEVE STEWART: I mean, you're expressing to me, like, why wouldn't I want it cleaned up?

I'm 64 years old. I eat fruit. We have grapefruit trees that's been tested. We donate them, or Dan. Everybody knows Dan. I think he helps donate them to -- what is that? Humana Food Bank.

And the roots of these grapefruit trees go how deep? Farther than your two feet that you're talking about. I don't know if any of us are dying in this neighborhood from creosote. So I guess I'm a little confused as to the importance that you're saying that I should want to go with having my yard done.

MS. NANCY NEIGER: I'm glad to know that there is somebody else who is not giving up his grapefruit tree.

MR. STEVE STEWART: Well, I mean, really. Think about it.

MR. THORPE: Well, I think in the future I can understand your reluctance. You have lived here most of your life.

MR. STEVE STEWART: I was born and raised right there on that property.

MR. THORPE: But going forward to the property value of your property in the future, I mean, all the property around you will be cleaned up and yours might not, so that might be --

MR. STEVE STEWART: And I'm different because I don't sell property. I was born and raised there. It doesn't do anything to the value of my property.

My grandfather died there. My daddy died there, and I'm going to die there, and my kids will take it. They are already there. So my situation is totally different. But people that are looking at the property value, I certainly understand.

MR. RUDY TANASIJEVICH: Let me clarify. I'm Rudy Tanasijevich. I work with the EPA.

On the comment about your grapefruit

trees or any structure or shrubbery or certain landscaping and sites where we have residential cleanups, like Pete suggested, we try to work as close as we can with the property owners. If there are certain area of the property that you don't want touched for certain reasons, we work around that.

You know, we try to clean up as much contamination as we can if we get consent. We use much smaller equipment. They're not going to go in there with a backhoe around the grapefruit trees.

MR. STEVE STEWART: So, basically, this is a service to us if we want it?

MR. RUDY TANASIJEVICH: Well, I mean, the Superfund program is a program that assesses contamination and identifies a risk to human health. And once we do that, we design cleanups to address that risk, so human health and the environment and ecosystems are not impacted.

MR. STEVE STEWART: I wouldn't object to anything that involved anybody's health in here. I'm just asking questions about how deep, what has been tested, what is

contaminated and what is not contaminated. And I guess, basically, why we are doing it?

MR. RUDY TANASIJEVICH: That's what we are here for.

MR. STEVE STEWART: That's why I'm here. I've never been to one of these meetings. I have never been concerned about what goes on outside of my fence. But now you're talking inside of it.

In terms of your property, we can share the information or the data that we have on your property and help inform you whether or not your parcels or some of your parcels are ones that we would like to see cleaned up or not.

MR. THORPE: I understand. After the meeting, give me your street address, and I will let you know if we sampled it or not.

UNKNOWN SPEAKER: Can we request to be tested or retested?

MR. THORPE: During the remedial design we could -- we're going to sample all the additional yards inside those different exposure units. Right now we only have some yards sampled, but anything inside those boxes,

every single yard was sampled if it was inside those boxes.

MS. ALLIE NORTON: I'm Allie Norton, and I'm with Channel 3.

Do you have any idea how many homes are impacted or will be impacted with the remediation?

MR. THORPE: I don't have the exact number. It's probably somewhere between 40 to 50. I'm not quite sure off the top of my head, but it's a fair bit.

MS. ALLIE NORTON: Do you have any idea how many you have already tested?

MR. THORPE: I sampled approximately 90 yards so far. And a lot of them, the farther -- the closer you are to the site, the more contaminated they are, and those are the ones that will be cleaned up.

The farther away you go from the site, it drops off pretty fairly to the area where you're not below seven parts per trillion, which won't be cleaned up.

Nancy?

MS. NANCY NEIGER: I'm Nancy Neiger again. I have a question that is my favorite topic,

aside from my grapefruit tree, and that is the bankruptcy status.

I know we had a flurry of excitement when the person bought the tax lien or liens up. Does that transaction affect anything that we have seen here tonight at all?

MR. THORPE: Not yet, no.

MS. ALLIE NORTON: Not yet. I don't like the way that one sounds.

MR. THORPE: Well, right now there are no responsible parties, as we know. An individual bought seven acres of the site during a tax sale. I, Keith Wilkins and Rebecca Ferguson met with that individual two weeks ago near the site to talk to him about it. He was interested. I talked to him about the site, what had gone on on the site historically.

He told me what he was planning to use the site for. And he said he was interested in working with City, in turning the property over to the City so that the City can turn it into a park.

Now, we sent him the general notice of liability letter saying that he is responsible -- or could be responsible for the

past, what occurred on the site. And we are going to move forward with that and possibly send him a 104(e) letter, which says, send us any information that you have on the site and how you came in possession of the property, and he may could potentially become a responsible party.

Yes.

UNKNOWN SPEAKER: (Inaudible.) I'm concerned about the CMZ-4A, which is the blue square here on the paper.

MR. THORPE: Right.

UNKNOWN SPEAKER: Does that incorporate the fenced-in area that is right behind my house?

MR. THORPE: No. That is the lumber yard's retention pond. ACW is not a part of that retention pond. I drove past it before this meeting. That is pretty overwhelmed.

UNKNOWN SPEAKER: Yes. It hasn't been tended to in 22 years. Everybody that I talk to acts like they didn't hear a word I said.

MR. THORPE: That's frustrating, I know.

UNKNOWN SPEAKER:

Yes, because when you go out in your

yard, you're attacked by mosquitoes. And the more rain, the more mosquitoes. We cannot use our yard, period.

MR. THORPE: And I apologize --

UNKNOWN SPEAKER: And the City -- excuse me for interrupting you. But the City is aware of this, and they have done zippo. And that's very irritating with the different types of mosquitoes and diseases that they bring. They could care less.

MR. THORPE: And it seems like the City or there must be some ordinance that they can make the lumber yard clean up their retention pond. There must be some kind of local city --

MR. RICK MILLER: That's code enforcement.

MR. THORPE: Code enforcement.

UNKNOWN SPEAKER: They went out there. This was several years ago. Zippo.

UNKNOWN SPEAKER: The only way that you're going to get any kind of follow through is to bug them once a week. Somebody will finally get so ticked off, that they will know your name, and they might actually take action. I say this from prior experience.

UNKNOWN SPEAKER: Well, the thing is there

must be different rules or regulations for a private pond than those that you see that are very well manicured. Now, these -- this pond has a Sycamore tree in it. It's three stories tall, which when I moved back home 22 years ago, it was a great big dirt pit that my house and Mrs -- Ms. Ward's house could sit in.

Nobody wants to be bothered. It seems like those mosquitoes only bother me. It doesn't bother anybody else in the neighborhood.

UNKNOWN SPEAKER: Mr. Wilkins, is there a way -- how do we find out who is responsible for what on that particular item? I mean, if she's been asking the wrong person or department, I'm personally happy to stand up and make all of the noise I need to. I'm sure you-all know that.

MR. KEITH WILKINS: There are two jurisdictions over that. One is the City, and the other one is the health department. The City from a code enforcement standpoint, I don't know what their findings were and why nothing happened. But I think we have talked about it. I went by and looked at the

property, too. I can find out why code enforcement didn't feel like it warranted any action.

MR. RICK MILLER: Code enforcement sends me a letter, and they can't clean that up.

MR. KEITH WILKINS: That's a problem.

And then the health department, they have a jurisdiction also.

UNKNOWN SPEAKER: I called them. They sent a man out with some little fish and put it in the water. And when the water went down, the fish died.

MR. KEITH WILKINS: (Inaudible). You're right. They can't survive if they are not in the water.

UNKNOWN SPEAKER: That's fine. My grandfather used to run that department, so I know about it.

MR. KEITH WILKINS: I will look into the city side. Call the health department.

UNKNOWN SPEAKER: I will see you after the meeting.

MR. THORPE: Any more questions?

MS. ALLIE NORTON: How much money has already been put into this in the 34 years that

it's been going on?

MR. THORPE: Approximately 30 million dollars has been spent on the site so far.

MS. ALLIE NORTON: Now, this -- we have this attorney that has purchased some of the property, and you said that he might be responsible for the past -- the past costs on that. How much are you talking about with seven acres of land?

MR. KEITH WILKINS: How much would he be responsible for?

MS. ALLIE NORTON: Yes.

MR. KEITH WILKINS: Potentially, it depends on how much -- he could be incurred -- it's yet to determined. He might be a responsible party. It could be whatever he's able to pay.

MR. THORPE: Pat?

MR. PAT JOHNSON: Pat Johnson, president of the neighborhood association.

So you went through the presentation. Basically, it says the remediation. At that point, we had talked about what would ultimately go on the property. Has anything changed there? A park is where we left on

that.

MR. THORPE: Right. Right. We had that meeting in December of last year where we met with you guys. We got feedback from you guys and talked to you guys about what you wanted to see the site be turned into.

Nothing has changed as far as that goes. We are still working with the City. As far as I know, the City is still moving forward with buying the rest of the site.

And the new property owner, the attorney, he has been cooperative so far. He has signed an access agreement with the EPA and the DEP. We can go down to the site and take samples.

But like I said, from our last conversation with him, it sounded as if he is willing to hand the property over to the City swell. So there shouldn't be, as I know right now, any disruptions in how things will develop. Because towards the end of your remediation, it's going to be tailored to future usage. It's going to be a park, so it would be tailored towards that, so ultimately, you are going to have to know that decision

before you can finish.

And the property right now, I don't see any changes. The property is zoned recreational, which means a park. I don't see how it's going to change anytime soon, so we are going to move forward with that assumption.

MR. KEITH WILKINS: Conservation. It's on conversation.

MR. THORPE: On conservation. I'm sorry.

Any more questions? I'll give you a chance.

MR. JOE MORRIS: Joe Morris, property owner. We have a couple of vacant lots, and we plan on building on them. We recently tore down a house that had been on the property, so the ground has been disturbed in the middle of the lot, at least.

My question is: How does that affect us building on the property?

MR. THORPE: Well, I would like to see where you're -- if you want to give me your information after the meeting, I can tell you if your lot has been sampled or not.

MR. JOE MORRIS: It's on the corner of "J" and Cypress, the northwest corner.

MR. THORPE: Okay. So it has been sampled is what you're telling me?

MR. JOE MORRIS: According to that, it was sampled real near it, if not on it. The little red things, those were sampled?

MR. THORPE: Some of them were not. In fact, some of them were higher.

MR. JOE MORRIS: It was in the purple area.

MR. THORPE: Okay. Then we can talk after the meeting. And when I get back to the office, I can look up the information and tell you whether it will be cleaned up or not based our current information.

MR. JOE MORRIS: I mean, I would prefer to have it cleaned up before we break ground to build. But I don't want on have to wait forever.

MR. THORPE: I understand.

MR. JOE MORRIS: I'm getting old.

MR. THORPE: When we get to the remedial phase of the cleanup, the number one priority will be to get residential yards cleaned up first.

But, yeah, if you stick around, let

me get your information.

MR. JOE MORRIS: I will.

MR. THORPE: In the corner.

MR. KEVIN ROBINSON: Kevin Robinson, the Pensacola News Journal.

Will there be any health concerns for -- if you're working on one residential property for people living in the surrounding area, and stuff just picked up and that sort of thing?

MR. THORPE: Well, we have a dust-monitoring program put in place. Every time we do a residential cleanup like that, we have monitors surrounding the property, usually in the four directions to see what is going on with the property, if it's hazardous or not. That is pretty much standard procedure when we do residential cleanups. So we will know if dust is kicking up and going in someone else's hard, we will know that in real time.

Yes.

You're next.

UNKNOWN SPEAKER: (Inaudible.)

This --

MR. THORPE: Go ahead.

UNKNOWN SPEAKER: This new retention pond, like I need another one two doors over, can you explain how that is going to work specifically?

MR. THORPE: Well, we are going to be capping a large portion of the property. Most of the property will be capped, and it's doing to produce a lot of storm water runoff.

Now, we could just slope it off, but then it will go in someone's yard, their backyard. We can work with the City and slope it all in that direction so that it goes to the retention pond to reduce storm water going into people's backyards and flooding their backyards. It's all going into one retention pond.

I think we can get pretty creative with the City and maybe make it like a -- put a fountain in the middle and a full-time pond. But it will be a city park, so I imagine it will be more well maintained that be the lumber yard's.

UNKNOWN SPEAKER: Is it going to look like the one down there on Ninth Avenue and the front, the bay front, but in miniature?

MR. THORPE: I'm not familiar with that.

I live in Atlanta. Sorry.

UNKNOWN SPEAKER: Admiral Mason Park, I think is what you're referring to on Bay Drive.

UNKNOWN SPEAKER: Right. It has a fountain and keeps the water moving and stuff like that. Would it be a miniature like that and be fenced in?

UNKNOWN SPEAKER: There is not a design yet, but it would be similar, I guess, in concept where there are walking trails and benches and things like that. But that's yet to be designed.

MR. DAN BOWEN: Dan Bowen. I live on the corner of "F" and Cypress.

And like Steve, I have been down here for three generations. And, hopefully, it will last a little bit loner.

But did I hear you right that there has been 30 billion spent so far?

MR. THORPE: Yes, that's correct.

MR. DAN BOWEN: And then the cost of this project is?

MR. THORPE: 34.1 billion?

MR. DAN BOWEN: Thirty-four?

MR. THORPE: Yes.

MR. DAN BOWEN: Billion?
MR. THORPE: Yes.
MR. DAN BOWEN: Okay. I mean, I have been to quite a few of these meetings. This isn't too much different from what we have been told before; correct?
MR. THORPE: Correct. Go ahead.
MR. DAN BOWEN: Okay. What is the probability of this being funded then? I know you say the ROD was funded. But the actual design and work is still out; correct?
MR. THORPE: Right.
MR. DAN BOWEN: I mean, is it another 50/50, or are we --
MR. THORPE: I can't really tell you too much. You probably -- it all happens -- the progress is ongoing in D.C. And you know as much as I do with what is going to happen with that.
MR. DAN BOWEN: Right.
MR. THORPE: It's all in their hands. Like I said before, the remedial design, usually, the costs of that are lower. So to implement a remedial design is usually easier.
And I think this story -- or this

site might have a good story that might get it funded. But there is really no guarantee. You have an entire community being clean up, all the groundwater cleaned up. It's going to be turned into a park. That's a great story, but I don't know about funding. I really can't promise you anything.

MR. DAN BOWEN: So is it high on your list? And as far as being on the list, is it a large, medium or small project?

MR. THORPE: It is a large project, a larger.

MR. DAN BOWEN: And it's high on the list?

MR. THORPE: When they go to D.C. to figure out what sites are going to be cleaned up or which are not, they look at risks, risk reduction.

I think your groundwater here and the soil on-site, you have some contamination that needs to be addressed. It's hard to say, though, about the process.

MR. DAN BOWEN: Thank you.

UNKNOWN SPEAKER: Back to this retention pond. Is the water that is collected there going to seep down into the ground, or is it

going to go into a pipe and then go to the bay?

MR. THORPE: I imagine it will go out to the bay.

MR. KEITH WILKINS: The clean water.

MR. THORPE: Yes, the clean water.

MR. KEITH WILKINS: You're talking about clean water, not his water?

UNKNOWN SPEAKER: Right.

UNKNOWN SPEAKER: Rainwater.

UNKNOWN SPEAKER: The rainwater will be going out to the bay.

MR. THORPE: And plus, the whole set is going to be lined, too. So it's going to go through clean dirt into the retention pond.

MR. DAN BOWEN: So where is that dirt going to be funneled to? Down F Street? Is it going to be directed right down F Street.

MR. THORPE: It will have to tie into some storm water line somewhere.

MR. DAN BOWEN: So I'm not contaminated now, but I will be.

MR. THORPE: The water going into the retention pond will be clean.

MR. STEVE STEWART: Three or four years ago when they eliminated storm water at L

Street, it came down to I Street to eliminate it from going into the Pensacola Yacht Club property. They did all this, shooting the 20-inch pipes, three of them under the ground. Were you around? Are you familiar with all of that?

MR. THORPE: No.

MR. STEVE STEWART: Well, anyway, they did for a city block in front of my house all the way to L Street.

And there was a Corps of Engineer that was with us for about 30 order days while all of this work was being done. He was out of New York. And he told me that this creosote works was the third-largest dirt contamination in the United States.

UNKNOWN SPEAKER: I agree with that.

MR. STEVE STEWART: Do you agree with that?

MR. THORPE: I --

MR. STEVE STEWART: Have you ever thought about it? Is it that about? The Corps of Engineer.

MR. THORPE: I don't think it's the third-most soil contaminated property in the

United States. I don't think it's anywhere near that, no.

MR. KEITH WILKINS: He may have been referring to Escambia Treating --

MR. STEVE STEWART: No, sir. He said the United States. I'm pretty familiar with the other sites and all that that was done out there.

MR. KEITH WILKINS: Escambia Treating was the third largest --

MR. STEVE STEWART: He was from New York, sir, and he was speaking where he's been with the Corps of Engineers. And he's older than I am. He told me that he would rank it about the third in the three largest contaminations in the United States. It may be. I don't guess it matters. But I mean, when we're speaking of a problem.

MR. RICK MILLER: We still don't know if there is money coming for us or not, so it's just another meeting?

MR. THORPE: No, no, no. This meeting is we are moving forward with the Proposed Plan. So in the past, as someone was alluding to, I have talked about the technologies in the past.

I have talked about doing a barrier wall. I have talked about doing thermal extraction.

But I have always had a caveat where I have said, I think this is what we are going to do. This is the formal process we're putting forward. This is what we're doing. We want to hear your feedback, and then we're moving forward.

So the only thing that is going to stop us from moving forward is the funding. That's it. There is no administrative --

MR. RICK MILLER: So we still don't have the funding, you're pretty sure?

MR. THORPE: For sure, yes. But it could be there. That's above my pay grade.

MS. M. PORTER: Is there anyone or anyway we can vote or help to get funded for this?

MR. RUDY TANASIJEVICH: Like Pete is saying, this comment period is the probably the most important part for the community's voice to be heard. So like he said, this is not just these ideas that we are thinking may or may not happen.

This is the culmination of years of work to come up with a site-wide final revenue.

And this proposed plan process and the public notice and comment period is your opportunity to say what you like about it, what you don't like about it, what you would like to see changed, what you don't want to see changed. And providing your comment on funding is something that is totally valid and that we would respond to and provide whatever information we can.

I think, Pete, and correct me if I'm wrong, we're competing for resources at the regional level with the states in the Southeast, but, also, like he says, when we go to headquarters or D.C. as a part of the budget process, all of our Region 4 sites are also competing against all the other sites around the country.

So Mr. Stewart was asking, where does this -- or that gentleman over there, where does this fit on the priority or the funding line? We could say, well, within the region, it may fall here, but that doesn't guarantee money because it's a much more complicated funding process.

But the importance of getting this

site cleaned up and the importance of having money is a part of EPA's budgeting process. It's a very valid comment that we can take, and we can respond to and pass along.

MS. SPENCER: Can we have your name, please, for the record? Your name for the record?

MS. M. PORTER: Porter.

MS. SPENCER: Porter?

MS. M. PORTER: Yes.

MS. SPENCER: Thank you.

MR, BOB NEIGER: Bob Neiger, resident.

In answer to your question, our Congressman was here the other day, and he was out on the site. He wants it cleaned up. So that's who you go to. That's where you start.

I'm sure those people are already doing that because we put an awful lot of time as a neighborhood into getting that site looked at and worked on. It's been 17 years that we have been doing this. And this is just another ROD.

But the neighborhood is in to getting it cleaned up. And there have been a lot of comments we have seen hear. And, of course,

there is the senator, too. But that goes with the people, along with our city representatives and our county representatives, you can knock on their doors and say, we have an interest. I'm sure that our association president probably will write a letter to our local Congressman since he was here and say, listen, our whole neighborhood is interested in getting this done, or the taxpayers. We all would like to get something done. But if we don't as a group, you could sit here and wait, but something will be done.

If you don't know anything about Congress and Senators and our government anymore, sitting on your haunches means sitting on your haunches, but you have to knock on the door.

So as a group of people, we have an association. Our president is right there. He's willing to write a letter or something that gets them moving. Pete has been trying to get it cleaned up for years. He's interested.

There is already a design for the park out here. The park has been designed for ten years. So we know it's out there. We

talked about it having a fountain.

I'm covering stuff that I already know because I have around this stuff for so damn long. But if you really want to generate some interest, get ahold of our new Congressman. He's been here. He knows the site. He wants it cleaned up. And I know the City has probably had conversations with him. The news media was there. Of course, the only people who showed up were protesters, but none of the neighborhood showed up to actually talk about remediating the site. And there was a lot of stuff about saving the EPA and saving the whales. But that's how we have to get it done. That's what you folks have got to do.

When he's done talking with this man, get ahold of your congressman. Get ahold of your senator. Get ahold of the association. They are very, very important. They carry an awful lot of weight within the City. You just have to do it that way.

MR. PAT JOHNSON: I think it's important if we can get Pete to the point where it's shovel ready, he probably has a better chance of getting it approved --

MR, BOB NEIGER: Yes, that's the truth.
MR. PAT JOHNSON: -- if there is still more stuff you're asking to get through.
If we can get through this meeting and get your responses back to where you can say, here's what we are going to do. Then when he's asking for approval, it's shovel ready. We just want to know.
MR. THORPE: Yes, once I get the responses back, we'll sign the Record of Decision this fall and have a year of remedial design. Then at the end of the remedial design, it's shovel ready to go.
MR. RICK MILLER: I thought I heard on the news today that -- I thought it was one of our congressmen, but I'm not sure. But someone at the federal level used the Superfund site here as an example of why they should take a part the EPA.
MR. THORPE: What did he say?
MR. RICK MILLER: He said it today.
MR. THORPE: What did he say?
MR. RICK MILLER: Because of how bad of a joke you have done with it. It's a fine example of --

UNKNOWN SPEAKER: Can I come to your defense?

MR. RICK MILLER: No. I'm just repeating what I heard on the news.

UNKNOWN SPEAKER: I understand. I have an opinion that may not reflect everybody's. And that, as much as you want to pick on the EPA, there are other parties that are responsible for nothing being done hear. A big one is the City of Pensacola, because I have seen more news on TV in the last four lays than I have in the prior eight years.

We tried everything we knew to get that TV camera down here when we are really ginned up and ready to go.

And then there is the FDEP. They should have shown some interest in making this an urgent site.

What about Escambia County?

So I'm not all for dumping on the EPA as being the only party that has not done what they were supposed to do down here. They are just one of at least four.

MR. RICK MILLER: I wasn't dumping on them. I was just repeating what I heard.

UNKNOWN SPEAKER: No, I understand that. But I just want everybody to be aware that the EPA shouldn't the one walking away from this with the only black hat on because there are a whole bunch of other parties that could have been doing more and chose to look the other way.

We were laughing when we sat down before the meeting started. This neck of the woods always used to be considered the armpit of Pensacola. And that's why it never got any attention. Once the treatment plant we moved, now we are pretty again. So that is what the City's interest is. We're not for the City's information. People who live here understand that.

MR. THORPE: I guess I would say we have done a lot of remedial action out here. That one little case I listed of all the properties we cleaned up; two ditches, several yards, part of the Yacht Club, an apartment complex, 200,000 gallons of DNAPL recovered. We have done a lot of work out here.

It hasn't put the site, its final use to bed. We have done a lot of work out here.

So I think we are doing a lot of good work out there.

MR. RICK MILLER: It just makes me very concerned that no funding is going to come if they are talking about us on that level, specifically this setup.

UNKNOWN SPEAKER: That means you need to write that letter to Mr. Bates.

UNKNOWN SPEAKER: I do have one last question. It has to do with reuse, though, and I don't know whether or not you can even address it at this point.

Once the cap is there or plans are made for it, is it going to be non-vehicular traffic? We still have concerns that the City has the intention to put a pass-through street on that somewhere. I Street is the one that is usually pointed out.

MR. THORPE: It would have to be -- it could be done, but it would have to be done in remedial design where you have to plan it that way. Once the cap is on there and it's finalized, you can't put a road over it. It would destroy the cap.

UNKNOWN SPEAKER: So we will know during

the remedial phase, the phase whether that will be a part of the plan.

MR. THORPE: Right. And after the comment period is over, I don't want to throw too many documents at you guys, but after the comment period is over, we are going to issue that Reeves plan that we talked about back in December. I will issue that.

I believe that we did -- there is no mention of a road going north/south to the site. But there was a lot of interest from the public about a road going farther along to --

UNKNOWN SPEAKER: Gimbal?

MR. THORPE: Gimbal, yes. And that was going to be part of the reuse plan.

UNKNOWN SPEAKER: Yes. The road will continue past my house on Gimbal Street. Now, that is going to be a real road, not dirt, with curbs. And is it going to have piping put on the side to catch the rain as it goes? Do you know about that?

MR. THORPE: That is infrastructure. We don't -- we just clean up sites. We don't. I'm sorry.

UNKNOWN SPEAKER: That is probably where

the piping is going to come.

MR. KEITH WILKINS: If the City builds a street, if the City built a street, we build them to an engineering standard that includes storm water, banks, curb gutter, asphalt and all that. So that's your question.

Now, I don't know about Gimbal Street. Specifically, I have not heard a single conversation, but I have only been with the City a year and a half, but I have not heard a single conversation about a through street across the property in any direction but Pine Street.

UNKNOWN SPEAKER: Pine Street is a dirt street south of Gimbal.

UNKNOWN SPEAKER: Gimbal was the one that we talked about in the plan where the City was intending to make that commercial in some way to connect with Main Street.

UNKNOWN SPEAKER: I understand the whole area is intended to be a buffer, to suffer Sanders Beach from commercial development.

UNKNOWN SPEAKER: Well, how would they get to the park?

UNKNOWN SPEAKER: Again, it hasn't been

designed, but what I envision is on the perimeter, there would be parking off of some of these streets with walkways. It's all off-perimeter to access.

MR. DAN BOWEN: I actually have a copy of all those plans. It's by the City. I'm sure you can get a copy of it if you want. It's quite detailed on all of the shops.

MR. THORPE: Can I see that, Dan?

MR. DAN BOWEN: Sure. That's an old reuse plan.

MR. THORPE: A 2010 reuse plan.

MR. DAN BOWEN: I didn't write a date on it, but I'm sure we can research when it was done.

MR. THORPE: But I would wait to look at the new reuse plan because that incorporates the new understanding of how we're gone to -- the current situation at the site. This and the previous reuse plans, we were going to put the dirt on a smaller footprint. We can put the soil where the dipping ponds were where the remediation system used to be. We can take the same amount of soil and spread it out over a larger footprint, so the cap will be much

lower.

In the past, I came here and said the cap was going to be 10, 14 feet high. You guys didn't like that. So we went back to the drawing board and found another way to make it lower, five feet. I think this is the original one from like 2003.

UNKNOWN SPEAKER: That one is completely wiped out now, though; right? That won't happen? Three will just be a big park and have like commercial and housing and stuff on it?

MR. DAN BOWEN: Well, it was a multitude of plans. It had the park, and it had retail.

MR. THORPE: That's what I don't like about it. The reuse plan looked like somebody was going to buy out the lumber yard and turn it into some kind of real estate development. We can't do that. Someone else has to do that. That is not part of what a reuse plan should be. It's just the site itself. And we're cleaning up what I have control over.

MS. SPENCER: And since I have been around a long time through like four RPMs, that was like before Shea and before the -- there has been like five RPMs. So I was here when that

was done. It was a whole different concept of what we thought about redevelopment at that time.

MR. DAN BOWEN: The Corps of Engineer guy told me that that property could be cleaned up and then capped off and used for something top surface, such as a park or what have you. There could never be any major structure on that property. There would be no digging or doing anything heavy. It would be a top-surface park. Do you agree with that?

MR. THORPE: Pretty much. In remedial design, the City wants to put a small -- not any big structure, a small structure, like a one-story building here or there. That could be accommodated.

MR. DAN BOWEN: But no mall or no big structure going in out there for people to make money. It's for the neighborhood for the people.

MR. THORPE: It couldn't be anything too big, nothing like a mall or depot or nothing like that.

MR. DAN BOWEN: That's how he explained it.

MR. THORPE: That is correct.

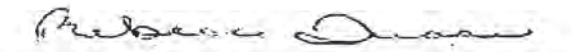
We're done.

(Whereupon, the meeting adjourned at 7:20 p.m.)

CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF ESCAMBIA)

I, Rebecca T. Fussell, Court Reporter, do hereby certify that I was authorized to and did stenographically report the foregoing proceedings; and that the transcript is a true record.



Rebecca Fussell

APPENDIX C
SELECTED REMEDY DETAILED COST ESTIMATE SHEETS

Feasibility Study Cost Estimate

Alternative #: CMZ-1 Alternative #2 **NPW Cost:** $5,067,800

Title: Barrier Wall Containment with Cap

Project: ACW Pensacola

Location: Pensacola, FL **Project Number:** 049019 **Base Year:** 2016

Project Phase: FS **Date:** 12/5/2016 **Revision:** 0

Task Description: Construct Barrier Wall: Perimeter slurry wall keyed into base clay at approximately 110 ft bls installed with cuttr soil mixer system. Surface cap.

Cost Basis: RECON Construction Service estimate (April 2010), Oasis Construction, GA (2007)

Item			Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS						
Slurry Wall VEB						
CSM Costs are order of magnitude. RECON costs assume $10 to $13 per vertical square foot of slurry wall.						
Slurry Wall Design						
Remedial Design Professional Labor			1		$ 59,951	**$59,951**
Slurry Wall Construction						
Perimeter Work Platform			13,239	cy	$ 7.00	$92,673
	Trench Wall Thickness	3 ft				
	Depth of Wall	110 ft				
	Perimeter Linear Feet	1,980 ft				
Excavation/Trenching, and Construction of Slurry Wall			217,800	sf	$ 13.00	$2,831,400
Bench Scale Test			1	ls	$ 38,324	$38,324
Mobilize/Demobilize Drilling Rig & Crew			1	ls	$ 2,767	$2,767
Auger holes for wall bench scale test			2,383	lf	$ 50	$119,309
Decontaminate Rig, Augers, Screen (Rental Equipment)			15	day	$ 794	$11,906
						$3,096,379
Composite Cap for Containment Cell						
Engineered composite liner over proposed containment area to consist of the following components (listed from contaminants to ground surface): (1) high strength geotextile - geogrid; (2) GeoNet - leachate collection system; (3) by-product gas vents; (4) Fill Material (for contouring the requisite drainage slope); (5) a geo-membrane layer (HDPE or LDPE); (6) a geocomposite drain layer; (7) a protective soil layer; (10) a top soil layer and (11) vegetation. This estimate assumes that contaminated material is in-place, grubbed and graded, and ready to be covered. In addition to these components, anchor trenching will be required.						
Mobilization/Demobilization - Geosynthetic Contractor			1	ls	$ 20,000	$20,000
Re-vegetation / restoration			4.16	acres	$ 1,500	$6,240
Top soil layer (6")	181,120 sf		336	cy	$ 10.00	$3,356
Protective soil layer (18")			10,062	cy	$ 8.00	$80,498
Geocomposite drainage net layer			181,120	sf	$ 0.91	$164,819
HDPE geo-membrane			181,120	sf	$ 1.00	$181,120
						$456,033
					Subtotal - Capital Costs:	**$3,612,362**
Contractor Fee			10%	of Capital Cost		$361,236
Legal Fees, Licenses & Permits			0.5%	of Capital Cost		$18,062
Engineering & Administrative			8%	of Capital Cost		$288,989
Contingency			15%	of Capital Cost		$541,854
					Total Cost:	**$4,822,503**

Item	Qty.	Unit	Unit Cost	Subtotal ($)
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	30	Total Years for O&M		
Cap Maintenance and Monitoring				
Monitoring and Maintenance, repair vegetation	4	per	$ 3,000	$12,000
				$12,000
			NPW Subtotal:	**$184,469**
Contractor Fee	10%	of NPW Cost		$18,447
O&M Contingency	15%	of NPW Cost		$27,670
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$14,758
Total O&M Cost				**$245,344**
TOTAL ESTIMATE				
			Total NPW Cost:	**$5,067,800**

S = Subcontractor; L = Labor; M = Material; R = Rental; O = Other Direct Charge; PD = Per Diem; T = Travel

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)

Feasibility Study Cost Estimate

Alternative #: CMZ-2A Alternative #3 — **NPW Cost: $10,993,300**

Title: Steam Enhanced Extraction (SEE)

Project: ACW Pensacola
Location: Pensacola, FL — **Project Number:** 049019 — **Base Year:** 2016
Project Phase: FS — **Date:** 12/5/2016 — **Revision:** 1
Task Description: SEE for treatment of NAPL and source area soils; Aboveground treatment and discharge.
Cost Basis: SEE -ERM 2013 Cost Estimate

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Steam-Enhanced Extraction (SEE)				
SEE unit cost ERM based on 2013 Cost Estimate actual treatment costs for steam stripping. Includes design, construction and operation for one year.				

	Depth (ft bls)	NAPL Saturated Volume (cy)	
SEE Treatment Volumes	0 - 3	-	
	3 - 20	43,120	
	20-40	36,030	
	40-60	24,180	
	60-80	13,270	
	80-100	7,580	
	100-120	3,080	yd^3
	120-140	3,080	yd^3
		130,340	

Thermal Remediation Costs				
Project Planning and Design	1	total	$ 170,937	$170,937
Mobilization	1	total	$ 20,150	$20,150
Treatment Well Installation (steam injection, extraction wells, SVE)	1	total	$ 301,730	$301,730
Thermal Treatment Equipment Installation/Fabrication - Steam Plant	1	total	$ 1,259,050	$1,259,050
Thermal Treatment Equipment Installation/Fabrication - Treatment System	1	total	$ 1,816,230	$1,816,230
Phase 1 - Heat Up Period Operation	1	total	$ 1,509,820	$1,509,820
Phase 2 - Active Treatment Period	1	total	$ 2,926,690	$2,926,690
Post Remediation Activities/Demobilization	1	total	$ 230,100	$230,100
		Net Unit Cost (capital and O&M costs):	$ 63.00	
			Subtotal:	**$8,234,707**
			Subtotal - Capital Costs:	**$8,234,707**
Contractor Fee	10%	of Capital Cost		$823,471
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$41,174
Engineering & Administrative	8%	of Capital Cost		$658,777
Contingency	15%	of Capital Cost		$1,235,206
			Total Cost:	**$10,993,334**

Item	Qty.	Unit	Unit Cost	Cost ($)
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
Monitoring Period 1	0	Total Years for O&M		
All long term monitoring associated with this alternative are included under Site-wide costs for 30 years.				
			NPW Subtotal:	$0
Contractor Fee	10%	of NPW Cost		$0
O&M Contingency	15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$0
Total O&M Cost				**$0**
TOTAL ESTIMATE				
			Total NPW Cost:	**$10,993,300**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. CMZ 2A and 2B completed as a single project with one mobilization.
5. All wells installed in one field event. Waste disposal of drill cuttings assumes F-listed waste. No on site disposal considered.
6. Portable steam plant and treatment compound used to complete 2A first then 2B, not simultaneously.
7. Piping system and well heads constructed with flanges and reused for 2B after completion of 2A.
8. Construction estimate based on experience and vendor quotes from other projects. No vendor quotes for this estimate.
9. Equipment purchases are for new equipment. Rental or leases not considered. Used equipment could further reduce costs.
10. Demobilization will be completed after completion of 2B project. Fifteen soil borings at each CMZ are assumed with one mobilization.

Feasibility Study Cost Estimate | **Alternative #: CMZ-2B Alternative #3** | **NPW Cost: $5,002,200**

Title: Steam Enhanced Extraction (SEE)

Project: ACW Pensacola
Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016
Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 1
Task Description: SEE for treatment of NAPL and source area soils; Aboveground treatment and discharge.
Cost Basis: SEE -ERM 2013 Cost Estimate

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Steam-enhanced Extraction (SEE) 3 - 20 ft bls				
SEE unit cost developed from ERM site-specific estimate for steam stripping. Includes design, construction and operation for one year.				
	Depth (ft bls)	**NAPL Saturated Volume (cy)**		
SEE Treatment Volumes	0 - 3	- yd^3		
	3 - 20	46,740 yd^3		
	20-40	- yd^3		
	40-60	- yd^3		
		46,740		
Thermal Remediation Costs				
Project Planning and Design	1	total	$ 170,933	$170,933
Mobilization	1	total	$ -	$0
Treatment Well Installation (steam injection, extraction wells, SVE)	1	total	$ 233,770	$233,770
Thermal Treatment Equipment Installation/Fabrication - Steam Plant	1	total	$ 511,835	$511,835
Thermal Treatment Equipment Installation/Fabrication - Treatment System	1	total	$ 239,782	$239,782
Phase 1 - Heat Up Period Operation	1	total	$ 1,203,969	$1,203,969
Phase 2 - Active Treatment Period	1	total	$ 1,271,628	$1,271,628
Post Remediation Activities/Demobilization	1	total	$ 115,050	$115,050
	Net Unit Cost (capital costs):		$ 80	
			Subtotal:	**$3,746,967**
			Subtotal - Capital Costs:	**$3,746,967**
Contractor Fee	10%	of Capital Cost		$374,697
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$18,735
Engineering & Administrative	8%	of Capital Cost		$299,757
Contingency	15%	of Capital Cost		$562,045
			Total Cost:	**$5,002,200**
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	0	Total Years for O&M		
				$0
Contractor Fee	10%	of NPW Cost		$0
O&M Contingency	15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$0
Total O&M Cost				**$0**
TOTAL ESTIMATE				
			Total NPW Cost:	**$5,002,200**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)

Feasibility Study Cost Estimate | **Alternative #: CMZ-3 Alternative #2** | **NPW Cost: $3,182,200**

Title: ISCO and ISEB Barriers

Project: ACW Pensacola

Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016

Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 1

Task Description: Installation of Aerobic biodegradation barriers using infused oxygen along the northern and southwest edge of the CMZ. Also includes installation of a slow release oxidation reactive wall on the southern edge.

Cost Basis: Escambia O2 Infusion Pilot Test, Professional judgment and engineering experience. Carus Corp for SR ISCO material costs.

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
ISCO Slow Release Treatment Barrier				
Installation of slow release (SR) ISCO barrier wall along southern boundary. Treatment extends to 80 ft bls. Drilling of 114 injection wells for oxidation barrier. Two- 575-ft rows. Assumes 3 points/day/rig, 2 rigs/day. 9 hr day (19 days or 2 weeks total). Task includes well development. Permanent wells used for subsequent application and performance monitoring.				
Treatability Studies				
ISCO Treatability Study	1	total	$ 20,000	$20,000
SR Oxidant Installation				
Labor	1	total	$ 57,783	$57,783
Travel	1	total	$ 11,424	$11,424
Drilling Costs	1	total	$ 137,555	$137,555
Well Materials	1	total	$ 39,827	$39,827
Permanganate Direct Injection - Chemicals, tax	208,320	lbs.	$ 2.49	$519,487
SR Oxidant Candles, tax (3 replacements)	6,840	each	$ 52.50	$359,100
Solar Powered Compressors	4	each	$ 26,838	$107,352
Piping., Trenching	1	total	$ 35,000	$35,000
Miscellaneous Materials/Equipment	1	total	$ 69,526	$69,526
Rentals/Consumables	1	total	$ 13,631	$13,631
			Subtotal:	**$1,370,685**
ISEB Treatment Barriers				
Installation of infused oxygen ISEB line treatment along the northern and southwest boundary. Treatment extends from 20 to 80 ft bls. ISEB to consist of injection of 90% O2 for 5 years. Drilling of (10) 2-inch 2-cluster injection wells for oxygen infusion barrier (40 wells over two 300-ft barriers. Assumes 2 points/day/rig, 2 rig/day. 9 hr day (10 days or 2 weeks total).				
Treatability Studies				
ISCO Treatability Study	1	total	$ 40,000	$40,000
ISEB Installation				
Labor	1	total	$ 62,291	$62,291
Travel	1	total	$ 10,410	$10,410
Drilling Costs	1	total	$ 114,510	$114,510
Well Materials	1	total	$ 20,352	$20,352
O2 Trailer	2.5	each	$ 139,781	$349,453
Miscellaneous Materials/Equipment	1	total	$ 67,838	$67,838
Rentals/Consumables	1	total	$ 10,859	$10,859
			Subtotal:	**$675,713**
			Subtotal - Capital Costs:	**$2,046,398**
Contractor Fee	10%	of Capital Cost		$204,640
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$10,232
Engineering & Administrative	8%	of Capital Cost		$163,712
Contingency	15%	of Capital Cost		$306,960
			Total Cost:	**$2,731,942**

Item	Qty.	Unit	Unit Cost	Subtotal ($)
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	1	Total Years for O&M - ISCO		
	5	Total Years for O&M - ISEB		
ISCO Operation and Monitoring				
Labor, chemicals, inspecting SR oxidant, supplies, reporting, sample/analysis	1	year	$ 60,000	$60,000
				$60,000
ISEB Operation and Monitoring				
Electricity, labor, supplies, reporting, sample/analysis	1	year	$ 65,000	$65,000
				$65,000
			ISCO/ISEB NPW Subtotal:	**$338,559**
Contractor Fee	10%	of NPW Cost		$33,856
O&M Contingency	15%	of NPW Cost		$50,784
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$27,085
Total O&M Cost				**$450,283**
TOTAL ESTIMATE				
			Total NPW Cost:	**$3,182,200**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. ISEB Estimate from Brunswick Wood Treating Site Full scale application
5. The first 3 feet below ground surface will be excavated per CMZ-4A remediation.
6. Cost from O2 Trailers purchase price for Escambia Wood Treating Pilot Test

Feasibility Study Cost Estimate

Alternative #: CMZ-4A Alternative #2 **NPW Cost:** $2,006,200

Title: Excavation, Encapsulate On-Facility in Barrier Wall

Project: ACW Pensacola

Location: Pensacola, FL **Project Number:** 049019 **Base Year:** 2016

Project Phase: FS **Date:** 12/5/2016 **Revision:** 1

Task Description: Alternative 2 consists of: Excavate on-facility contaminated soil to approximately 3 feet bls. Excavated material is transferred to an on-facility containment area inside the Barrier Wall (CMZ-1). (CMZ-2A and -3 volumes)

Cost Basis: See general assumptions below.

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Excavation and On-Facility Transport of Soils				
Excavation - Surface Soil - Source Area	61,794	CY	$ 7.00	
Dust Control & Air Monitoring	61,794	per CY	$ 2.50	$154,485
Swell Volume (5%)	64,884		$ 7.00	$454,186
				$608,671
Base Liner Installation				
Placement of 60-mil HDPE Liner and GCL basal barrier	1	ls	$ -	$0
Labor	1	ls	$ -	$0
Travel	1	ls	$ 19,400	$19,400
Mobilization/Demobilization	195,017		$ 0.88	$171,615
Base Lining System, textured HDPE, 60 mil	195,017	ft2	$ 0.80	$156,014
Base Lining System, geosynthetic clay liner (GCL)				**$347,029**
Composite Cap for Containment Cell				
HDPE and GCL cap for containment cell	1	ls	$ 20,000	$20,000
Mobilization, Utility Locates/Demobilization	4	acres	$ 1,500	$6,000
Re-vegetation/Restoration	2,954	cy	$ 18	$53,172
Top soil lay (6")	8,861	cy	$ 15	$132,915
Protective soil layer (18")	159,500	sf	$ 0.70	$111,650
Geocomposite drainage net layer	159,500	sf	$ 0.80	$127,600
HDPE geo-membrane	159,500	sf	$ 0.60	$95,700
HDPE 60-mil Liner				**$547,037**
			Subtotal - Capital Costs:	**$1,502,736**
Contractor Fee	10%	of Capital Cost		$150,274
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$7,514
Engineering & Administrative	8%	of Capital Cost		$120,219
Contingency	15%	of Capital Cost		$225,410
			Total Cost:	**$2,006,153**
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	0	Total Years for O&M		
			O&M NPW Subtotal:	**$0**
Contractor Fee	10%	of NPW Cost		$0
O&M Contingency	15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$0
Total O&M Cost				**$0**
TOTAL ESTIMATE				
			Total NPW Cost:	**$2,006,200**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. Based on volume from 0-3 ft across CMZ-2A, 3A, and 3B * 1.05 swell factor
5. Containment construction (included in CMZ-1 Alternative #2)

Feasibility Study Cost Estimate

Alternative #: CMZ-4B Alternative #4 **NPW Cost: $5,426,400**

Title: Excavation/Disposal On-Facility Over CMZ-2A/3 Areas

Project: ACW Pensacola
Location: Pensacola, FL **Project Number:** 049019 **Base Year:** 2016
Project Phase: FS **Date:** 12/5/2016 **Revision:** 1
Task Description:

Alternative 4 consists of: excavation of soils, transport and disposal of to ACW Site over the CMZ-2A and CMZ-3 areas with a soil cover; backfill excavation areas and replace grass and ornamentals. Total volume includes 30,000 cy stockpile & 10,000 cy PYC spoils.

Cost Basis: See general assumptions below.

Item	Note#	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS					
Mobilization of Personnel, Equipment and Supplies		1	LS	$ 100,000	$100,000
Soil Excavation, Transport, Disposal and Backfilling					
Gimble Street Excavation	10				
Clearing, Grubbing and chipping; securing of area, traffic control		17,085	SF	$ 0.18	$3,075
Excavation		3,297	CY	$ 7.00	$23,079
Transport and disposal of material to former facility		3,297	CY	$ 3.00	$9,891
Backfilling and compaction		3,297	CY	$ 12.00	$39,564
Hydro-seeding		17,085	SF	$ 0.10	$1,680
Pine Street Excavation	10				
Clearing, Grubbing and chipping; securing of area, traffic control		54,440	SF	$ 0.18	$9,799
Excavation		7,393	CY	$ 7.00	$51,752
Transport and disposal of material to former facility		7,393	CY	$ 3.00	$22,179
Backfilling and compaction		7,393	CY	$ 12.00	$88,717
Hydro-seeding		54,440	SF	$ 0.10	$5,354
Excavation of Vacant Areas	14				
Clearing, Grubbing and chipping; securing of area, traffic control		945,139	SF	$ 0.27	$253,382
Removal of fencing in impacted areas	15	1	LS	$ 6,000.00	$6,000
Excavation		8,933	CY	$ 12.00	$107,200
Transport and disposal of material to former facility		6,432	CY	$ 3.00	$19,296
Backfilling and compaction		6,432	CY	$ 12.00	$77,184
Sod Replacement (areas not occupied by trees left in place)	16	756,111	SF	$ 0.40	$302,444
Replace fencing with same	17	1	LS	$ 12,000.00	$12,000
Excavation of Improved Areas	18				
Secure areas; traffic control		1	LS	$ 50,000.00	$50,000
Clearing, Grubbing and chipping		457,832	SF	$ 0.18	$82,410
Temporary Relocation of Residents	19	60	Units	$ 700.00	$42,000
Removal of fencing in impacted areas	20	1	LS	$ 17,000.00	$17,000
Excavation		28,604	CY	$ 20.00	$572,077
Transport and disposal of material to former facility		20,595	CY	$ 3.00	$61,784
Backfilling and compaction		28,604	CY	$ 24.00	$686,492
Sod Replacement (areas not occupied by trees left in place)		457,832	SF	$ 0.60	$274,699
Landscaping: Replacement with like		60	Units	$ 2,000.00	$120,000
Replace fencing with same	20	1	LS	$ 34,000.00	$34,000

Item	Note#	Qty.	Unit	Unit Cost	Subtotal ($)
On-facility Stockpile (30,000 cy)					
Excavation and disposal on ACW under soil cover.		30,000	CY	$ 7.00	$210,000
Approved Licensed Arborist to direct / oversee tree work	21	181	Days	$ 500.00	$90,500
Perimeter Air Monitoring Program					
Real Time Particulate Monitoring w/Data logging		362	Days	$ 167.00	$60,454
Onsite personnel (10-hour days)		362	Days	$ 550.00	$199,100
Rolloff Soil Characterization (Pine and Gimble Streets)		62	Days	$ 1,000.00	$62,000
Soil Cover (CMZ-2A, 3)					
Top soil layer (6")		10,299	CY	$ 10.00	$102,990
Protective soil layer (18")		30,897	CY	$ 8.00	$247,176
Hydroseeding		556	MSF	$ 35.00	$19,465
				Subtotal - Capital Costs:	**$4,064,746**
Contractor Fee		10%	of Capital Cost		$406,475
Legal Fees, Licenses & Permits		0.5%	of Capital Cost		$20,324
Engineering & Administrative		8%	of Capital Cost		$325,180
Contingency		15%	of Capital Cost		$609,712
				Total Cost:	**$5,426,436**
OPERATION & MAINTENANCE					
		5.00%	Discount Rate		
		0.00%	Escalation Factor		
		0	Total Years for O&M		
				O&M NPW Subtotal:	$0
Contractor Fee		10%	of NPW Cost		$0
O&M Contingency		15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)		8%	of NPW Cost		$0
Total O&M Cost					$0
TOTAL ESTIMATE					
				Total NPW Cost:	**$5,426,400**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. Containment construction (included in CMZ-1 Alternative #2)
5. General Contractor is responsible for soil moving and placement of GeoGrid
6. Special Contractor is responsible for geo-synthetic material installation
7. Assumed unit price was found in the general literature
8. Unit price information obtained from Oasis Construction Services (Georgia); quoted during late 2007 - early 2008
9. Assumed unit price was obtained from case study or project knowledge
10. Assumes costs of Coleman Evans Excavation Area 15; hydro-seeding costs are taken from Coleman Evans Excavation Area 6.
11. Assumes costs of Coleman Evans Excavation Area 2 are applicable; hydro-seeding costs are taken from Coleman Evans Excavation Area 6.
12. Total of 21,405sf for sidewalks in easements
13. Linear feet of sidewalks (21405/3)
14. Assumes costs of Coleman Evans Excavation Area 15 are applicable; fence replacement costs scaled up based on additional number of parcels in excavation.
15. Assumes 25% of vacant parcels have fences
16. Assumes 80% of vacant parcel to be sodded
17. Assumes 25% of vacant parcels have fences
18. Assumes costs of Coleman Evans Excavation Area 10 are applicable; landscaping / fence replacement costs are taken from Area 15 and scaled up based on additional number of parcels in excavation.
19. total of 2 nights in hotel plus meals (family of 4) # of impacted residences
20. Assumes 25% of improved parcels have fences
21. Duration of days of work = 362 days

Feasibility Study Cost Estimate

Alternative #: OU2/CMZ-5 Alternative #3 **NPW Cost: $3,409,300**

Title: ISCO/ISEB Treatment Barrier

Project: ACW Pensacola
Location: Pensacola, FL **Project Number:** 049019 **Base Year:** 2016
Project Phase: FS **Date:** 12/1/2016 **Revision:** 2
Task Description: Alternative 3 consists of: Installation of an ISCO/ISEB treatment barrier directly north of the Bay (off-facility) with 21 injection well locations. Wells screened 40-60, and 60-80 ft bls in two clusters on 40-ft spacing. Oxidant and infused oxygen to be prepared at injection trailers at each locations. Oxidant to be either permanganate slow-release candles, persulfate, or ozone. Operation costs based upon 10-year period.

Cost Basis: See general assumptions below.

Item	Note#	Qty.	Unit	Unit Cost		Subtotal ($)
CAPITAL COSTS						
Treatability Studies						
ISCO Treatability Study		1	total	$ 25,000		$25,000
ISEB Treatability Study		1	total	$ 35,000		$35,000
					Subtotal:	**$60,000**
ISCO/ISEB Injection Wells						
Oversight/Labor		1	total	$ 35,276		$35,276
Travel		1	total	$ 3,426		$3,426
Subcontractor		1	total	$ 121,485		$121,485
Materials/Rentals		1	total	$ 17,095		$17,095
					Subtotal:	**$177,281**
Recovery Wellheads						
Valves, 2-inch Tru Union		42	each	$ 65.00		$2,730
Pressure Gauges		42	each	$ 29.00		$1,218
Miscellaneous Fittings/Supplies		42	each	$ 25.00		$1,050
					Subtotal:	**$4,998**
Trenching, Piping for New Extraction Wells						
Labor		1	total	$ 24,120		$24,120
Cat 235, 2.5 cy, Soil/Sand, Trenching		92	cy	$ 3.54		$327
950, 3.25 cy, Backfill with Excavated Material		92	cy	$ 2.94		$272
Compact Soil with Vibrating Plate, 2 Passes		92	cy	$ 3.13		$289
PVC piping, fittings		1	total	$ 5,000		$5,000
					Subtotal:	**$30,009**
Groundwater Recovery Influent Manifolds						
Totalizing Flowmeters		42	total	$ 350		$14,700
Pressure Gauges		42	each	$ 38.00		$1,596
Sample Ports		42	each	$ 15.00		$630
Ball Valves		42	each	$ 55.00		$2,310
Fittings, Pipe		1	total	$ 2,500		$2,500
					Subtotal:	**$21,736**
Equipment Trailers						
South System (O3/O2, controls, turnkey)		1	total	$ 400,000		$400,000
					Subtotal:	**$400,000**
					Subtotal - Capital Costs:	**$694,024**
Contractor Fee		10%	of Capital Cost			$69,402
Legal Fees, Licenses & Permits		0.5%	of Capital Cost			$3,470
Engineering & Administrative		8%	of Capital Cost			$55,522
Contingency		15%	of Capital Cost			$104,104
					Total Cost:	**$926,521**

Item	Note#	Qty.	Unit	Unit Cost	Subtotal ($)
OPERATION & MAINTENANCE					
		5.00%	Discount Rate		
		0.00%	Escalation Factor		
		10	Total Years for O&M - ISCO		
Labor (15 hrs/wk)		1	each	$ 93,600.00	$ 93,600.00
Materials, Supplies		1	each	$ 12,800.00	$ 12,800.00
Electric Service		1	each	$ 11,500.00	$ 11,500.00
Well Rehabilitations		1	each	$ 5,200.00	$ 5,200.00
Rentals, Consumables, Services, PLC Support		1	each	$ 9,200.00	$ 9,200.00
Performance Monitoring RW, influent, effluent sampling)		1	each	$ 18,000.00	$ 18,000.00
				Subtotal:	$150,300
				NPW Subtotal:	**$1,160,577**

Annual Groundwater Sampling	Time Period	Units	Qty	Unit Cost	Line Item Cost	Net Present Worth
SUPPLIES						
Supplies/ Shipping	40	each	1	$ 5,000.00	$ 5,000.00	$ 85,795
Travel	40	events	1	$ 6,000.00	$ 6,000.00	$ 102,955
MONITORING - Period 1 (Yrs 0-5) - Semiannual						
Personnel (4-man crew @ 10-hour days, 10 days)	10	hours	400	$ 100.00	$ 40,000.00	$ 308,869
Report preparation (data summary report)	10	each	1	$ 10,000.00	$ 10,000.00	$ 77,217
MONITORING - Period 2 (Yrs 6-10)[2]						
Personnel (4-man crew @ 10-hour days, 7 days)	5	hours	280	$ 125.00	$ 35,000.00	$ 151,532
Report preparation (data summary report)	5	each	1	$ 7,000.00	$ 7,000.00	$ 30,306
MONITORING - Period 3 (Yrs 10-30)						
Personnel (3-man crew @ 10-hour days, 7 days)	20	hours	210	$ 150.00	$ 31,500.00	$ 149,325
Report preparation (data summary report)	20	each	1	$ 7,000.00	$ 7,000.00	$ 33,183
					Subtotal:	**$ 939,183**

Contractor Fee	10%	of NPW Cost	$116,058
O&M Contingency	15%	of NPW Cost	$174,087
Engineering & Administrative (applied on O&M)	8%	of NPW Cost	$92,846
Total O&M Cost			**$2,482,750**

TOTAL ESTIMATE		
	Total NPW Cost:	**$3,409,300**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)

Feasibility Study Cost Estimate | **Site-wide Costs** | **NPW Cost:** $241,600

Institutional Controls, Five-Year Reviews

Project: ACW Pensacola
Location: Pensacola, FL | 049019 | **Base Year:** 2016
Project Phase: FS | 12/5/2016 | **Revision:** 1
Task Description: ICs and 5YRs consist of: Institutional Controls and/or deed restrictions on future site uses. Completion of 5 yr Reviews for a total period of 30 years.
Cost Basis: See general assumptions below.

Item	Units	Qty	Unit Price	Line Item Cost	Net Present Worth [1]
CAPITAL COSTS					
Administrative Restrictions (Deed and Zoning Restrictions)	LS	1	$ 20,000.00	$ 20,000.00	
			Subtotal:	$ 20,000.00	
Contractor Fee (10% of Subtotal)				$ 2,000.00	
Engineering & Administrative (Contractor Overhead) (8% of Subtotal)				$ 3,000.00	
Legal fees, permits, and other licenses (0.5% of Subtotal)				$ 400.00	
Contingency (15% of Subtotal)				$ 3,000.00	
			Subtotal:	$ 8,400.00	
			Subtotal Capital Costs	$ 28,400.00	**$ 28,400**
OPERATION AND MAINTENANCE (O&M)					
Five-Year Reviews					
Periodic cost inputs to each Five-Year Review					
Personnel (2-man crew @ 2 12-hour days)[3]	hours	48	$ 100.00	$ 4,800.00	
Supplies/ Travel[4]	days	3	$ 3,000.00	$ 9,000.00	
Soil/Groundwater Sampling and Lab Testing[5]	sample	20	$ 450.00	$ 9,000.00	
Consultant travel (for site visit and interviews)[6]	days	2	$ 500.00	$ 1,000.00	
Report Prep (interviews, research, reporting)[7]	lump sum	1	$ 25,000.00	$ 25,000.00	
				$ 48,800.00	
Five-Year Review - Year 5	Event	1		$ 48,800.00	$ 38,236
Five-Year Review - Year 10	Event	1		$ 53,680.00	$ 32,955
Five-Year Review - Year 15	Event	1		$ 58,560.00	$ 28,168
Five-Year Review - Year 20	Event	1		$ 63,440.00	$ 23,910
Five-Year Review - Year 25	Event	1		$ 68,320.00	$ 20,175
Five-Year Review - Year 30	Event	1		$ 73,200.00	$ 16,937
				Subtotal: 5 Yr Reviews:	**$ 160,381**
Contractor Fee		10%	of NPW Cost		$ 16,038
O&M Contingency		15%	of NPW Cost		$ 24,057
Engineering & Administrative (applied on O&M)		8%	of NPW Cost		$ 12,830
				Subtotal:	**$ 52,926**
				Total NPW Cost =	**$ 213,307**
				Total NPW Cost =	**$ 241,591**

NOTES:

[1] NPW = Net Present Worth Cost
Series of Payments NPW Calculation: [Payment] x $[(1 + r)^t - 1] \div [r (1 + r)^t]$
Single Payment NPW Calculation: [Payment] $\div (1 + r)^t$
Assumed Discount Interest Rate = 5.00%
[2] Sampling crew
[3] Includes airfare + sampling equipment
[4] Includes shipping and lab fees
[5] Includes airfare + per diem
[6] Includes all costs for document prep

Source of Cost Data:
Professional judgment and engineering experience, unless specified and notated.
Labor rates for sampling personnel are based on typical labor rates for the area.

Cost Adjustment Checklist:

COST ESTIMATE FACTOR:	
Includes H&S Productivity (labor & equip)?	Assumed included in cost data.
Cost escalation to base year?	Current year is base year.
Area cost factored in?	Assumed included in cost data.
Subcontractor overhead and profit included?	Assumed included in cost data.
Prime contractor overhead and profit included?	Includes 15% overhead. Profit is included with cost summary.

APPENDIX D
STATE CORRESPONDENCE

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

August 4, 2017

U.S. EPA, Region IV
Superfund Division
Attn: Mr. Peter Thorpe
61 Forsyth Street, SW
Atlanta, GA 30303

Subject: DEP Review of Draft Amended Record of Decision
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida

Dear Mr. Thorpe:

Thank you for the opportunity to review the draft June 2017 Amended Record of Decision (AROD) for the American Creosote Works (ACW) Superfund site, Pensacola, Escambia County, Florida. Florida Department of Environmental Protection (DEP) review comments are provided below.

Please also find attached July 28, 2017 review comments from the University of Florida (UF)-Center for Environmental & Human Toxicology. UF review included the following: 1) the draft AROD and 2) the March 2017 Probabilistic Risk Assessment (PRA) developed by GeoSyntec Consultants for EPA and included in the Final ACW Feasibility Study. Also included in the UF correspondence are the results of the recent ACW bioavailability assessment completed by DEP, derivation of the site specific relative bioavailability of 0.59 and the corresponding calculation of site specific Alternative Soil Cleanup Target Levels (ASCTLs) for dioxin for the ACW site by UF for DEP. DEP concurs with the attached UF review comments.

Summary of the AROD recommended site remedy:

The primary contaminants in the soil, sediments and groundwater released as a consequence of the former wood treating operations at ACW are semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs) pentachlorophenol (PCP) and dioxin. Section 12.0 and Figure 10 of the draft AROD propose the following combination of containment and treatment alternatives to address onsite and offsite DNAPL/sources and soils as well as contaminated groundwater including treatment of onsite and offsite PCP in groundwater and groundwater monitoring, in the five (5) Contaminated Media Zones (CMZs) defined in the Feasibility Study and the AROD:

- CMZ-1- Main (on facility) Source Zone- Alternative #2, Barrier Wall and Containment Cap- DNAPL, residual creosote and creosote stained soils including principal threat waste (PTW) will be contained in place with a low permeability cap and slurry wall extending to the clay unit located approximately 100 ft bls. Dioxin and SVOC/PAH contaminated vadose zone soils and PTW in CMZ-4A will be excavated and relocated under the CMZ-1 cap, along with contaminated soils and debris piles from previous off-facility excavations and temporarily stockpiled in CMZ-4A.
- CMZ-2A- Extended (on facility) DNAPL plume - Alternative #3, (SEE)- DNAPL contamination in this area will be addressed using Steam Enhanced Extraction (SEE) and multiphase extraction system (MPE) to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". Additional delineation will be conducted during remedial design (RD) to delineate the vertical extent of DNAPL, currently confirmed at 137 ft bls by SB-527.
- CMZ-2B- Extended (off facility) DNAPL plume- Alternative #3 (SEE)- Creosote DNAPL in the shallow zone (above the shallow clay at approximately 20 ft bls) will be addressed using SEE and MPE to recover and treat mobile DNAPL. Isolated stringers of residual contamination below the clay will not be actively treated based on Solute model predictions that the Bayou would not be impacted by groundwater contaminant discharge over the next 50 years.
- CMZ-3- Secondary Source Zone/Absorbed Phase Zone (on facility) - Alternative #2 (ISCO/ISEB)- Onsite saturated zone sources outside of the CMZ-1 area will be addressed by insitu chemical oxidation and/or enhanced bioremediation treatment barriers on the northern and southern CMZ-3 boundaries to depths of 80 ft bls to promote aerobic degradation and chemical destruction of the creosote and pentachlorophenol (PCP) source and related groundwater contamination as well as mitigate dissolved plume migration toward Pensacola Bay. Additional PCP characterization is necessary in the RD to *identify* the PCP source and support a flexible treatment system layout. Groundwater contamination has been documented in monitoring wells (MW) OW-9 and CW6 at depths of 60 ft bls. Solute modeling predicted that PCP could reach Pensacola Bay, consistent with available data.
- CMZ-4A- Surface Soil Contamination (on facility)- Alternative #2- (Excavation, Encapsulation inside CMZ-1 Barrier Wall)- All CMZ-4A vadose zone contaminated soils (0-3 ft bls)- except soils overlying CMZ-3 - will be excavated and placed inside the CMZ-1 Barrier Wall and capped. Dioxins and SVOC/PAHs in CMZ-4 exceed the LDR criteria and are considered PTW. In lieu of treatment which is cost prohibitive, *CMZ-4A vadose zone soils overlying CMZ-3 (estimated 61,794 cy) will be placed in an* ***encapsulated cell within CMZ-3.***
- CMZ-4B- Surface soil contamination (off facility)- Alternative #4- (Excavation /Disposal On-facility over CMZ-2A/3 Areas)- Excavation of approximately 53,617 cy of offsite dioxin contaminated soils (EPA action level of 50 ng/kg dioxin) to an estimated depth of 2 ft bls and disposal on the (former ACW) facility property over the CMZ-2A/3 areas. Offsite contaminated soils in Pine and Gimble Street right of ways (9208 cy) exceed the LDR, are considered PTW and will be disposed in the CMZ-1 containment cell(??).

- CMZ-5- Extended Dissolved Groundwater Plume (on and off facility)- ***Interim*** Alternative #3- (ISCO/ISEB Treatment Barriers)- This alternative supplements the onsite CMZ-3 Alternative #2 remedy. PCP groundwater contamination on and off facility on the eastern portion of the site will be treated insitu with an infusion of gaseous oxygen as well as nutrients if necessary. Monitoring of the naphthalene/SVOC plume on the western portion of the Site is proposed to confirm a decline in groundwater contaminant concentrations in response to the source remedies and contaminant flux reduction on the facility. Should monitoring not show sufficient abatement of the naphthalene plume in a 5 year timeframe following implementation of the CMZ-1, 2A and 2B source remedies, an evaluation of other alternatives will be completed so that a final remedy can be selected and documented in a Final ROD for CMZ-5. With sufficient abatement in that initial 5 year timeframe, active groundwater treatment at the Bay would not be necessary.

The estimated cost of the EPA selected remedy is $35.3 million.

DEP AROD review comments are as follows:

DEP supports the technologies selected in the draft AROD to address DNAPL, soil and groundwater contamination at the ACW site.

- Section 12.0- Selected Remedy
  - DEP recommends that Section 12 focus on a summary of the selected alternative for each CMZ. The text in this Section discussing the rationale for and comparison to other alternatives (not selected) is confusing and would seem more appropriate in Section 10, Comparative Analysis.
  - There appear to be some inconsistencies between the remedial components outlined in Section 12.0 and those phases or actions identified in Part 1: Declaration, particularly CMZ-4A.
  - CMZ-4A: In Section 4.6.2 of the Feasibility Study (FS), the proposed CMZ-4A Alternative #2 for contaminated vadose zone soils in the 0-3 ft bls interval is to excavate all those soils in CMZ-2A *and overlying CMZ-3* (estimated 61,794 cy) and place those soils inside the CMZ-1 containment system for long term isolation. Conversely, the selected remedy for CMZ-4A (based on Alternative #2 in Sections 9.5.2 and 12.2.5 of the draft AROD and including Figure 10) indicates that **all** CMZ-4A vadose zone soils (0-3 ft bls)- *except vadose zone soils overlying CMZ-3* - will be excavated and placed inside CMZ-1. The AROD states that *CMZ-4A vadose zone soils overlying CMZ-3 will be placed in an* ***encapsulated cell within CMZ-3****. The entire onsite facility area (excluding CMZ-1) will be covered with a 2 ft thick permeable cover consisting of backfill and hydroseeded.*
    - DEP was not able to locate previous discussion or evaluation of the use of an encapsulated cell in CMZ-4A. Please confirm or correct the above inconsistency.
    - We assume that the intended purpose of the cell is to mitigate direct contact and potential sources to groundwater. Please provide

construction information (proposed cell material and dimensions) for the *encapsulated* cell in the AROD *consistent* with that intent.

- Please clarify if on facility soil excavation, encapsulated cell construction, and redisposition of soils into the cell was considered in buildup of costs and sequencing of activities.
- Currently, proposed soil cleanup target levels (SCTLs) for onsite vadose zone soils are based on Commercial SCTLs, without consideration of potential leachability. It is likely that both vadose zone soils as well as NAPL are contributing to existing groundwater contamination. Based on the FS, DEP understood that all vadose soil (water table estimated at 3 ft bls, fluctuating at 3-5 ft bls) would be excavated and contained inside CMZ-1. Please clarify how the proposed AROD revisions to CMZ-4A Alternative #2 will ensure that onsite vadose soils remaining outside of the CMZ-1 containment unit will not continue to be a contaminant source to groundwater.

- Please state in Sections 4.0 and 12.0 of draft ROD, *where* the 35,000 cy of onsite stockpiled soils and debris will be relocated and secured on facility as part of the remedy.
- Please state in Sections 4.0 and 12.0 that soils from Pine and Gimble St that exceed LDRs will be relocated in CMZ-1 as part of the remedy, if that is the case.
- CMZ-2A: Please clarify the CMZ-2A remedial goals in Section 12.0. The selected remedy states that the goal of SEE in this area is to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". It is unclear what criteria will be used to confirm that remedial goal has been met. As noted in previous DEP comments, documentation of performance and effectiveness of CMZ-1 containment unit and the 100' clay will require downgradient monitoring in CMZ-2A. Given the contiguous nature of CMZ-1 and CMZ-2, remediation of CMZ-2 should be such that releases from the CMZ-1 containment cell at concentrations above groundwater cleanup target levels (GCTLs) can be recognized. As such, DEP has recommended active remediation of CMZ-2A to GCTLs.
- CMZ-2B: DEP recommends that post active remedial monitoring in this area include monitoring of groundwater contaminant levels *below the shallow clay* to evaluate the effectiveness of the source remedy and model predictions that DNAPL stringers below the clay do not require active remediation for the groundwater to meet remedial action objectives (RAOs) and groundwater cleanup levels.
- CMZ-5:
  - Please clarify in Part 1: Declaration that the CMZ-5 groundwater remedy represents an interim remedy, consistent with Section 12.0. The Declaration states that AROD represents the final remedy.
  - Please clarify in Section 12.0 that the CMZ-5 Alt #3 remedy includes a ISCO/ISEB treatment barrier *offsite along the Pensacola Bay Shoreline to depths of 40 to 80 ft bls* on the eastern end of the Site that will be

implemented as part of this CMZ-5 remedy to address PCP. We understand that the need for additional treatment to address the remaining groundwater contaminant plume (SVOCs including naphthalene) will be based on the initial Five Year Review.

- Please clarify in Section 12.0 that evaluation of sufficient contaminant abatement in the initial 5 year timeframe will consider not only a documented decline in groundwater contaminant concentrations throughout the plume including SVOCs and PCP, but will also evaluate the continued likelihood of impacts to *surface water* via groundwater contaminant discharge. As discussed in prior DEP review comments, this evaluation may include surface water sampling of the Bay, updated groundwater modeling based on more recent data, and confirmation of a shallow clay extending into the Bay that would mitigate such discharge to surface water. Data for site related contaminants would be compared to groundwater and surface water criteria in Chapters 62-777 and 62-302, F.A.C.
- Please clarify in the Section 12.0 that the proposed insitu groundwater treatment alternatives for CMZ-3 and CMZ-5 will also be implemented prior to the FYR evaluation of the effectiveness of the interim groundwater remedy.

- Please clarify in Section 12.0 that **Institutional Controls (IC)** are an integral component of the selected remedy, and discuss the purpose of the ICs and the anticipated IC instruments.
  - ICs should include *onsite restrictive covenant(s)* to 1) restrict land use to a commercial or park scenario, 2) prohibit activities that would compromise the effectiveness and integrity of the remedy including the cap and 2 ft of clean fill onsite, outside of the CMZ-1 containment area, and 3) require management of any contaminated soils that might be brought to the surface as contaminated media. (Note that zoning restrictions, fencing, easements, and public notices/advisories and signage cited as example in the FS and AROD as ICs are not considered adequate controls.)
  - ICs should also include *groundwater use controls* to mitigate exposure to contaminated groundwater in the interim until groundwater meets groundwater cleanup target levels for unrestricted use. Groundwater use ICs should include restrictions associated with the existing designation of the site vicinity as a *"delineated area" under 62-524, F.A.C.* Please clarify if there is an *Memorandum of Agreement* in place between EPA and the Water Management District to further enhance the effectiveness of the delineated area IC.
  - In Part 1: Declaration of the AROD, the document states that "the site will have ICs for industrial/commercial uses only, which also includes recreational". These are two distinct types of land uses and exposure scenarios, with more stringent criteria for recreational land use. As

discussed elsewhere in DEP comments, ICs- as well as engineering controls- must be such that the resulting remedy is protective of both scenarios.

- Section 12.4 incorrectly references Tables 4 & 5 rather than Tables 11 & 12 as containing the final cleanup levels.

- Section 7.0- Summary of Site Risks
  - Section 7.1.5- Uncertainties
    - Please see the attached UF discussion regarding technical concerns with the approach used in development of the 37 ng/kg dioxin ASCTL (March 2017 Geosyntec PRA).
    - Please see the attached UF discussion regarding the UF development of the site specific relative bioavailability calculated from an oral bioaccessibility study using ACW soils, and the resulting site specific direct exposure ASCTLs for dioxin under residential, commercial/industrial and recreational land use scenarios using a deterministic risk assessment approach
    - Please update the placeholders in Section 7.1.5 of the AROD to reflect the DEP recommended site specific relative bioavailability (0.59) and resulting site specific ASCTLs for dioxin derived by UF.
  - Section 7.2- Summary of Ecological Risk Assessment-
    - Section 7.2.3 concludes that while the maximum concentrations of chemicals detected in shallow groundwater exceed Florida Marine SWQC for Class 3 Marine Surface water (Fish Consumption, Recreation, Propagation and Maintenance of Healthy Well-balanced Population of Fish and Wildlife), the impact of the shallow aquifer in the Bay is likely to be minimal due to low water volumes and tidal mixing. In addition, it was noted in the draft AROD that sampling of surface water, pore water and sediment in Pensacola Bay by USACE indicated that detected concentrations are *generally* below ecological concern. DEP requests a more detailed discussion in this Section of the frequency and extent of these exceedances to demonstrate the basis for the conclusion that concentrations are below ecological concern. There was an EPA review and evaluation of data contained in the June 2008 Phase II RD Activity report that may be useful in this regard (see Brett Thomas email, dated 9/23/2013).
  - Please briefly discuss the 2016 EPA removal of contaminated soil/sediment from the PYC ditch. Please clarify in Section 7.0 that the intent of that removal and backfilling of the ditch to an elevation consistent with the adjacent upland was to address human health and ecological risk posed by contaminants in the former PYC ditch sediment. Please clarify if this remedial objective has been accomplished.

- Section 7.0- Contaminants of Concern (COCs)
  - *Soils*- Site related soil COCs are identified in Table 1 based on the 2014 HHRA. The proposed soil COCs consist of BaP-TEQ, PCP, 2- methylnaphthalene and 2,3,7,8- Dioxin-TEQ. Review of AROD Tables 3-7 indicate that these contaminants were selected based on concentrations exceeding a 10-4 cancer risk or HI of 1 under an on facility industrial or recreation land use scenario and/or an offsite residential land use scenario. Based on EPA policy, such exceedances would trigger a CERCLA remedial action and application of State ARARs. A comparison of the maximum concentration of each soil contaminant presented in the FS to Chapter 62-777, F.A.C. default SCTLs, indicates that *carbazole and naphthalene* should also be identified as on facility soil COCs and included in Table 11, Cleanup Levels for Soil COCs.
  - *Groundwater*- Table 2 identifies groundwater COCs based on a comparison of the *mean* groundwater concentration to the proposed screening value. Use of the mean is not consistent with Chapter 62-780 or EPA guidance. Additionally, many of the proposed screening values in Table 2 exceed the GCTLs promulgated in Chapter 62-777. Never the less, a comparison of groundwater contaminant levels to the GCTLs does not change the list of COCs, which appears comprehensive.
    Please see UF corrections to groundwater screening values based on Chapter 62-777, F.A.C.

- Section 8.0- Cleanup Levels-
  - *Soil cleanup levels*- Table 11 reflects Chapter 62-777 residential or commercial/industrial default SCTLs. If a Park or recreational land use scenario is anticipated on the former facility property, recreational based ASCTLs should also be identified in the AROD consistent with that anticipated land use. As noted in the 2014 FS/Risk Assessment review comments, DEP recommends an exposure frequency of 200 d/y for 14 years for the non-ditch recreational scenario. These input values have been used by DEP for park visitation in Florida at other sites. Using a 10-6 risk management level and default assumptions, the recreational dioxin soil criterion, for example, would be **17 ng/kg**. If the site specific relative bioavailability at ACW is considered, the site specific recreational ASCTL for dioxin would be **28 ng/kg** (see attached UF correspondence).
    In lieu of identifying recreational SCTLs for all COCs in the AROD, the remedy could require an engineering control over the entire on facility property (such as 2 ft thickness of clean fill, low permeability cap or pavement, or combination of such controls) to effectively mitigate direct contact under a recreational land use scenario. Appropriate restrictions would be documented in a restrictive covenant (discussed above).

  - *On facility Soils*- The presence of leachable vadose zone soils should be discussed in the AROD. How the remedy will address these leachable soils and

the basis for making that determination should be clearly stated in the AROD. As noted in previous DEP comments, *leachability criteria* for all soil contaminants, particularly those with corresponding GCTL exceedances, should be included as remedial goals in the ROD. In lieu of site specific leachability criteria, Chapter 62-777, F.A.C. default leachability SCTLs would apply. Conversely, if all on facility vadose zone soils are to be excavated and placed within the CMZ-1 containment unit (or otherwise effectively encapsulated to address the leachable mass), then identification of numeric soil leachability criteria may not be required in the AROD.

- *Offsite Soils (CMZ-4B)*

  EPA has proposed offsite soil remediation based on the *Conceptual Site Model (CSM)* presented in Section 5 of the AROD, exposure units (EUs) as shown in Figures 5 and 6, and application of the EPA's remedial action trigger policy using the more stringent of an HI of 1 or 10-4 cancer risk. The dioxin trigger based on an HI of 1 will determine where remedial action of offsite soils will occur, as outlined in the following excerpt from Section 5.1 of the AROD (italics added):

  "All off-facility contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, Florida's SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's SCTL, which 7 ppt for dioxin. There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD). "

  DEP has the following concerns with this approach to offsite soil contamination.

  - Use of a remedial action trigger that is less stringent that a 10-6 cancer risk and HI of 1 is not consistent with State ARARs and would result in elimination of properties with contamination that requires remediation to meet the State's promulgated levels of protection.
  - As noted in previous DEP review comments on the FS, congener analysis and risk assessment, it appears that exclusion of properties from Remedial Action based on the congener fingerprinting data is premature and underestimates the extent of site related soil contamination and related risk. It appears that the EUs presented in Figures 5 and 6 of the AROD represent EPA's anticipated areas of offsite soil remediation. DEP strongly recommends additional soil sampling during the RD and use of a *weight of evidence approach* that considers not only the congener analysis but also concentration gradients to determine the location and extent of offsite, site related soil contamination.

- Review of the Figures 5 and 6 and related dioxin data maps in the FS indicates that there is an absence of data to support the proposed limits of remediation and that additional delineation outside of the proposed EUs will need to be conducted during the RD or as part of confirmatory sampling during the Remedial Action to ensure that the remedy is protective, consistent with the State 10-6 risk management level.
- In Section 5.0, the CSM proposes 2 major mechanisms for transport of contamination from on facility to offsite properties- vehicular traffic and overland flow. Overland flow included surface runoff/migration from the facility south to the Bay including via the PYC ditch as well as runoff west, north and east of the facility property. The FS indicates that trucks loaded with treated poles would leave the main entrance of South J Street, driving down Pine or Cypress Streets resulting in deposition of contaminants along the vehicular traffic routes. The distribution of offsite dioxin contaminated soils would seem consistent with these migration pathways. However, it does not appear that the proposed exposure units fully consider offsite contaminant trends and the documented presence of dioxin contamination in all downgradient areas that are likely site related. These areas include:
  1) South of Cypress between J and I Streets (dioxin)
  2) North and South of Cypress between H and G Streets (dioxin; PAH to north)
  3) Northwest of F Street and Cypress intersection (dioxin)
  4) Immediately east of F Street between Pine and Gimble (dioxin)
  5) South of Gimble between F and G Streets (dioxin)
  6) South of Main Street between Barrancas Ave and I Street (dioxin)
  7) North and South of Sonya between J & K Streets, outside of the proposed EUs (PAHs)
  8) South of SE ditch at F Street (PAHs)
- The proposed areas of remediation do not consider the BAP-TEQ SCTL exceedances documented in the 1997 offsite soil sampling. While this data was based on composite samples, the data did indicate likely exceedances, particularly in the vicinity of the PYC ditch contaminant migration pathway, where DNAPL has been documented. Offsite BAP-TEQ soil concentrations were observed as high as 850 ug/kg (above the 100 ug/kg default residential SCTL). Additional soil sampling for carcinogenic PAHs is recommended during the RD to confirm that site related BAP-TEQ exceedances are not present offsite (see areas above).
- Please note that while the FS and AROD assume offsite soil remediation to 2 ft bls, soil exceeding the Chapter 62-777 F.A.C. default residential SCTL or appropriate site specific ASCTL throughout the vadose zone must be addressed to allow unrestricted residential use.

Recommendation- DEP recently completed an oral bioaccessibility study at the ACW site to evaluate site specific relative bioavailability of dioxin in soils and to

support development of site specific ASCTL(s) for dioxin based on Florida's risk management criteria of 10-6 and HI of 1. Using 12 soil samples from the ACW site, the assessment confirmed a mean bioaccessibility of 0.59 which was used as the site specific relative bioavailability for dioxin in soil. Based on a deterministic risk calculation, the site specific health based ASCTL under a residential land use scenario would be **15 ng/kg, dioxin-TEQ.** *DEP recommends that this site specific soil criterion be used to inform the offsite dioxin delineation and confirm the areas to be addressed by the offsite soil remedy.*

- *Groundwater Preliminary Remedial Goals (PRGs) (Table 12)* -
  - Table 12 identifies up to 4 different PRGs for each COC such that remedial goals are not clear. DEP understands that the proposed CMZ-5 alternative represents an *interim* groundwater remedy. As stated in the draft AROD, further evaluation of the need for additional groundwater remedial action and the effectiveness of the source and interim groundwater remedy in addressing contaminated groundwater will be conducted in a 5 year time frame after implementation of the CMZ-1, 2A and 2B source remedies. DEP recommends that a single PRG be applied to each COC and identified as the groundwater cleanup goal in the ROD to facilitate that evaluation. Consistent with CERCLA, where more stringent, the promulgated State standard or criterion (GCTL) under Chapters 62-550 and 62-777, F.A.C. would be relevant and appropriate for each contaminant and should be reflected in this AROD as the final PRGs.
  - Please correct the DEP GCTLs cited in Table 12 for the following- 2-Methylphenol (35 ug/l), 4-Methylphenol (3.5 ug/l) and 2,4-Dimethylphenol (140 ug/l).

- *Surface water-*
  - Section 8.1, Section 12.0- No summary table of surface water COCs and corresponding surface water quality criteria (SWQC) for marine surface water have been included in the AROD. In lieu of such a table, please clarify in the text that Chapters 62-302 Class II SWQC and 62-777 Surface water CTLs for site related COCs are relevant and appropriate when evaluating the effectiveness of the remedy in protecting marine surface waters from migration of contaminated groundwater into Pensacola Bay/ Bayou Chico, and to confirm that the AROD remedial action objectives (RAOs) have been met.

- <u>State Acceptance- Part I: Declaration, Section 10.8 and Appendix C</u>
  - Please remove the statement in Part 1: Declaration that "the State of Florida concurs with the Selected Remedy". Please remove the reference in Section 10.8 to "FDEP concurrence letter included as Appendix C".

DEP does not normally provide formal concurrence with a Superfund site remedy prior to receipt of the final executed ROD or AROD. The DEP concurrence letter is not included as an attachment to the ROD or AROD.

- ARARs- Tables 13 and 14
  - Action Specific ARARs- The following should be considered for ACW
    - Chapter 62-780.222, F.A.C. - requires warning signs at hazardous waste sites.
    - Chapter 62-701.340, 62-701.400 and 62-701.600, F.A.C. - provides requirements for final cover design and construction of a landfill cover.
    - Chapter 62-780.680(2) and 62-780.680(3)- provides the criteria and requirements for use of institutional and engineering controls in a risk based closure. Some portions of site may be restricted or capped.
  - Note that Section 13.2 incorrectly references tables "12 and 13" as the ARARs tables.
- Please provide the referenced Appendices. None were provided with the draft AROD for review.

Thank you for consideration of the DEP AROD review comments. Please let us know if you have any questions or would like to discuss further. I can be reached at 850-245-8969.

Sincerely,

Kelsey A Helton

Kelsey Helton
DEP-Waste Cleanup Program

Attachment

August 14, 2017

EPA's response to FDEP's comments from August 4, 2017 listed below in yellow.

DEP AROD review comments are as follows:

DEP supports the technologies selected in the draft AROD to address DNAPL, soil and groundwater contamination at the ACW site.

- Section 12.0- Selected Remedy
  - DEP recommends that Section 12 focus on a summary of the selected alternative for each CMZ. The text in this Section discussing the rationale for and comparison to other alternatives (not selected) is confusing and would seem more appropriate in Section 10, Comparative Analysis.
    Agreed
  - There appear to be some inconsistencies between the remedial components outlined in Section 12.0 and those phases or actions identified in Part 1: Declaration, particularly CMZ-4A.
    Agreed
  - CMZ-4A: In Section 4.6.2 of the Feasibility Study (FS), the proposed CMZ-4A Alternative #2 for contaminated vadose zone soils in the 0-3 ft bls interval is to excavate all those soils in CMZ-2A *and overlying CMZ-3* (estimated 61,794 cy) and place those soils inside the CMZ-1 containment system for long term isolation. Conversely, the selected remedy for CMZ-4A (based on Alternative #2 in Sections 9.5.2 and 12.2.5 of the draft AROD and including Figure 10) indicates that all CMZ-4A vadose zone soils (0-3 ft bls)- *except vadose zone soils overlying CMZ-3* - will be excavated and placed inside CMZ-1. The AROD states that *CMZ-4A vadose zone soils overlying CMZ-3 will be placed in an* ***encapsulated cell within CMZ-3***. *The entire onsite facility area (excluding CMZ-1) will be covered with a 2 ft thick permeable cover consisting of backfill and hydroseeded.*
    - DEP was not able to locate previous discussion or evaluation of the use of an encapsulated cell in CMZ-4A. Please confirm or correct the above inconsistency.
    - We assume that the intended purpose of the cell is to mitigate direct contact and potential sources to groundwater. Please provide construction information (proposed cell material and dimensions) for the encapsulated cell in the AROD consistent with that intent.
    - Please clarify if on facility soil excavation, encapsulated cell construction, and redisposition of soils into the cell was considered in buildup of costs and sequencing of activities.
    - Currently, proposed soil cleanup target levels (SCTLs) for onsite vadose zone soils are based on Commercial SCTLs, without consideration of potential leachability. It is likely that both vadose zone soils as well as NAPL are contributing to existing groundwater contamination. Based

on the FS, DEP understood that all vadose soil (water table estimated at 3 ft bls, fluctuating at 3-5 ft bls) would be excavated and contained inside CMZ-1. Please clarify how the proposed AROD revisions to CMZ-4A Alternative #2 will ensure that onsite vadose soils remaining outside of the CMZ-1 containment unit will not continue to be a contaminant source to groundwater.

These changes were made with the purpose to mitigate direct contact and potential sources to groundwater. An additional benefit was to level out the heights of the two caps so they were more level with each other. Without these changes the CMZ-1 cap would be significantly higher than the CMZ-2A/3 cap.

All CMZ-4A (this includes the upper 3 feet of CMZ2A) soils with the exception of soils that overlay CMZ-3 would be placed inside the CMZ-1 Alternative #2 Barrier Wall and capped for long-term isolation. CMZ-4A soils overlying CMZ-3 will be placed within an encapsulated cell within CMZ-3. The entire CMZ-2A/3 area will be encapsulated.

- in Sections 4.0 and 12.0 of draft ROD, *where* the 35,000 cy of onsite stockpiled soils and debris will be relocated and secured on facility as part of the remedy.
  They will go in CMZ-2A/3. This was changed in the ROD.
- Please state in Sections 4.0 and 12.0 that soils from Pine and Gimble St that exceed LDRs will be relocated in CMZ-1 as part of the remedy, if that is the case.
  They will go in CMZ-1. This was changed in the ROD.
- CMZ-2A: Please clarify the CMZ-2A remedial goals in Section 12.0. The selected remedy states that the goal of SEE in this area is to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". It is unclear what criteria will be used to confirm that remedial goal has been met. As noted in previous DEP comments, documentation of performance and effectiveness of CMZ-1 containment unit and the 100' clay will require downgradient monitoring in CMZ-2A. Given the contiguous nature of CMZ-1 and CMZ-2, remediation of CMZ-2 should be such that releases from the CMZ-1 containment cell at concentrations above groundwater cleanup target levels (GCTLs) can be recognized. As such, DEP has recommended active remediation of CMZ-2A to GCTLs.
  A sentence will be added to the ROD stating "CMZ-2A will be remediated to a level that will be able to detect leakage from CMZ-1's containment remedy. This level will be determined during the Remedial Design. "

- CMZ-2B: DEP recommends that post active remedial monitoring in this area include monitoring of groundwater contaminant levels *below the shallow clay* to evaluate the effectiveness of the source remedy and model predictions that DNAPL stringers below the clay do not require active remediation for the groundwater to meet remedial action objectives (RAOs) and groundwater cleanup levels.

This was described in Section 12.0. Agreed.

- CMZ-5:
  - Please clarify in Part 1: Declaration that the CMZ-5 groundwater remedy represents an interim remedy, consistent with Section 12.0. The Declaration states that AROD represents the final remedy.
    The Declaration was changed.
  - Please clarify in Section 12.0 that the CMZ-5 Alt #3 remedy includes a ISCO/ISEB treatment barrier *offsite along the Pensacola Bay Shoreline to depths of 40 to 80 ft bls* on the eastern end of the Site that will be implemented as part of this CMZ-5 remedy to address PCP. We understand that the need for additional treatment to address the remaining groundwater contaminant plume (SVOCs including naphthalene) will be based on the initial Five Year Review.
    Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated.
  - Please clarify in Section 12.0 that evaluation of sufficient contaminant abatement in the initial 5 year timeframe will consider not only a documented decline in groundwater contaminant concentrations throughout the plume including SVOCs and PCP, but will also evaluate the continued likelihood of impacts to *surface water* via groundwater contaminant discharge. As discussed in prior DEP review comments, this evaluation may include surface water sampling of the Bay, updated groundwater modeling based on more recent data, and confirmation of a shallow clay extending into the Bay that would mitigate such discharge to surface water. Data for site related contaminants would be compared to groundwater and surface water criteria in Chapters 62-777 and 62-302, F.A.C.
    During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. This sitewide ROD is an interim remedy for groundwater. The final groundwater ROD will include GCTL and surface water criteria as clean up numbers.

    This language was added to the ROD: "Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. If signicant decreasing trends are present at the first Five Year Review a final groundwater ROD could be written at that time."

  - Please clarify in the Section 12.0 that the proposed insitu groundwater treatment alternatives for CMZ-3 and CMZ-5 will also be implemented prior to the FYR evaluation of the effectiveness of the interim groundwater remedy.

Agreed.

- Please clarify in Section 12.0 that **Institutional Controls (IC)** are an integral component of the selected remedy, and discuss the purpose of the ICs and the anticipated IC instruments.
  - ICs should include *onsite restrictive covenant(s)* to 1) restrict land use to a commercial or park scenario, 2) prohibit activities that would compromise the effectiveness and integrity of the remedy including the cap and 2 ft of clean fill onsite, outside of the CMZ-1 containment area, and 3) require management of any contaminated soils that might be brought to the surface as contaminated media. (Note that zoning restrictions, fencing, easements, and public notices/advisories and signage cited as example in the FS and AROD as ICs are not considered adequate controls.)
  - ICs should also include *groundwater use controls* to mitigate exposure to contaminated groundwater in the interim until groundwater meets groundwater cleanup target levels for unrestricted use. Groundwater use ICs should include restrictions associated with the existing designation of the site vicinity as a *"delineated area" under 62-524, F.A.C.* Please clarify if there is an *Memorandum of Agreement* in place between EPA and the Water Management District to further enhance the effectiveness of the delineated area IC.
  - In Part 1: Declaration of the AROD, the document states that "the site will have ICs for industrial/commercial uses only, which also includes recreational". These are two distinct types of land uses and exposure scenarios, with more stringent criteria for recreational land use. As discussed elsewhere in DEP comments, ICs- as well as engineering controls- must be such that the resulting remedy is protective of both scenarios.

    There is currently no MOA in place between EPA and the Water Management District. The two parties are close to getting it finalized and put into place. FDEP will be notified once that has been done.

    Language was added to the ROD describing the type of ICs needed.
- Section 12.4 incorrectly references Tables 4 & 5 rather than Tables 11 & 12 as containing the final cleanup levels.

  Agreed.

- <u>Section 7.0- Summary of Site Risks</u>
  - Section 7.1.5- Uncertainties
    - Please see the attached UF discussion regarding technical concerns with the approach used in development of the 37 ng/kg dioxin ASCTL (March 2017 Geosyntec PRA).
    - Please see the attached UF discussion regarding the UF development of the site specific relative bioavailability calculated from an oral

bioaccessibility study using ACW soils, and the resulting site specific direct exposure ASCTLs for dioxin under residential, commercial/industrial and recreational land use scenarios using a deterministic risk assessment approach

- Please update the placeholders in Section 7.1.5 of the AROD to reflect the DEP recommended site specific relative bioavailability (0.59) and resulting site specific ASCTLs for dioxin derived by UF.
  Noted and the place holders have been removed.

- Section 7.2- Summary of Ecological Risk Assessment-
  - Section 7.2.3 concludes that while the maximum concentrations of chemicals detected in shallow groundwater exceed Florida Marine SWQC for Class 3 Marine Surface water (Fish Consumption, Recreation, Propagation and Maintenance of Healthy Well-balanced Population of Fish and Wildlife), the impact of the shallow aquifer in the Bay is likely to be minimal due to low water volumes and tidal mixing. In addition, it was noted in the draft AROD that sampling of surface water, pore water and sediment in Pensacola Bay by USACE indicated that detected concentrations are *generally* below ecological concern. DEP requests a more detailed discussion in this Section of the frequency and extent of these exceedances to demonstrate the basis for the conclusion that concentrations are below ecological concern. There was an EPA review and evaluation of data contained in the June 2008 Phase II RD Activity report that may be useful in this regard (see Brett Thomas email, dated 9/23/2013).
    More language was added to the ROD to describe EPA's position. Some language was added from Brett Thomas' e-mail as suggested.
- Please briefly discuss the 2016 EPA removal of contaminated soil/sediment from the PYC ditch. Please clarify in Section 7.0 that the intent of that removal and backfilling of the ditch to an elevation consistent with the adjacent upland was to address human health and ecological risk posed by contaminants in the former PYC ditch sediment. Please clarify if this remedial objective has been accomplished.

  This sentence was added to the ROD "All human health and ecological risk posed by PYC ditch was eliminated by the removal and backfilling of the ditch during July 2016"in Section 7.0.

- <u>Section 7.0- Contaminants of Concern (COCs)</u>
  - *Soils*- Site related soil COCs are identified in Table 1 based on the 2014 HHRA. The proposed soil COCs consist of BaP-TEQ, PCP, 2- methylnaphthalene and 2,3,7,8- Dioxin-TEQ. Review of AROD Tables 3-7 indicate that these contaminants were selected based on concentrations exceeding a 10-4 cancer risk or HI of 1 under an on facility industrial or recreation land use scenario and/or an offsite residential land use scenario. Based on EPA policy, such exceedances would trigger a CERCLA remedial action and application of State

ARARs. A comparison of the maximum concentration of each soil contaminant presented in the FS to Chapter 62-777, F.A.C. default SCTLs, indicates that *carbazole and naphthalene* should also be identified as on facility soil COCs and included in Table 11, Cleanup Levels for Soil COCs.

Please review table 9.1A and 9.1B in the 2014 HHRA. Those are the tables were EPA looks at the accumulated risk for a COPC and decides if it becomes a COC or not. Carbazole and Naphthalene do not have enough risk associated with them to become COCs.

- *Groundwater*- Table 2 identifies groundwater COCs based on a comparison of the *mean* groundwater concentration to the proposed screening value. Use of the mean is not consistent with Chapter 62-780 or EPA guidance. Additionally, many of the proposed screening values in Table 2 exceed the GCTLs promulgated in Chapter 62-777. Never the less, a comparison of groundwater contaminant levels to the GCTLs does not change the list of COCs, which appears comprehensive.
  Please see UF corrections to groundwater screening values based on Chapter 62-777, F.A.C.
  Noted.

- Section 8.0- Cleanup Levels-
  - *Soil cleanup levels*- Table 11 reflects Chapter 62-777 residential or commercial/industrial default SCTLs. If a Park or recreational land use scenario is anticipated on the former facility property, recreational based ASCTLs should also be identified in the AROD consistent with that anticipated land use. As noted in the 2014 FS/Risk Assessment review comments, DEP recommends an exposure frequency of 200 d/y for 14 years for the non-ditch recreational scenario. These input values have been used by DEP for park visitation in Florida at other sites. Using a 10-6 risk management level and default assumptions, the recreational dioxin soil criterion, for example, would be **17 ng/kg**. If the site specific relative bioavailability at ACW is considered, the site specific recreational ASCTL for dioxin would be **28 ng/kg** (see attached UF correspondence).
    In lieu of identifying recreational SCTLs for all COCs in the AROD, the remedy could require an engineering control over the entire on facility property (such as 2 ft thickness of clean fill, low permeability cap or pavement, or combination of such controls) to effectively mitigate direct contact under a recreational land use scenario. Appropriate restrictions would be documented in a restrictive covenant (discussed above).

    The remedy includes engineering controls over the entire facility and the appropriate IC in the form of a restrictive covenant will be put in place on the property.

- *On facility Soils*- The presence of leachable vadose zone soils should be discussed in the AROD. How the remedy will address these leachable soils and the basis for making that determination should be clearly stated in the AROD. As noted in previous DEP comments, *leachability criteria* for all soil contaminants, particularly those with corresponding GCTL exceedances, should be included as remedial goals in the ROD. In lieu of site specific leachability criteria, Chapter 62-777, F.A.C. default leachability SCTLs would apply. Conversely, if all on facility vadose zone soils are to be excavated and placed within the CMZ-1 containment unit (or otherwise effectively encapsulated to address the leachable mass), then identification of numeric soil leachability criteria may not be required in the AROD.

  The water table is at 3 feet. All surficial soil across the facility will be excavated and encapsulated under CMZ-1 except the soil from CMZ-3. All surficial soil from CMZ-3 will be excavated and encapsulated under the CMZ-2A/3 area.

- *Offsite Soils (CMZ-4B)*
  EPA has proposed offsite soil remediation based on the *Conceptual Site Model (CSM)* presented in Section 5 of the AROD, exposure units (EUs) as shown in Figures 5 and 6, and application of the EPA's remedial action trigger policy using the more stringent of an HI of 1 or 10-4 cancer risk. The dioxin trigger based on an HI of 1 will determine where remedial action of offsite soils will occur, as outlined in the following excerpt from Section 5.1 of the AROD (italics added):

  "All off-facility contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, Florida's SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's SCTL, which 7 ppt for dioxin. There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD). "

  DEP has the following concerns with this approach to offsite soil contamination.

  - Use of a remedial action trigger that is less stringent that a 10-6 cancer risk and HI of 1 is not consistent with State ARARs and would result in elimination of properties with contamination that requires remediation to meet the State's promulgated levels of protection.
  - As noted in previous DEP review comments on the FS, congener analysis and risk assessment, it appears that exclusion of properties from Remedial Action based on the congener fingerprinting data is premature and underestimates the extent of site related soil contamination and related risk. It appears that the EUs presented in Figures 5 and 6 of the AROD represent EPA's anticipated areas of offsite

soil remediation. DEP strongly recommends additional soil sampling during the RD and use of a *weight of evidence approach* that considers not only the congener analysis but also concentration gradients to determine the location and extent of offsite, site related soil contamination.

- Review of the Figures 5 and 6 and related dioxin data maps in the FS indicates that there is an absence of data to support the proposed limits of remediation and that additional delineation outside of the proposed EUs will need to be conducted during the RD or as part of confirmatory sampling during the Remedial Action to ensure that the remedy is protective, consistent with the State 10-6 risk management level.
- In Section 5.0, the CSM proposes 2 major mechanisms for transport of contamination from on facility to offsite properties- vehicular traffic and overland flow. Overland flow included surface runoff/migration from the facility south to the Bay including via the PYC ditch as well as runoff west, north and east of the facility property. The FS indicates that trucks loaded with treated poles would leave the main entrance of South J Street, driving down Pine or Cypress Streets resulting in deposition of contaminants along the vehicular traffic routes. The distribution of offsite dioxin contaminated soils would seem consistent with these migration pathways. However, it does not appear that the proposed exposure units fully consider offsite contaminant trends and the documented presence of dioxin contamination in all downgradient areas that are likely site related. These areas include:
  1) South of Cypress between J and I Streets (dioxin)
  2) North and South of Cypress between H and G Streets (dioxin; PAH to north)
  3) Northwest of F Street and Cypress intersection (dioxin)
  4) Immediately east of F Street between Pine and Gimble (dioxin)
  5) South of Gimble between F and G Streets (dioxin)
  6) South of Main Street between Barrancas Ave and I Street (dioxin)
  7) North and South of Sonya between J & K Streets, outside of the proposed EUs (PAHs)
  8) South of SE ditch at F Street (PAHs)
- The proposed areas of remediation do not consider the BAP-TEQ SCTL exceedances documented in the 1997 offsite soil sampling. While this data was based on composite samples, the data did indicate likely exceedances, particularly in the vicinity of the PYC ditch contaminant migration pathway, where DNAPL has been documented. Offsite BAP-TEQ soil concentrations were observed as high as 850 ug/kg (above the 100 ug/kg default residential SCTL). Additional soil sampling for carcinogenic PAHs is recommended during the RD to confirm that site related BAP-TEQ exceedances are not present offsite (see areas above).

- Please note that while the FS and AROD assume offsite soil remediation to 2 ft bls, soil exceeding the Chapter 62-777 F.A.C. default residential SCTL or appropriate site specific ASCTL throughout the vadose zone must be addressed to allow unrestricted residential use.

Recommendation- DEP recently completed an oral bioaccessibility study at the ACW site to evaluate site specific relative bioavailability of dioxin in soils and to support development of site specific ASCTL(s) for dioxin based on Florida's risk management criteria of 10-6 and HI of 1. Using 12 soil samples from the ACW site, the assessment confirmed a mean bioaccessibility of 0.59 which was used as the site specific relative bioavailability for dioxin in soil. Based on a deterministic risk calculation, the site specific health based ASCTL under a residential land use scenario would be **15 ng/kg, dioxin-TEQ**. DEP recommends that this site specific soil criterion be used to inform the offsite dioxin delineation and confirm the areas to be addressed by the offsite soil remedy.

EPA has confidence in the two residential exposure units. They are based on the CSM and the dioxin congener analysis. Additional soil sampling outside of these exposure units can be performed if there is data that suggests that it might be site related to ACW in the remedial design. The sentence "There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD)." *was removed from the ROD.*

EPA's new trigger for BAP is 11,000 ug/kg (10-4) or 18,000 ug/kg (HI=1). This change is based on the recent update to the benzo(a) pyrene toxicity assessment in IRIS (link). There are no concentrations in the two residential exposure units that trigger action with a concentration exceeding either one of those numbers. The vast majority of the BAP contamination is located with the existing exposure units. The majority of BAP will be excavated with the dioxin impacted soil in the exposure units. The small amount that will be left behind will not pose a significant threat.

https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=136

Soil was sampled in intervals from 0-6 inches, 6-12 inches and 12- 24 inches below the surface. The soil will continue to be sampled and remediated until we get to the triggered remediation goal. The soil below 24 inches no longer has the same potential exposure route for the soil in a residential scenario.

- *Groundwater Preliminary Remedial Goals (PRGs) (Table 12) -*
  - Table 12 identifies up to 4 different PRGs for each COC such that remedial goals are not clear. DEP understands that the proposed CMZ-5 alternative represents an *interim* groundwater remedy. As stated in the draft AROD, further evaluation of the need for additional groundwater remedial action and the effectiveness of the source and interim groundwater remedy in addressing contaminated groundwater will be conducted in a 5 year time frame after implementation of the CMZ-1, 2A and 2B source remedies. DEP recommends that a single PRG

be applied to each COC and identified as the groundwater cleanup goal in the ROD to facilitate that evaluation. Consistent with CERCLA, where more stringent, the promulgated State standard or criterion (GCTL) under Chapters 62-550 and 62-777, F.A.C. would be relevant and appropriate for each contaminant and should be reflected in this AROD as the final PRGs.

The final groundwater ROD will have GCTLs as the cleanup goals.

- Please correct the DEP GCTLs cited in Table 12 for the following- 2-Methylphenol (35 ug/l), 4-Methylphenol (3.5 ug/l) and 2,4-Dimethylphenol (140 ug/l).

Agreed.

- *Surface water-*
  - Section 8.1, Section 12.0- No summary table of surface water COCs and corresponding surface water quality criteria (SWQC) for marine surface water have been included in the AROD. In lieu of such a table, please clarify in the text that Chapters 62-302 Class II SWQC and 62-777 Surface water CTLs for site related COCs are relevant and appropriate when evaluating the effectiveness of the remedy in protecting marine surface waters from migration of contaminated groundwater into Pensacola Bay/ Bayou Chico, and to confirm that the AROD remedial action objectives (RAOs) have been met.

One of the ROD's RAO is "Provide protection of marine surface waters from migration of contaminated groundwater into Pensacola Bay/Bayou Chico." The status of the groundwater cleanup will be evaluated during the first Five Year Review. Additional groundwater actions will be taken if significant progress has not been made at that point. If significant progress has been made, then it is possible the final groundwater ROD will be written at that time with the final appropriate groundwater remedy.

- <u>State Acceptance- Part I: Declaration, Section 10.8 and Appendix C</u>
  - Please remove the statement in Part 1: Declaration that "the State of Florida concurs with the Selected Remedy". Please remove the reference in Section 10.8 to "FDEP concurrence letter included as Appendix C".
    DEP does not normally provide formal concurrence with a Superfund site remedy prior to receipt of the final executed ROD or AROD. The DEP concurrence letter is not included as an attachment to the ROD or AROD.

Agreed.

- <u>ARARs- Tables 13 and 14</u>
  - Action Specific ARARs- The following should be considered for ACW
    - Chapter 62-780.222, F.A.C. - requires warning signs at hazardous waste sites.

        - Chapter 62-701.340, 62-701.400 and 62-701.600, F.A.C. - provides requirements for final cover design and construction of a landfill cover.
        - Chapter 62-780.680(2) and 62-780.680(3)- provides the criteria and requirements for use of institutional and engineering controls in a risk based closure. Some portions of site may be restricted or capped.
    - Note that Section 13.2 incorrectly references tables "12 and 13" as the ARARs tables.
      Agreed.
- Please provide the referenced Appendices. None were provided with the draft AROD for review.
  Attached.

Florida Department of Environmental Protection

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Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

August 21, 2017

U.S. EPA, Region IV
Superfund Division
Attn: Mr. Peter Thorpe
61 Forsyth Street, SW
Atlanta, GA 30303

Subject: EPA-DEP Responses to DEP Comments, Draft Record of Decision, June 2017
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida

Dear Mr. Thorpe:

Thank you for the August 14, 2017 EPA responses to DEP comments (RTCs) on the draft Amended Record of Decision (AROD). This is to acknowledge EPA's RTCs and document DEP's understanding of those responses. DEP looks forward to receipt of the revised AROD including Appendices and Figures in response to our comments and recommended clarifying AROD edits also provided to you on August 17th, to confirm that DEP comments have been addressed. We appreciate EPA's consideration and look forward to design and implementation of the site remedy.

We have retained the same format, with EPA's responses in yellow following each original DEP comment and DEP's subsequent response identified in blue *italics*. We request that EPA include this August 21, 2017 correspondence as well as the original and more lengthy DEP review comments dated August 4, 2017 (attached) in an Appendice in the final AROD, entitled "State Correspondence".

DEP AROD review comments and EPA-DEP RTCs are as follows:

DEP supports the technologies selected in the draft AROD to address DNAPL, soil and groundwater contamination at the ACW site.

- Section 12.0- Selected Remedy
  - DEP recommends that Section 12 focus on a summary of the selected alternative for each CMZ. The text in this Section discussing the rationale for and comparison to other alternatives (not selected) is confusing and would seem more appropriate in Section 10, Comparative Analysis.
    Agreed Thank you.

- There appear to be some inconsistencies between the remedial components outlined in Section 12.0 and those phases or actions identified in Part 1: Declaration, particularly CMZ-4A.

  Agreed Thank you.

- CMZ-4A: In Section 4.6.2 of the Feasibility Study (FS), the proposed CMZ-4A Alternative #2 for contaminated vadose zone soils in the 0-3 ft bls interval is to excavate all those soils in CMZ-2A *and overlying CMZ-3* (estimated 61,794 cy) and place those soils inside the CMZ-1 containment system for long term isolation. Conversely, the selected remedy for CMZ-4A (based on Alternative #2 in Sections 9.5.2 and 12.2.5 of the draft AROD and including Figure 10) indicates that all CMZ-4A vadose zone soils (0-3 ft bls)- *except vadose zone soils overlying CMZ-3* - will be excavated and placed inside CMZ-1. The AROD states that *CMZ-4A vadose zone soils overlying CMZ-3 will be placed in an* ***encapsulated cell within CMZ-3****. The entire onsite facility area (excluding CMZ-1) will be covered with a 2 ft thick permeable cover consisting of backfill and hydroseeded.*
  - DEP was not able to locate previous discussion or evaluation of the use of an encapsulated cell in CMZ-4A. Please confirm or correct the above inconsistency.
  - We assume that the intended purpose of the cell is to mitigate direct contact and potential sources to groundwater. Please provide construction information (proposed cell material and dimensions) for the encapsulated cell in the AROD consistent with that intent.
  - Please clarify if on facility soil excavation, encapsulated cell construction, and redisposition of soils into the cell was considered in buildup of costs and sequencing of activities.
  - Currently, proposed soil cleanup target levels (SCTLs) for onsite vadose zone soils are based on Commercial SCTLs, without consideration of potential leachability. It is likely that both vadose zone soils as well as NAPL are contributing to existing groundwater contamination. Based on the FS, DEP understood that all vadose soil (water table estimated at 3 ft bls, fluctuating at 3-5 ft bls) would be excavated and contained inside CMZ-1. Please clarify how the proposed AROD revisions to CMZ-4A Alternative #2 will ensure that onsite vadose soils remaining outside of the CMZ-1 containment unit will not continue to be a contaminant source to groundwater.

These changes were made with the purpose to mitigate direct contact and potential sources to groundwater. An additional benefit was to level out the heights of the two caps so they were more level with each other. Without these changes the CMZ-1 cap would be significantly higher than the CMZ-2A/3 cap.

All CMZ-4A (this includes the upper 3 feet of CMZ2A) soils with the exception of soils that overlay CMZ-3 would be placed inside the CMZ-1 Alternative #2 Barrier Wall and capped for long-term isolation. CMZ-4A

soils overlying CMZ-3 will be placed within an encapsulated cell within CMZ-3. The entire CMZ-2A/3 area will be encapsulated.
Thank you for that clarification. We support this approach. Encapsulation as described will also address leachable soils remaining onsite, outside of CMZ-1.
As per DEP recommended clarifying language in AROD Section 8.1, Cleanup Levels, "Leachable soils will be mitigated by containing all contaminated soils within an effective containment cell- either in the CMZ-1 containment unit or in the CMZ-3 encapsulation cell.

- in Sections 4.0 and 12.0 of draft ROD, *where* the 35,000 cy of onsite stockpiled soils and debris will be relocated and secured on facility as part of the remedy.
  They will go in CMZ-2A/3. This was changed in the ROD. Thank you
- Please state in Sections 4.0 and 12.0 that soils from Pine and Gimble St that exceed LDRs will be relocated in CMZ-1 as part of the remedy, if that is the case.
  They will go in CMZ-1. This was changed in the ROD. Thank you.
- CMZ-2A: Please clarify the CMZ-2A remedial goals in Section 12.0. The selected remedy states that the goal of SEE in this area is to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". It is unclear what criteria will be used to confirm that remedial goal has been met. As noted in previous DEP comments, documentation of performance and effectiveness of CMZ-1 containment unit and the 100' clay will require downgradient monitoring in CMZ-2A. Given the contiguous nature of CMZ-1 and CMZ-2, remediation of CMZ-2 should be such that releases from the CMZ-1 containment cell at concentrations above groundwater cleanup target levels (GCTLs) can be recognized. As such, DEP has recommended active remediation of CMZ-2A to GCTLs.
  A sentence will be added to the ROD stating "CMZ-2A will be remediated to a level that will be able to detect leakage from CMZ-1's containment remedy. This level will be determined during the Remedial Design. "
  Thank you. Effective performance monitoring downgradient of the CMZ-1 containment system is an important component of confirming the effectiveness of the containment alternative.

- CMZ-2B: DEP recommends that post active remedial monitoring in this area include monitoring of groundwater contaminant levels *below the shallow clay* to evaluate the effectiveness of the source remedy and model predictions that DNAPL stringers below the clay do not require active remediation for the groundwater to meet remedial action objectives (RAOs) and groundwater cleanup levels.
  This was described in Section 12.0. Agreed. *Thank you.*
- CMZ-5:

- Please clarify in Part 1: Declaration that the CMZ-5 groundwater remedy represents an interim remedy, consistent with Section 12.0. The Declaration states that AROD represents the final remedy.
  The Declaration was changed.
  Thank you. As noted in this exerpt from the 2016 Feasibility Study (FS) - The site-specific goal of this FS is to recommend a final remedy to address the site-related creosote NAPL, polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), and dioxin contamination in the soil and sediment at the Site (OU3/OU2), as well as recommend an interim remedy to address the dissolved semi-volatile organic compound (SVOC) and PCP groundwater plume (OU2) at the Site.

- Please clarify in Section 12.0 that the CMZ-5 Alt #3 remedy includes a ISCO/ISEB treatment barrier *offsite along the Pensacola Bay Shoreline to depths of 40 to 80 ft bls* on the eastern end of the Site that will be implemented as part of this CMZ-5 remedy to address PCP. We understand that the need for additional treatment to address the remaining groundwater contaminant plume (SVOCs including naphthalene) will be based on the initial Five Year Review.
  Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated.
  Thank you. Our review of the red-line revised AROD confirms that there will be an offsite insitu treatment barrier along the Bay shoreline on the east end of the site as part of CMZ-5.

- Please clarify in Section 12.0 that evaluation of sufficient contaminant abatement in the initial 5 year timeframe will consider not only a documented decline in groundwater contaminant concentrations throughout the plume including SVOCs and PCP, but will also evaluate the continued likelihood of impacts to *surface water* via groundwater contaminant discharge. As discussed in prior DEP review comments, this evaluation may include surface water sampling of the Bay, updated groundwater modeling based on more recent data, and confirmation of a shallow clay extending into the Bay that would mitigate such discharge to surface water. Data for site related contaminants would be compared to groundwater and surface water criteria in Chapters 62-777 and 62-302, F.A.C.
  During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. This sitewide ROD is an interim remedy for groundwater. The final groundwater ROD will include GCTL and surface water criteria as clean up numbers.

This language was added to the ROD: "Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. If signicant decreasing trends are present at the first Five Year Review a final groundwater ROD could be written at that time." *Thank you for the clarification.*

- Please clarify in the Section 12.0 that the proposed insitu groundwater treatment alternatives for CMZ-3 and CMZ-5 will also be implemented prior to the FYR evaluation of the effectiveness of the interim groundwater remedy.
  Agreed. *Thank you.*

- Please clarify in Section 12.0 that **Institutional Controls (IC)** are an integral component of the selected remedy, and discuss the purpose of the ICs and the anticipated IC instruments.
  - ICs should include *onsite restrictive covenant(s)* to 1) restrict land use to a commercial or park scenario, 2) prohibit activities that would compromise the effectiveness and integrity of the remedy including the cap and 2 ft of clean fill onsite, outside of the CMZ-1 containment area, and 3) require management of any contaminated soils that might be brought to the surface as contaminated media. (Note that zoning restrictions, fencing, easements, and public notices/advisories and signage cited as example in the FS and AROD as ICs are not considered adequate controls.)
  - ICs should also include *groundwater use controls* to mitigate exposure to contaminated groundwater in the interim until groundwater meets groundwater cleanup target levels for unrestricted use. Groundwater use ICs should include restrictions associated with the existing designation of the site vicinity as a *"delineated area" under 62-524, F.A.C.* Please clarify if there is an *Memorandum of Agreement* in place between EPA and the Water Management District to further enhance the effectiveness of the delineated area IC.
  - In Part 1: Declaration of the AROD, the document states that "the site will have ICs for industrial/commercial uses only, which also includes recreational". These are two distinct types of land uses and exposure scenarios, with more stringent criteria for recreational land use. As discussed elsewhere in DEP comments, ICs- as well as engineering controls- must be such that the resulting remedy is protective of both scenarios.
    There is currently no MOA in place between EPA and the Water Management District. The two parties are close to getting it finalized and put into place. FDEP will be notified once that has been done.

Language was added to the ROD describing the type of ICs needed.
Thank you. As noted in DEP's recommended clarifying language in Section 12.4, Estimated Outcomes of the Selected Remedy: ***"Future land use at the Site property is anticipated to be industrial /commercial. The CMZ-1 containment area would remain undeveloped. The remainder of the Site property may also be used for recreation (park) with appropriate ICs and engineering controls consisting of the cap or 2 foot soil cover over the entire area which would prevent exposure to underlying contaminated soils."***

The above statement documents the resolution of the issue of different SCTLs for commercial/industrial versus recreational land use scenarios.

- Section 12.4 incorrectly references Tables 4 & 5 rather than Tables 11 & 12 as containing the final cleanup levels.
  Agreed.

- Section 7.0- Summary of Site Risks
  - Section 7.1.5- Uncertainties
    - Please see the attached UF discussion regarding technical concerns with the approach used in development of the 37 ng/kg dioxin ASCTL (March 2017 Geosyntec PRA).
    - Please see the attached UF discussion regarding the UF development of the site specific relative bioavailability calculated from an oral bioaccessibility study using ACW soils, and the resulting site specific direct exposure ASCTLs for dioxin under residential, commercial/industrial and recreational land use scenarios using a deterministic risk assessment approach
    - Please update the placeholders in Section 7.1.5 of the AROD to reflect the DEP recommended site specific relative bioavailability (0.59) and resulting site specific ASCTLs for dioxin derived by UF.
      Noted and the place holders have been removed.
      Thank you for incorporating the DEP site specific bioavailability study results in the AROD.

  - Section 7.2- Summary of Ecological Risk Assessment-
    - Section 7.2.3 concludes that while the maximum concentrations of chemicals detected in shallow groundwater exceed Florida Marine SWQC for Class 3 Marine Surface water (Fish Consumption, Recreation, Propagation and Maintenance of Healthy Well-balanced Population of Fish and Wildlife), the impact of the shallow aquifer in the Bay is likely to be minimal due to low water volumes and tidal mixing. In addition, it was noted in the draft AROD that sampling of surface water, pore water and sediment in Pensacola Bay by USACE indicated that detected concentrations are *generally* below ecological concern. DEP requests a

more detailed discussion in this Section of the frequency and extent of these exceedances to demonstrate the basis for the conclusion that concentrations are below ecological concern. There was an EPA review and evaluation of data contained in the June 2008 Phase II RD Activity report that may be useful in this regard (see Brett Thomas email, dated 9/23/2013).

More language was added to the ROD to describe EPA's position. Some language was added from Brett Thomas' e-mail as suggested.

Thank you. DEP understands that EPA will bolster the AROD conclusion that there is no unacceptable risk to ecological receptors associated with sediments and surface water in the aquatic areas by including additional information from the 2010 SESD evaluation of site related sediment, pore water and surface water quality data.

- Please briefly discuss the 2016 EPA removal of contaminated soil/sediment from the PYC ditch. Please clarify in Section 7.0 that the intent of that removal and backfilling of the ditch to an elevation consistent with the adjacent upland was to address human health and ecological risk posed by contaminants in the former PYC ditch sediment. Please clarify if this remedial objective has been accomplished.

  This sentence was added to the ROD "All human health and ecological risk posed by PYC ditch was eliminated by the removal and backfilling of the ditch during July 2016"in Section 7.0. Thank you for that clarification.

- Section 7.0- Contaminants of Concern (COCs)
  - *Soils*- Site related soil COCs are identified in Table 1 based on the 2014 HHRA. The proposed soil COCs consist of BaP-TEQ, PCP, 2- methylnaphthalene and 2,3,7,8- Dioxin-TEQ. Review of AROD Tables 3-7 indicate that these contaminants were selected based on concentrations exceeding a 10-4 cancer risk or HI of 1 under an on facility industrial or recreation land use scenario and/or an offsite residential land use scenario. Based on EPA policy, such exceedances would trigger a CERCLA remedial action and application of State ARARs. A comparison of the maximum concentration of each soil contaminant presented in the FS to Chapter 62-777, F.A.C. default SCTLs, indicates that *carbazole and naphthalene* should also be identified as on facility soil COCs and included in Table 11, Cleanup Levels for Soil COCs.

    Please review table 9.1A and 9.1B in the 2014 HHRA. Those are the tables were EPA looks at the accumulated risk for a COPC and decides if it becomes a COC or not. Carbazole and Naphthalene do not have enough risk associated with them to become COCs.

    As noted by DEP on the red-lined AROD, we request the following clarifying statement as a footnote to AROD Table 11, Cleanup Levels for Soil COCs: ***"While naphthalene concentrations onsite exceed the State Commercial -SCTL of 300 mg/kg, naphthalene was screened out as a COC by the risk assessment. Regardless, the Site remedy includes engineering controls (caps or 2 ft thick***

soil covers) throughout the Site property, which will effectively address these naphthalene exceedances."

Carbazole exceedances are in the saturated zone so SCTL would not apply.

- *Groundwater*- Table 2 identifies groundwater COCs based on a comparison of the *mean* groundwater concentration to the proposed screening value. Use of the mean is not consistent with Chapter 62-780 or EPA guidance. Additionally, many of the proposed screening values in Table 2 exceed the GCTLs promulgated in Chapter 62-777. Never the less, a comparison of groundwater contaminant levels to the GCTLs does not change the list of COCs, which appears comprehensive.
  Please see UF corrections to groundwater screening values based on Chapter 62-777, F.A.C.
  Noted. Thank you. Please note DEP GCTL corrections highlighted on red-line AROD on Table 12.

- Section 8.0- Cleanup Levels-
  - *Soil cleanup levels*- Table 11 reflects Chapter 62-777 residential or commercial/industrial default SCTLs. If a Park or recreational land use scenario is anticipated on the former facility property, recreational based ASCTLs should also be identified in the AROD consistent with that anticipated land use. As noted in the 2014 FS/Risk Assessment review comments, DEP recommends an exposure frequency of 200 d/y for 14 years for the non-ditch recreational scenario. These input values have been used by DEP for park visitation in Florida at other sites. Using a 10-6 risk management level and default assumptions, the recreational dioxin soil criterion, for example, would be **17 ng/kg**. If the site specific relative bioavailability at ACW is considered, the site specific recreational ASCTL for dioxin would be **28 ng/kg** (see attached UF correspondence).
    In lieu of identifying recreational SCTLs for all COCs in the AROD, the remedy could require an engineering control over the entire on facility property (such as 2 ft thickness of clean fill, low permeability cap or pavement, or combination of such controls) to effectively mitigate direct contact under a recreational land use scenario. Appropriate restrictions would be documented in a restrictive covenant (discussed above).

    The remedy includes engineering controls over the entire facility and the appropriate IC in the form of a restrictive covenant will be put in place on the property. *Thank you.*

  - *On facility Soils*- The presence of leachable vadose zone soils should be discussed in the AROD. How the remedy will address these leachable soils and the basis for making that determination should be clearly stated in the AROD. As noted in previous DEP comments, *leachability criteria* for all soil

contaminants, particularly those with corresponding GCTL exceedances, should be included as remedial goals in the ROD. In lieu of site specific leachability criteria, Chapter 62-777, F.A.C. default leachability SCTLs would apply. Conversely, if all on facility vadose zone soils are to be excavated and placed within the CMZ-1 containment unit (or otherwise effectively encapsulated to address the leachable mass), then identification of numeric soil leachability criteria may not be required in the AROD.

The water table is at 3 feet. All surficial soil across the facility will be excavated and encapsulated under CMZ-1 except the soil from CMZ-3. All surficial soil from CMZ-3 will be excavated and encapsulated under the CMZ-2A/3 area.
Thank you for that clarification.

- *Offsite Soils (CMZ-4B)*
  EPA has proposed offsite soil remediation based on the *Conceptual Site Model (CSM)* presented in Section 5 of the AROD, exposure units (EUs) as shown in Figures 5 and 6, and application of the EPA's remedial action trigger policy using the more stringent of an HI of 1 or 10-4 cancer risk. The dioxin trigger based on an HI of 1 will determine where remedial action of offsite soils will occur, as outlined in the following excerpt from Section 5.1 of the AROD (italics added):

  "All off-facility contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, Florida's SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's SCTL, which 7 ppt for dioxin. There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD). "
  DEP has the following concerns with this approach to offsite soil contamination.

  - Use of a remedial action trigger that is less stringent that a 10-6 cancer risk and HI of 1 is not consistent with State ARARs and would result in elimination of properties with contamination that requires remediation to meet the State's promulgated levels of protection.
  - As noted in previous DEP review comments on the FS, congener analysis and risk assessment, it appears that exclusion of properties from Remedial Action based on the congener fingerprinting data is premature and underestimates the extent of site related soil contamination and related risk. It appears that the EUs presented in Figures 5 and 6 of the AROD represent EPA's anticipated areas of offsite soil remediation. DEP strongly recommends additional soil sampling during the RD and use of a *weight of evidence approach* that considers not only the congener analysis but also concentration gradients to

determine the location and extent of offsite, site related soil contamination.

- Review of the Figures 5 and 6 and related dioxin data maps in the FS indicates that there is an absence of data to support the proposed limits of remediation and that additional delineation outside of the proposed EUs will need to be conducted during the RD or as part of confirmatory sampling during the Remedial Action to ensure that the remedy is protective, consistent with the State 10-6 risk management level.
- In Section 5.0, the CSM proposes 2 major mechanisms for transport of contamination from on facility to offsite properties- vehicular traffic and overland flow. Overland flow included surface runoff/migration from the facility south to the Bay including via the PYC ditch as well as runoff west, north and east of the facility property. The FS indicates that trucks loaded with treated poles would leave the main entrance of South J Street, driving down Pine or Cypress Streets resulting in deposition of contaminants along the vehicular traffic routes. The distribution of offsite dioxin contaminated soils would seem consistent with these migration pathways. However, it does not appear that the proposed exposure units fully consider offsite contaminant trends and the documented presence of dioxin contamination in all downgradient areas that are likely site related. These areas include:
  1) South of Cypress between J and I Streets (dioxin)
  2) North and South of Cypress between H and G Streets (dioxin; PAH to north)
  3) Northwest of F Street and Cypress intersection (dioxin)
  4) Immediately east of F Street between Pine and Gimble (dioxin)
  5) South of Gimble between F and G Streets (dioxin)
  6) South of Main Street between Barrancas Ave and I Street (dioxin)
  7) North and South of Sonya between J & K Streets, outside of the proposed EUs (PAHs)
  8) South of SE ditch at F Street (PAHs)
- The proposed areas of remediation do not consider the BAP-TEQ SCTL exceedances documented in the 1997 offsite soil sampling. While this data was based on composite samples, the data did indicate likely exceedances, particularly in the vicinity of the PYC ditch contaminant migration pathway, where DNAPL has been documented. Offsite BAP-TEQ soil concentrations were observed as high as 850 ug/kg (above the 100 ug/kg default residential SCTL). Additional soil sampling for carcinogenic PAHs is recommended during the RD to confirm that site related BAP-TEQ exceedances are not present offsite (see areas above).
- Please note that while the FS and AROD assume offsite soil remediation to 2 ft bls, soil exceeding the Chapter 62-777 F.A.C. default residential SCTL or appropriate site specific ASCTL throughout the vadose zone must be addressed to allow unrestricted residential use.

Recommendation- DEP recently completed an oral bioaccessibility study at the ACW site to evaluate site specific relative bioavailability of dioxin in soils and to support development of site specific ASCTL(s) for dioxin based on Florida's risk management criteria of 10-6 and HI of 1. Using 12 soil samples from the ACW site, the assessment confirmed a mean bioaccessibility of 0.59 which was used as the site specific relative bioavailability for dioxin in soil. Based on a deterministic risk calculation, the site specific health based ASCTL under a residential land use scenario would be **15 ng/kg, dioxin-TEQ**. DEP recommends that this site specific soil criterion be used to inform the offsite dioxin delineation and confirm the areas to be addressed by the offsite soil remedy.

EPA has confidence in the two residential exposure units. They are based on the CSM and the dioxin congener analysis. Additional soil sampling outside of these exposure units can be performed if there is data that suggests that it might be site related to ACW in the remedial design. The sentence "There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD)." *was removed from the ROD.*

EPA's new trigger for BAP is 11,000 ug/kg (10-4) or 18,000 ug/kg (HI=1). This change is based on the recent update to the benzo(a) pyrene toxicity assessment in IRIS (link). There are no concentrations in the two residential exposure units that trigger action with a concentration exceeding either one of those numbers. The vast majority of the BAP contamination is located with the existing exposure units. The majority of BAP will be excavated with the dioxin impacted soil in the exposure units. The small amount that will be left behind will not pose a significant threat.

https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=136

Soil was sampled in intervals from 0-6 inches, 6-12 inches and 12- 24 inches below the surface. The soil will continue to be sampled and remediated until we get to the triggered remediation goal. The soil below 24 inches not longer has the same potential exposure route for the soil in a residential scenario.

DEP concurs with the proposed remedial alternatives and technologies comprising the ACW site remedy. We appreciate EPA's use of the larger offsite exposure units and suggest that we use this approach to expand on the offsite areas to be addressed by the Superfund remedy and to minimize the discrepancy between the EPA's "trigger" and State requirements.

DEP does not, however, support the strict application of the EPA trigger policy to define the extent of soil remediation of dioxin soil contamination on offsite residential properties at ACW. Strict use of the 10-4 or Hazard Index (HI) risk trigger is not consistent with State ARARs and Chapter 62-777, F.A.C. soil cleanup target levels. As proposed, soils not exceeding the trigger of 50 ppt dioxin, would not be addressed and would result in site related dioxin contaminated soils left on offsite properties at levels above the State risk management levels of 10-6 and HI of 1, following the completion of EPA's remedial work.

We share EPA's desire to move forward with a site remedy. We hope that EPA will continue to work with DEP during design and remedy implementation to ensure that all offsite properties

exceeding State ARARs are addressed. Where this will not occur, we propose to enter into an SSC for this fund lead site that outlines the responsibilities of the agencies and recognizes any contributions Florida would need to make for the remedy to achieve ARARs for the entire site.

A review of the historic Bap-TEQ levels in offsite soils at ACW indicates that the offsite exposure units proposed in the AROD will address those soils exceeding the 1.0 mg/kg residential alternative soil cleanup target level, as documented in the August 1, 2017 University of Florida correspondence, "Review of benzo(a)pyrene ASCTLs in letters dated February 10 and May 11, 2017".

- *Groundwater Preliminary Remedial Goals (PRGs) (Table 12) -*
  - Table 12 identifies up to 4 different PRGs for each COC such that remedial goals are not clear. DEP understands that the proposed CMZ-5 alternative represents an *interim* groundwater remedy. As stated in the draft AROD, further evaluation of the need for additional groundwater remedial action and the effectiveness of the source and interim groundwater remedy in addressing contaminated groundwater will be conducted in a 5 year time frame after implementation of the CMZ-1, 2A and 2B source remedies. DEP recommends that a single PRG be applied to each COC and identified as the groundwater cleanup goal in the ROD to facilitate that evaluation. Consistent with CERCLA, where more stringent, the promulgated State standard or criterion (GCTL) under Chapters 62-550 and 62-777, F.A.C. would be relevant and appropriate for each contaminant and should be reflected in this AROD as the final PRGs.
    The final groundwater ROD will have GCTLs as the cleanup goals. Thank you.
  - Please correct the DEP GCTLs cited in Table 12 for the following- 2-Methylphenol (35 ug/l), 4-Methylphenol (3.5 ug/l) and 2,4-Dimethylphenol (140 ug/l).
    Agreed. Thank you.

- *Surface water-*
  - Section 8.1, Section 12.0- No summary table of surface water COCs and corresponding surface water quality criteria (SWQC) for marine surface water have been included in the AROD. In lieu of such a table, please clarify in the text that Chapters 62-302 Class II SWQC and 62-777 Surface water CTLs for site related COCs are relevant and appropriate when evaluating the effectiveness of the remedy in protecting marine surface waters from migration of contaminated groundwater into Pensacola Bay/ Bayou Chico, and to confirm that the AROD remedial action objectives (RAOs) have been met.

One of the ROD's RAO is "Provide protection of marine surface waters from migration of contaminated groundwater into Pensacola Bay/Bayou Chico." The status of the groundwater cleanup will be evaluated during the first Five Year

Review. Additional groundwater actions will be taken if significant progress has not been made at that point. If significant progress has been made, then it is possible the final groundwater ROD will be written at that time with the final appropriate groundwater remedy. *Thank you. DEP supports that approach.*

- State Acceptance- Part I: Declaration, Section 10.8 and Appendix C
  - Please remove the statement in Part 1: Declaration that "the State of Florida concurs with the Selected Remedy". Please remove the reference in Section 10.8 to "FDEP concurrence letter included as Appendix C".
    DEP does not normally provide formal concurrence with a Superfund site remedy prior to receipt of the final executed ROD or AROD. The DEP concurrence letter is not included as an attachment to the ROD or AROD.
    Agreed. *Thank you.*

- ARARs- Tables 13 and 14
  - Action Specific ARARs- The following should be considered for ACW
    - Chapter 62-780.222, F.A.C. - requires warning signs at hazardous waste sites.
    - Chapter 62-701.340, 62-701.400 and 62-701.600, F.A.C. - provides requirements for final cover design and construction of a landfill cover.
    - Chapter 62-780.680(2) and 62-780.680(3)- provides the criteria and requirements for use of institutional and engineering controls in a risk based closure. Some portions of site may be restricted or capped.
      ? *EPA has included the above rule references in other RODs for other Superfund sites where applicable or relevant and appropriate.*
  - Note that Section 13.2 incorrectly references tables "12 and 13" as the ARARs tables.
    Agreed.
- Please provide the referenced Appendices. None were provided with the draft AROD for review.
  Attached. *Thank you.*

Please let us know if you have any questions.

Sincerely,

Kelsey A Helton

Kelsey Helton
Waste Cleanup Program

Attachment- DEP August 4, 2017 Review Comments on Draft AROD

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Appendix B. Site Photographs

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American Creosote Works (Pensacola)
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Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block P
Date: 07/06/09
Photographer: PM / DP
Description: 841 South H Street (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: 1501 Cypress Street (Escambia County Property Appraiser)

Block P
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: 1408 Sonia Street (Escambia County Property Appraiser)

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: 1408 Sonia Street (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block Q
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block R
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block R
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block R
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block R
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block R
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block T
Date: 07/06/09
Photographer: PM / DP
Description: 1000 South K Street (Escambia County Property Appraiser)

Block T
Date: 07/06/09
Photographer: PM / DP
Description: 1000 South K Street (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block T
Date: 07/07/09
Photographer: PM / DP
Description: 1000 South K Street (Escambia County Property Appraiser)

Block U
Date: 07/06/09
Photographer: PM / DP
Description: 913 South I Street (Escambia County Property Appraiser)

Block U
Date: 07/06/09
Photographer: PM / DP
Description: 913 South I Street (Escambia County Property Appraiser)

Block V
Date: 07/06/09
Photographer: PM / DP
Description: 1500 Sonia Street (Escambia County Property Appraiser)

American Creosote Works (Pensacola)
OU3 Remedial Design
Photo Log

Block V
Date: 07/06/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

Block V
Date: 07/07/09
Photographer: PM / DP
Description: (b) (6) (Escambia County Property Appraiser)

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Appendix C. Supplemental Remedial Design Investigation – CD Only

C1 - Soil Boring Logs

C2 - Lithologic Photo Logs

C3 - Analytical Results

C4 - Data Validation Reports

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Appendix C1 - Soil Boring Logs

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Well/Boring No. ACW-MW2B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	35'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	
								1				
								2				
								3				
								4				
SB	2	5	5	100				5			SAND; dark brown; loose; fine grained; subrounded; moist	
								6				
								7			Light gray; wet	
								8				
								9				
SB	3	10	10	100				10			Medium gray; mild creosote odor	
								11			Dark brown	
								12				
								13			Creosote stains; leaves residue on gloves; strong creosote odor	
								14			Hard pan creosote	
								15				
								16				
								17				
								18			Creosote residue leaves stain on sonic sleeve	
								19			Clayey SAND; gray; dense	
								20			SAND; light gray	

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Well/Boring No. ACW-MW2B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	35'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; light gray; slight sweet odor; loose; fine grained; subangular to angular; wet	
								22				
								23				
								24				
								25				
								26				
								27				
								28			Dark gray; with some silt	
								29			SILT; light gray; nonplastic; some fine grained sand	
SB	5	5	5	100				30			SAND; light gray; fine to medium grained; subrounded; wet	
								31				
								32			Fine grained	
								33			Sandy SILT; light gray; nonplastic; wet; some zones of clay	
								34				
								35			Silty CLAY; light gray; nonplastic	Boring terminated at 35' bls; installed well - screened 23-33' bls
								36				
								37				
								38				
								39				
								40				

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Well Completion Log

Well No. ACW-MW2B

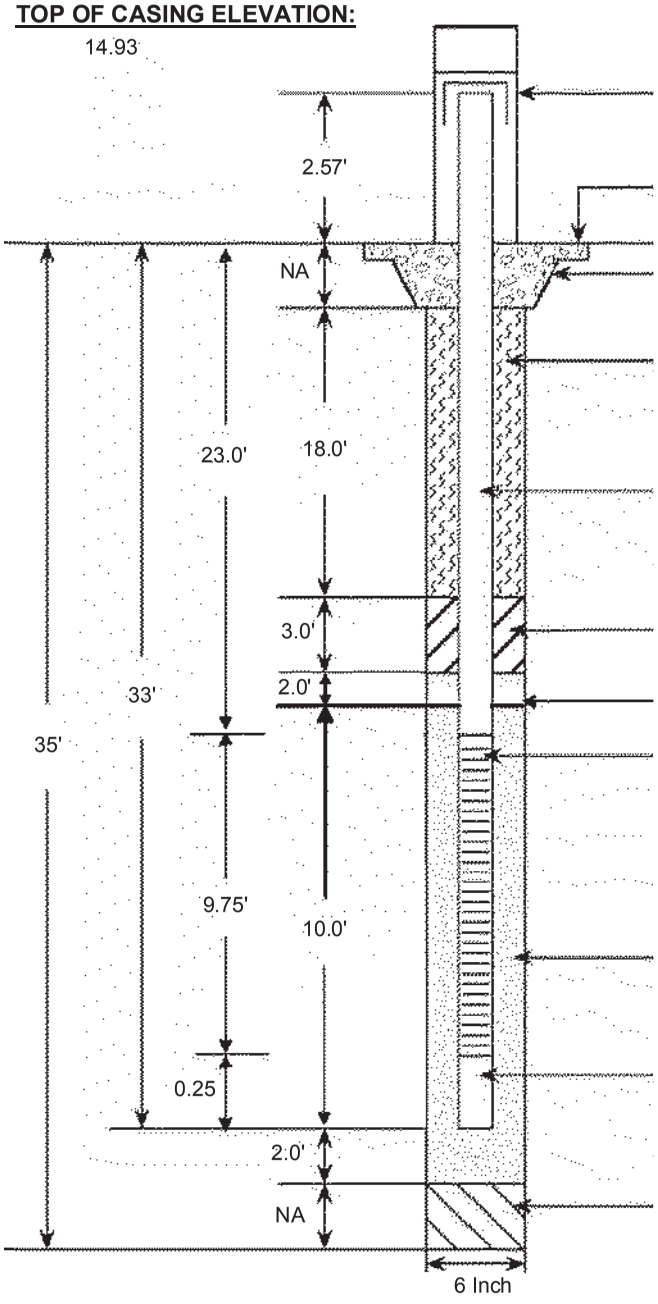
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	37.57

COORDINATES (DATUM)	GROUND ELEVATION (FEET AMSL)	START DATE	END DATE
N 520850.53 E 1105896.18 NAD 83	NAVD88	4/4/2018	4/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
4"x4" Aluminum stickup protector

WELL PAD ELEVATION:
12.35

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

N.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF PRIMARY SEAL:
Bentonite Chips

TYPE OF SECONDARY FILTER:
20/30 Sand

N.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

(NOT TO SCALE)

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. ACW-MW3D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/3/18	4/3/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	
								1				
								2				
								3				
								4				
SB	2	5	4	80				5			SAND; dark brown; no odor; loose; fine grained; rounded to subrounded; moist; some gravel	
								6			With organics; wood pieces of varying sizes	
								7				
								8				
								9				
SB	3	10	10	100				10			Relict creosote/staining; wet	
								11				
								12				
								13				
								14				
								15			Mild odor; some NAPL residue	
								16			Black; creosote odor & residue; hard-pan type layer	
								17	0.4		Dark brown; increasing clay	
								18			CLAY; gray; hard; high plasticity; wet; some sand	
								19			Sandy CLAY; light gray; soft; medium plasticity; wet	
								20			SAND; light gray; loose; fine grained; wet	

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Well/Boring No. ACW-MW3D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/3/18	4/3/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			With some light brown	
								22				
								23				
								24			Medium gray	
								25				
								26	0.7		~2" dark brown zone	
								27			Medium brown	
								28			Clayey SAND; light gray; loose; fine grained; wet	
								29				
SB	5	10	10	100				30			SAND; light gray; sulfuric odor; loose to medium dense; fine grained; wet; some silt	
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. ACW-MW3D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/3/18	4/3/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41			SAND; light gray; sulfuric odor; loose to medium dense; fine grained; wet; some silt & clay	
								42			Increasing clay	
								43			Clayey SILT; light gray; stiff; wet; some fine grained sand	
								44				
								45			Silty SAND; light gray; medium dense; fine grained; wet; some clay	
								46				
								47				
								48			Medium to fine grained	
								49				
SB	7	10	10	100				50			Loose; fine to coarse grained	
								51				
								52				
								53			Light brown; sweet odor; fine to medium grained	
								54				
								55				
								56			Light gray; no odor	
								57				
								58				
								59				
								60				

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Well/Boring No. ACW-MW3D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/3/18	4/3/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61			SAND; light gray; loose; fine to coarse grained; subangular; wet; some silt	
								62				
								63				
								64			Very mild, sweet, diesel-like odor	
								65				
								66				
								67				
								68			Very mild, sweet, diesel-like odor	
								69				
SB	9	10	10	100				70			Mild, sweet odor	
								71				
								72				
								73			No odor; no silt	
								74				
								75				
								76				
								77				
								78				
								79				Boring terminated at 80' bls; installed well - screened 69.5-79.5' bls
								80				

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Well Completion Log

Well No. ACW-MW3D

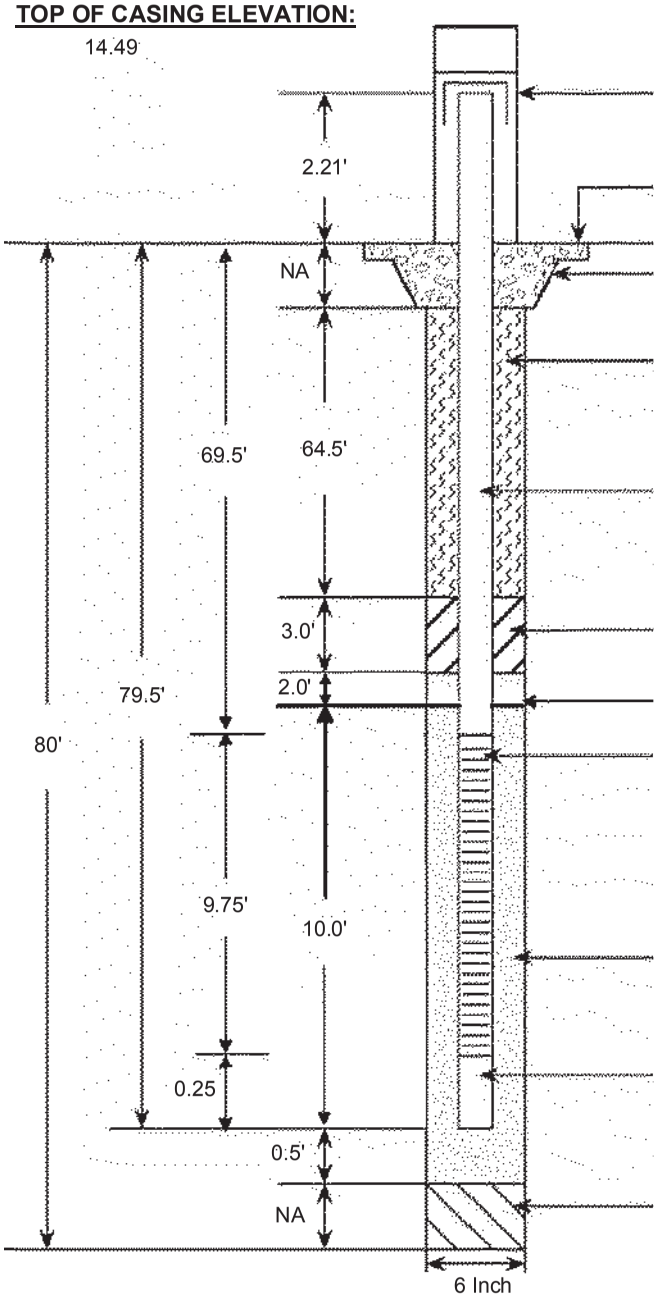
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	82.21'

COORDINATES (DATUM)	GROUND ELEVATION (FEET AMSL)	START DATE	END DATE
N 520814.26 E 1106264.38 NAD 83	NAVD88	4/3/2018	4/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
4"x4" Aluminum stickup protector

WELL PAD ELEVATION:
12.28

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

N.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF PRIMARY SEAL:
Bentonite Chips

TYPE OF SECONDARY FILTER:
20/30 Sand

N.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

(NOT TO SCALE)

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. **BW01**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521339.6 E 1105220.0 NAD83	TBD NAVD88	4/7/18	4/7/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	5	100				0			SAND; dark brown; loose; fine grained; subrounded to subangular; moist	Boring cleared for utilities prior to drilling.
								1	0.0		Orange-brown; some silt & clay	
								2			Brown; no silt or clay	
								3			Subangular	
								4				
SB	2	5	5	100				5				
								6				
								7				
								8				
								9	2.2			
SB	3	10	10	100				10			Wet	
								11			Dark brown; creosote odor & staining; residue on gloves	
								12				
								13				
								14				
								15				
								16			Medium brown ~2" NAPL stringer; strong odor	
								17				
								18			Silty SAND; brown; mild odor; medium dense; fine grained; wet	
								19			Clayey SAND; gray; medium dense; fine grained; wet	
								20	8.5		SAND; gray; loose; fine grained; wet	

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Well/Boring No. BW01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521339.6 E 1105220.0 NAD83	TBD NAVD88	4/7/18	4/7/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	9	90				21	3.7		Silty SAND; light gray; medium dense; fine grained; subrounded to subangular; wet; trace coarse grains	
								22				
								23				
								24				
								25				
								26				
								27			Medium to coarse grained; subangular	
								28				
								29	1.1			
SB	5	10	10	100				30			SAND; light gray to gray; loose; fine grained; subrounded to angular; wet	
								31	2.4			
								32				
								33	7.5			
								34			Medium grained; some clay	
								35				
								36				
								37				
								38			1" clay zone	
								39			Sandy SILT; light gray; creosote odor; soft; nonplastic; wet	
								40				

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Well/Boring No. BW01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521339.6 E 1105220.0 NAD83	TBD NAVD88	4/7/18	4/7/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41	22.9		SAND; light gray; loose; fine to medium grained; subrounded to subangular; wet; some clay	
								42	3.4			
								43				
								44				
								45			No clay	
								46				
								47				
								48			Trace coarse grains	
								49	3.0			
SB	7	10	10	100				50				
								51				
								52				
								53	2.7			
								54				
								55			Medium grained; with trace coarse grains	
								56				
								57				
								58				
								59	9.7			
								60				

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Well/Boring No. **BW01**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521339.6 E 1105220.0 NAD83	TBD NAVD88	4/7/18	4/7/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	9.5	95				61			SAND; light gray; loose; coarse grained; subrounded to subangular; wet	
								62			Silty SAND; light gray; loose; fine grained; subrounded; wet	
								63	3.6			
								64				
								65			Brownish-gray; fine to medium with trace coarse grains	
								66				
								67			Light gray	
								68				
								69	4.3			
SB	9	10	9	90				70			Sandy SILT; light gray; soft; nonplastic	
								71				
								72	3.3			
								73				
								74				
								75			SILT; light gray; soft; nonplastic; wet	
								76				
								77				
								78				
								79	4.9			
								80				

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Well/Boring No. **BW01**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521339.6 E 1105220.0 NAD83	TBD NAVD88	4/7/18	4/7/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			Silty SAND; light gray; loose; fine to coarse grained; wet	
								82			SILT; light gray; soft; nonplastic; wet	
								83				
								84				
								85				
								86				
								87			Trace sand	
								88				
								89				
SB	11	10	7	70				90				
								91				
								92				
								93				
								94			Light gray and orange-brown; increasing sand	
								95			Sandy SILT; mottled orange, red, brown, light gray; very stiff; nonplastic; wet	
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. **BW01**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521339.6 E 1105220.0 NAD83	TBD NAVD88	4/7/18	4/7/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			Sandy SILT; mottled orange, red, brown, light gray; very stiff; nonplastic; wet Dark gray; some clay	
								102				
								103				
								104				
								105				
								106			CLAY; dark gray; hard; low plasticity; moist; seams of sand throughout (most apparent from 106' to 107.5' bls)	
								107				
								108				
								109				
								110				Boring terminated at 110' bls. Boring backfilled with grout.
								111				
								112				
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				

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Well/Boring No. **BW03**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521362.2 E 1105457.9 NAD83	TBD NAVD88	2/27/2018	2/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Gravelly, clayey SAND; black to red brown; fine to coarse grained; dry to moist; no odor; organics present.	Boring cleared for utilities prior to drilling
								1				
								2				
								3				
SB	2	6	6	100				4			Silty SAND; black; fine to medium grained; loose; moist.	
								5				
								6				
								7			SAND; white; fine to medium grained; loose; moist; no odor.	
								8				
								9				
SB	3	10	10	100				10				
								11				
								12				
								13			Black. Creosote staining present from 12.5 to 19 feet bls. Creosote odor present	
								14				
								15				
								16				
								17				
								18				
								19			White. No creosote staining.	
								20				

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Well/Boring No. BW03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521362.2 E 1105457.9 NAD83	TBD NAVD88	2/27/2018	2/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; white; fine to coarse grained; loose; moist. Creosote odor present. Limey, clay lumps present from 20-23 feet bls.	
								22				
								23				
								24				
								25				
								26				
								27			Medium to coarse grained; wet; creosote odor present.	
								28				
								29				
SB	5	10	10	100				30			Fine to coarse grained; moist; some creosote odor and staining present.	
								31				
								32				
								33				
								34			Creosote odor present.	
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. BW03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521362.2 E 1105457.9 NAD83	TBD NAVD88	2/27/2018	2/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	9.5	95				41			No recovery from 40 to 40.5 feet bls.	
											Clayey SAND; white; fine grained; stiff; moist; creosote odor present.	
								42			SAND; white; fine to coarse grained; loose; moist. Creosote odor present.	
								43				
								44				
								45				
								46			Grading more fine sand.	
								47				
								48			Grading more medium sand.	
								49				
SB	7	10	10	100				50			Grading more fine sand. No odor.	
								51				
								52				
								53			Grading more coarse sand.	
								54				
								55				
								56				
								57			Tan with black stains. No Odor.	
								58				
								59			White.	
								60				

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Well/Boring No. BW03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521362.2 E 1105457.9 NAD83	TBD NAVD88	2/27/2018	2/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61				
								62				
								63				
								64				
											SAND; tan brown; fine to coarse grained; loose; moist; no odor. Black staining from 66.5 to 67 feet bls.	
								65				
								66				
								67			White.	
								68				
								69				
SB	9	10	10	100				70			SAND; white; fine to coarse grained; loose; moist; trace silt present; very slight creosote odor present.	
								71			Grading more fine sand; no odor.	
								72				
								73				
								74				
								75				
								76				
								77				
								78				
								79			Silty SAND; white; fine to coarse grained; loose; moist; sporadic grey clays present; no odor.	
								80				

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Well/Boring No. BW03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521362.2 E 1105457.9 NAD83	TBD NAVD88	2/27/2018	2/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	9	90				81			Silty SAND; white; fine to coarse grained; loose to stiff; wet to moist; creosote odor present.	
								82				
								83				
								84				
								85				
								86				
								87			SAND; white; fine to medium grained; loose; moist; no odor. fine to coarse grained; trace silt present.	
								88				
								89				
SB	11	10	9	90				90			SAND; grey; fine to coarse grained; loose; moist; creosote odor present.	
								91			loose to stiff; lenses of silty fine sand; creosote odor present.	
								92			Silty SAND; white fine to coarse; stiff; moist to wet; no odor.	
								93				
								94				
								95				
								96				
								97			SAND; grey (with red staining), fine to coarse grained; loose; moist; no odor.	
								98			Clayey SAND; red; fine to coarse grained; loose to slightly stiff; moist; no odor.	
								99				
								100				

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Well/Boring No. BW03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521362.2 E 1105457.9 NAD83	TBD NAVD88	2/27/2018	2/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			Clayey SAND; red brown; fine to coarse grained; loose; moist; no odor.	
								102				
								103			Dark grey; moist to wet.	
								104				
								105				
								106			CLAY; grey; hard; high plasticity; moist; sporadic sand lenses throughout; no odor.	
								107				
								108			No sand lenses.	
								109				
ST	13	2	2	100				110			Shelby tube collected from 110' to 112' bls - no recovery	
								111				
								112				Boring terminated at 112' bls. Borehole backfilled with grout.
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				

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Well/Boring No. **BW04**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521334.4 E 1105572.9 NAD83	TBD NAVD88	2/28/2018	2/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	5	100				0			Gravelly, Clayey SAND; black to brown; fine to coarse grained; loose; dry to moist; no odor; organics present.	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
								4				
SB	2	5	5	100				5			SAND; red brown; fine; dry; loose; no odor; some organics; 1-2 inch silty sand layer at 5.5' that is black and fine to medium grained.	
								6				
								7			White; fine to medium grained; loose; moist; no odor.	
								8			Slight creosote odor.	
								9				
SB	3	10	8	80				10			Dark grey; fine to coarse grained; moist; loose; no odor; sporadic clays present.	
								11				
								12				
								13			Grey; fine to coarse grained;	
								14				
								15			Dark grey; creosote odor present.	
								16			Dark grey/black; strong creosote odor present.	
								17				
								18			Grey; creosote odor present.	
								19				
								20				

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Well/Boring No. BW04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521334.4 E 1105572.9 NAD83	TBD NAVD88	2/28/2018	2/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	9	90				21			SAND; tan; fine to medium grained; loose; moist; creosote odor present.	
								22			Strong creosote odor present; 1 inch layer of hardpan creosote at 22.3' bls.	
								23			Dark tan; fine to coarse grained; loose; moist; creosote odor present.	
								24			Tan.	
								25				
								26				
								27				
								28			White; grading more coarse sand.	
								29				
SB	5	10	9	90				30			White grading to tan; medium to coarse; no odor.	
								31				
								32				
								33				
								34			Tan; fine to coarse; sporadic clay clumps present.	
								35				
								36			Creosote odor and staining present.	
								37				
								38			Brown; fine to medium grained; moist; slight odor. 1 inch clay layer at 38.1' bls. 3 inch clay layer at 38.5' bls. Clay is brown, medium plastic, moist, and stiff.	
								39			White; fine to coarse grained; loose; moist; slight odor present. Limey, clay clump present at 39.2' bls. Clay is white, medium plastic, stiff, and moist.	
								40				

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Well/Boring No. BW04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521334.4 E 1105572.9 NAD83	TBD NAVD88	2/28/2018	2/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41			SAND; white; fine to coarse grained; loose; moist; no odor; trace clay.	
								42				
								43				
								44				
								45				
								46				
								47				
								48				
								49				
SB	7	10	10	100				50			No trace clay.	
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59			Trace silt and clay present.	
								60				

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Well/Boring No. BW04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521334.4 E 1105572.9 NAD83	TBD NAVD88	2/28/2018	2/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	8	10	10	100				61			SAND; white; fine to coarse grained; loose; moist; very slight odor; trace clay.	
								62			Pink tan.	
								63				
								64			White.	
								65				
								66				
								67			Pink tan.	
								68			White.	
								69				
SB	9	10	10	100				70			White; fine to medium grained; loose; moist; no odor; moderate sorting; trace silt present.	
								71				
								72				
								73				
								74			Fine to coarse grained; poorly sorted; trace silt present.	
								75				
								76				
								77			Fine to medium grained. No trace silt.	
								78				
								79				
								80				

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Well/Boring No. BW04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521334.4 E 1105572.9 NAD83	TBD NAVD88	2/28/2018	2/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	9	90				81			SAND; white and slightly pink; very fine to medium grained; loose to stiff; moist; no odor.	
								82				
								83				
								84				
								85				
								86			Pinkish white; very fine to coarse grained.	
								87				
								88			White.	
								89				
SB	11	10	10	100				90			Silty SAND; white; fine to medium grained; loose to stiff; moist; no odor.	
								91				
								92				
								93				
								94			Very fine to coarse grained; loose to slightly sitff. Grading coarser sand from 93' to 98' bls.	
								95				
								96				
								97				
								98			Clayey, Silty SAND; orange to red brown; fine to coarse grained; loose to stiff; moist; no odor.	
								99				
								100				

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Well/Boring No. BW04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	110'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521334.4 E 1105572.9 NAD83	TBD NAVD88	2/28/2018	2/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			Clayey, Silty SAND; orange red; fine to medium grained; loose; moist; no odor.	
								102			Clayey SAND; dark grey; fine to medium grained; stiff; moist to wet; no odor.	
								103				
								104			CLAY; dark grey; stiff to hard; medium plasticity; moist; no odor. Intermittent sand lenses present.	
								105				
								106			Highly plastic; hard; moist; no odor.	
								107				
								108				
								109				
								110			Shelby tube collected from 110' to 112' bls - no recovery	
								111				
								112				Boring terminated at 112' bls. Borehole backfilled with grout.
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				

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Well/Boring No. **BW05**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521291.8 E 1105704.5 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	10	100				0			Sandy CLAY; dark brown; loose; moist; abundant organics present; no odor.	Boring cleared for utilities prior to drilling.
								1			Silty SAND; dark brown black; fine grained; loose; moist; no odor; some organics present.	
								2				
								3			SAND; tan; fine to lower medium grained; loose; moist; no odor; trace silt present.	
								4			White; upper fine grained to lower medium grained; loose; moist; creosote odor present.	
								5				
								6				
								7				
								8				
								9			Dark tan.	
SB	2	10	10	100				10			Tan; fine to coarse grained; loose; moist; creosote odor. Some organics present.	
								11				
								12			Fine to medium grained.	
								13				
								14			Light tan; medium grained.	
								15				
								16			Dark tan; fine to coarse grained; loose; moist; creosote odor present. Soil leaves residue on gloves.	
								17				
								18				
								19				
								20			Creosote staining.	

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Well/Boring No. BW05

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521291.8 E 1105704.5 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	3	10	10	100				21			SAND; white; fine to medium grained; moist; creosote odor and staining present.	
								22			Tan and black; fine to coarse grained; loose; moist; strong creosote odor and staining present. 1.5 inches of hardpan creosote at 22.5' bls.	
								23			Grading more coarse sand. Soil leaves residue on gloves.	
								24				
								25				
								26				
								27				
								28				
								29				
SB	4	10	9	90				30			White; fine to coarse grained; loose; moist; no odor.	
								31			White tan; medium to coarse grained.	
								32				
								33			Tan to dark tan; medium grained; loose; moist; cresosot odor present; trace clay present. Creosote staining increasing with depth to 37' bls.	
								34				
								35				
								36				
								37			Dark brown; fine to medium grained; moist; creosote odor and staining present.	
								38			Tan; no odor beond 38-38.5' bls.	
								39				
								40				

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Well/Boring No. BW05

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521291.8 E 1105704.5 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	5	10	10	100				41			Silty CLAY; tan; stiff; moist; medium plastic, some sand SAND; tan; fine to coarse grained; loose; moist to wet; creosote odor present; trace clay present. Grading more coarse sand to 47.5' bls.	
								42				
								43				
								44				
								45				
								46			Fine to coarse; no odor; no trace clay.	
								47			White; moist to dry; no odor.	
								48				
								49				
SB	6	10	10	100				50			Fine to medium grained.	
								51				
								52				
								53			Fine to coarse.	
								54				
								55				
								56				
								57			Pinkish white.	
								58				
								59				
								60				

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Well/Boring No. **BW05**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521291.8 E 1105704.5 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	7	10	9	90				61			SAND; white; fine to coarse grained; loose; moist; no odor.	
								62				
								63				
								64				
								65			Pink; fine to medium grained.	
								66			Pinkish white.	
								67				
								68				
								69			White; fine to coarse grained; loose; moist; no odor; trace silt present.	
SB	8	10	10	100				70			Trace silt and clay present. Grading more fine sand from 70' bls to 80' bls.	
								71				
								72				
								73				
								74				
								75				
								76				
								77				
								78				
								79				
								80				

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Well/Boring No. BW05

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521291.8 E 1105704.5 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	9	10	10	100				81			SAND; tan grading to white; fine to coarse grained; loose; wet to moist; no odor; trace silt and clay present.	
								82			Silty SAND; white; fine; loose to stiff; moist; no odor.	
								83				
								84				
								85			SAND; white; fine to medium grained; loose; moist; no odor; trace silt present.	
								86			Fine to coarse grained.	
								87				
								88				
								89			Fine to medium grained; no trace silt.	
SB	10	10	10	100				90				
								91			Silty SAND; white; fine to medium grained; stiff; moist; no odor.	
								92			Fine to coarse grained; trace silt and clay present.	
								93				
								94				
								95			SAND; white fine to coarse grained; loose; moist; trace clay and silt present.	
								96				
								97				
								98			Clayey SAND; orange; fine to coarse grained; stiff; moist; no odor.	
								99			Dark red; fine to coarse grained; stiff; moist; no odor; some silt, interspersed silt and clay lenses present.	
								100				

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Well/Boring No. **BW05**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521291.8 E 1105704.5 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	11	10	10	100				101			Clayey SAND; orange; fine to coarse grained; stiff; moist; no odor; some silt, interspersed silt and clay lenses present.	
								102				
								103			Grey; fine to coarse grained; stiff; moist; no odor; prevalent clay lenses present.	
								104				
								105			CLAY; hard; high plasticity; interspersed sand lenses at 105' bls and 107' bls.	
								106				
								107				
								108				
								109				
ST	12	2	2	100				110			Shelby tube collected from 110' to 112' bls - no recovery	
								111				
								112				Boring terminated at 112' bls. Borehole backfilled with grout.
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				

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Well/Boring No. **BW06**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521213.0 E 1105778.3 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	5	100				0			Gravelly SAND; black to red; fine to coarse grained; loose; dry to moist; no odor; organics present.	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
								4				
SB	2	5	3	60				5			No Recovery from 5' to 6' bls.	
								6				
								7			Clayey SAND; brown; fine grained; loose; moist; organics present; organic odor present. Black; dry to moist.	
								8				
								9			SAND; white; fine grained; loose; moist; no odor.	
											No Recovery from 9.5' to 10' bls.	
SB	3	10	9	90				10			SAND; light brown; fine to medium grained; loose; moist; no odor; trace clay present.	
								11				
								12				
								13				
								14				
								15				
								16				
								17			Brown; creosote odor present; soil leaves residue on gloves.	
								18				
								19				
								20				

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Well/Boring No. BW06

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521213.0 E 1105778.3 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; light brown tan; fine to medium grained; loose; moist to wet; cresote odor; trace gravel & clay present.	
								22				
								23			Fine to coarse grained; moist; creosote odor and staining present.	
								24				
								25			Dark brown; very heavy creosote staining present; strong odor; soil leaves heavy residue on gloves. 1 to 2 inches of black, hard pan creosote at 25.5' bls.	
								26				
								27				
								28			Brown; medium to coarse grained; loose; moist; creosote odor and staining present.	
								29				
SB	5	10	10	100				30			Tan; slight creosote odor present.	
								31				
								32			Creosote odor present; leaves heavy creosote odor on gloves; free product from 31.5' to 31.7' bls; heavy creosote staining present.	
								33				
								34				
								35				
								36			Light brown; fine grained; loose; moist; creosote odor and staining present.	
								37				
								38				
								39			Trace coarse sand.	
								40				

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Well/Boring No. BW06

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521213.0 E 1105778.3 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	9	100				41			SAND; light brown; fine to coarse grained; moist; creosote odor present. Grades more coarse sand with depth from 40' to 50' bls.	
								42			Dark brown; creosote staining; soil leaves creosote residue on gloves.	
								43				
								44			Light brown; moist to wet; no staining; no residue; trace clay present.	
								45				
								46				
								47			Grading tan.	
								48				
								49				
SB	7	10	10	100				50			White; fine to coarse grained; loose; moist; no odor.	
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59				
								60				

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Well/Boring No. BW06

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521213.0 E 1105778.3 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61			SAND; white; fine to coarse grained; loose; moist; no odor; trace silt present.	
								62				
								63				
								64				
								65			Pinkish white.	
								66				
								67			Pink	
								68			Pinkish white.	
								69				
SB	9	10	9	90				70			White; grading more fine grained sand and less coarse grained sand with depth from 70' to 78' bls.	
								71				
								72				
								73				
								74				
								75				
								76				
								77				
								78			White; fine; loose; moist; no odor; trace silt present.	
								79				
								80				

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Well/Boring No. BW06

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521213.0 E 1105778.3 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			SAND; white; fine to coarse grained; loose; moist; no odor; no trace silt present. Fine grained.	
								82				
								83				
								84			Fine to coarse grained. Grading to fine sand with depth from 84' to 86' bls.	
								85				
								86			Fine to medium grained.	
								87				
								88				
								89				
SB	11	10	9	90				90			Medium to coarse grained. Fine to coarse grained; trace silt present.	
								91				
								92			Silty SAND; white; fine to coarse grained; moderately stiff; moist; no odor; trace clay present.	
								93				
								94				
								95				
								96				
								97				
								98			SAND; white to tan; fine to coarse grained; loose; moist; trace silt and clay present. Grades more coarse sand with depth from 97.5' to 100' bls.	
								99				
								100				

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Well/Boring No. BW06

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521213.0 E 1105778.3 NAD83	TBD NAVD88	3/1/2018	3/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			Clayey SAND; orange red; fine to coarse grained; loost to stiff; moist to wet; no odor.	
								102				
								103			Grey; fine to coarse grained; stiff; moist; no odor; clay lenses from 104.5' to 106.5' bls.	
								104				
								105				
								106				
								107			CLAY; grey; hard; high plasticity; moist; no odor.	
								108				
								109				
SB	13	10	10	100				110				
								111				
								112				
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				Boring terminated at 120' bls. Borehole backfilled with grout.

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Well/Boring No. **BW07**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521093.0 E 1105776.0 NAD83	TBD NAVD88	3/1/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Gravelly Clayey SAND; black; fine to coarse grained; loose; dry to moist; creosote odor present; organics present.	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	5	83				4			Clayey SAND; black; fine to medium grained; loose; moist to wet; strong creosote odor; sheen and iridescence present; free product present; organics present.	
								5				
								6			SAND; black grading to white; upper fine grained; loose; moist; very faint creosote odor to no odor; sporadic clay clump at 5.5' to 7' bls.	
								7				
								8				
								9				
SB	3	10	10	100				10			Upper fine grained to lower medium grained; creosote odor present.	
								11				
								12			Tannish white.	
								13				
								14				
								15				
								16			Light tannish brown.	
								17				
								18				
								19				
								20				

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Well/Boring No. BW07

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521093.0 E 1105776.0 NAD83	TBD NAVD88	3/1/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	9	90				21			SAND; dark tan; fine grained; loose; moist; creosote odor; trace clay present.	
								22				
								23				
								24			Dark brown to black; strong creosote odor; soil leaves creosote staning on gloves. 0.5 inch clay layer at 23.75' bls.	
								25				
								26				
								27			Hard pan creosote and free product at 27.25' bls.	
								28			Tan; fine to coarse grained; loose; moist; creosote odor.	
								29				
SB	5	10	9	90				30			Light tan; lower medium grained to coarse grained; trace fine sand, silt, and clay present.	
								31				
								32				
								33				
								34			Tan; upper medium grained to coarse grained; moist to wet.	
								35			Grading white.	
								36			Grading tan.	
								37			Dark tan.	
								38				
								39			Tan.	
								40			Fine to coarse grained; creosote odor present.	

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Well/Boring No. BW07

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521093.0 E 1105776.0 NAD83	TBD NAVD88	3/1/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	6	10	10	100				41			SAND; whitish tan; fine to coarse grained; loose; moist.	
								42				
								43			Tannish white; fine to medium grained; creosote odor and staining present.	
								44				
								45			Brown; fine grained; loose; moist; trace medium sand present; creosote odor.	
								46			White and black; medium grained; loose; moist; creosote odor and staining present; trace fine sand present.	
								47			Tan/light brown; fine to coarse grained; creosote odor present; trace silt present.	
								48				
								49				
SB	7	10	10	100				50			Tan; fine to coarse grained; loose; moist.	
								51				
								52				
								53				
								54				
								55			White.	
								56				
								57				
								58				
								59				
								60				

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Well/Boring No. BW07

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521093.0 E 1105776.0 NAD83	TBD NAVD88	3/1/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61			SAND; white; fine grained; loose; moist sporadic silt and clay clumps from 60' to 62' bls. Grading more fine sand with depth from 60' to 70' bls.	
								62				
								63				
								64				
								65				
								66				
								67				
								68			Fine grained to lower coarse grained; loose; moist; no odor.	
								69				
SB	9	10	10	100				70			Fine to coarse grained.	
								71				
								72				
								73				
								74				
								75			Light brown; fine to coarse grained; loose; moist; no odor.	
								76			White.	
								77				
								78				
								79				
								80				

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Well/Boring No. BW07

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521093.0 E 1105776.0 NAD83	TBD NAVD88	3/1/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			SAND; white; fine to coarse grained; loose; moist; no odor.	
								82				
								83			Fine grained; loose to stiff; trace silt present.	
								84				
								85				
								86				
								87			Fine to medium grained; loose; trace silt present	
								88			Fine grained.	
								89				
								90			Fine to medium grained.	
SB	11	10	10	100				91			Silty SAND; white; fine to coarse grained; loose; moist; no odor.	
								92				
								93			Fine grained.	
								94				
								95				
								96			Fine to medium grained.	
								97				
								98			Fine to coarse grained.	
								99				
								100				

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Well/Boring No. BW07

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521093.0 E 1105776.0 NAD83	TBD NAVD88	3/1/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	9	90				101			Silty SAND; white grading to orange; fine to coarse grained; loose; moist.	
								102				
								103				
								104				
								105				
								106			Clayey, Silty SAND; red/orange brown; fine to coarse grained; loose to stiff; moist; no odor.	
								107			Orangish white.	
								108				
								109			Clayey SAND; grey; fine to coarse grained; loose to stiff; moist; no odor.	
SB	13	10	10	100				110			CLAY; grey; hard; high plasticity; moist.	
								111				
								112				
								113				
								114				
								115				
								116				
								117				
								118				
								119			Some sandstone chunks; red/grey.	
								120				Boring terminated at 120' bls. Borehole backfilled with grout.

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Well/Boring No. **BW08**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	117'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521074.7 E 1105691.7 NAD83	TBD NAVD88	3/2/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Gravelly, Clayey SAND; dark brown; fine to coarse grained; loose; dry to moist; creosote odor and staining present.	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			Clayey, silty SAND; fine to medium grained; loose; dry to moist; abundant organics present; no odor.	
								5				
								6				
								7			Black material that is charcoal-like; could be heavy organics or creosote hard pan. No odor present.	
								8			SAND; fine to medium grained; red to brown; loose; moist; no odor; sporadic clays; abundant organics present.	
								9				
SB	3	10	9	90				10			Dark grey to grey; fine to medium grained; loose; moist; trace clay present; slight creosote odor; trace coarse sand and gravel; abundant organics present.	
								11				
								12				
								13				
								14			Tannish grey; fine to medium grained; loose; moist; creosote odor and staining present from approximately 17' to 17.5' bls.	
								15				
								16				
								17				
								18			Light brown; soil leaves light residue on gloves.	
								19				
								20				

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Well/Boring No. BW08

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	117'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521074.7 E 1105691.7 NAD83	TBD NAVD88	3/2/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	7	70				21			No recovery from 20' to 23' bls.	
								22				
								23			SAND; light brown; fine grained; loose; moist; creosote odor present; organics present; soil leaves slight residue on gloves.	
								24				
								25				
								26			Light brown to black; fine to coarse grained; moist; strong creosote odor present; heavy creosote staining and free product present; soil leaves heavy residue on gloves.	
								27				
								28				
								29				
SB	5	10	10	100				30			Brown; fine to coarse grained; loose; moist; strong creosote odor; trace silt and clay present.	
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. BW08

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	117'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521074.7 E 1105691.7 NAD83	TBD NAVD88	3/2/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41			SAND; tan; fine to coarse grained; loose; moist; strong creosote odor; trace silt and clay present.	
								42				
								43				
								44				
								45				
								46				
								47				
								48				
								49				
SB	7	10	9	90				50			White; strong creosote odor; trace silt present.	
								51				
								52				
								53			Sandy CLAY; white; soft; moist; low plasticity; fine to medium grained sand.	
								54			SAND; white; fine to coarse grained; loose; moist; strong creosote odor; trace silt present.	
								55				
								56			Fine to medium grained. Grading more coarse sand with depth from 54' to 60' bls.	
								57				
								58				
								59				
								60				

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Well/Boring No. BW08

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	117'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521074.7 E 1105691.7 NAD83	TBD NAVD88	3/2/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	9	90				61			SAND; white; medium to coarse grained; loose; moist; no odor; trace fine sand and silt present. Slight creosote odor.	
								62				
								63				
								64				
								65				
								66			No odor.	
								67				
								68			Whitish pink; slight odor.	
								69			White; no odor.	
SB	9	10	10	100				70			Fine to coarse grained; no odor.	
								71			Whitish pink; medium to coarse grained; no odor; trace fine sand; sporadic clay clumps present.	
								72				
								73			Grading more coars sand with depth from 73' to 76' bls. White; fine to coarse grained; creosote odor; trace clay; sporadic clay clumps present.	
								74				
								75				
								76			Whitish pink; grading more fine sand with depth from 76' to 79' bls.	
								77				
								78			White/pinkish white; fine to coarse grained; loose; moist; no odor; trace silt. Drill team notices smell of TCE at 80' bls and points out that the rods are coming out of the hole very clean.	
								79			Grading more coarse sand with depth from 79' to 80' bls.	
								80				

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Well/Boring No. BW08

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	117'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521074.7 E 1105691.7 NAD83	TBD NAVD88	3/2/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			SAND; white; fine to coarse grained; creosote odor; trace clay; sporadic clay clumps present.	
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
								90				
SB	11	10	10	100				91			White; fine to coarse grained; loose; moist; creosote odor present.	
								92				
								93				
								94				
								95				
								96			Fine to medium grained.	
								97				
								98			Whitish orange; fine to coarse grained.	
								99			White with trace silt and clay present.	
								100				

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Well/Boring No. **BW08**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	117'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521074.7 E 1105691.7 NAD83	TBD NAVD88	3/2/2018	3/2/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	9	90				101			SAND; white; fine to coarse grained; loose; moist; trace silt and clay present.	
								102				
								103				
								104				
								105			Whitish pink.	
								106				
								107			Whitish orange.	
								108			Silty SAND; orangish white; fine to medium grained; stiff; moist; grading to mostly fine sand from 108.5' to 109.5' bls.	
								109				
								110			CLAY; grey; hard; high plasticity; moist.	
ST	13	2	2	100							Shelby tube collected due to sand in Shelby tube, decided to push another 5'.	
								111				
SB	14	5	5	100				112			CLAY; grey; hard; high plasticity; moist; no odor.	
								113				
								114				
								115				
								116				
								117				Boring terminated at 117' bls. Boring backfilled with grout.
								118				
								119				
								120				

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Well/Boring No. **BW09**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521025.9 E 1105541.2 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	1	10	2	20				0			Clayey SAND; red to black; fine to medium grained; loose; dry to moist; heavy creosote odor and staining; sheen visible with water; free product present; soil leaves heavy residue on gloves.	Boring cleared for utilities prior to drilling
								1				
								2			No recovery from 2' to 19' bls.	
								3				
								4				
								5				
								6				
								7				
								8				
								9				
SB	2	10	1	10				10				
								11				
								12				
								13				
								14				
								15				
								16				
								17				
								18				
								19			SAND; brown to grey; fine to medium grained; moist; strong creosote odor; creosote staining; free product present.	
								20				

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Well/Boring No. BW09

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521025.9 E 1105541.2 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	3	10	9	90				21			SAND; grey; fine grained to lower medium grained; loose; moist; strong creosote odor; some staining present.	
								22				
								23				
								24				
								25				
								26				
								27				
								28				
								29			Grey black; fine to medium grained.	
SB	4	10	10	100				30			Brown to black; fine to coarse grained; loose; moist; heavy creosote odor; staining present; free product present; hard pan of creosote present from 32' to 32.5' bls. Trace clay and silt present	
								31				
								32				
								33			Brownish white; fine to coarse grained; loose; moist; creosote odor and staining present, which becomes less prevalent after 33' to 34.5' bls.	
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. BW09

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521025.9 E 1105541.2 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	5	10	10	100				41			SAND; tannish white; fine grained to upper medium grained; loose; moist; creosote odor present; some staining; trace coarse sand and trace silt present.	
								42				
								43				
								44				
								45			Fine to coarse grained; trace silt; no coarse sand.	
								46				
								47				
								48				
								49				
SB	6	10	0	0				50			No recovery from 50' to 60' bls.	
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59				
								60				

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Well/Boring No. BW09

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521025.9 E 1105541.2 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	9	90				61			SAND; white to tan; fine to coarse grained; loose; moist; strong creosote odor; staining present; some free product present; oil sheen present on water.	
								62				
								63				
								64				
								65				
								66				
								67				
								68				
								69				
SB	8	10	10	100				70			Tan to black; fine to coarse grained; loose; moist; creosot odor; heavy staining at 70.75' to 71' bls; free product present.	
								71			Tannish white; fine to medium grained; loose to stiff; moist; creosote odor and staining present; free product present; trace silt.	
								72				
								73			Dark tan to white; fine to coarse grained; loose; moist; creosote odor and staining; free product present. 3 inch sandy clay layer at 74.5' bls, which is white, soft, and moist.	
								74				
								75				
								76			White; fine to medium grained; loose to stiff; moist; staining and odor present. 3 inch sandy clay layer at 76.5' bls, which is white, soft, and moist.	
								77			Fine to medium grained; loose; moist; odor and staining present.	
								78			Silty SAND; white; fine to medium grained; stiff; moist; odor present.	
								79			SAND; white; fine to coarse grained; loose; moist; odor present.	
								80				

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Well/Boring No. BW09

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521025.9 E 1105541.2 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	9	10	10	100				81			SAND; grey; fine to coarse grained; loose; moist; odor and staining present.	
								82			Dark tan; strong odor, heavy staining, and free product present. Grading more coarse sand with depth from 83' to 88' bls.	
								83			Black; strong odor, heavy staining, and free product present.	
								84				
								85			Tan to black; strong odor, heavy staining, and free product present.	
								86				
								87				
								88			White; odor present.	
								89				
SB	10	10	10	100				90			Fine to coarse grained; loose; moist; creosote odor present; some staining at 90' to 91' bls; trace silt present.	
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. **BW09**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521025.9 E 1105541.2 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	11	10	8	80				101			No recovery from 100' to 102' bls.	
								102			SAND; white; fine to coarse grained; loose to stiff; moist; slight odor; trace silt present.	
								103				
								104				
								105				
								106				
								107			Clayey Silty SAND; orange; fine to coarse grained; loose to stiff; moist; no odor.	
								108				
								109			Clayey SAND; red to orange; fine to coarse grained; loose to stiff; moist; no odor; chunks of sandstone present.	
SB	12	10	10	100				110			Sandy CLAY; brown; soft to hard; medum to low plasticity; moist; fine to coarse sand; no odor.	
								111			CLAY; grey; hard; high plasticity; moist; no odor.	
								112				
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				Boring terminated at 120' bls. Borehole backfilled with grout.

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Well/Boring No. **BW10**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520945.9 E 1105433.5 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Clayey SAND; black brown to red; fine to coarse grained; loose to dense; moist.	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			Black; creosote odor and staining; hard packed creosote.	
								5				
								6			Red; medium to fine grained; moist to dry; slight odor; fill.	
								7			SAND; grey to black; fine to medium grained; loose; moist; creosote odor; heavily stained; leaves residue on gloves.	
								8				
								9				
SB	3	10	10	100				10				
								11				
								12			Tan; some staining.	
								13				
								14				
								15				
								16			Brown to black; heavily stained; oil sheen; free product.	
								17				
								18				
								19				
								20				

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Well/Boring No. BW10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520945.9 E 1105433.5 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; white to light brown; fine to medium grained; loose; moist; creosote odor; some staining	
								22				
								23				
								24			Light brown; stained	
								25			Brown to dark brown; fine to coarse grained; heavily stained	
								26				
								27				
								28				
								29				
SB	5	10	10	100				30			White; slight creosote odor; minimal staining	
								31				
								32				
								33				
								34				
								35			Black to brown; fine to medium grained; very strong odor; heavily stained; sheen; free product	
								36				
								37			Dark brown; fine grained; sporadic clay clumps	
								38			3" clay lense; brown; stiff; moist; low plasticity	
								39				
								40				

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Well/Boring No. BW10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520945.9 E 1105433.5 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	7	70				41			No recovery 40' to 43'	
								42				
								43			SAND; tan; fine grained; loose; moist; creosote present; heavy odor; free product	
								44				
								45			Fine to medium grained; some staining	
								46				
								47				
								48				
								49			3" clay lense; grey; stiff; moist; medium plasticity	
											Clayey SAND; black; fine grained; loose to dense; moist; creosote odor; organic material	
SB	7	10	9	90				50			No recovery 50' to 51'	
								51			SAND; brown; fine to medium grained; loose; moist; creosote odor	
								52				
								53			Clayey Silty SAND; tan; fine grained; stiff; moist; creosote odor; sporadic clay clumps	
								54				
								55				
								56			SAND; tan; fine to coarse; loose to dense; moist; creosote odor; free product	
								57				
								58			Heavy staining @ 57.5' and 59.5'	
								59				
								60				

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Well/Boring No. BW10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520945.9 E 1105433.5 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	8	80				61			No recovery 60' to 62'	
								62			SAND; tan; fine to coarse grained; loose; moist; creosote odor; sporadic clay clumps throughout	
								63				
								64				
								65				
								66				
								67				
								68				
								69				
								70			Clayey SAND; white; fine to medium grained; loose to stiff; moist; creosote odor	
SB	9	10	9	90							No recovery 70' to 71'	
								71			Sandy CLAY; greyish white; soft; moist; high plasticity	
								72			SAND; tan; fine to coarse grained; loose; moist; trace clay; slight odor	
								73				
								74			CLAY; tan; moist; slight odor	
								75			SAND; white; fine grained; loose; moist; slight creosote odor; trace silt	
								76				
								77				
								78				
								79				
								80				

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Well/Boring No. BW10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520945.9 E 1105433.5 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81–90			SAND; white; fine grained; loose; moist; slight creosote odor	
SB	11	10	10	90				90			Pinkish white	
								93–94			Silty SAND; white; fine to coarse grained; loose; moist; creosote odor	
								95–100			SAND; white; fine to coarse grained; loose; moist; creosote odor	

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Well/Boring No. **BW10**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520945.9 E 1105433.5 NAD83	TBD NAVD88	3/3/2018	3/3/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	9	100				101			SAND; white; fine to coarse grained; loose; moist; creosote odor	
								102			Silty SAND; white; fine to coarse grained; dense; moist; no odor	
								103				
								104				
								105			SAND; light tan; fine grained; loose; moist; no odor; trace medium and coarse grained sand; trace silt	
								106				
								107				
								108				
								109				
SB	13	10	10	100				110			Silty SAND; white; fine to coarse grained; loose; moist; no odor	
								111				
								112				
								113			CLAY; grey; hard; moist; high plasticity; no odor Sand lense @ 113.5'	
								114				
								115			Red Orange Sand lense @ 115'	
								116				
								117				
								118			Clayey SAND; orange to red; fine to medium grained; dense; moist; no odor; interspersed clay lenses at 117.25', 118', and 119.5'	
								119				
								120				Boring terminated at 120' bls. Borehole backfilled with grout.

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Well/Boring No. **BW11**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	3/3/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			SAND; red; fine to medium grained; loose; moist; creosote odor	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			Organic Material from 4'-6'	
								5				
								6			SAND; black; fine grained; loose; moist; strong creosote odor	
								7			Clayey SAND; red; fine grained; loose to dense; moist; creosote odor	
								8			No recovery 7.5' to 10'	
								9				
SB	3	10	10	100				10			SAND; grey brown; fine to medium grained; loose; moist; creosote odor; creosote staining; leaves residue on gloves	
								11				
								12				
								13				
								14				
								15			Grey; fine grained	
								16				
								17				
								18			Encounter Free Product from 17.5 to 20 ft	
								19				
								20				

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Well/Boring No. BW11

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	3/3/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; grey; fine to coarse grained; loose; moist; creosote odor and staining; leaves light residue of gloves	
								22				
								23			0.5" clay lense at 23.5'	
								24				
								25				
								26				
								27				
								28				
								29			Fine to medium grained	
SB	5	10	9	90				30			Greyish white; fine to coarse grained	
								31				
								32				
								33				
								34				
								35				
								36			Black; fine grained; heavy creosote staining; leaves heavy residue on gloves; free product Grey to brown; fine to coarse grained; creosote odor and staining	
								37				
								38				
								39			Brown; fine to medium grained	
								40				

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Well/Boring No. **BW11**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	3/3/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41			SAND; tan; fine to medium grained; loose; moist; some creosote odor	
								42				
								43				
								44				
								45				
								46			Tanish white; fine grained	
								47			Tan	
								48			CLAY; grey; soft; high plasticity; moist	
								49			SAND; tan; fine to medium grained; loose to dense; moist; creosote odor	
SB	7	10	10	90				50			Fine to coarse grained	
								51				
								52			Sandy CLAY; tan; soft; high plasticity; moist	
								53				
								54			ORGANICS; black	
								55				
								56			SAND; greyish white; fine to medium grained; loose; moist	
								57				
								58				
								59			Brown	
								60				

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Well/Boring No. BW11

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	3/3/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61			CLAY; soft; moderate plasticity; moist	
								62				
								63				
								64			SAND; brown; fine to medium grained; loose; moist; creosote odor	
								65				
								66				
								67			Tan	
								68			CLAY; white; very soft; low plasticity; odor	
								69			SAND; tan and white; fine to medium grained; loose; moist; odor	
SB	9	10	10	100				70			Clayey SAND; tan white; fine grained; loose; moist; slight creosote odor	
								71			CLAY; brownish white; stiff to hard; high plasticity; no odor	
								72				
								73			Silty SAND; white; fine grained; loose to dense; moist; creosote odor	
								74				
								75				
								76				
								77			SAND; white; fine to coarse grained; loose; moist; creosote odor	
								78				
								79				
								80				

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Well/Boring No. **BW11**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	3/3/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			SAND; orangish white; fine to medium grained; loose; moist; no odor	
								82			CLAY; orange; soft to hard; high plasticity; moist; no odor	
								83			Grey	
								84				
								85			Orange	
								86			SAND; orangish white; fine to medium grained; loose; moist; no odor	
								87			Clayey Silty SAND; fine to medium grained; loose; moist; no odor	
								88				Boring terminated at 90' bls. Borehole backfilled with grout.
								89				
								90				
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. **BW11A**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	grass - adjacent to BW11	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	5/17/18	5/17/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
0	0	5	0	0				0			Hand augered to 5' bls to clear utilities	Boring cleared for utilities prior to drilling
								1				
								2				
								3				
								4				
1	1	5	10	100				5			Silty SAND; dark brown; strong creosote odor & heavy staining; loose; poorly graded; fine grained; moist	
								6				
								7	0.4			
								8				
								9			Grey brown; fine to medium grained	
2	2	10	10	100				10			SAND; grey; strong odor; no visible NAPL; loose; poorly graded; fine grained; wet	
								11	1.3		Grading tan Grading dark grey	
								12				
								13				
								14	2.9		Fine to medium grained; trace silt	
								15				
								16			Tan & grey	
								17	12.7		Dark brown; visible mobile creosote - leaves residue on sample liner & gloves; saturated with creosote; fine grained	
								18				
								19				
								20				

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Well/Boring No. **BW11A**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	grass - adjacent to BW11	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	5/17/18	5/17/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
3	3	10	10	100				21	10.8		SAND; dark brown; visible mobile creosote; loose; fine grained; wet	
								22			SAND; brown; odor, no residue; loose; fine grained; wet; trace silt	
								23			Tan; very slight odor; fine to medium grained	
								24				
								25	3.6		Tan no odor; no silt	
								26				
								27				
								28				
								29	1.7			
4	4	10	10	100				30			Tan	
								31				
								32	1.3		Fine to coarse grained; subangular to subrounded	
								33				
								34			Mottled tan odor; fine to medium grained	
								35	1.7		Dark brown; creosote staining, residue, trace mobile NAPL, strong odor, saturated; trace silt	
								36				
								37			Tan fine grained; some silt	
								38				
								39			Silty SAND; light brown slight odor, no visible staining/NAPL; medium dense; fine grained; wet	
								40				

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Well/Boring No. **BW11A**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	grass - adjacent to BW11	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	5/17/18	5/17/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING												
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
5	5	10	10	100				41	0.6		SAND; tan; loose; fine grained; wet	
								42				
								43			Silty SAND; grey; loose; fine grained; wet	
								44			Sandy SILT; grey; soft; nonplastic; wet	
								45			Sandy CLAY; grey; soft; nonplastic; wet; some silt	
								46	0.8		CLAY; grey; stiff; nonplastic; wet; trace wood debris; some silt; trace sand	
								47				
								48			Sandy SILT; grey; soft; nonplastic; wet	
								49			Silty SAND; grey; slight odor; loose; fine grained; wet	
6	6	10	8	80				50			No recovery 50-52' bls	
								51				
								52			Silty SAND; grey; slight odor; loose; fine grained; wet	
								53				
								54			Silty CLAY; grey; odor; stiff; nonplastic; wet; some sand; wood debris	
								55	4.5			
								56				
								57			Silty SAND; dark brown; strong odor, no residue; medium dense; fine grained; wet	
								58			Heavy odor & wood debris	
								59	3.6		Brown odor; loose	
								60				

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Well/Boring No. **BW11A**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	grass - adjacent to BW11	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	5/17/18	5/17/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
7	7	10	10	100				61			SAND; tan/grey; loose; fine to medium grained; wet	
											Silty SAND; grey; loose; fine grained; wet	
								62	1.2		Silty CLAY; dark brown; odor; hard; nonplastic; moist; wood debris	
								63			CLAY; dark brown; stiff; high plasticity; wet; no wood debris	
								64			Sandy SILT; grey; odor; soft; nonplastic; wet	
								65			Sandy CLAY; grey; odor; soft; nonplastic; wet	
								66	1.5		Silty CLAY; grey; odor; soft; nonplastic; wet; trace sand	
								67				
								68			Sandy SILT; grey; odor; soft; nonplastic; wet	
								69			Silty SAND; grey; slight odor; loose; fine grained; wet	
8	8	10	10	100				70				
								71	6.9		~1" horizontal NAPL stringer, strong odor, leaves residue	
								72			Sandy Silty CLAY; grey; odor; soft; nonplastic; wet	
								73				
								74			Fine to medium grained; less silt	
								75	3.4			
								76			SAND; grey; odor; loose; fine to medium grained; wet; trace silt	
								77				
								78				
								79				
								80			Fine to coarse grained; no silt	

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Well/Boring No. **BW11A**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	grass - adjacent to BW11	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	5/17/18	5/17/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
9	9	10	10	100				81	3.1		Sandy SILT; tan odor; soft; nonplastic; wet	
								82			Silty SAND; grey odor; loose; fine grained; wet	
								83			Fine to medium grained; less silt	
								84			SAND; grey; loose; fine to coarse grained; wet; no silt	
								85				
								86				
								87	2.6		Fine to medium grained; trace silt	
								88				
								89				
10	10	10	10	100				90			Silty SAND; blue grey (metallic sheen); very slight odor; loose; medium to coarse grained; wet; some clay; "sticky"	
								91				
								92			Sandy SILT; blue grey; soft; nonplastic; wet; some clay	
								92	0.9		Silty SAND; blue grey; very slight odor; loose; medium to coarse grained; wet; some clay	
								93			Sandy SILT; blue grey; soft; nonplastic; wet; some clay	
								94			Silty SAND; blue grey; very slight odor; loose; medium to coarse grained; wet; some clay	
								95				
								96				
								97	0.7			
								98			Orange & grey mottled; no odor; loose to medium dense	
								99				
								100				

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Well/Boring No. **BW11A**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	grass - adjacent to BW11	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520901.7 E 1105327.0 NAD83	TBD NAVD88	5/17/18	5/17/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
11	11	10	10	100				101			Silty SAND; orange; loose to medium dense; medium to coarse grained; wet; some clay	
								102	0.6		Mottled red/orange/tan	
								103				
								104				
								105				
								106				
								107	0.7		Grading light orange; fine to coarse grained; less silt	
								108				
								109			Tan; fine to medium grained; less silt	
12	12	10	10	100				110			Coarse grained; loose	
								111			Grading medium to coarse grained	
								112			Mottled red/orange/tan	
								113				
								114			Grey fine to coarse grained; loose; wet; some clay	
								115				
								116			Sandy SILT; grey mottled with orange, red, tan; soft; nonplastic; wet	
								117			Silty SAND; grey loose; fine to coarse grained; wet; some clay	
								118				
								119				
								120				Boring terminated at 120' bls; abandoned with bentonite grout

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Well/Boring No. **BW-11B**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.3 E 1105327.0 NAD83	TBD NAVD88	7/25/2018	7/25/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0			SAND; red; fine to medium grained; loose; dry; subround to subangular; fill; creosote odor	Boring cleared for utilities prior to drilling.
								1				
								2				
								3	8.5			
								4				
CB	1	5	5	100				5			Fine to lower medium grained; dry to moist; trace clay; creosote odor; PID: 8.5	
								6	28.5			
								7				
								8	16.4		Wood debris; black; creosote stained; creosote odor; PID: 28.5	
								9			SAND; black grading grey; fine to lower medium grained; loose; moist; subround; PID: 16.4	
CB	2	10	10	100				10			Tanish grey; creosote odor; creosote staining	
								11				
								12				
								13			Grey; fine to medium grained; creosote odor	
								14				
								15			Fine to lower medium grained; some creosote staining; creosote odor	
								16				
								17				
								18				
								19				
								20				

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Well/Boring No. **BW-11B**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.3 E 1105327.0 NAD83	TBD NAVD88	7/25/2018	7/25/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21	50.9		SAND; grey grading brown; fine to medium grained; leaves residue on gloves; PID: 50.9	
								22				
								23			Brown grading to black; fine to lower coarse grained; creosote present (free product); heavily stained; very strong odor; heavey residue on gloves; PID: 78.7	
								24	78.7			
								25				
								26				
								27	101.2			
								28				
								29	159.9			
								30			Creosote hard pan; PID: 101.2 and 159.9	
CB	4	10	10	100				31			Greyish brown; fine to coarse grained; subround to subangular; some creosote staining; strong creosote odor; PID: 1.5	
								32	8.3			
								33				
								34				
								35	180		Greyish light brown; fine to medium grained; minor creosote staining; strong creosote odor; PID: 8.3	
								36				
								37			Black; fine to coarse grained; free product; heavily creosote stained; very strong creosote odor; very heavey residue on gloves; PID: 180.0	
								38	11.5			
								39			Light brown; strong creosote odor; PID: 11.5	
								40				

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Well/Boring No. **BW-11B**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.3 E 1105327.0 NAD83	TBD NAVD88	7/25/2018	7/25/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	10	100				41	1.7		SAND; light brown to tan; fine to lower medium grained; slight creosote odor; PID: 1.7	
								42			Fine to medium grained	
								43				
								44			CLAY; grey; stiff; moderate plasticity; moist; organic material present	
								45			SAND; tan; fine; loose; saturated; subround; 1" clay layer at 45' bls - grey; soft; low plasticity; wet	
								46	2.6		Fine to medium grained; moist; creosote odor; brown organics at 46.25-46.5' bls; PID: 2.6	
								47				
								48				
								49			Organics - roots or trace debris (swamp deposits)	
CB	6	10	10	100				50			Clayey SAND; black; fine to medium grained; loose; wet; no odor	
								51			SAND; tan; fine to medium grained; loose; moist; creosote odor. Free product at 50.5 ft.	
								52			Fine to lower coarse grained	
								53			Fine to medium grained	
								54				
								55	109.9		Fine to lower coarse grained; subround to subangular Reddish tan with black streaks; free product; creosote stained; strong creosote odor; PID: 109.9	
								56				
								57				
								58				
								59			Tan; trace clay	
								60			CLAY; grey; hard; moderate plasticity; moist	

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Well/Boring No. **BW-11B**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.3 E 1105327.0 NAD83	TBD NAVD88	7/25/2018	7/25/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	7	10	10	100				61			SAND; tan; fine to coarse grained; loose; moist; subround to subangular; creosote staining; creosote odor; PID: 49.2	
								62				
								63	49.2			
								64				
								65	127.9			
								66				
								67				
								68				
								69				
CB	8	10	10	100				70			Brown; wet to saturated; free product; creosote staining; creosote odor; PID: 127.9	
								71				
								72				
								73			CLAY; greyish brown; very stiff; mosit; moderate plasticity	
								74			SAND; fine; whitish tan; loose; moist; trace clay	
								75			White; subround; PID: 1.8; 1" clay layer at 76' bls - grey; soft; wet; nonplastic	
								76	1.8			
								77				
								78				
								79				
								80				

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Well/Boring No. **BW-11B**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.3 E 1105327.0 NAD83	TBD NAVD88	7/25/2018	7/25/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	9	10	10	100				81	1.2		SAND; tanish white; fine to medium grained; loose; moist to wet; subround to subangular	
								82				
								83			White; fine	
								84				
								85				
								86				
								87				
								88				
								89			Tanish white; fine to medium grained	
CB	10	10	10	100				90			No recovery - sample fell out of core barrel	
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. **BW-11B**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.3 E 1105327.0 NAD83	TBD NAVD88	7/25/2018	7/25/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	11	10	10	100				101			SAND; reddish yellow; fine to coarse grained; trace clay; some gravel; clayey sand lens around 101.75-102.75' bls	
								102				
								103			Clayey SAND; grey; fine to coarse grained; loose; mosit; subround to subangular	
								104				
								105				
								106				
								107				
								108				
								109			CLAY; grey; hard; moist; high plasticity	
CB	12	10	10	100				110			Stiff to hard; moderate plasticity	
								111				
								112				
								113				
								114				
								115				
								116				
								117				
								118				
								119			Mottled yellow, red, purple, orange, and grey	Boring terminated at 120' bls. Boring backfilled with grout.
								120			SAND; orange; fine to coarse grained; loose; moist; trace clay; subround to subangular	

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Well/Boring No. **BW12_1**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Clayey SAND; brown; fine to coarse grained; loose; dry to wet; no odor; orangic material	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			SAND; brown to tan to grey; fine to medium grained; loose; moist; slight creosote odor	
								5				
								6				
								7				
								8				
								9				
SB	3	10	10	100				10			Black to brown; fine to medium grained; loose; moist; creosote odor and staining	
								11				
								12				
								13			3 inch creosote hard pan at 13'; 1 inch creosote hard pan at 16'	
								14				
								15				
								16			Brown; fine grained	
								17			Fine to coarse grained	
								18			Clayey SAND; grey; fine to medium grained; loose to dense; moist; odor	
								19				
								20			CLAY; grey; soft; high plasticity; moist	

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Well/Boring No. BW12_1

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	9	90				21			SAND; white; fine to medium grained; loose; moist; creosote odor; trace gravel	
								22				
								23				
								24				
								25				
								26			Fine to coarse grained	
								27				
								28				
								29				
SB	5	10	10	100				30			Fine to medium grained; sporadic clay clumps	
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38			CLAY; grey; soft; moderate plasticity; moist; organics (roots)	
								39			SAND; tan; fine to medium grained; loose; moist; creosote odor; sporadic clay clumps	
								40			CLAY; grey; hard; moist; high plasticity; organics (Large root)	

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Well/Boring No. BW12_1

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	6	10	10	100				41			No recovery 40' to 41'	
								42			CLAY; grey; soft; moist; high plasticity; organics	
								43			SAND; tanish grey; fine to medium grained; loose; moist; odor	
								44				
								45				
								46			CLAY; grey; soft; moist; high plasticity; organics	
								47			SAND; tan; fine to medium grained; loose; moist; odor	
								48				
								49				
SB	7	10	9	90				50				
								51				
								52				
								53				
								54			CLAY; very hard; moderate plasticity; dry SAND; tan; fine to coarse grained; loose; moist; odor	
								55				
								56				
								57			White	
								58				
								59				
								60			CLAY; white; very soft; low plasticity; wet	

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Well/Boring No. BW12_1

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61			Clayey SAND; white; fine grained; loose to dense; moist; creosote odor	
								62			SAND; white; fine grained; loose; moist; odor	
								63			CLAY; grey brown; hard; high plasticity; moist	
								64			SAND; white; fine grained; loose; moist; odor	
								65				
								66			CLAY; grey brown; hard; high plasticity; moist	
								67			SAND; white; fine grained; loose; moist; creosote odor	
								68				
								69				
SB	9	10	10	100				70				
								71				
								72				
								73				
								74				
								75				
								76				
								77				
								78				
								79				
								80				

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Well/Boring No. BW12_1

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			SAND; white; fine to coarse grained; loose; moist; creosote odor	
								82				
								83				
								84			Orange red; no odor	
								85				
								86				
								87			Orangish reddish white	
								88				
								89				
SB	11	10	10	100				90			Pink, red, orange, white, yellow; loose to dense	
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. BW12_1

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			SAND; orange and yellow; fine to coarse grained; loose to dense; moist	
								102				
								103				
								104				
								105				
								106				
								107				
								108				
								109				
SB	13	10	10	100				110				
								111				
								112				
								113				
								114				
								115			CLAY; grey; hard; hight plasticity; moist; lots of sand inclusions	
								116			SAND; white with red orange stains; fine to medium grained; loose; moist; no odor	
								117				
								118				
								119				
								120				

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Well/Boring No. **BW12_1**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Marsh	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520801.0 E 1105170.2 NAD83	TBD NAVD88	3/4/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	14	5	5	100				121			SAND; white to pink to orange; medium to coarse grained; loose; moist; no odor	Boring terminated at 125' bls. Borehole backfilled with grout.
								122				
								123				
								124				
								125				
								126				
								127				
								128				
								129				
								130				
								131				
								132				
								133				
								134				
								135				
								136				
								137				
								138				
								139				
								140				

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Well/Boring No. **BW12_2**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520905.4 E 1105255.5 NAD83	TBD NAVD88	3/5/2018	3/7/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING												
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
HA	1	4	4	100				0			Clayey SAND; brown to red; fine to medium grained; loose; moist; slight creosote odor; organics	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			SAND; red to black; fine to medium grained; loose; moist; creosote odor and staining; leaves residue on gloves	
								5				
								6				
								7				
								8				
								9				
SB	3	10	10	100				10			Brown to black; stong creosote odor; free product 13.25-14 ft and 18.5 - 20 ft	
								11				
								12				
								13				
								14				
								15				
								16				
								17				
								18				
								19				
								20				

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Well/Boring No. BW12_2

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520905.4 E 1105255.5 NAD83	TBD NAVD88	3/5/2018	3/7/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	12	60				21			SAND; brown; fine to medium grained; loose; moist; creosote odor and staining	
								22			Leaves slight residue on gloves	
								23				
								24				
								25				
								26				
								27				
								28			Silty SAND; tan grey; fine to medium grained; desne; moist; creosote odor	
								29			SAND; tan grey; fine grained; loose; moist; creosote odor	
		10						30				
								31			Clayey SAND; fine grained; very dense; moist; creosote odor	
								32			SAND; brown; fine grained; loose; moist; creosote odor	
								33				
								34			No recovery 33.5' to 50'	
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. BW12_2

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520905.4 E 1105255.5 NAD83	TBD NAVD88	3/5/2018	3/7/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	5	10	0	0				41			No recovery 33.5' to 50'	
								42				
								43				
								44				
								45				
								46				
								47				
								48				
								49				
SB	6	10	14	70				50			SAND; tan; fine to medium grained; loose; moist; creosote odor	
								51				
								52				
								53			Sandy CLAY; grey; soft; moist; moderate plasticity; organics (roots)	
								54				
								55			SAND; tan; fine to medium grained; loose; moist; creosote odor	
								56				
								57			Sporadic clay clumps	
								58				
								59				
								60				

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Well/Boring No. BW12_2

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520905.4 E 1105255.5 NAD83	TBD NAVD88	3/5/2018	3/7/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
		10						61			SAND; tan; fine to medium grained; loose; moist; creosote odor; sporadic clay clumps	
								62				
								63				
								64			No recovery 64' to 70'	
								65				
								66				
								67				
								68				
								69				
SB	7	10	10	100				70			SAND; white; fine to coarse grained; loose; moist; creosote odor	
								71				
								72			CLAY; white; soft; moderate plasticity; moist	
								73			SAND; white; fine grained; loose; moist; creosote odor	
								74				
								75				
								76				
								77				
								78				
								79				
								80				

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Well/Boring No. BW12_2

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520905.4 E 1105255.5 NAD83	TBD NAVD88	3/5/2018	3/7/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				81			SAND; white; fine to coarse grained; loose to dense; moist; creosote odor; trace silt	
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
SB	9	10	10	100				90			Slight creosote odor	
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99			CLAY; reddish orange grey; soft to stiff; high plasticity; moist	
								100				

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Well/Boring No. BW12_2

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520905.4 E 1105255.5 NAD83	TBD NAVD88	3/5/2018	3/7/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				101			Clayey SAND; orange; fine to coarse grained; loose; moist; no odor	
								102			CLAY; grey; soft to hard; high plasticity; moist	
								103			Sand lenses at 101.5', 102.5', and 104	
								104				
								105				
								106				
								107				
								108			Increasing sand lenses	
								109				
SB	11	10	10	100				110				
								111				
								112				
								113				
								114			Clayey SAND; grey; fine to coarse grained; loose; moist; no odor	
								115				
								116			CLAY; grey; hard; high plasticity; moist	
								117			Sandy CLAY; orange; soft; moderate plasticity; moist	
								118			CLAY; orangish grey; soft; moderate plasticity; moist	Boring terminated at 120' bls. Borehole backfilled with grout.
								119			Clayey SAND; reddish orange; fine to coarse grained; loose to dense; moist	
								120				

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Well/Boring No. **BW13**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520930.0 E 1105189.8 NAD83	TBD NAVD88	3/4/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Clayey SAND; red; fine to medium grained; loose; dry; slight creosote odor; organics	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			Sandy CLAY; red; soft; low plasticity; moist; creosote odor; sand is fine to medium grained	
								5				
								6				
								7			Clayey Silty SAND; brown; dry; slight odor (fill)	
								8				
								9			SAND; black; fine to medium grained; loose; moist; creosote odor	
SB	3	10	10	100				10			Clayey SAND: red; fine grained; moist; creosote odor	
								11			SAND; black to brown; fine to medium grained; loose; moist; creosote odor and staining; leaves residue on gloves; free product	
								12				
								13				
								14				
								15				
								16				
								17				
								18			Black; very strong odor and heavily stained; free product	
								19				
								20				

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Well/Boring No. **BW13**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520930.0 E 1105189.8 NAD83	TBD NAVD88	3/4/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; black; fine to medium grained; loose; moist; very strong creosote odor and heavily stained; leaves residue on gloves; free product	
								22			Brown; creosote odor and some staining	
								23			Clayey SAND; tan; fine grained; loose to dense; moist; creosote odor	
								24			CLAY; grey; soft; high plasticity; moist; medium stiff; medium plasticity; moist	
								25			Clayey SAND; dark brown; fine to medium grained; loose to dense; moist; odor	
								26			SAND; brown; fine to coarse grained; loose; moist; creosote odor and staining; leaves residue on gloves	
								27				
								28				
								29				
SB	5	10	10	100				30			Light brown	
								31				
								32				
								33			Free product from 33-34'	
								34			Brown; fine to medium grained	
								35				
								36				
								37				
								38				
								39			Sandy CLAY; brown; soft; moderate plasticity; moist	
								40			SAND; tan; fine to medium grained; loose; moist; odor	

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Well/Boring No. BW13

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520930.0 E 1105189.8 NAD83	TBD NAVD88	3/4/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	6	10	10	100				41			Brown; fine grained; 1.5" Clay layer 39.2' SAND; tan brown; fine to coarse grained; loose; moist; trace clay with sporadic clay lenses	
								42				
								43				
								44			Tan; fine grained; odor	
								45				
								46			Fine to medium grained	
								47				
								48			Clay lenses at 47.75 and 49; very hard; high plasticity; moist	
								49				
SB	7	10	9	90				50				
								51				
								52			Fine to coarse grained	
								53				
								54				
								55			Clay layers at 54.5' - 54.75'; hard; high plasticity; moist	
								56				
								57				
								58				
								59				
								60				

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Well/Boring No. **BW13**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520930.0 E 1105189.8 NAD83	TBD NAVD88	3/4/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	9	90				61			SAND; white; fine to coarse grained; loose; moist; creosote odor	
								62				
								63				
								64			Fine to medium grained; sporadic clay clumps	
								65				
								66				
								67				
								68				
								69				
SB	9	10	10	100				70				
								71				
								72			CLAY; soft to hard; moderate to high plasticity; moist	
								73			SAND; white; loose; miost; little to no odor	
								74				
								75				
								76				
								77				
								78				
								79				
								80				

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Well/Boring No. **BW13**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520930.0 E 1105189.8 NAD83	TBD NAVD88	3/4/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	5	50				81			No recovery 80' to 85'	
								82				
								83				
								84				
								85			SAND; white; fine grained; loose; moist; slight creosote odor	
								86				
								87				
								88				
								89			Orange; trace clay	
								90			Grey; fine to coarse grained; no odor	
SB	11	10	0	0				90			No recovery 90' to 100'	
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. **BW13**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	112'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520930.0 E 1105189.8 NAD83	TBD NAVD88	3/4/2018	3/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			CLAY; grey; hard; high plasticity; moist; no odor	
								102			SAND; red and yellow; fine to medium grained; loose; moist; no odor; trace clay	
								103				
								104				
								105			Clayey SAND: grey; fine to coarse grained; medium dense; moist; no odor	
								106				
								107			CLAY; grey; hard; high plasticity; moist; no odor Sand lenses at 107.5', 108.5', 108.75'	
								108				
								109				
ST	13	10	2	100				110			Shelby tube collected from 110-112' bls - no recovery	Boring terminated at 112' bls. Borehole backfilled with grout.
								111				
								112				
								113				
								114				
								115				
								116				
								117				
								118				
								119				
								120				

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Well/Boring No. **BW14**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	4	4	100				0			Clayey SAND; red and brown; fine to medium grained; loose to dense; moist to dry; organics; no odor	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
SB	2	6	6	100				4			Medium grained	
								5			Sandy CLAY; black; very soft; low plasticity; wet; organics; odor (fill)	
								6				
								7			Heavy creosote staining and odor	
								8			SAND; black; fine to medium grained; loose; moist; strong creosote odor; heavily stained; free product	
								9				
SB	3	10	10	100				10				
								11				
								12				
								13			Brownish to tan; creosote odor; some staining	
								14				
								15			Tan; fine grained	
								16				
								17				
								18				
								19				
								20				

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Well/Boring No. **BW14**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING											
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY				DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	4	10	9	90				21			SAND; dark brown/black; fine to coarse grained; loose; moist; stong odor and staining; free product @ 27.5-28'	
								22				
								23				
								24				
								25				
								26				
								27				
								28				
								29				
SB	5	10	10	100				30			Brown; fine to medium grained; creosote odor and some staining	
								31				
								32			Fine to coarse grained	
								33				
								34				
								35			White; fine to medium grained	
								36				
								37				
								38				
								39			Silty SAND; white; fine grained; dense; moist; odor	
								40				

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Well/Boring No. **BW14**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41			Silty SAND; white; fine grained; dense; moist; odor	
											SAND; white; fine to medium grained; loose; moist; odor; trace of silt	
								42			Silty SAND; white; fine grained; dense; moist; odor	
											SAND; white; fine to medium grained; loose; moist; odor; trace of silt	
								43				
								44				
								45				
								46			Silty SAND; white; fine grained; dense; moist; odor	
								47				
								48				
								49			SAND; tannish white; fine to coarse grained; loose; moist; creosote odor; some staining	
SB	7	10	10	100				50			Silty SAND; white; fine to medium grained; loose; moist; odor	
								51			SAND; white; fine to coarse grained; loose; moist; odor	
								52			Silty SAND; white; fine to coarse grained; loose; moist to wet; odor	
								53				
								54				
								55			SAND; white; fine to coarse grained; loose; saturated; odor; trace silt	
								56			Silty SAND; white; fine to coarse grained; loose; wet to moist; odor	
								57				
								58			SAND; white; fine to coarse grained; loose; moist; odor	
								59				
								60				

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Well/Boring No. **BW14**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61			SAND; white; fine to coarse grained; loose; moist; odor; trace silt	
								62				
								63				
								64				
								65				
								66				
								67				
								68				
								69				
SB	9	10	10	90				70			Trace silt and clay	
								71				
								72				
								73				
								74				
								75			CLAY; yellowish white; soft; high plasticity; moist	
								76				
								77			SAND; white; fine to coarse grained; loose; moist; increasing clay content with depth	
								78			CLAY; white; soft; high plasticity; moist; trace sand Sand lenses at 77.5' and 78.25'	
								79			SAND; white; fine to coarse grained; loose; moist; increasing clay content with depth	
								80				

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Well/Boring No. **BW14**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81			SAND; white; fine to coarse grained; loose; moist; creosote odor and staining	
								82				
								83				
								84				
								85				
								86				
								87			Free product from 87' to 88.5'	
								88			Grading more fine sand	
								89				
SB	11	10	10	100				90			Pinkish white; fine to coarse grained	
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well/Boring No. BW14

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			SAND; white/pinkish white; fine to coarse grained; loose; moist; slight creosote odor	
								102			Pinkish white; no odor	
								103				
								104				
								105			White; fine grained	
								106				
								107				
								108				
								109			White; fine to coarse grained	
SB	13	10	10	100				110				
								111			Silty SAND; white; fine to coarse grained; dense; moist; no odor; trace clay	
								112				
								113				
								114				
								115				
								116			Clayey SAND; red orange; fine to coarse grained; dense; moist; no odor; interspersed silt and clay lenses	
								117				
								118				
								119			Grey	
								120				

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Well/Boring No. **BW14**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	125'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 521066.8 E 1105204.1 NAD83	TBD NAVD88	3/5/2018	3/5/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 150CC	C. Dickson

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	P. Cole	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	14	5	5	100				121			CLAY; grey to yellow to maroon; very hard; moderate to high plasticity; moist	Boring terminated at 125' bls. Borehole backfilled with grout.
								122				
								123				
								124				
								125				
								126				
								127				
								128				
								129				
								130				
								131				
								132				
								133				
								134				
								135				
								136				
								137				
								138				
								139				
								140				

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Well/Boring No. **BW16**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520906.4 E 1105109.5 NAD83	TBD NAVD88	4/9/18	4/9/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	5	100				0			SAND; light brown; odor; loose; fine grained; wet	Boring cleared for utilities prior to drilling.
								1				
								2				
								3				
								4				
SB	2	5	5	100				5				
								6				
								7			Gray	
								8				
								9	0			
SB	3	10	10	100				10			Dark brown; strong creosote odor & staining	
								11	14			
								12				
								13				
									13.2		Residual creosote	
								14			1 inch hard pan layer - black	
								15	0.9			
								16			Zones of black sand; heavy creosote residue	
								17				
								18			Sandy SILT; brown; stiff to very stiff; nonplastic; wet	
								19	1.7		Grayish brown	
								20			Silty SAND; light grayish brown; loose; fine grained; wet	

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Well/Boring No. BW16

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520906.4 E 1105109.5 NAD83	TBD NAVD88	4/9/18	4/9/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21	1.8		SAND; light grayish brown; loose; fine to medium grained; subrounded to subangular; wet	
								22				
								23				
								24				
								25				
								26			Fine grained; dense; trace silt	
								27			Increasing silt	
								28				
								29				
								30	36.1		Sandy SILT; light brown; soft; nonplastic; wet	
SB	5	10	10	100					7.0		Clayey SAND; gray; dense; fine grained; subrounded; wet; some silt	
								31				
								32				
								33			Sandy SILT; gray; mild creosote odor; soft; nonplastic; wet	
								34				
								35	1.4		Silty SAND; light gray; fine grained; subrounded to subangular; wet; some clay	
								36			CLAY; stiff; medium plasticity; moist	
											Silty SAND; gray; dense; fine grained; subangular	
								37				
								38				
								39				
								40				

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Well/Boring No. **BW16**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520906.4 E 1105109.5 NAD83	TBD NAVD88	4/9/18	4/9/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41	8.5		Silty SAND; grayish brown; dense; fine grained; subrounded to subangular; moist	
								42				
								43	1.5		Light gray; interbedded silty sand and clay	
								44				
								45			CLAY; dark gray; stiff to very stiff; high plasticity; moist; some sand; light gray at 45.5'	
								46				
								47			Silty SAND; light brown; mild creosote odor; loose; fine grained; moist	
								48				
								49				
SB	7	10	10	100				50	7.2		SAND; light brown; mild creosote odor; loose; fine grained; subangular; moist	
								51				
								52				
								53	5.5			
								54				
								55				
								56				
								57				
								58			Fine to medium grained; some silt	
								59				
								60				

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Well/Boring No. **BW16**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520906.4 E 1105109.5 NAD83	TBD NAVD88	4/9/18	4/9/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61	5.5		Silty SAND; light brown; mild creosote odor; medium dense; fine grained	
									10.7			
								62			CLAY; light gray; soft; low to nonplastic; wet	
								63				
								64			Clayey SAND; light gray; medium dense; fine grained; subrounded; wet	
								65			Silty SAND; light gray; creosote odor; dense; fine grained; subrounded to subangular; wet	
								66				
								67			Small seam of residual NAPL - vertical	
								68			SAND; light gray; loose; fine to medium grained; wet	
								69			SILT; light gray; soft; nonplastic; some sand	
SB	9	10	10	100				70	14.5		SAND; light gray; creosote odor; loose; subrounded to subangular; wet	
								71				
								72				
								73	8.1			
								74				
								75				
								76				
								77			Silty SAND; light gray; creosote odor; medium dense; fine grained; wet	
								78				
								79				
								80				

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Well/Boring No. BW16

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520906.4 E 1105109.5 NAD83	TBD NAVD88	4/9/18	4/9/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	10	10	10	100				81	18.6		Silty SAND, light gray, fine grained, wet, medium dense, creosote odor	
								82	4.2			
								83				
								84				
								85				
								86				
								87				
								88				
								89				
SB	11	10	10	100				90	19.7		SAND; light gray; loose; medium grained; subangular; wet	
								91	2.7			
								92				
								93				
								94				
								95	10		Creosote odor	
								96				
								97				
								98				
								99				
								100	7.3			

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Well/Boring No. **BW16**

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass	120'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520906.4 E 1105109.5 NAD83	TBD NAVD88	4/9/18	4/9/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	H. Yost	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	12	10	10	100				101			SAND; light gray; no odor; loose; fine to medium grained; subangular; wet; some silt and clay	
								102				
								103				
								104				
								105			Silty SAND; light brown; dense; fine grained; subrounded to subangular; wet	
								106				
								107				
								108				
								109				
								110			Sandy SILT; light brown; soft; nonplastic; wet	
SB	13	10	15	150				111			SAND, gray, medium grained, loose, trace silt	
								112				
								113			Orangish brown; fine grained	
								114			CLAY; gray; stiff; high plasticity; moist	
								115				
								116				
								117			Clayey SAND; gray; fine grained; wet	
								118			Interbedded clay and clayey sand; gray	Boring terminated at 120' bls. Boring backfilled with grout.
								119			Silty CLAY; reddish brown; nonplastic; dry; brittle texture	
								120			SAND; orange; loose; fine grained; dry	

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Well/Boring No. DPT1000

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 3	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	60

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239465354 **Latitude** 30.40378685	TBD	11/03/2018	11/04/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	E. Pearson

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	4	4	100				0			SAND (SP); orange; fine/medium grained; loose; subrounded; well sorted; wet.	Hand augered 0-4 feet for utility clearance.
								1				
								2				
								3			grading white/light gray; fine grained.	
								4				
DPT	1	4	4	100				5			saturated.	
								6				Groundwater sampled from 6' to 10' bls. GW1000-10 is sample ID.
								7				
DPT	2	4	4	100				8				
								9			grading to gray.	
								10				
								11				
DPT	3	4	4	100				12				
								13				
								14				
								15				
DPT	4	4	4	100				16			grading to black; fine/medium grained; moderate creosote odor.	Groundwater sampled from 16' to 20' bls. GW1000-20 is sample ID.
								17				
								18				
								19				
								20				

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Well/Boring No. DPT1000

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 3	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	60

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239465354 **Latitude** 30.40378685	TBD	11/03/2018	11/04/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	E. Pearson

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	5	4	4	100				21			SAND (SP); gray; slight creosote odor; fine/medium grained; loose; subrounded; well sorted; wet.	
								22				
								23				
								24				
DPT	6	4	4	100				25			grading minor creosote odor; medium grained with minor silt.	
								26				
								27				
								28				
DPT	7	4	4	100				29				Groundwater sampled from 28' to 32' bls. GW1000-32 is sample ID.
								30			Silty SAND (SM); light gray; minor creosote odor; fine/medium grained; subrounded; well sorted; saturated.	
								31				
								32				
DPT	8	4	4	100				33			No odor.	
								34				
								35				
								36				
DPT	9	4	4	100				37				
								38				
								39				
								40				

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Well/Boring No. DPT1000

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 3	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	60

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239465354 **Latitude** 30.40378685	TBD	11/03/2018	11/04/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	E. Pearson

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	10	4	4	100				41			SAND (SP); white; no odor; fine/medium grained; subrounded; well sorted; loose with trace silt.	
								42				Groundwater sampled from 42' to 46' bls. GW1000-46 is sample ID.
								43				
DPT	11	4	4	100				44			Silty SAND (SM); very light gray; fine/medium grained; subrounded; well sorted; loose; no odor.	
								45				
								46				Groundwater sampled from 46' to 50' bls. GW1000-50 is sample ID.
								47			CLAY (CH); light gray; wet; high plasticity; soft; trace sand.	
											grading brown.	
DPT	12	4	4	100				48				
								49			2-inches of black staining with no odor. 3-inch lens of sand. 3-inch lens of gray clay.	
								50			SAND (SP); light gray; no odor; fine/medium grained; loose; subrounded; well sorted; saturated.	
								51				
								52				
DPT	13	4	4	100				53			grading medium grained.	
								54			grading fine/medium grained.	
								55				
DPT	14	4	4	100				56				Groundwater sampled from 56' to 60' bls. GW1000-60 is sample ID.
								57				
								58				
								59				Boring terminated at 60 ft below land surface.
								60			Refusal at 60' bls.	

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Well/Boring No. DPT1001

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	52

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.23985947 **Latitude** 30.403631395	TBD	10/31/2018	10/30/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	4	4	100				0			SAND (SP); orange; loose; medium/coarse grained; subrounded; well sorted; wet.	Hand augered 0-4 feet for utility clearance.
								1				
								2				
								3				
DPT	1	4	4	100				4				
								5			grading white; fine/medium grained; saturated.	
								6				Groundwater sampled from 6' to 10' bls. GW1001-10 is sample ID.
								7				
DPT	2	4	4	100				8				
								9				
								10				
								11				
DPT	3	4	4	100				12				
								13			grading very light brown; fine grained; minor creosote odor.	
								14				
								15				Groundwater sampled from 15' to 19' bls. GW1001-19 is sample ID.
DPT	4	4	4	100				16			grading black; creosote odor.	
								17				
								18			grading dark brown; creosote odor.	
								19				
								20				

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Well/Boring No. DPT1001

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	52

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.23985947 **Latitude** 30.403631395	TBD	10/31/2018	10/30/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	5	4	0	0				21			No recovery from 20' to 24' bls.	
								22				
								23				
								24				
DPT	6	4	4	100				25			SAND (SP); white to light gray; minor creosote odor; well sorted; medium grained; subrounded; saturated.	
								26				Groundwater sampled from 26' to 30' bls. GW1001-30 is sample ID.
								27				
								28				
DPT	7	4	4	100				29			grading white with no odor.	
								30				
								31			Silty SAND (SM); white; fine grained; loose; subangular; well sorted; saturated.	
								32				
DPT	8	4	4	100				33				
								34				
								35				
								36			SAND (SP); white; no odor; coarse grained; subrounded; loose; saturated; trace silt.	
DPT	9	4	4	100				37				Groundwater sampled from 36' to 40' bls. GW1001-40 is sample ID.
								38				
								39				
								40				

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Well/Boring No. DPT1001

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	52

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.23985947 **Latitude** 30.403631395	TBD	10/31/2018	10/30/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	10	4	4	100				41			SAND (SP); white; no odor; coarse grained; subrounded; loose; saturated; trace silt.	
								42				
								43				
								44			Sandy CLAY (CH); white; highly plastic; soft; saturated.	
DPT	11	4	4	100				45				
								46				Groundwater sampled from 46' to 50' bls. GW1001-50 is sample ID.
								47				
								48			Pushed from 48' to 52' bls at DPT1001, and liner has jammed in rods. Refusal at 52' bls. No lithology from 48' to 52' bls.	
DPT	12	4	0	0				49				
								50				
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59				
								60				

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Well/Boring No. DPT1002

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	56

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239838959 **Latitude** 30.403379757	TBD	11/2/2018	11/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	4	4	100				0			SAND (SP); light orange; fine/medium grained; subrounded; wet; loose; well sorted.	Hand augered 0-4 feet for utility clearance.
								1				
								2				
								3				
DPT	1	4	4	100				4				
								5				
								6			grading white; saturated.	Groundwater sampled from 6' to 10' bls. GW1002-10 is sample ID.
								7				
DPT	2	4	4	100				8				
								9			grading fine grained.	
								10				
								11				
DPT	3	4	4	100				12			grading light tan; minor creosote odor.	
								13				
								14				
								15				
DPT	4	4	4	100				16			grading black; creosote odor.	Groundwater sampled from 16' to 20' bls. GW1002-20 is sample ID.
								17				
								18			Creosote staining present in globs from 18' to 19.5' bls.	
								19				
								20				

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Well/Boring No. DPT1002

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	56

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239838959 **Latitude** 30.403379757	TBD	11/2/2018	11/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	5	4	4	100				21			SAND (SP); light orange; fine/medium grained; subrounded; wet; loose; well sorted. grading light brown with no globs of creosote; fine/medium grained; creosote odor.	
								22				
								23				
								24				
DPT	6	4	4	100				25			grading to brown; minor creosote odor.	
								26				Groundwater sampled from 26' to 30' bls. GW1002-30 is sample ID.
								27				
								28				
DPT	7	4	4	100				29			grading gray; minor creosote odor.	
								30				
								31				
								32				
DPT	8	4	4	100				33				
								34				
								35				
								36				
DPT	9	4	4	100				37			Silty SAND (SM); light gray; fine grained; subangular; saturated; well sorted; loose.	
								38				Groundwater sampled from 38' to 42' bls. GW1002-42 is sample ID.
								39				
								40				

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Well/Boring No. DPT1002

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	56

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239838959 **Latitude** 30.403379757	TBD	11/2/2018	11/1/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	10	4	4	100				41			Silty SAND (SM); light gray; fine grained; subangular; saturated; well sorted; loose.	
								42				
								43			small, 2-inch lens of light gray clay lens in silty sand.	
DPT	11	4	4	100				44				
								45				
								46			grading to fine/medium grained silty sand.	
								47				
DPT	12	4	0	0				48			No recovery from 48' to 52' bls at DPT1002 (liner is empty).	
								49				
								50				Groundwater sampled from 50' to 54' bls. GW1002-54 is sample ID.
								51				
DPT	13	4	4	100				52			SAND (SP); light gray; fine grained; subrounded; saturated; loose; well sorted.	
								53				
								54			grading to medium grained.	
								55				
								56			Refusal at 56' bls.	
								57				
								58				
								59				
								60				

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Well/Boring No. DPT1004

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	40

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.240654886 **Latitude** 30.402769412	TBD	11/5/2018	11/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	E. Pearson

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	4	4	100				0			SAND (SP); orange; loose; well sorted; fine/medium grained; subrounded; wet.	Hand augered 0-4 feet for utility clearance.
								1				
								2				
								3				
DPT	1	4	4	100				4				
								5				
								6				Groundwater sampled from 6' to 10' bls. GW1004-10 is sample ID.
								7			grading white; saturated; medium grained.	
DPT	2	4	4	100				8				
								9				
								10				
								11				
DPT	3	4	4	100				12				
								13			grading light tan.	
								14				
								15				
DPT	4	4	4	100				16			grading black with no creosote odor, but sulfide odor is present.	Groundwater sampled from 16' to 20' bls. GW1004-20 is sample ID.
								17			grading gray. grading light gray. grading brown.	
								18			grading light brown.	
								19			grading light gray/white. grading gray/light brown.	
								20				

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Well/Boring No. DPT1004

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	40

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.240654886 **Latitude** 30.402769412	TBD	11/5/2018	11/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	E. Pearson

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	5	4	4	100				21			SAND (SP); light gray to white; loose; well sorted; fine/medium grained; subrounded; wet.	
								22				
								23				
DPT	6	4	4	100				24				
								25				
								26				Groundwater sampled from 26' to 30' bls. GW1004-30 is sample ID.
								27				
DPT	7	4	4	100				28				
								29				
								30				
								31				
DPT	8	4	4	100				32				
								33				
								34				
								35				
DPT	9	4	4	100				36			grading brown.	Groundwater sampled from 36' to 40' bls. GW1004-40 is sample ID.
								37				
								38				
								39				
								40			Refusal at 40' bls.	

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Well/Boring No. DPT1005

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	35

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.240255711 **Latitude** 30.402418911	TBD	10/29/2018	10/29/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	4	4	100				0			SAND (SP); light brown; medium grained; subangular; loose; wet; minor organics present.	Hand augered 0-4 feet for utility clearance.
								1				
								2				
								3				
DPT	1	4	4	100				4				
								5				
								6			grading white; saturated.	
								7				
DPT	2	4	4	100				8				
								9				
								10				Groundwater sampled from 10' to 14' bls. GW1005-14 is sample ID.
								11				
DPT	3	4	4	100				12				
								13			black/dark brown with very slight creosote odor.	
								14				
								15				
DPT	4	4	4	100				16				
								17				
								18			Clayey SAND (SC); dark brown; slight creosote odor; well sorted; fine to medium grained; subangular; saturated.	Groundwater sampled from 18' to 22' bls. GW1005-22 is sample ID.
								19			2-inch lens of sand at 18.5' bls.	
								20				

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Well/Boring No. DPT1005

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	35

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.240255711 **Latitude** 30.402418911	TBD	10/29/2018	10/29/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	5	4	4	100				21			Clayey SAND (SC); dark brown; slight creosote odor; well sorted; fine to medium grained; subangular; saturated.	
								22			Silty SAND (SM); light gray; minor creosote odor; loose; well sorted; medium grained; subangular; saturated.	
								23				
								24				
DPT	6	4	4	100				25			SAND (SP); very light gray; slight creosote odor present; loose; well sorted; fine to medium grained; subangular; saturated.	
								26				Groundwater sampled from 26' to 30' bls. GW1005-30 is sample ID.
								27				
DPT	7	4	4	100				28			grading white.	
								29				
								30				
								31				
DPT	8	3	0	0				32			Refusal at 35' bls at DPT1005. Pushed from 32' to 35' bls, and liner is stuck in rods. No lithology from 32' to 35' bls.	
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. DPT1006

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	32

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239612069 **Latitude** 30.402513593	TBD	10/30/2018	10/30/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	4	4	100				0			SAND (SP); brown; fine grained; loose; well sorted; subrounded; wet.	Hand augered 0-4 feet for utility clearance.
								1				
								2				
								3				
DPT	1	4	4	100				4				
								5				
								6			grading white; saturated.	
								7				
DPT	2	4	4	100				8				
								9				
								10				
								11				
DPT	3	4	4	100				12				Groundwater sampled from 12' to 16' bls. GW1006-16 is sample ID.
								13			grading gray with slight creosote odor.	
								14				
								15			grading black.	
											grading medium/coarse grained; dark gray.	
DPT	4	4	4	100				16				
								17				
								18			Sandy CLAY (CL); dark bluish gray; low to medium plasticity; soft to very soft; saturated.	
								19				
								20				

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Well/Boring No. DPT1006

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass	32

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
Longitude -87.239612069 **Latitude** 30.402513593	TBD	10/30/2018	10/30/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Walker-Hill Environmental	DPT	7822DT	T. Gonzalez

INSPECTOR	CHECKED BY	APPROVED BY
P. Cole	H. Yost	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
DPT	5	4	4	100				21			Sandy CLAY (CL); dark bluish gray; low to medium plasticity; soft to very soft; saturated.	
								22				
								23			grading light brown.	
DPT	6	4	0	0				24			Refusal at 32' bls at DPT1006. Pushed from 24' to 28' bls and from 28' to 32' bls; liners stuck in the rods for both intervals. No lithology from 24' to 32' bls at DPT1006.	
								25				
								26				
								27				
DPT	7	4	0	0				28				
								29				
								30				
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. IW-01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520817.3 E 1106332.4 NAD 83	NA NAVD88	7/28/2018	7/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0			SAND; black with some red; fine to medium grained; very loose to loose; dry to moist; organics present	Hand augered 0-5 feet for utility clearance.
								1				
								2				
								3				
								4				
CB	1	5	5	100				5	0.0		Black grading to tan; fine to lower medium grained; loose; moist; subround to subangular; trace organics; trace medium sand grains; PID: 0.0	
								6				
								7				
								8				
								9				
CB	2	10	10	100				10	10.1		Dark brown to brown; fine to medium; wet to moist; trace clay; some creosote staining; creosote odor; PID: 10.1	
								11				
								12				
								13				
								14				
								15			Grading more fine sand grains	
								16				
								17				
								18			Brown; fine to coarse grained; moist; creosote staining; creosote odor	
								19			CLAY; brown; very stiff; dry to moist; moderate plasticity	
								20				

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Well/Boring No. IW-01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520817.3 E 1106332.4 NAD 83	NA NAVD88	7/28/2018	7/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21	1.7		SAND; tan grading to white; fine to upper medium grained; loose; moist; subround to subangular; sporadic clay clumps; slight odor; trace lower coarse sand grains; PID: 1.7	
								22				
								23				
								24				
								25				
								26				
								27				
								28				
								29				
CB	4	10	10	100				30	0.2		White; fine to medium grained; very slight odor; trace coarse sand grains; PID: 0.2	
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. IW-01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520817.3 E 1106332.4 NAD 83	NA NAVD88	7/28/2018	7/28/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	10	100				41	0.7		SAND; white; fine to upper medium grained; loose; moist; subround to subangular; sporadic clay clumps; slight odor; trace coarse sand grains	sample IW-01_40-45A & B collected
								42				
								43				
								44				
								45			Fine to lower coarse grained; subrounded to subangular; wet to moist; sporadic clay clumps	sample IW-01_45-50A & B collected
								46				
								47				
								48				
								49				
CB	6	10	10	100				50	0.0		Fine to upper medium grained; trace coarse sand grains	
								51				
								52				
								53				
								54				
								55			Tanish white to white; fine to coarse grained; loose; moist; subround to subangular; trace clay	sample IW-01_50-60A & B, & A_FD & B_FD
								56				
								57				
								58				Boring terminated at 60 ft below land surface.
								59				
								60				

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Well/Boring No. IW-02

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520815.0 E 1106337.1 NAD 83	NA NAVD88	7/29/2018	7/29/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0			SAND; Red to black; fine to medium grained; loose; dry to moist; trace gravel; trace coarse sand grains	Hand augered 0-5 feet for utility clearance.
								1			Black to light brown-tan; moist; subround to subangular; PID: 0.0	
								2				
								3				
								4			White	
CB	1	5	5	100				5			White grading light brown; trace coarse grains	
								6	0.0			
								7				
								8				
								9			Black; trace clay; PID: 0.0	
CB	2	10	0	0				10			No recovery - core was shaken and washed from the core barrel upon retrieval	
								11				
								12				
								13				
								14				
								15				
								16				
								17				
								18				
								19				
								20				

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Well/Boring No. IW-02

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520815.0 E 1106337.1 NAD 83	NA NAVD88	7/29/2018	7/29/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21	1.2		SAND; dark brown to brown; fine to medium grained; loose; moist; subround to subangular; PID: 1.2	
								22				
								23				
								24				
								25				
								26				
								27			Trace clay clumps	
								28			CLAY; brown grading grey; very stiff to hard; dry to moist; moderate plasticity	
								29			SAND; white; fine to lower medium grained; loose; moist; subround to subangular	
								30				
CB	4	10	10	100				31	0.4		Fine to medium grained; trace coarse sand grains; PID: 0.4	
								32				
								33				
								34				
								35				
								36				
								37				
								38			Trace clay clumps	
								39				
								40				

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Well/Boring No. IW-02

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520815.0 E 1106337.1 NAD 83	NA NAVD88	7/29/2018	7/29/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	5	50				41			No recovery - core washed out	
								42				
								43				
								44				
								45	0.0		SAND; white; fine to medium grained; loose; moist; subround to subangular; trace coarse sand grains; PID: 0.0	
								46				
								47				
								48				
								49			Trace clay clumps	
CB	6	10	10	100				50	0.2		PID: 0.2	
								51				
								52				
								53				
								54			Fine to coarse; trace clay; sporadic clay clumps	
								55				
								56				
								57				
								58				Boring terminated at 60 ft below land surface.
								59				
								60				

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Well/Boring No. MW7A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass yard	20'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/6/18	4/6/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	No PID readings; meter not working
SB	2	5	5	100				5			SAND; gray brown; loose; fine grained; subrounded; wet	
								6			Large 6" chunk of wood	
SB	3	10	10	100				10			Brown; medium dense; fine to medium grained	
								14			Dark brown; leaves light residue on gloves; mild odor; loose; fine grained	
								15			Brown	
								17			Dark brown	
								18			Light brown; fine to medium grained; angular	Boring terminated at 20' bls; installed well - screened 10-20' bls
								20			Sandy CLAY; gray; soft; low plasticity; wet	

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Well Completion Log

Well No. MW7A

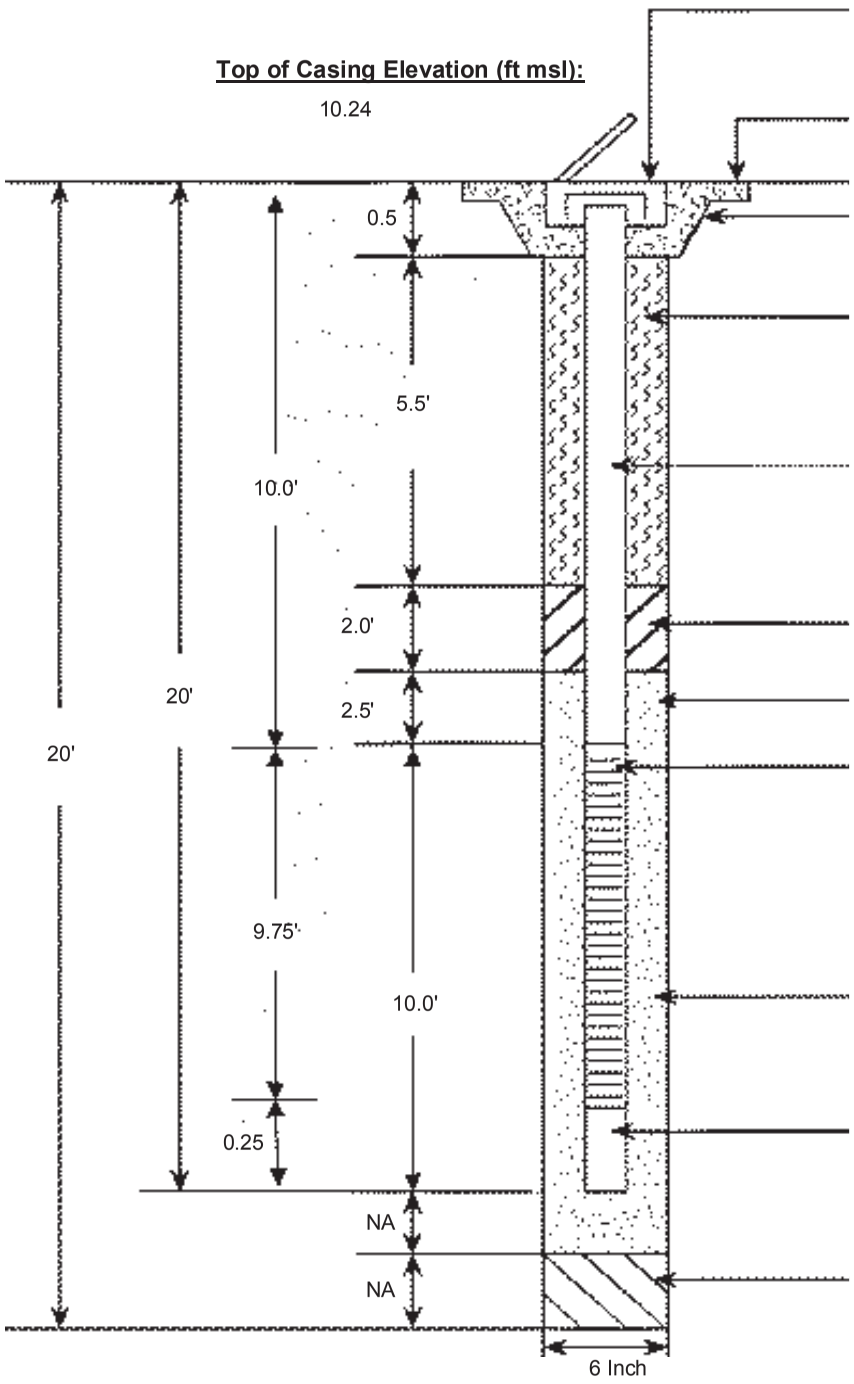
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	20'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520310.43 E 1106062.58 NAD 83	NAVD88	4/6/2018	4/6/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
8" bolt down man hole cover

WELL PAD ELEVATION (ft msl):
10.63

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

I.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF SEAL:
Bentonite Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. MW7B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/5/18	4/5/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	
								1				
								2	0.0			
								3				
								4				
SB	2	5	5	100				5	0.0		SAND; gray; loose; fine grained; subrounded; moist	
								6				
								7				
								8			Light gray	
								9				
SB	3	10	10	100				10	0.0		Brown; wet	
								11	0.0			
								12			Dark brown; very mild odor; leaves residue on gloves (stained)	
								13			Lighter residue	
								14	0.0			
								15				
								16				
								17				
								18				
								19			Darker creosote-stained, heavy creosote residue	
								20				

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Well/Boring No. MW7B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/5/18	4/5/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; brown; fine grained; wet; some clay	
								22			Clayey SAND; gray; medium dense; fine to medium grained; wet	
								23			Sandy CLAY; gray; soft; nonplastic; wet	
								24			CLAY; gray; soft; nonplastic; wet; trace sand	
								25	0.0			
								26			SAND; dark gray; medium dense; fine grained; subrounded; wet; some silt	
								27				
								28				
								29			Light gray	
SB	5	10	10	100				30			Loose; no silt	
								31				
								32				
								33				
								34				
								35	0.0			
								36				
								37				
								38			Silty SAND; gray; loose; fine grained; subrounded; wet	
								39				
								40				

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Well/Boring No. MW7B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/5/18	4/5/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	7	70				41			SAND; gray; loose; fine grained; subangular to subrounded; wet; trace silt	
								42				
								43				
								44				
								45				
								46				
								47			No recovery 47-50' bls	
								48				
								49				
SB	7	10	12	120				50			Sandy CLAY; gray; soft; nonplastic; wet	
								51				
								52				
								53			Hard	
								54				
								55			High plasticity	
								56	0.0		Wood pieces/organics	
								57			Sandy SILT; soft; nonplastic; wet; increasing sand	
								58				
								59				
								60	0.0			

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Well/Boring No. MW7B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grassy	80'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/5/18	4/5/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	10	10	100				61	0.0		Silty SAND; light gray; medium dense; fine grained; subrounded; wet	
								62				
								63				
								64			CLAY; light brown; medium stiff; wet	
								65			Dark gray Light gray	
											SILT; light gray; soft; nonplastic; wet	
								66			Silty SAND; light gray; loose; fine grained; wet	
								67				
								68			Sandy SILT; light gray; soft; nonplastic; wet	
								69				
SB	9	10	6	60				70				
								71				
								72			Silty SAND; light gray; medium dense; fine grained; wet	
								73				
								74			Decreasing silt	
								75				
								76			No recovery 76-80' bls	
								77				
								78				Boring terminated at 80' bls; installed well - screened 69.5-79.5' bls
								79				
								80				

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Well Completion Log

Well No. MW7B

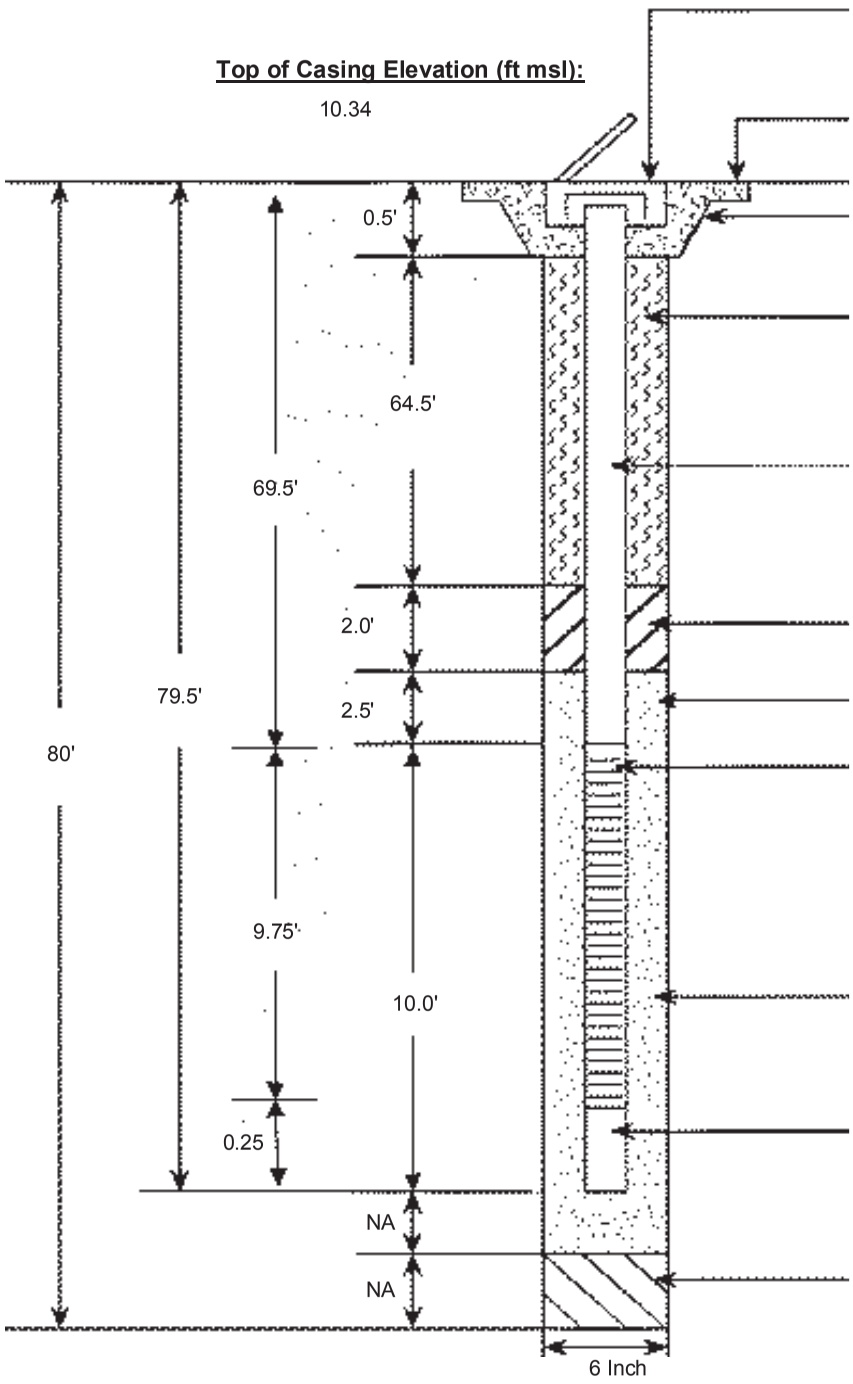
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	79.5'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520306.55 E 1106060.75 NAD 83	NAVD88	4/5/2018	4/6/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
8" bolt down man hole cover

WELL PAD ELEVATION (ft msl):
10.68

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

I.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF SEAL:
Bentonite Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. MW8A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	45'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520242.2 E 1106526.3 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	0	0				0			Hand augered to 5' bls to clear utilities	Boring cleared for utilities prior to drilling
								1				
								2				
								3				
								4				
SB	1	5	5	100				5			SAND; brown loose; poorly graded; fine to medium grained; moist; trace silt	
								6				
								7	0.2		Grading tan	
								8				
								9			Grading white	
SB	2	10	10	100				10			Dark brown; creosote stained; relict NAPL (leaves residue); no odor; wet; silt	
								11				
								12	0.4			
								13			Grading brown; fine to coarse grained	
								14				
								15	1.9			
								16			CLAY; dark grey; soft; nonplastic; wet; some silt; trace sand	
								17				
								18	0.7		SAND; orange; loose; poorly graded; fine to medium grained; wet; trace silt	
								19			Grading tan Grading light tan & white	
								20				

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Well/Boring No. MW8A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	45'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520242.2 E 1106526.3 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	3	10	10	100				21			SAND; tan; loose; poorly graded; fine to medium grained; wet; trace silt	
								22				
								23				
								24				
								25				
								26			Grading light orange	
								27				
								28				
								29			Grading white	
SB	4	10	10	100				30			Well graded; fine to coarse grained	
								31				
								32	0.9		Light grey; poorly graded; fine to medium grained	
								33				
								34				
								35			No silt	
								36				
								37				
								38	0.4			
								39				
								40				

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Well/Boring No. MW8A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	45'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520242.2 E 1106526.3 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	5	10	10	100				41			SAND; white; loose; well graded; fine to coarse grained; wet; trace silt	
								42				
								43				
								44				
								45				Boring terminated at 45' bls; screened well 35-45' bls
								46				
								47				
								48				
								49				
								50				
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59				
								60				

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Well Completion Log

Well No. MW8A

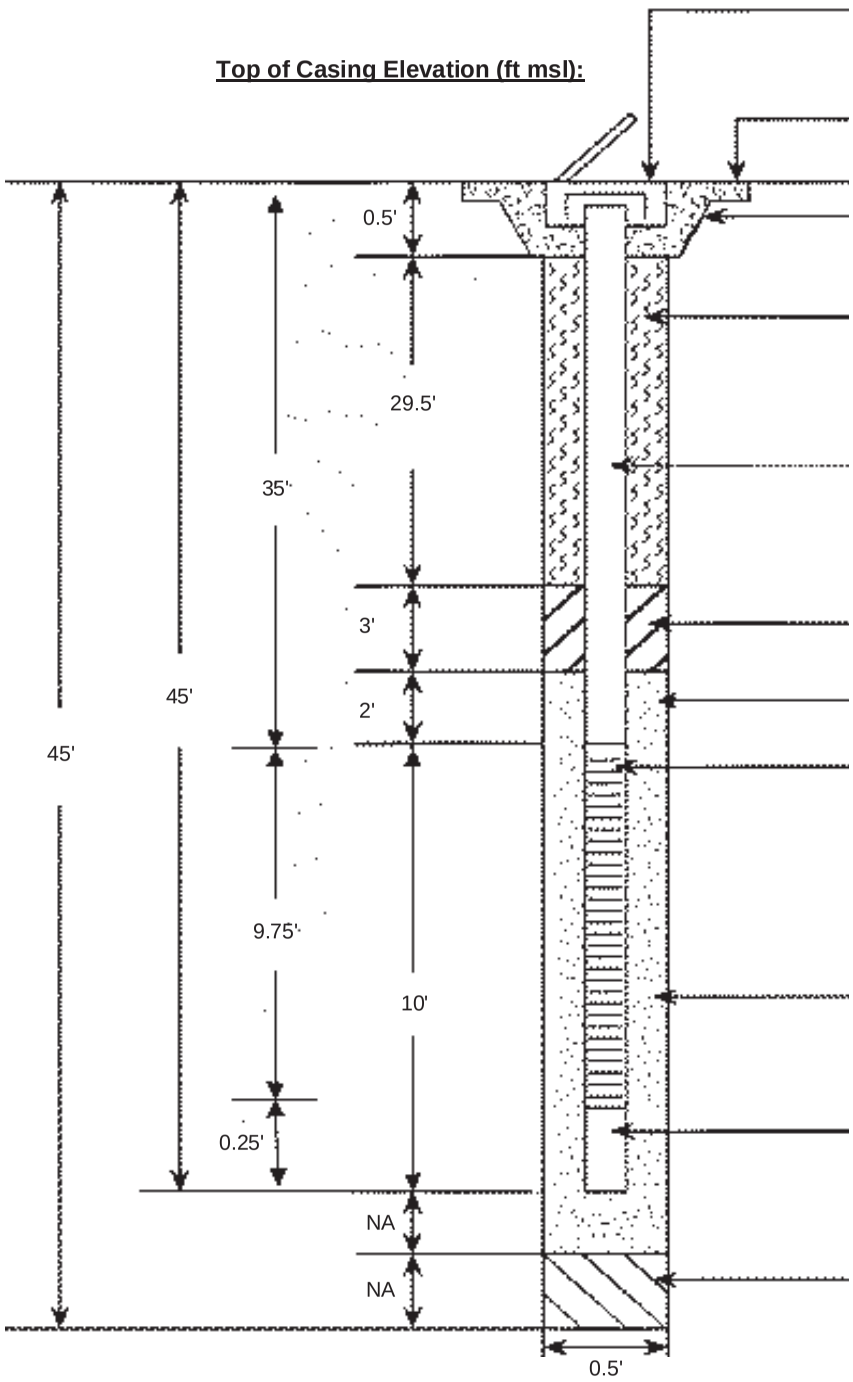
CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	sidewalk - right of way	45'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520242.2 **E** 1106526.3 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1911	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins



PROTECTIVE CASING:
4" boltdown manhole in existing sidewalk

WELL PAD ELEVATION (ft msl):
TBD

WELL PAD DIMENSIONS:
NA

TYPE OF GROUT:
Enviroplug Grout

I.D & TYPE OF RISER PIPE:
2" ID SCH 40 PVC

TYPE OF SEAL:
Enviroplug Med. Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID SCH 40 PVC 0.01" slot

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
Threaded PVC

BACKFILL MATERIAL:
NA

REMARKS:

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Well/Boring No. MW8B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	65'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520253.5 E 1106527.2 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	0	0				0			Hand augered to 5' bls to clear utilities	Boring cleared for utilities prior to drilling
								1				
								2				
								3				
								4				
SB	1	5	5	100				5			SAND; dark brown; loose; poorly graded; fine to medium grained; moist; trace silt	
								6				
								7	0.0		Grading light brown Grading tan	
								8				
								9			Grading white; fine grained; wet	
SB	2	5	5	100				10				Collect groundwater sample for SVOCs from 10-15' bls
								11				
								12			Dark brown; relict creosote & staining; slight odor	
								13	5.5			
								14				
SB	3	5	5	100				15			~1" horizontal relict NAPL stringer; leaves residue on gloves; slight odor Tan & brown	
								16				
								17	7.9			
								18			Grading dark brown; slight NAPL odor & creosote staining ~1" horizontal relict NAPL stringer; leaves residue on gloves; slight odor	
								19				
								20				

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Well/Boring No. MW8B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	65'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520253.5 E 1106527.2 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			Sandy CLAY; grey/blue grey; medium stiff; nonplastic; wet	
								22				
								23	0.2		SAND; tan; loose; well graded; fine to coarse grained; wet; some silt	
								24				
								25			White poorly graded; fine to medium grained; trace silt	
								26				
								27				
								28				
								29	0.3			
SB	5	10	10	100				30				
								31				
								32				
								33	0.5			
								34			Grading well graded; fine to coarse grained; some silt	
								35				
								36				
								37				
								38	0.2			
								39				
								40				

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Well/Boring No. MW8B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	65'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520253.5 E 1106527.2 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	10	10	100				41			SAND; white loose; poorly graded; fine to medium grained; wet; trace silt	
								42	0.3			
								43				
								44				
								45			Grading light tan & grey	
								46			Grading grey; fine grained	
								47	2.9		Sandy SILT; dark brown to black; mild creosote odor; hard; nonplastic; moist; with wood debris	
								48			SAND; light tan no odor; loose; poorly graded; fine to medium grained; wet; trace silt	
								49				
SB	7	10	4	40				50	0.2		No recovery 50-56' bls; sample fell out of core barrel due to nature of sand	
								51				
								52				
								53				
								54				
								55				
								56			SAND; tan; loose; poorly graded; fine to medium grained; wet; trace silt	
								57				
								58	0.0			
								59				
								60				

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Well/Boring No. MW8B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	65'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520253.5 E 1106527.2 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	8	5	5	100				61			SAND; tan; loose; poorly graded; fine to medium grained; wet; trace silt	
								62			Grading well graded; fine to coarse grained	
								63				
								64			Poorly graded; medium to coarse grained; no silt	
								65				Boring terminated at 65' bls; screened well 55-65' bls
								66				
								67				
								68				
								69				
								70				
								71				
								72				
								73				
								74				
								75				
								76				
								77				
								78				
								79				
								80				

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Well Completion Log

Well No. MW8B

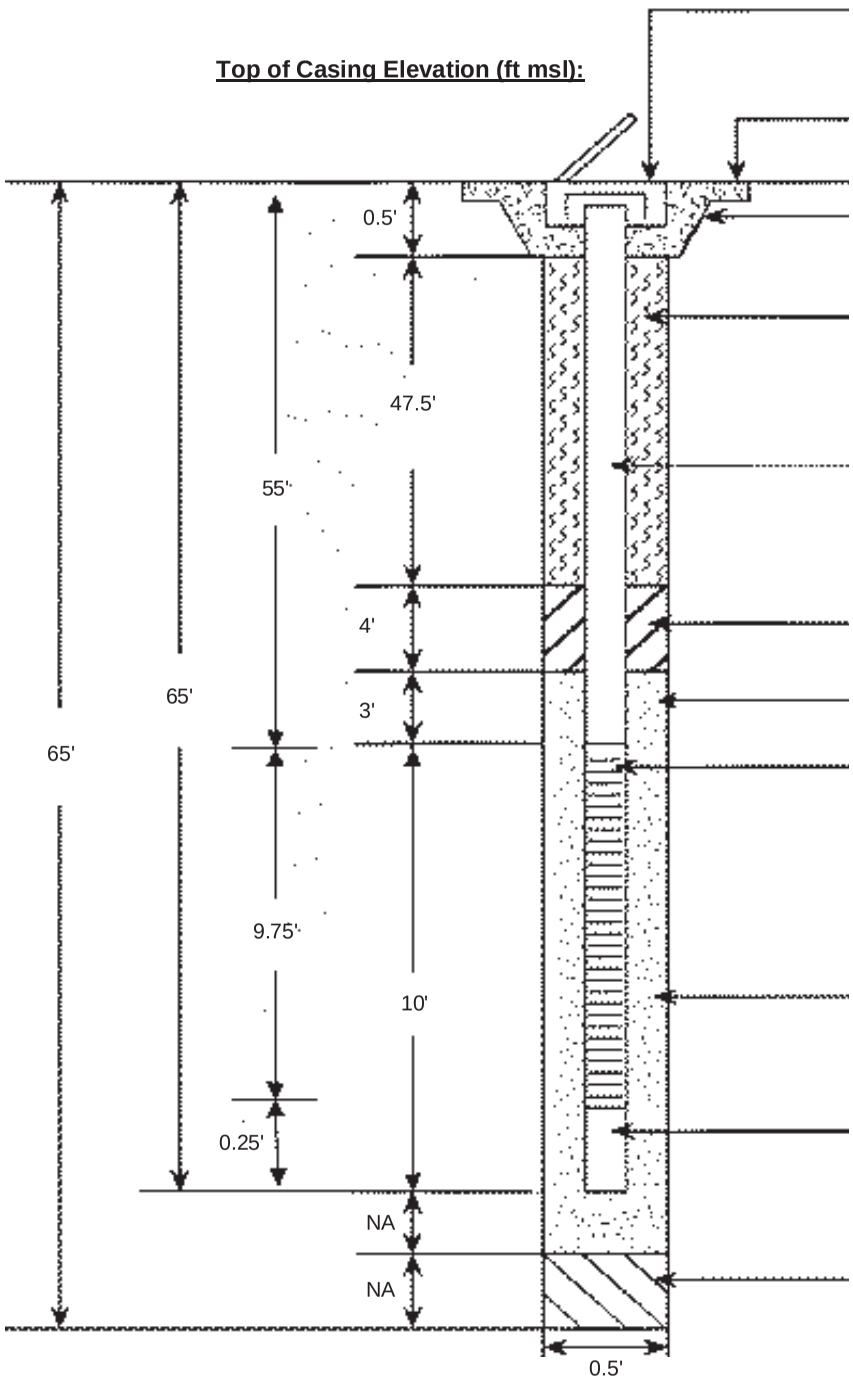
CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	sidewalk - right of way	65'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520253.5 **E** 1106527.2 NAD83	TBD NAVD88	5/16/18	5/16/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1911	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins



PROTECTIVE CASING:
4" boltdown manhole in existing sidewalk

WELL PAD ELEVATION (ft msl):
TBD

WELL PAD DIMENSIONS:
NA

TYPE OF GROUT:
Enviroplug Grout

I.D & TYPE OF RISER PIPE:
2" ID SCH 40 PVC

TYPE OF SEAL:
Enviroplug Med. Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID SCH 40 PVC 0.01" slot

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
Threaded PVC

BACKFILL MATERIAL:
NA

REMARKS:

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Well/Boring No. MW8C

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520265.3 E 1106527.5 NAD83	TBD NAVD88	5/15/18	5/15/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	0	0				0			Hand augered to 5' bls to clear utilities	Boring cleared for utilities prior to drilling
								1				
								2				
								3				
								4				
SB	1	5	5	100				5			SAND; dark brown to black; no odor; loose; poorly graded; fine to medium grained; moist; some silt; with wood debris	No PID readings; gas meter still in transit from EON
								6				
								7				
								8			Grading white; trace silt; no wood debris	
								9				
SB	2	10	10	100				10			Wet	
								11			Dark brown; slight creosote odor & some staining; well graded; fine to coarse grained; some silt	
								12				
								13				
								14				
								15			Residual creosote - leaves oily sheen on gloves; slight odor (~15-15.5')	
								16				
								17			Silty CLAY; dark grey; slight odor; stiff to very stiff; low to medium plasticity; some sand which decreases with depth	
								18				
								19			Clayey SAND; dark grey medium dense; poorly graded; fine to medium grained; wet; some silt	
								20				

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Well/Boring No. MW8C

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520265.3 E 1106527.5 NAD83	TBD NAVD88	5/15/18	5/15/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	3	10	10	100				21			SAND; light grey; loose; poorly graded; fine to medium grained; wet; some silt	
											Sandy CLAY; dark grey; stiff; low plasticity; wet; with silt	
								22			Clayey SAND; dark grey; medium dense; fine to medium grained; wet; some silt	
								23			SAND; tan loose; well graded; fine to coarse grained; wet	
								24				
								25				
								26			Grading tan to white	
								27				
								28				
								29				
SB	4	10	10	100				30			Slight creosote odor; poorly graded; fine to medium grained; trace silt	
								31				
								32				
								33			No odor	
								34				
								35				
								36			Grading well graded; fine to coarse grained	
								37				
								38				
								39				
								40				

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Well/Boring No. MW8C

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520265.3 E 1106527.5 NAD83	TBD NAVD88	5/15/18	5/15/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	5	10	10	100				41			SAND; light grey; loose; poorly graded; fine to medium grained; wet	
								42				
								43				
								44				
								45				
								46				
								47			Grading light tan	
								48				
								49				
SB	6	10	10	100				50			Silty SAND; light tan; loose; well graded; fine to coarse grained; wet; trace clay	
								51				
								52				
								53				
								54			With increasing silt & clay	
								55			Sandy SILT with CLAY; light grey; medium stiff; nonplastic; wet; with fine to coarse sand	
								56				
								57				
								58			Grading less silt, more clay; medium to coarse sand	
								59				
								60				

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Well/Boring No. MW8C

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520265.3 E 1106527.5 NAD83	TBD NAVD88	5/15/18	5/15/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	10	100				61			SAND; light tan; loose; well graded; fine to coarse grained; subrounded to subangular; wet; trace silt	
								62			Silty SAND; light grey; loose; well graded; fine to coarse grained; subrounded to subangular; wet; trace silt & clay	
								63				
								64			SAND; light tan; loose; well graded; fine to coarse grained; subrounded to subangular; wet; trace silt	
								65				
								66				
								67			Silty SAND; light grey; loose; well graded; fine to coarse grained; subrounded to subangular; wet; trace silt & clay	
								68				
								69			Grading light tan to brown	
SB	8	10	10	100				70			SAND; light tan; loose; well graded; fine to coarse grained; subrounded to subangular; wet; trace silt	
								71				
								72				
								73				
								74				
								75			Grading poorly graded; fine to medium grained	
								76				
								77				
								78				
								79				
								80				

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Well/Boring No. MW8C

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	sidewalk - right of way	90'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520265.3 E 1106527.5 NAD83	TBD NAVD88	5/15/18	5/15/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1191	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	9	10	10	100				81			Silty SAND; light grey; medium dense; poorly graded; fine to medium grained; wet	
								82				
								83				
								84				
								85			SAND; light grey; loose; poorly graded; fine to medium grained; wet; trace silt	
								86				
								87				
								88				
								89				
								90				Boring terminated at 90' bls; screened well 75-85' bls
								91				
								92				
								93				
								94				
								95				
								96				
								97				
								98				
								99				
								100				

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Well Completion Log

Well No. MW8C

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

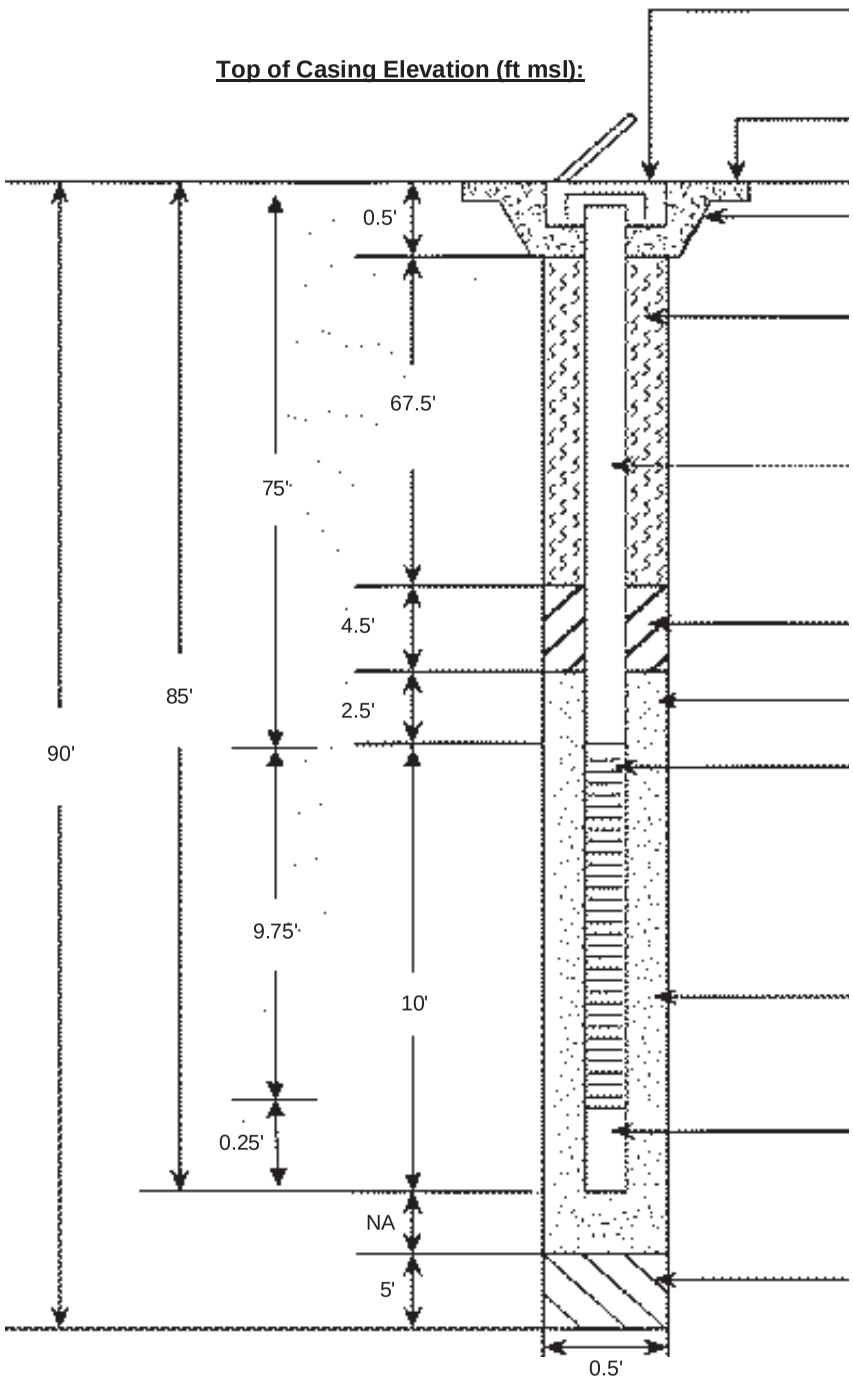
PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	sidewalk - right of way	90'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520265.3 **E** 1106527.5 NAD83	TBD NAVD88	5/15/18	5/15/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TS 1911	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
H. Yost	A. Callaway	R. Dawkins

Top of Casing Elevation (ft msl):



PROTECTIVE CASING:
4" boltdown manhole in existing sidewalk

WELL PAD ELEVATION (ft msl):
TBD

WELL PAD DIMENSIONS:
NA

TYPE OF GROUT:
Enviroplug Grout

I.D & TYPE OF RISER PIPE:
2" ID SCH 40 PVC

TYPE OF SEAL:
Enviroplug Med. Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID SCH 40 PVC 0.01" slot

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
Threaded PVC

BACKFILL MATERIAL:
Formation Sand

REMARKS:

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Well/Boring No. MW9A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Grass yard	20

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/8/18	4/8/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	
								1				
								2				
								3				
								4				
SB	2	5	5	100				5			SAND, brown, fine grained, subangular	
								6				
								7				
								8				
								9			light brown, wet	
SB	3	10	10	100				10			dark brown, strong creosote odor, creosote stained, no residue	
								11				
								12				
								13				
								14	4.3			
								15			medium to fine grained	
								16			1 inch black creosote stringer	
								17	2.9		dark brownish black, medium to fine grained, leaves residue, creosote stained and odor	
								18			SILT, gray, soft, non-plastic, mild cresoste odor, wet	Boring terminated at 20' bls; installed well - screened 8-18' bls
								19			Silty Clay, gray, soft, medium plasticity	
								20				

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Well Completion Log

Well No. MW9A

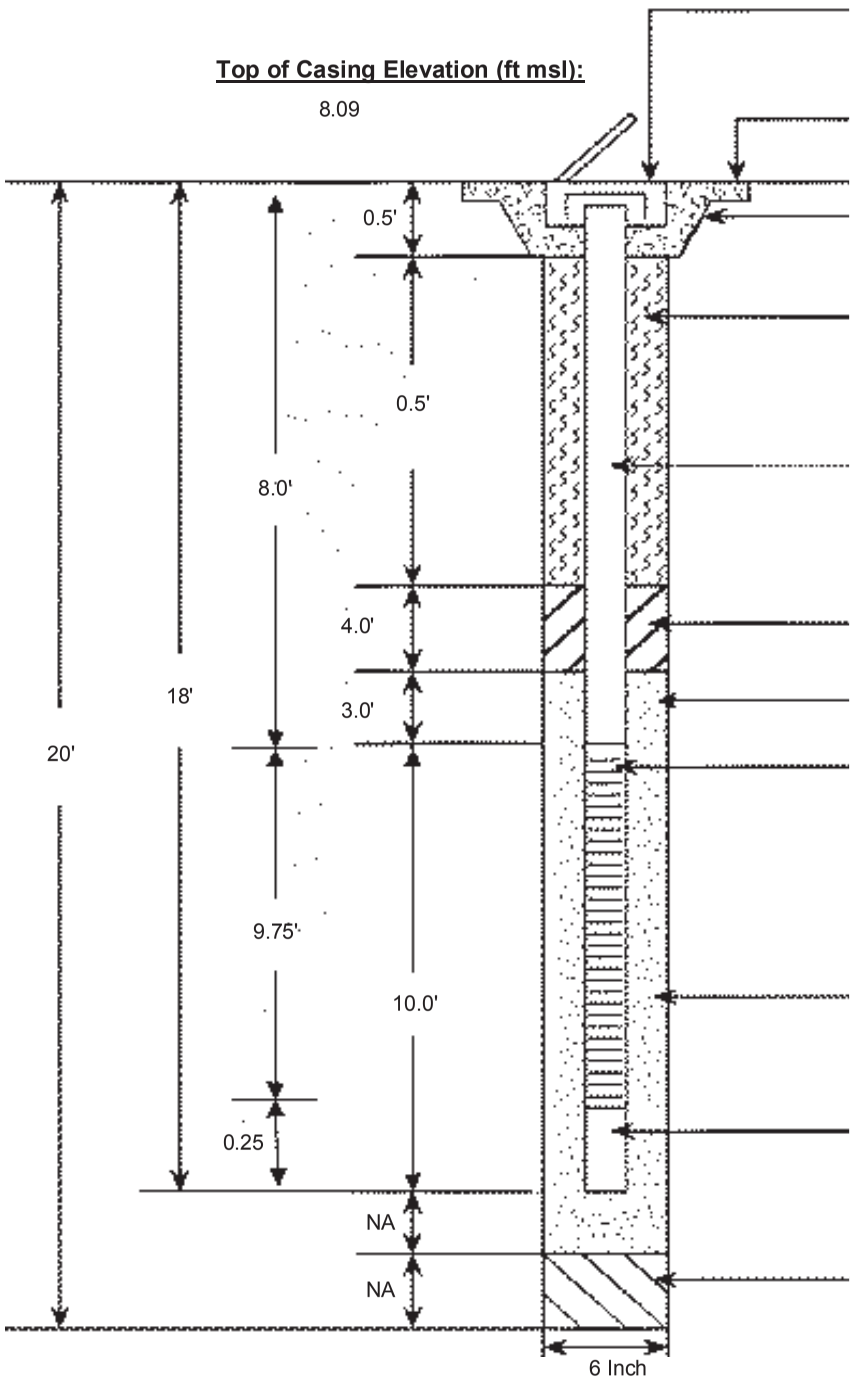
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	18'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520236.51 E 1105562.29 NAD 83	NAVD88	4/8/2018	4/8/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
8" bolt down man hole cover

WELL PAD ELEVATION (ft msl):
8.30

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

I.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF SEAL:
Bentonite Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. MW10A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Gravel	28'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	No PID readings; raining
SB	2	5	5	100				5			SAND; brown; loose; fine grained; subrounded; wet	
								9			Dark gray	
SB	3	10	10	100				10				
								15			~2" organic zone with some black clay	
								16			Gray; fine to medium grained	
								19			Light brown; some silt	

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Well/Boring No. MW10A

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Gravel	28'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	8	8	100				21			SAND; light gray; loose; fine grained; subrounded; wet	
								22				
								23				
								24				
								25				
								26				
								27				
								28				Boring terminated at 28' bls; installed well - screened 16.5-26.5' bls
								29				
								30				
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well Completion Log

Well No. MW10A

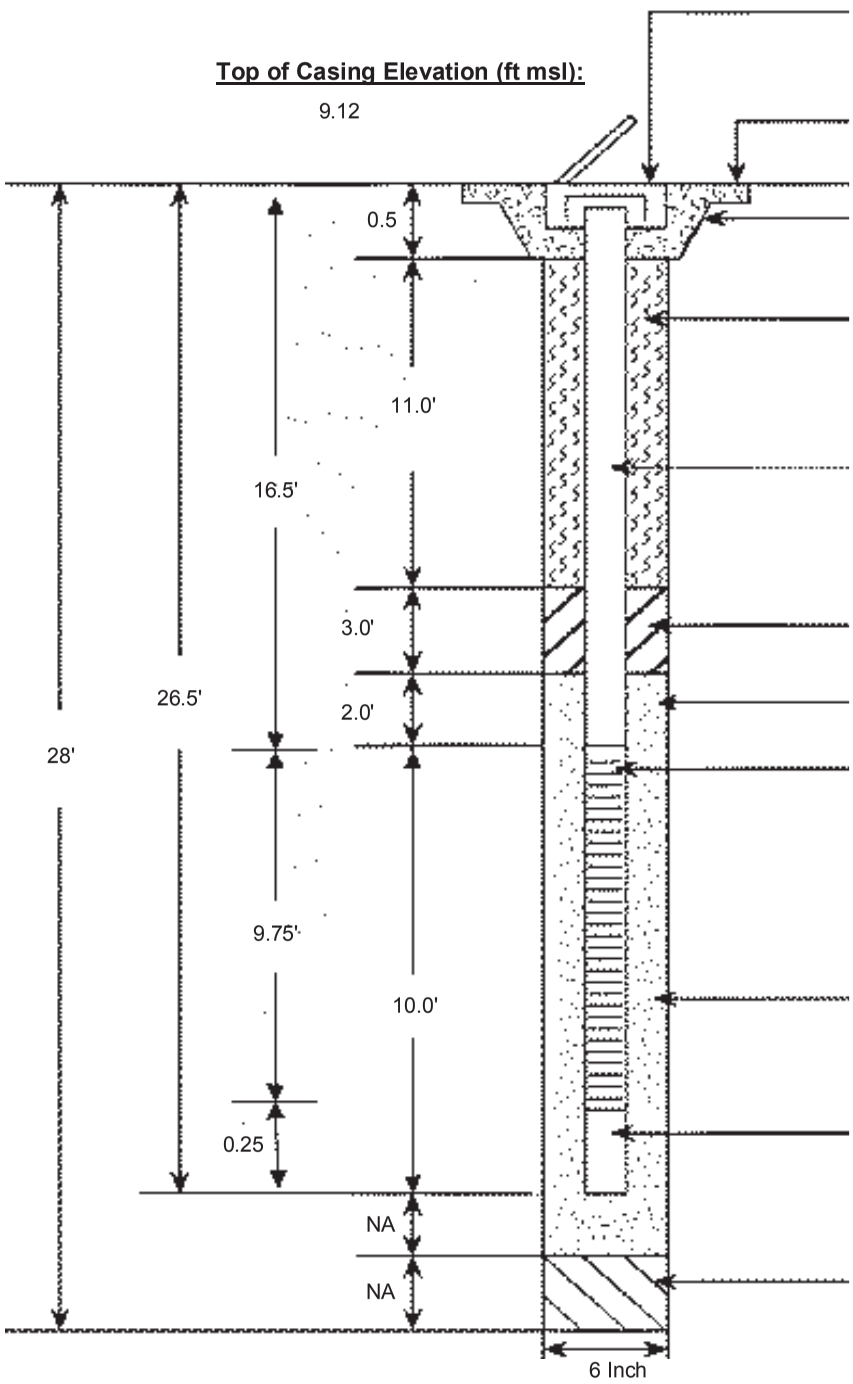
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	26.5'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520230.66 **E** 1104124.84 NAD 83	NAVD88	4/4/2018	4/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
8" bolt down man hole cover

WELL PAD ELEVATION (ft msl):
8.84

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

I.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF SEAL:
Bentonite Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. MW10B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Gravel	47.5'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	1	5	0	0				0			Hand augered to 5' bls to clear utilities	No PID readings; raining
SB	2	5	5	100				5			SAND; brown; medium dense; fine grained; rounded to subrounded; wet Light brown	
SB	3	10	10	100				10			CLAY; black; organic wood pieces within clay	
								13			SAND; medium gray; loose; fine to medium grained; subrounded; wet Light brown; with some silt	
								20				

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Well/Boring No. MW10B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Gravel	47.5'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				21			SAND; light gray; loose; fine grained; subrounded; wet	
								22				
								23				
								24				
								25				
								26				
								27				
								28				
								29				
								30				
SB	5	10	10	100				31			With some silt	
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. MW10B

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
USEPA Region IV	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, FL	Gravel	47.5'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N TBD E TBD NAD83	TBD NAVD88	4/4/18	4/4/18

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Rotosonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	M. Wood	J. Canfield

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	6	7.5	7.5	100				41			SAND; light gray; loose; fine grained; subrounded; wet; some silt	
								42			Clayey SAND; medium gray; medium dense; fine grained; subrounded; wet	
								43			SAND; medium gray; medium dense; fine grained; subrounded; wet	
								44			Light gray; loose	
								45				
								46				
								47				
								48				Boring terminated at 47.5' bls; installed well - screened 37-47' bls
								49				
								50				
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59				
								60				

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Well Completion Log

Well No. **MW10B**

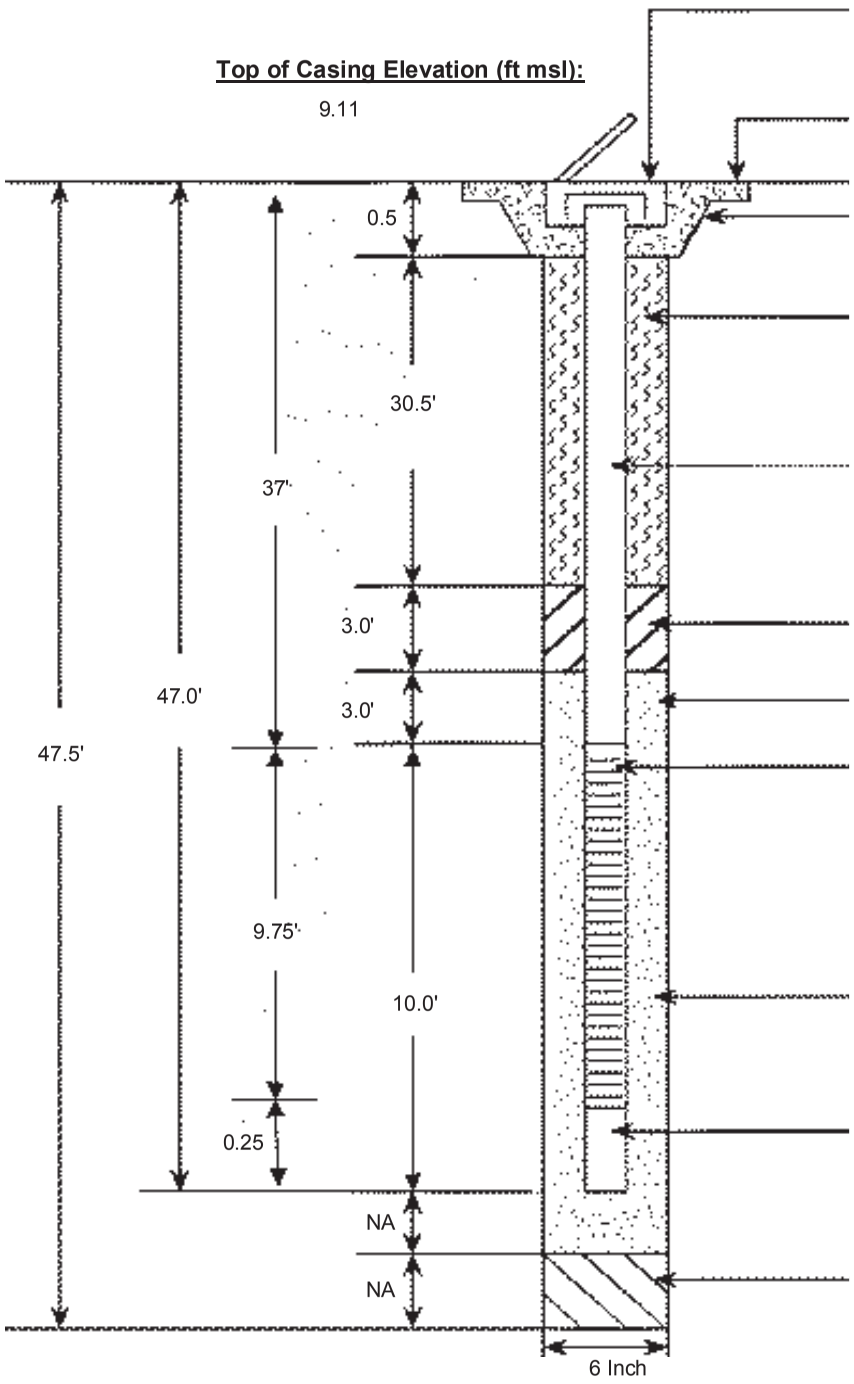
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass	47.0'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520239.13 E 1104125.39 NAD 83	NAVD88	4/4/2018	4/4/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSI 1191	R. Morgan

INSPECTOR	CHECKED BY	APPROVED BY
A. Callaway	D. Prouty	R. Dawkins



PROTECTIVE CASING:
8" bolt down man hole cover

WELL PAD ELEVATION (ft msl):
8.83

WELL PAD DIMENSIONS:
3'x3'x4" concrete

TYPE OF GROUT:
30% High Solids Bentonite

I.D & TYPE OF RISER PIPE:
2" ID schedule 40 PVC

TYPE OF SEAL:
Bentonite Chips

20/30 Sand

I.D. & TYPE OF SCREEN:
2" ID sch 40 PVC Circum Slot w/ 0.01" opening

TYPE OF FILTER:
20/30 Sand

TYPE OF END CAP:
PVC

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place.

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Well/Boring No. PMW-01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520812.1 E 1106335.5 NAD 83	NA NAVD88	7/26/2018	7/26/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0			SAND; black to dark brown; fine to medium grained; very loose to loose; dry to moist; subround to subangular	Hand augered 0-5 feet for utility clearance.
								1				
								2				
								3				
								4				
CB	1	5	5	100				5	0.0		Dark brown; loose; organics present; organic odor; PID: 0.0	
								6				
								7				
								8			Pinksih tan; moist; no odor	
								9				
CB	2	10	10	100				10	0.0		Light brown; PID: 0.0	
								11				
								12			Grading brown	
								13				
								14				
								15				
								16			Grading black; creosote odor, creosote staining; leaves heavey residue on gloves	
								17				
								18				
								19				
								20			Black; fine to coarse grained	

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Well/Boring No. PMW-01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520812.1 E 1106335.5 NAD 83	NA NAVD88	7/26/2018	7/26/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				0.0			SAND; dark brown to black; fine to lower coarse grained; creosote staining; creosote odor	
								21				
								22			Sandy CLAY; grey; soft; nonplastic; wet	
								23	7.2		SAND; white; fine to medium grained; loose; moist; subround to subangular; creosote staining; creosote odor; trace coarse sand grains; PID: 7.2	
								24				
								25				
								26				
								27			Slight odor	
								28				
								29				
CB	4	10	10	100				30	1.4		Fine to lower medium grained; trace clay; trace medium and coarse grains; slight odor; PID: 1.4	
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. PMW-01

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520812.1 E 1106335.5 NAD 83	NA NAVD88	7/26/2018	7/26/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	7	70				41	0.0		No recovery - core washed out	
								42				
								43			SAND; white; fine to medium grained; loose; moist; subround to subangular; trace clay; trace coarse grains; trace gravel	
								44				
								45				
								46				
								47				
								48				
								49				
CB	6	10	10	100				50	0.0			
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58			Medium to coarse grains	Boring terminated at 60 ft below land surface.
								59				
								60				

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Well/Boring No. PMW-02

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520812.2 E 1106337.7 NAD 83	NA NAVD88	7/27/2018	7/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0			SAND; black; fine to medium grained; very loose to loose; dry to moist; subround to subangular; trace gravel at 1.5' bls (fill)	Hand augered 0-5 feet for utility clearance.
								1				
								2				
								3				
								4			Grading white	
CB	1	5	5	100				5			Loose; moist; subround; no odor	
								6				
								7				
								8	0.0		Black; possible creosote staining; no odor White; PID: 0.0	
								9			Black; creosote staining; creosote odor	
CB	2	10	10	100				10			Light brown; fine to medium grained; loose; moist; subround to subangular	
								11				
								12				
								13	1.2		Very dark brown; trace clay; slight odor; possible creosote staining; PID: 1.2	
								14				
								15				
								16				
								17				
								18			Brown; fine to coarse grained	
								19			CLAY; grey; stiff to very stiff; moist; moderate plasticity	
								20				

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Well/Boring No. PMW-02

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520812.2 E 1106337.7 NAD 83	NA NAVD88	7/27/2018	7/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21			SAND; brown grading to white; fine to medium grained; loose; moist; subround to subangular; sporadic clay clumps	
								22				
								23				
								24				
								25	5.9		Tan brown; fine to coarse grained; PID: 5.9	
								26				
								27			Some creosote staining; creosote odor Tan brown; fine to coarse grained	
								28				
								29			White; fine to medium grained	
CB	4	10	10	100				30			Greyish white; sautrated to moist; trace clay clumps	
								31				
								32				
								33				
								34	1.7			
								35				
								36			Fine to lower medium grained; wet to moist; trace medium to upper medium grains; PID: 1.7	
								37				
								38				
								39				
								40				

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Well/Boring No. PMW-02

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520812.2 E 1106337.7 NAD 83	NA NAVD88	7/27/2018	7/27/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	10	100				41	0.0		SAND; white; fine to medium; loose; moist; subround to subangular; trace coarse sand grains	
								42				
								43				
								44				
								45				
								46				
								47				
								48				
								49				
CB	6	10	0	0				50			No recovery - core bit "trap door" head fell off downhole. Sample fell out of sample barrel	
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				Boring terminated at 60 ft below land surface.
								59				
								60				

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Well/Boring No. PMW-03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520807.1 E 1106331.2 NAD 83	NA NAVD88	7/24/2018	7/24/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0	0.0		SAND; dark grey grading brown; fine to medium grained; loose; dry; subround to subangular; no odor; some organics present	Hand augered 0-5 feet for utility clearance.
								1				
								2				
								3				
								4				
CB	1	5	5	100				5	0.0		Tan; fine to coarse grained; loose; moist; subround; no odor; PID: 0.0	
								6				
								7			Grading white; fine to medium grained	
								8			Grading pinkish white; PID: 0.0	
								9			Creosote stained	
CB	2	10	10	100				10			Tan to dark brown; fine to coarse grained; some creosote staining; subround; no odor	
								11				
								12				
								13			Light brown to dark brown; fine to medium grained; slight creosote staining	
								14				
								15				
								16	0.0			
								17			Dark brown; upper fine to coarse grained; creosote staining; very slight creosote odor; trace clay: PID: 0.0	
								18				
								19				
								20				

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Well/Boring No. PMW-03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520807.1 E 1106331.2 NAD 83	NA NAVD88	7/24/2018	7/24/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21	0.0		SAND; brown; to light brown; fine to coarse grained; loose; moist; some creosote staining; sporadic clay clumps	
								22				
								23			Upper fine to upper medium grains; very slight to no creosote staining; no odor	
								24				
								25				
								26				
								27			Upper fine to coarse grained; subround to subangular; no staining; no odor; trace clay	
								28				
								29				
CB	4	10	10	100				30	0.0		White; fine to coarse grained; moist to wet; trace clay; sporadic clay clumps; PID: 0.0	
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. PMW-03

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520807.1 E 1106331.2 NAD 83	NA NAVD88	7/24/2018	7/24/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	10	100				41	0.0		SAND; white; upper fine to lower coarse; loose; moist; no staining; no odor; trace clay	
								42				
								43				
								44				
								45			Increase clay content; slightly stiff	
								46				
								47				
								48				
								49				
CB	6	10	8	80				50	0.0		No recovery - core washed out	
								51				
								52			SAND; white; fine to upper coarse; loose; moist to wet; subangular to subround; no staining; slight creosote odor; trace clay; PID: 0.0	
								53				
								54				
								55				
								56				
								57				
								58				Boring terminated at 60 ft below land surface.
								59				
								60				

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Well/Boring No. PMW-04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520809.2 E 1106333.9 NAD 83	NA NAVD88	7/24/2018	7/24/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0	0.6		SAND; grey to dark brown; fine to medium grained; very loose; dry; subround to subangular; no odor; orgainics present	Hand augered 0-5 feet for utility clearance.
								1				
								2				
								3				
								4				
CB	1	5	5	100				5			Brown to dark brown; fine to medium grained; loose; slightly moist to dry; subround to subangular; no odor; trace clay; trace organics; PID: 0.0	
								6				
								7				
								8				
								9			Tan; fine to lower coarse grained; loose; moist; subround; no odor; trace clay	
CB	2	10	9	90				10	0.0		No recovery - core washed out	
								11			SAND; brown; fine to lower coarse grained; wet to saturated; loose; subround to subangular; creosote staining; no odor; PID: 0.0	
								12				
								13			Fine to medium grained; moist; subround	
								14				
								15				
								16				
								17				
								18				
								19			Creosote odor	
								20				

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Well/Boring No. PMW-04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520809.2 E 1106333.9 NAD 83	NA NAVD88	7/24/2018	7/24/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21	0.0		SAND; brown to dark brown; fine to coarse grained; loose; moist; subround to subangular; creosote staining; no odor; sporadic clay clumps	
								22			CLAY; grey; soft; wet; nonplastic	
								23			SAND; brown to dark brown; fine to coarse grained; loose; moist; subround to subangular; creosote staining; no odor; sporadic clay clumps	
								24			CLAY; grey; soft; wet; nonplastic	
								25			SAND; brown to dark brown; fine to coarse grained; loose; moist; subround to subangular; creosote staining; no odor; sporadic clay clumps	
								26			Tanish to white; trace clay; increase clay content with depth	
								27				
								28				
								29				
CB	4	10	10	100				30	0.0		White; fine to upper medium; moist to wet; subround; trace clay; sporadic clay clumps; PID: 0.0	
								31				
								32				
								33				
								34				
								35			Fine to lower coarse grained	
								36				
								37				
								38				
								39				
								40				

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Well/Boring No. PMW-04

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520809.2 E 1106333.9 NAD 83	NA NAVD88	7/24/2018	7/24/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	10	100				41	0.0		SAND; white; fine to upper medium grained; moist to saturated; subround to subangular; trace clay	
								42				
								43				
								44				
								45				
								46				
								47			Fine to lower coarse grained; moist; sporadic clay clumps; trace clay	
								48				
								49			Fine to upper medium grained; subround	
CB	6	10	10	100				50	0.0		Fine to upper coarse grained; subround to subangular	
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59			Grading less fine grains	Boring terminated at 60 ft below land surface.
								60				

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Well/Boring No. PMW-05

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520807.4 E 1106339.2 NAD 83	NA NAVD88	7/26/2018	7/26/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
HA	0	5	5	100				0	0.0		SAND; grey to white; fine to medium grained; very loose to loose; dry to moist; subround to subangular; organics present (roots); organic odor; PID: 0.0	Hand augered 0-5 feet for utility clearance.
								1				
								2				
								3				
								4				
CB	1	5	1	10				5			No recovery - sample fell out of core barrel	
								6				
								7				
								8				
								9			SAND; brown grading tan; fine to medium grained; loose; moist; subround to subangular	
CB	2	10	10	100				10	0.0		Tanish grey; moist to wet; PID: 0.0	
								11				
								12				
								13				
								14				
								15				
								16				
								17				
								18			Grading more coarse sand grains	
								19				
								20			Trace clay	

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Well/Boring No. PMW-05

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520807.4 E 1106339.2 NAD 83	NA NAVD88	7/26/2018	7/26/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	3	10	10	100				21			SAND; brown; moist to wet; sporadic clay clumps	
								22			Fine to upper coarse grained; no odor	
								23				
								24				
								25			Black; fine to coarse grained; creosote staining; creosote odor	
								26			White; some creosote staining; creosote odor	
								27			Fine to medium grained; slight creosote odor; trace clay	
								28				
								29			Fine	
CB	4	10	10	100				30	0.0		Greyish white; wet to saturated; no odor; PID: 0.0	
								31				
								32				
								33				
								34			Fine to medium grained; sporadic clay clumps; no odor	
								35				
								36			Fine to coarse grained; wet to moist; sporadic clay lenses ~ 1 - 3 mm	
								37				
								38				
								39			Fine to medium grained; moist	
								40				

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Well/Boring No. PMW-05

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grassy Meadow	60'

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520807.4 E 1106339.2 NAD 83	NA NAVD88	7/26/2018	7/26/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
GSE, Inc.	Sonic 4x6	TSi 150 CC	T. Herod

INSPECTOR	CHECKED BY	APPROVED BY
M. Jury	D. Prouty	C. Wallace

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
CB	5	10	10	100				41			SAND; white; moist to wet; trace clay; trace organics	
								42				
								43				
								44			White; fine to coarse grained; loose	
								45				
								46				
								47			Fine to medium grained; saturated to moist; trace coarse sand grains; trace gravel; trace organics	
								48				
								49				
CB	6	10	10	100				50			Fine to coarse grained; moist	
								51				
								52				
								53				
								54				
								55			Grading more coarse sand grains	
								56				
								57				
								58				Boring terminated at 60 ft below land surface.
								59			Grading more fine to medium sand grains	
								60				

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Well Completion Log

Well No. SIW-1-1D

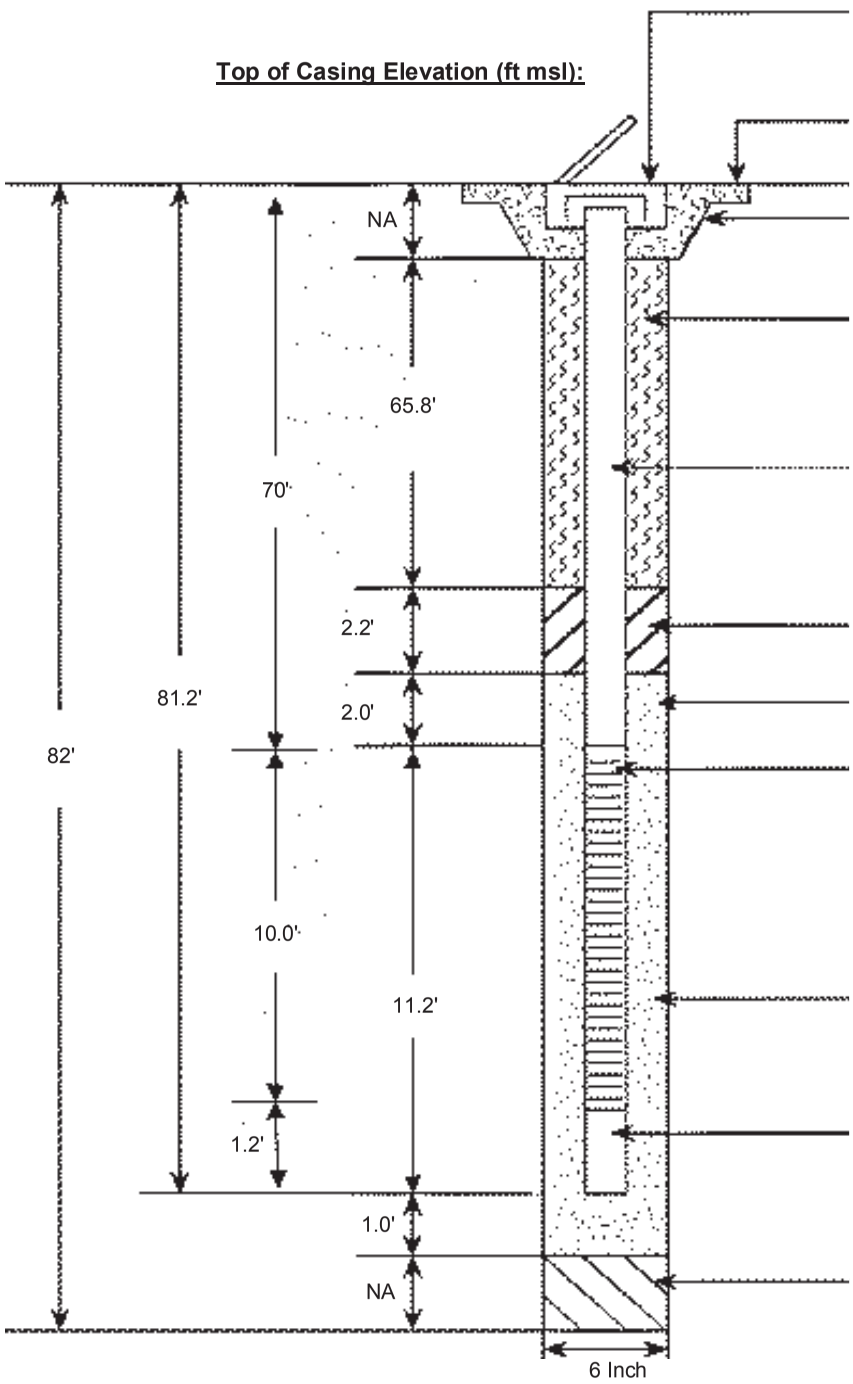
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	81.8'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 1105845.29 E 520882.96 NAD 83	NA NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway



PROTECTIVE CASING:
None

WELL PAD ELEVATION (ft msl):
NA

WELL PAD DIMENSIONS:
None

TYPE OF GROUT:
Texas Lehigh Class H Grout

I.D & TYPE OF RISER PIPE:
2" ID Carbon Steel Pipe

TYPE OF SEAL:
30/65 Standard Brand

20/30 Standard Brand Sand

I.D. & TYPE OF SCREEN:
2" ID sch 5, Type 304 SS Wire Wrap w/ 0.01" opening

TYPE OF FILTER:
20/30 Standard Brand Sand

TYPE OF END CAP:
Stainless steel, Blunted

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place. A total of 1,000 gallons was removed during development using the surge and purge method and a stainless steel submersible pump as a surge block. Final turbidity upon completion measured 371 NTUs.

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Well/Boring No. SIW-1D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	82

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520882.96 E 1105845.29 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	7	70				0			SAND; brownish gray; loose; poorly graded; fine grained; moist; some wood fragments.	
								1				
								2	1.1			
								3				
								4			grading light grayish tan.	
								5				
								6	0.0			
								7			No Recovery	
								8				
								9				
SB	2	10	10	100				10			grading light brown; slight odor.	
								11				
								12				
								13	0.0			
								14			grading very dark brown to black.	
								15				
								16				
								17				
								18	7.9			
								19			(18.5-19.5 ft) Intermittent weakly cemented sand lens; Black to very dark brown; odor; heavily weathered creosote. CLAY lens 19.5 ft, 0.75" thick. Partially penetrated with creosote.	
SB	3	10	10	100				20				
								21			grading light grayish tan.	
								22	0.1		grading brown.	
								23				
								24				
								25				
								26				
								27	0.0		grading tan.	
								28				
								29				
								30				

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Well/Boring No. SIW-1D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	82

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520882.96 E 1105845.29 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				31			SAND; brownish tan; loose; poorly graded; fine grained; wet; trace clay.	
								32	0.0			
								33				
								34				
								35			sandy CLAY lens 1".	
								36				
								37				
								38	0.0			
								39				
SB	5	10	10	100				40			grading brownish tan.	
								41				
								42				
								43	0.0			
								44				
								45				
								46				
								47				
								48	0.0			
								49				
SB	6	10	10	100				50				
								51			Horizontal staining.	
								52				
								53	0.3		Horizontal staining.	
								54				
								55				
								56				
								57				
								58	0.6		Horizontal stringer (3mm) of highly weathered, non-mobile creosote.	
								59				
								60				

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Well/Boring No. SIW-1D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	82

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520882.96 E 1105845.29 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING

SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY	DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	7	10	8	80	61			SAND; brownish tan; loose; poorly graded; fine grained; wet; trace clay.	
					62				
					63	0.0		grading light brown.	
					64				
					65				
					66				
					67	0.0			
					68			No Recovery	
					69				
SB	8	10	10	100	70			Horizontal stringer (5mm) of highly weathered creosote on top of 2" CLAY lens. Lower 2" clay lens at 72.8 ft; no staining.	
					71			light grayish tan; no staining.	
					72				
					73	0.0			
					74				
					75				
					76				
					77				
					78	0.0			
					79				
					80				
					81				
					82				Boring terminated at 82 ft below land surface.
					83				
					84				
					85				
					86				
					87				
					88				
					89				
					90				

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Well Completion Log

Well No. SIW-1-1S

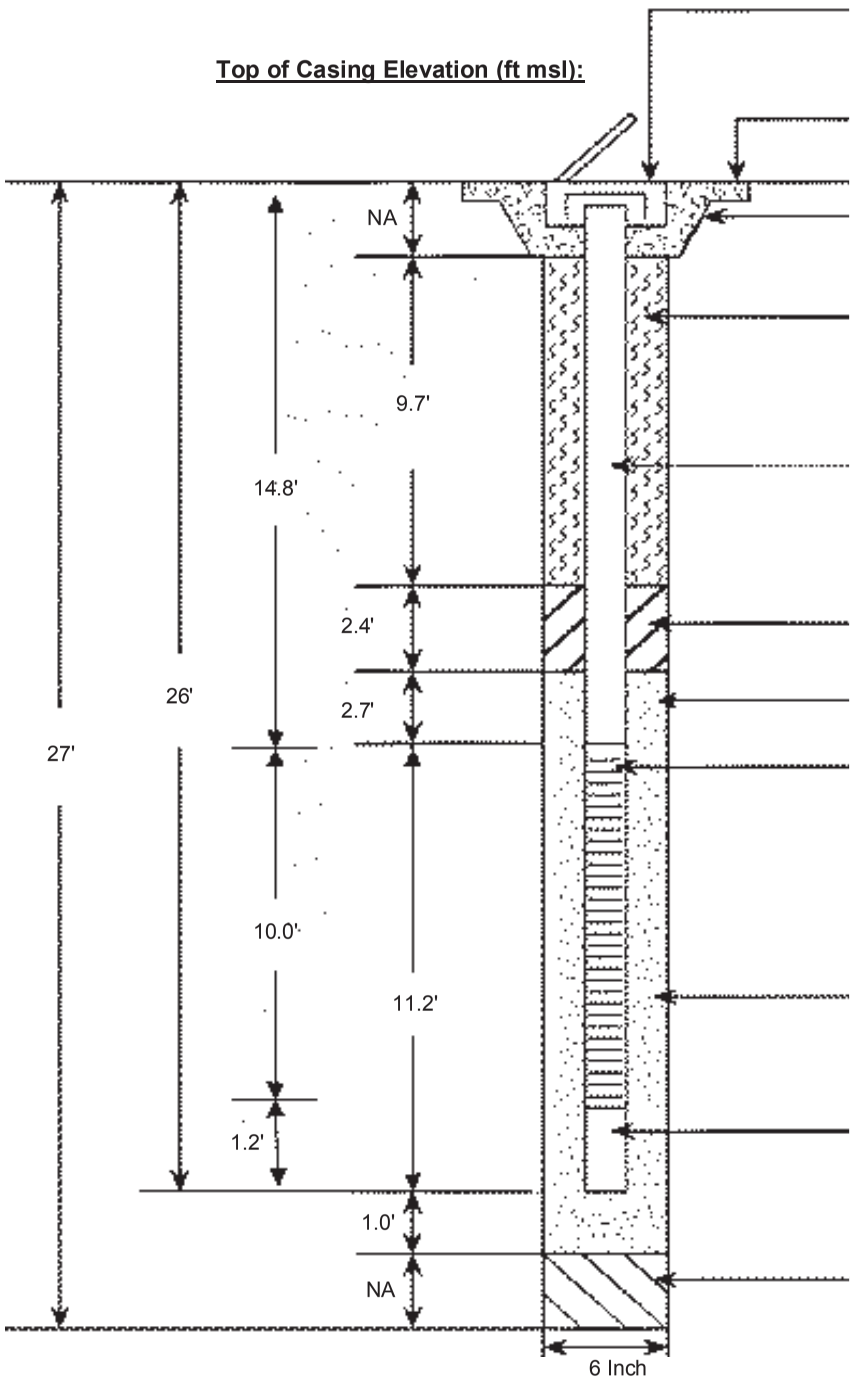
CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BTOC)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	26.4'

COORDINATES (DATUM)	ELEVATION (FEET AMSL)	START DATE	END DATE
N 520883.63 E 1105842.44 NAD 83	NA NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway



PROTECTIVE CASING:
None

WELL PAD ELEVATION (ft msl):
NA

WELL PAD DIMENSIONS:
None

TYPE OF GROUT:
Texas Lehigh Class H Grout

I.D & TYPE OF RISER PIPE:
2" ID Carbon Steel Pipe

TYPE OF SEAL:
30/65 Standard Brand

20/30 Standard Brand Sand

I.D. & TYPE OF SCREEN:
2" ID sch 5, Type 304 SS Wire Wrap w/ 0.01" opening

TYPE OF FILTER:
20/30 Standard Brand Sand

TYPE OF END CAP:
Stainless steel, Blunted

BACKFILL MATERIAL:
None

The borehole was advanced using 4"x6" sonic override system to total depth. Well materials were installed by pouring while tagging and the sand pack was vibrated into place. A total of 225 gallons was removed during development using the surge and purge method and a stainless steel submersible pump as a surge block. Final turbidity upon completion measured 218 NTUs.

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Well/Boring No. SIW-1S

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	27

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520883.63 E 1105842.44 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	8	80				0–8	0.2		SAND; brownish gray; loose; poorly graded; fine grained; subrounded; slightly moist; some wood fragments.	
											grading light grayish tan.	
								8	0.0		No Recovery	
SB	2	10	10	100				10–20	0.0		grading brown.	
											grading dark brown.	
									0.2		grading brownish tan.	
SB	3	7	7	100				20–23	0.9		grading dark brown; weathered creosote.	
											(22.8-23.1 ft) Weakly cemented sand; Black to very dark brown; odor; heavily weathered creosote.	
								26	0.0		Clayey SAND lens 26 feet, 1" thick. No staining.	
								27			light grayish tan.	Boring terminated at 27 ft below land surface.

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Well/Boring No. TMP-1-5

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520889.53 E 1105844.01 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	5	50				0			SAND; brownish gray; loose; poorly graded; fine grained; slightly moist; some wood debris.	
								1	3.6			
								2				
								3				
								4	0.0		grading light grayish tan.	
								5			No Recovery	
								6				
								7				
								8				
								9				
SB	2	10	10	100				10			light brown; fine to medium grained; slight odor.	
								11				
								12	0.0			
								13				
								14				
								15				
								16			grading dark brown.	
								17				
								18			Weakly cemented sand; Black to dark brown; odor; heavily weathered crosote.	
								19	10.2			
SB	3	10	10	100				20				
								21			dark brown	
								22	0.0			
								23				
								24				
								25				
								26			Horizontal staining (26.4 and 27.3 ft)	
								27	0.0			
								28				
								29				
								30				

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Well/Boring No. TMP-1-5

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520889.53 E 1105844.01 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				31			SAND; light gray; loose; poorly graded; fine grained; wet; some wood debris.	
								32	0.0			
								33				
								34			Clayey SAND; tan grading grayish tan; cohesive; poorly graded; fine to medium grained; wet; .	
								35			SAND; light gray; loose; poorly graded; fine grained; wet.	
								36			Silty SAND; light grayish tan; dense; poorly graded; fine grained; wet.	
								37	0.0		Sandy CLAY; stiff; low plasticity; saturated.	
								38			SAND; light gray; loose; poorly graded; fine grained; wet.	
								39				
SB	5	10	8	80				40				
								41				
								42	0.0			
								43				
								44				
								45				
								46	0.0			
								47				
								48				
								49				
SB	6	10	10	100				50				
								51				
								52	0.0			
								53				
								54				
								55				
								56				
								57	0.0			
								58				
								59				
								60				

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Well/Boring No. TMP-1-5

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520889.53 E 1105844.01 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	7	70				61			SAND; grading light brown; loose; poorly graded; fine to medium grained; wet.	
								62	0.0			
								63				
								64				
								65				
								66	0.0			
								67				
								68			No Recovery	
								69				
SB	8	10	10	100				70			.	
								71			1" CLAY lens at 71 ft	
								72	0.0		2" CLAY lens at 71.8 ft	
								73			light grayish tan; very slight odor.	
								74				
								75				
								76				
								77	0.0			
								78				
								79				
								80				Boring terminated at 80 ft below land surface.
								81				
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
								90				

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Well/Boring No. TMP-1-7D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.21 E 1105850.11 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	9	90				0			SAND; brownish gray; loose; poorly graded; fine grained; moist; some wood debris in top 4 feet.	
								1	1.3			
								2				
								3				
								4				
								5				
								6			grading light grayish tan.	
								7	0.0			
								8				
								9				
											No Recovery	
SB	2	10	10	100				10			grading fine to medium grained.	
								11				
								12				
								13	0.0			
								14				
								15			grading very dark brown to black.	
								16				
								17				
								18				
								19	7.5		(18.5-18.8 ft) Weakly cemented sand lens; Black to very dark brown; odor; heavily weathered creosote.	
SB	3	10	10	100				20				
								21			grading light brown.	
								22				
								23	0.0			
								24			Clayey SAND lens 1" thick.	
								25			grading brownish tan.	
								26				
								27	0.0			
								28				
								29				
								30			grading dense; fine grained.	

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Well/Boring No. TMP-1-7D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.21 E 1105850.11 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				31–40	0.0 0.0		SAND; brownish tan; dense; poorly graded; fine grained; wet. grading light grayish tan.	
SB	5	10	8	80				40–42			Sandy CLAY; very light gray; odor; soft; low to medium plasticity; saturated.	
								42–48	0.0		SAND; light tan; slight odor; fine to medium grained; wet. Silty SAND lens, 44.3 - 44.7 ft.	
								48–50	0.0		No Recovery	
SB	6	10	10	100				50–57	0.0			
								57–58			Silty SAND; tan; slight odor; poorly graded; fine to medium grained; wet.	
								58–60	0.0		SAND; grading brownish tan; slight odor; fine to medium grained; wet.	

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Well/Boring No. TMP-1-7D

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520879.21 E 1105850.11 NAD 83	NM NAVD88	6/20/2018	6/20/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	8	80				61			SAND; tan; slight odor; poorly graded; fine to medium grained; wet.	
								62				
								63	0.6		(63') Horizontal stringer / staining 1/2".	
								64				
								65				
								66				
								67	0.0			
								68				
								69			cemented sand nodule 2" diameter.	
SB	8	10	10	100				70			Sandy CLAY lens 1" thick with slight staining on top.	
								71			Sandy CLAY lens 2" thick with slight staining on top.	
								72			light grayish tan; no staining.	
								73	0.0		grading light grayish tan; fine grained.	
								74				
								75			grading fine to medium grained.	
								76				
								77				
								78	0.0			
								79				
								80				Boring terminated at 80 ft below land surface.
								81				
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
								90				

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Well/Boring No. TMP-1-7S

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520888.99 E 1105837.31 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	5	50				0			SAND; brownish gray; poorly graded; fine grained; subrounded; slightly moist; trace gravel and wood debris.	
								1				
								2	1.7			
								3				
								4	0.0		grading light grayish tan.	
								5			No Recovery	
								6				
								7				
								8				
								9				
SB	2	10	10	100				10			light brown.	
								11				
								12				
								13	0.0			
								14			grading dark brown.	
								15				
								16				
								17			(17-19.5 ft) Weakly cemented sand; Black to very dark brown; odor; heavily weathered creosote.	
								18	9.4			
								19			Clay lens 19.5 feet, 1" thick, partially infiltrated Creosote staining.	
								20			Silty SAND; light grayish tan; odor; fine to medium grained;	
SB	3	10	10	100							SAND; light grayish tan; odor; poorly graded; fine grained; subrounded; moist.	
								21				
								22				
								23	0.0		grading light brown.	
								24				
								25			grading dark brown.	
								26				
								27			grading light brown.	
								28	0.0			
								29			weakly cemented.	
								30				

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Well/Boring No. TMP-1-7S

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520888.99 E 1105837.31 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING

SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY	DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	4	10	10	100	31			SAND; light brown; odor; poorly graded; fine grained; subrounded; moist.	
					32			weakly cemented; fine stringer stain.	
					33	0.0		Clayey Silty SAND; cohesive (non plastic); odor; poorly graded; fine to medium grained; subrounded; saturated.	
					34				
					35			SAND; light brown; odor; poorly graded; fine grained; wet.	
					36				
					37				
					38	0.0			
					39				
SB	5	10	7	70	40				
					41				
					42				
					43	0.0			
					44				
					45				
					46	0.0			
					47			No Recovery	
					48				
					49				
SB	6	10	10	100	50			grading light grayish tan.	
					51				
					52				
					53	0.0			
					54				
					55				
					56	0.8		Horizontal stringer staining.	
					57				
					58				
					59				
					60				

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Well/Boring No. TMP-1-7S

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520888.99 E 1105837.31 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING

SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY	DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SB	7	10	8	80	61–67	0.0		SAND; light brown; odor; poorly graded; fine grained; wet.	
					67–68	0.0		Silty SAND; light brown; cohesive; poorly graded; fine grained; wet.	
					68–70			No Recovery	
SB	8	10	10	100	70–71			CLAY; light brown; stiff; medium plastic; saturated; some sand.	
					71–80	0.0		SAND; very light gray; loose; well graded; medium to fine grained; subrounded; moist.	Boring terminated at 80 ft below land surface.
					80–90				

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Well/Boring No. TMP-1-10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520889.51 E 1105853.01 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	5	50				0			SAND; brownish gray; loose; poorly graded; fine grained; subrounded; slightly moist; some wood debris.	
								1				
								2				
								3				
								4			grading light grayish tan.	
								5			No Recovery	
								6				
								7				
								8				
								9				
SB	2	10	10	100				10			light brown.	
								11				
								12				
								13				
								14				
								15			(15.1-15.6 ft) Weakly cemented sand; Black to very dark brown; odor; heavily weathered creosote.	
								16			Clay lens 15.6 feet, 1" thick, partially infiltrated Creosote staining.	
								17				
								18			Silty SAND; light brown; poorly graded; fine grained; wet.	
								19			Clayey SAND; tan; cohesive; poorly graded; fine grained; wet.	
								20			SAND; tan; loose; poorly graded; fine to medium grained; subrounded; wet.	
SB	3	10	10	100				21				
								22				
								23				
								24				
								25				
								26				
								27				
								28			staining ends immediatley above the underlying Silty SAND.	
								29				
								30			Silty SAND; light brown; cohesive; dense; poorly graded; fine grained wet.	

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Well/Boring No. TMP-1-10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520889.51 E 1105853.01 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				31			Silty SAND; light brown; cohesive; dense; poorly graded; fine grained wet.	
								32				
								33			SAND; light brown; loose; poorly graded; fine grained; subrounded; wet.	
								34				
								35				
								36				
								37				
								38				
								39				
SB	5	10	7	70				40				
								41				
								42				
								43				
								44				
								45				
								46				
								47			No Recovery	
								48				
								49				
SB	6	10	10	100				50			SAND: Same as above.	
								51				
								52				
								53				
								54				
								55				
								56				
								57				
								58				
								59				
								60				

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Well/Boring No. TMP-1-10

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520889.51 E 1105853.01 NAD 83	NM NAVD88	6/21/2018	6/21/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	7	70				61			SAND; light brown; loose; poorly graded; fine grained; subrounded; wet.	
								62				
								63				
								64				
								65				
								66				
								67				
								68			No Recovery	
								69				
SB	8	10	10	100				70			Fine SILT lens (0.25") with creosote staining.	
								71			Clay lenses, 2" thick; slight staining penetrating upper clay lens. No staining in underlying sand.	
								72				
								73				
								74				
								75			fine grained.	
								76				
								77				
								78				
								79				
								80				Boring terminated at 80 ft below land surface.
								81				
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
								90				

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Well/Boring No. TMP-1-12

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520871.89 E 1105841.90 NAD 83	NM NAVD88	6/19/2018	6/19/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	7	70				0			SAND; brownish gray; odor; loose; poorly graded; fine to medium grained; slightly moist; some creosote treated wood debris.	
								1	2.4			
								2				
								3				
								4				
								5				
								6				
								7	0.0		grading light grayish tan.	
								8			No Recovery	
								9				
								10				
SB	2	10	10	100				11			grading light brown; slight odor.	
								12	0.0			
								13				
								14				
								15				
								16			grading dark brown to black.	
								17	4.9			
								18				
								19				
								20			(19.3-19.5 ft) weakly cemented sand lens; Black to very dark brown; odor; heavily weathered creosote.	
SB	3	10	10	100				21				
								22	0.3		grading brownish tan.	
								23				
								24				
								25				
								26				
								27	0.1		grading very light gray; fine grained.	
								28				
								29				
								30				

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Well/Boring No. TMP-1-12

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520871.89 E 1105841.90 NAD 83	NM NAVD88	6/19/2018	6/19/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				31			SAND; very light gray; odor; loose; poorly graded; fine grained; wet.	
								32	0.0		Silty Clayey SAND; light grayish tan; odor; poorly graded; fine grained; wet.	
								33			light grayish tan; fine to medium grained.	
								34				
								35				
								36				
								37			Silty Clayey SAND lens 37.5 - 37.7 ft.	
								38	0.0			
								39				
SB	5	10	10	100				40				
								41			Sandy CLAY; soft; very light gray; medium plasticity	
								42			SAND; light grayish tan; odor; loose; poorly graded; fine to medium grained; wet.	
								43	0.0			
								44				
								45				
								46				
								47				
								48	0.1		grading brownish tan.	
								49				
								50				
SB	6	10	10	100				51			Horizontal staining, 51.2-51.4 ft.	
								52				
								53	0.6			
								54			Horizontal staining, 54.0-54.5 ft on top of 1 mm clay lens.	
								55			grading light grayish tan.	
								56				
								57				
								58	0.0			
								59				
								60				

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Well/Boring No. TMP-1-12

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520871.89 E 1105841.90 NAD 83	NM NAVD88	6/19/2018	6/19/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	8	80				61			SAND; light grayish tan; odor; loose; poorly graded; fine to medium grained; wet.	
								62				
								63	0.0			
								64			staining 64-65.2 ft. Horizontal stringer in medium grained sand matrix separates with fine clay lenses above and below.	
								65				
								66				
								67	0.0			
								68				
								69			No Recovery	
SB	8	10	10	100				70				
								71			(70.3 ft) Clay lens 1.5" thick with creosote staining on top overlying very light grayish tan; medium to fine grained SAND.	
								72				
								73	0.0			
								74				
								75				
								76			grading fine grained.	
								77				
								78				
								79	0.0			
								80				Boring terminated at 80 ft below land surface.
								81				
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
								90				

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Well/Boring No. TMP-1-15

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520877.86 E 1105828.94 NAD 83	NM NAVD88	6/19/2018	6/19/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	1	10	2	20				0–10			SAND; light grayish tan; poorly graded; fine grained; subrounded; moist.	
											No Recovery	
SB	2	10	10	100				10–20	0.0		some staining, slight odor.	
											grading dark brown; strong odor (highly weathered, non-mobile creosote)	
									0.7			
SB	3	10	10	100				20–30	6.8		Clay lens at 23.5 feet. Creosote staining partially diffused into clay.	
											light tan; fine to medium grained; slight odor.	
									0.0			
											brown; dense; fine grained; moist.	

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Well/Boring No. TMP-1-15

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520877.86 E 1105828.94 NAD 83	NM NAVD88	6/19/2018	6/19/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	4	10	10	100				31	0.0		SAND; light grayish; loose; poorly graded; fine grained; subrounded; wet.	
								32				
								33			Silty Clayey SAND; light grayish tan; poorly graded; fine grained; subrounded; wet; slight odor.	
								34			SAND; light grayish tan; loose; poorly graded; fine grained; subrounded; wet.	
								35				
								36				
								37	0.0			
								38			Silty Clayey SAND; light grayish tan; dense; poorly graded; fine grained; wet; slight odor.	
								39			SAND; light grayish tan; loose; poorly graded; fine grading fine to medium grained; subrounded; wet.	
SB	5	10	10	100				40				
								41				
								42	0.0			
								43			Silty SAND lenses 0.5" thick (43.4-44.5 ft).	
								44				
								45				
								46				
								47	0.0			
								48				
								49				
SB	6	10	10	100				50				
								51				
								52	0.2		Staining 53-54 ft.	
								53				
								54			Horizontal stringer of highly weathered, non-mobile creosote on top of fine clay lens.	
								55			light grayish tan; fine grained; slight odor.	
								56				
								57				
								58	0.0			
								59				
								60				

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Well/Boring No. TMP-1-15

LOG OF BORING

CLIENT	PROJECT	PROJECT NO.
US EPA Region 4	American Creosote Works	049089

PROJECT LOCATION	SURFACE CONDITIONS	TOTAL DEPTH (FEET BGS)
Pensacola, Escambia County, Florida	Grass, flat, SPT Area west of MW2-B	80

COORDINATES (DATUM)	GROUND ELEV. (FEET AMSL)	START DATE	END DATE
N 520877.86 E 1105828.94 NAD 83	NM NAVD88	6/19/2018	6/19/2018

DRILLING CONTRACTOR	DRILLING METHOD	DRILL RIG DESIGNATION	DRILLER
Earth Tech Drilling, Inc.	Sonic 4x6	TSi 150	P. Lemenze

INSPECTOR	CHECKED BY	APPROVED BY
D. Prouty	R. Dawkins	A. Callaway

DPT or Sonic SAMPLING								DEPTH (FEET)	PID (ppm)	LITHOLOGY	CLASSIFICATION OF MATERIALS	Remarks
SAMPL TYPE	SAMPLE NUMBER	RUN LENGTH	RUN RECOVERY	% RECOVERY								
SB	7	10	10	100				61			SAND; light brown; dense; poorly graded; fine grained; subrounded; wet.	
								62	0.0			
								63				
								64				
								65			Horizontal stringer (3mm) of highly weathered, non-mobile creosote on top of fine silty SAND lens.	
								66				
								67				
								68				
								69				
								70	0.7		2" CLAY lens at 70.3 feet. No odor or staining beneath.	
SB	8	10	10	100				71			light grayish tan; loose; well graded; medium to fine grained; moist; no odor.	
								72	0.0			
								73				
								74				
								75				
								76				
								77	0.0			
								78				
								79			grading fine grained.	
								80			Silty SAND; light grayish tan; dense; poorly graded; fine grained; moist.	Boring terminated at 80 ft below land surface.
								81				
								82				
								83				
								84				
								85				
								86				
								87				
								88				
								89				
								90				

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Appendix C2 - Lithologic Photo Logs

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Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	1
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB524 sonic core from 0 to 7 ft bgs.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	2
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB524 sonic core from 0 to 7 ft bgs.

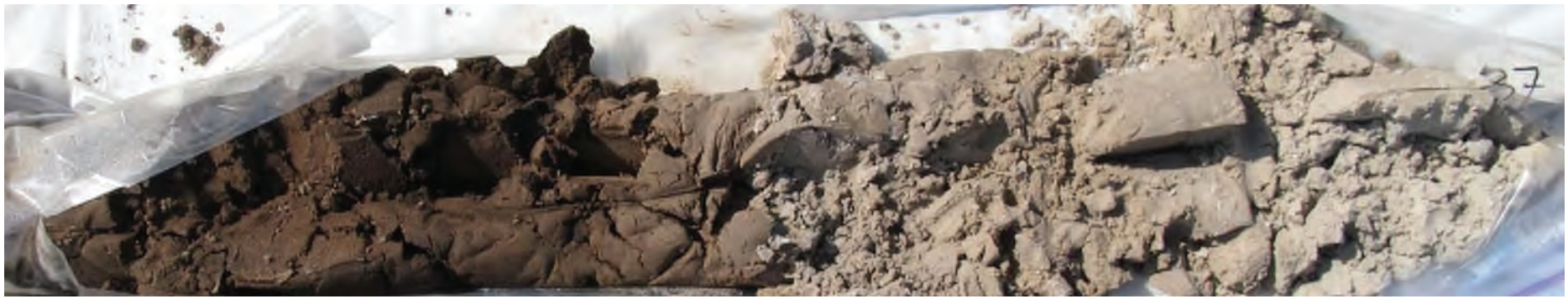
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	3
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB524 sonic core from 17 to 27 ft bgs. Top photo is ~17 to 22 ft bgs, and bottom photo is ~22 to 27 ft bgs. Note smiley face drawn with finger on NAPL-saturated sonic sleeve (e.g., free-flowing DNAPL zone) where sample was collected from 24 to 25 ft bgs for potential analysis at PTS laboratory.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	4
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB524 sonic core from 27 to 37 ft bgs. Top photo is ~27 to 32 ft bgs, and bottom photo is ~32 to 37 ft bgs. DNAPL zones identified by black and brown discolored soil, which is more porous sand than the underlying light gray/white soil (e.g., sand with silt/clay).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	1
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic location (right portion of photo). View looking east.

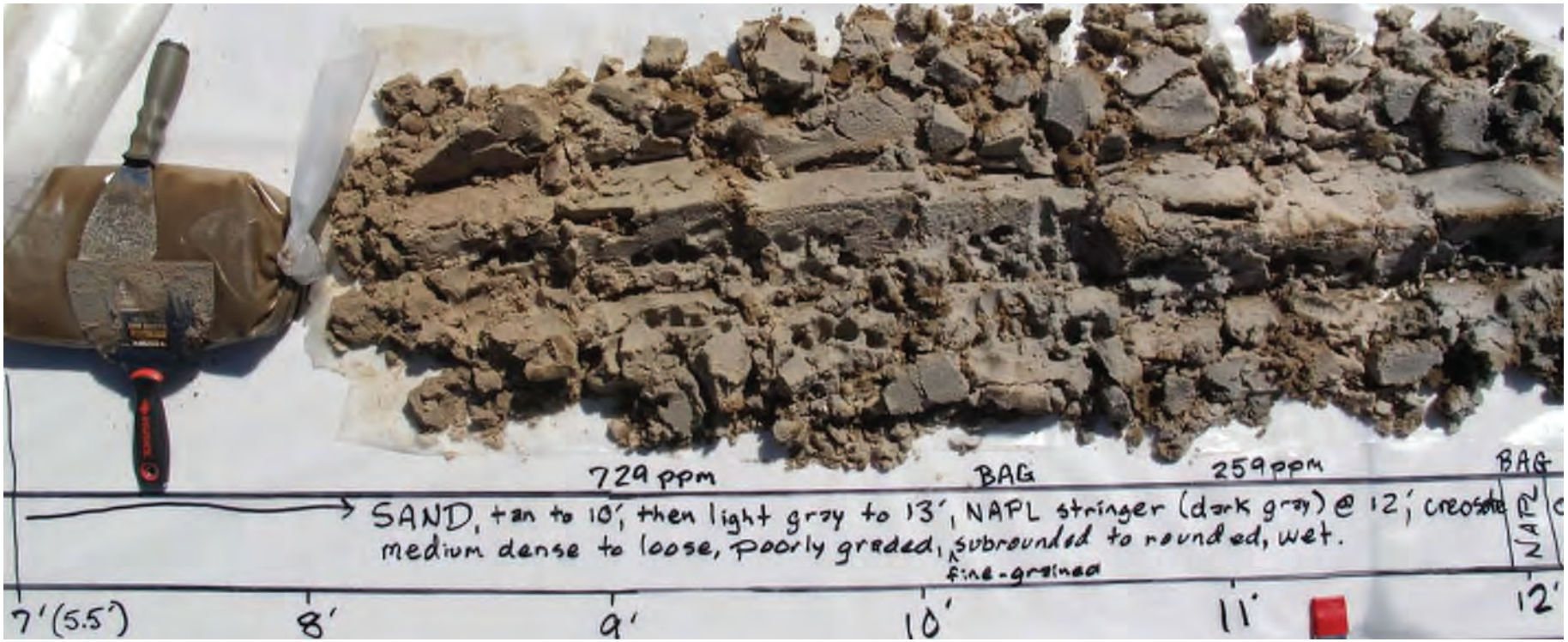
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	2
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic location bagging the first sample from 7 to 17 ft bgs. View looking southeast.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	3
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



Title: SB525 sonic core from 7 to 12 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

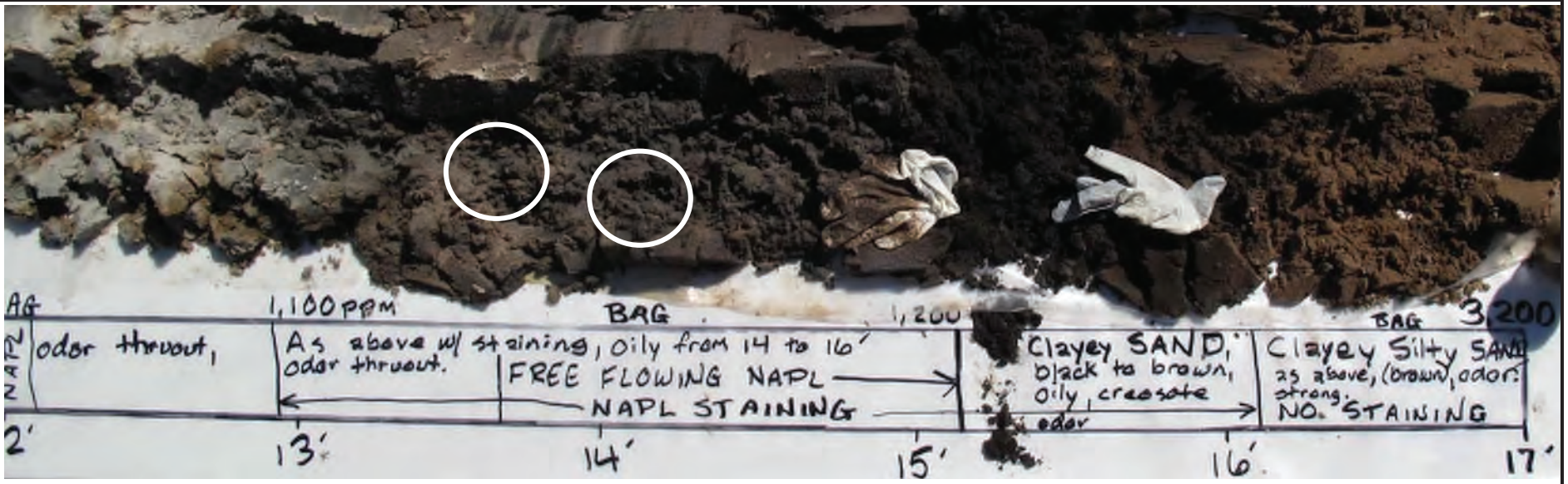
Photographic Record

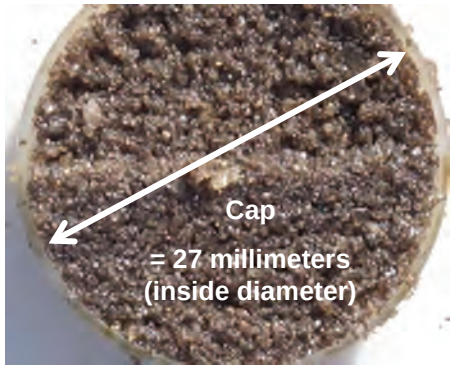
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	4
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 12 to 17 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

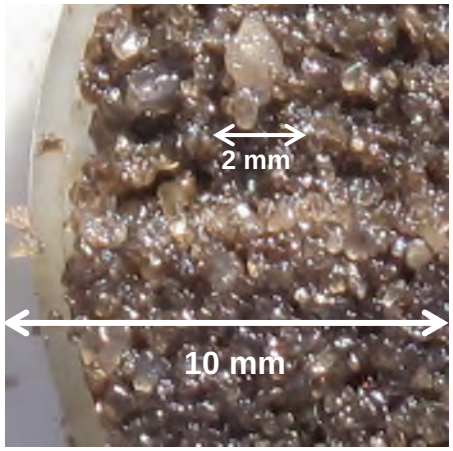
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	4A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Dates:**	10/25+28/11

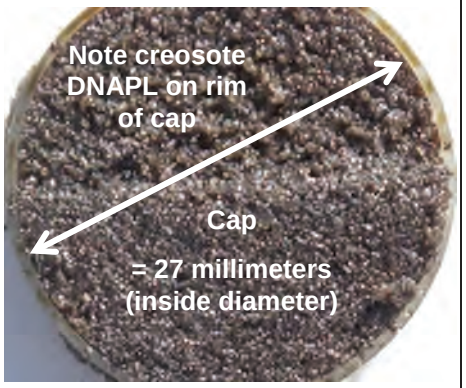




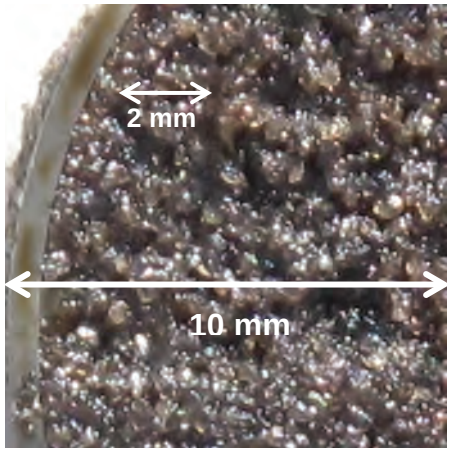
SB525 @ 13.7 ft bgs



SB525 @ 13.7 ft bgs



SB525 @ 14.1 ft bgs

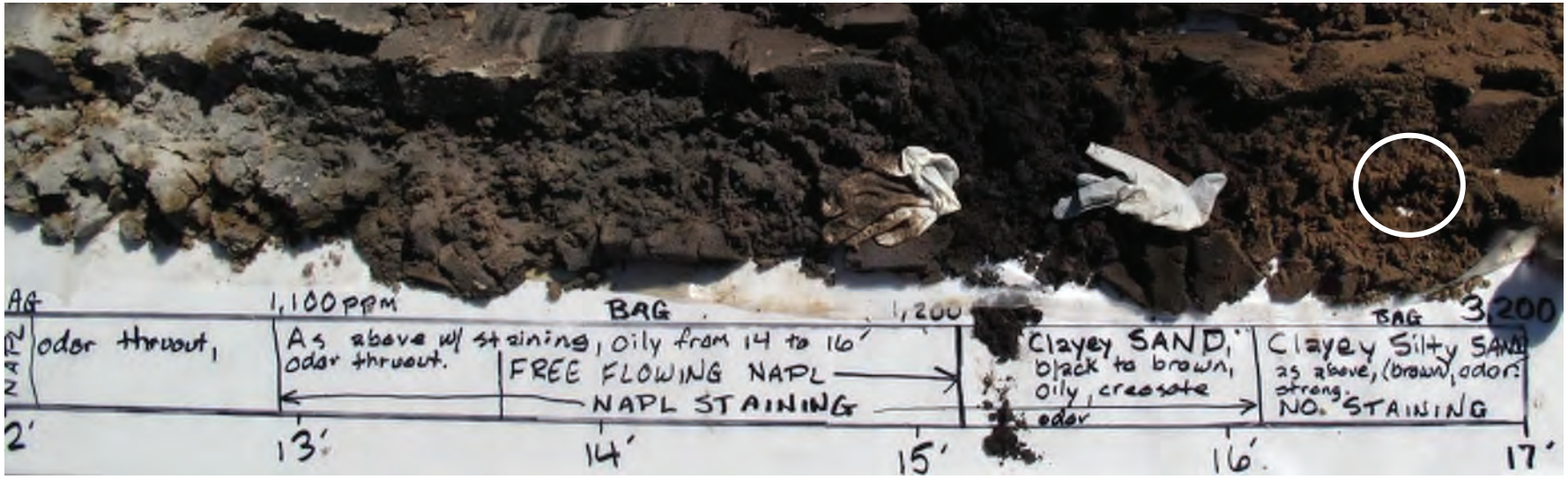


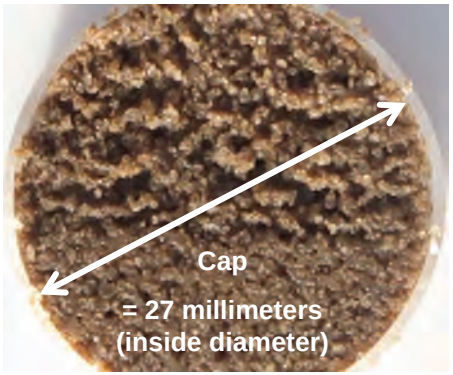
SB525 @ 14.1 ft bgs

Title: SB525 sonic core from 12 to 17 ft bgs. Magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over (0-degrees).

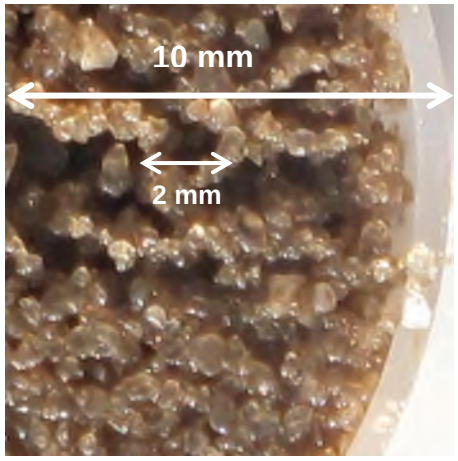
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	4B
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Dates:**	10/25+28/11





SB525 @ 16.5 ft bgs



SB525 @ 16.5 ft bgs

SB525 @ 16.5 ft bgs

SB525 @ 16.5 ft bgs

Title: SB525 sonic core from 12 to 17 ft bgs. Magnified soil and settling jar test from soil underlying the DNAPL zone. The settling jar was filled about half way with soil, topped with distilled water, vigorously shaken, and allowed ~30 minutes of settling. (The silt layer would settle given more with time.)

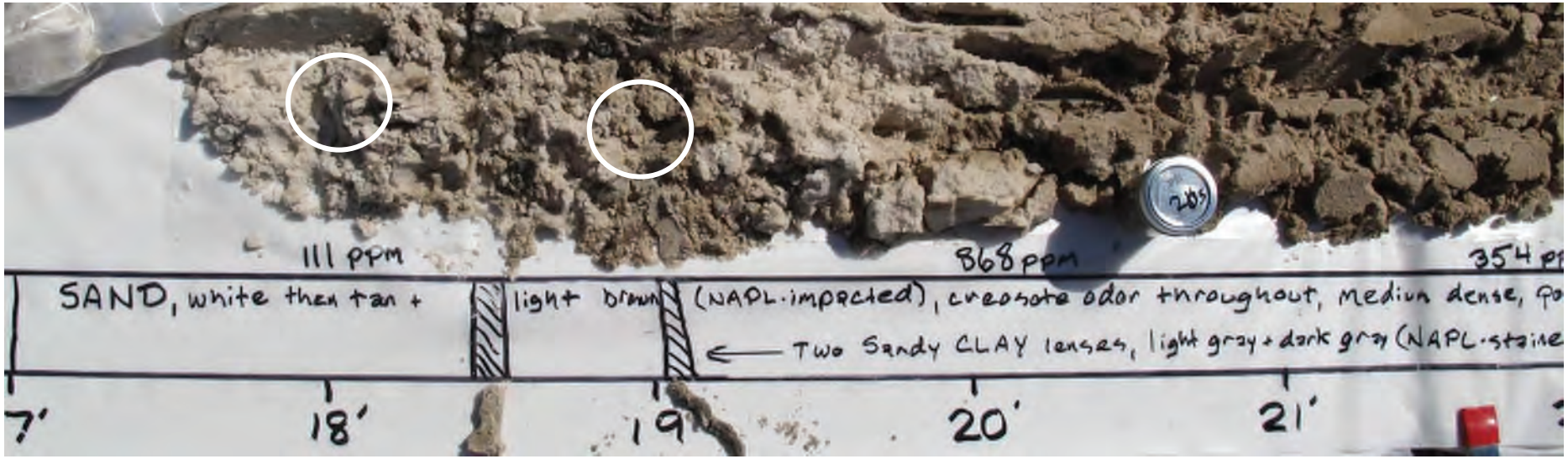
Photographic Record

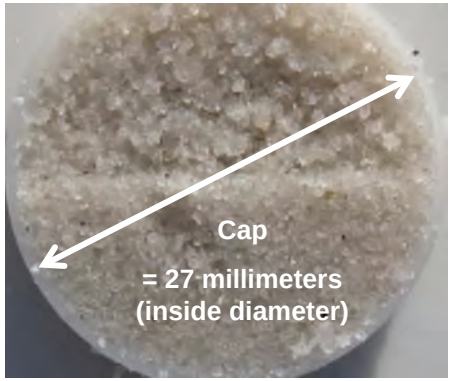
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	5
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 17 to 22 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

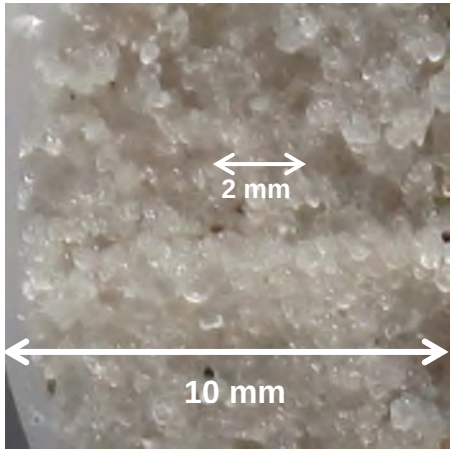
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	5A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Dates:**	10/25+28/11

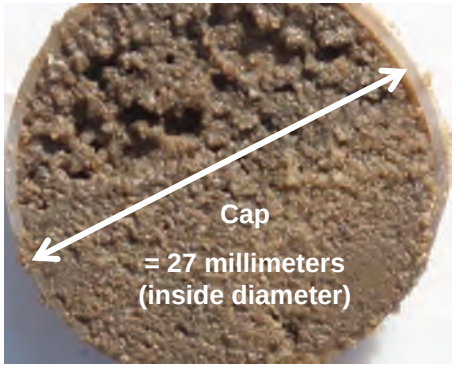




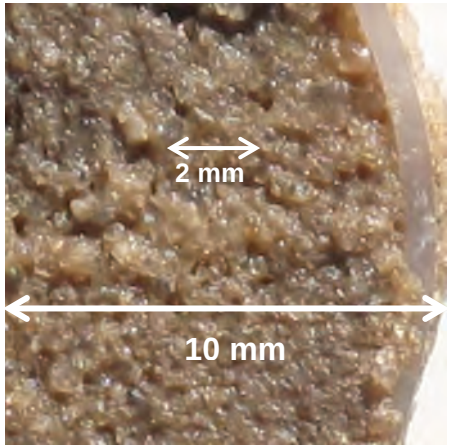
SB525 @ 18 ft bgs



SB525 @ 18 ft bgs



SB525 @ 19 ft bgs

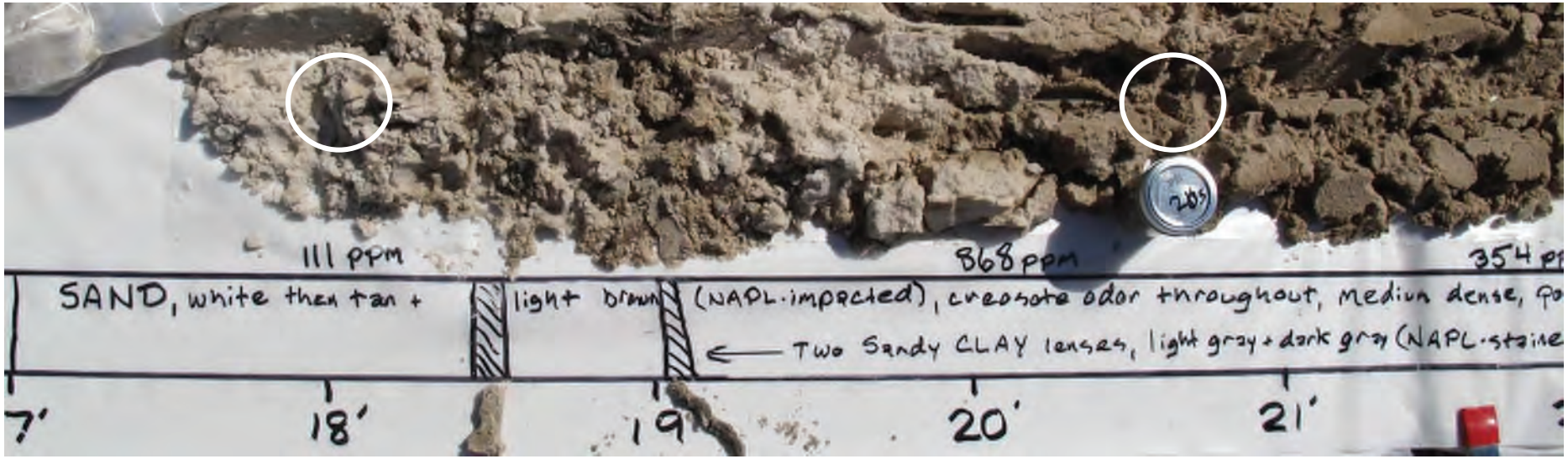


SB525 @ 19 ft bgs

Title: SB525 sonic core from 17 to 22 ft bgs. Magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over (0-degrees).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	5B
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Dates:**	10/28/11



SB525 @ 18 ft bgs

SB525 @ 18 ft bgs

SB525 @ 20.5 ft bgs

SB525 @ 20.5 ft bgs

Title: SB525 sonic core from 17 to 22 ft bgs. Settling jar tests. The settling jars were vigorously shaken, and allowed ~30 minutes of settling. Silt is in suspension, and would settle out given more time.

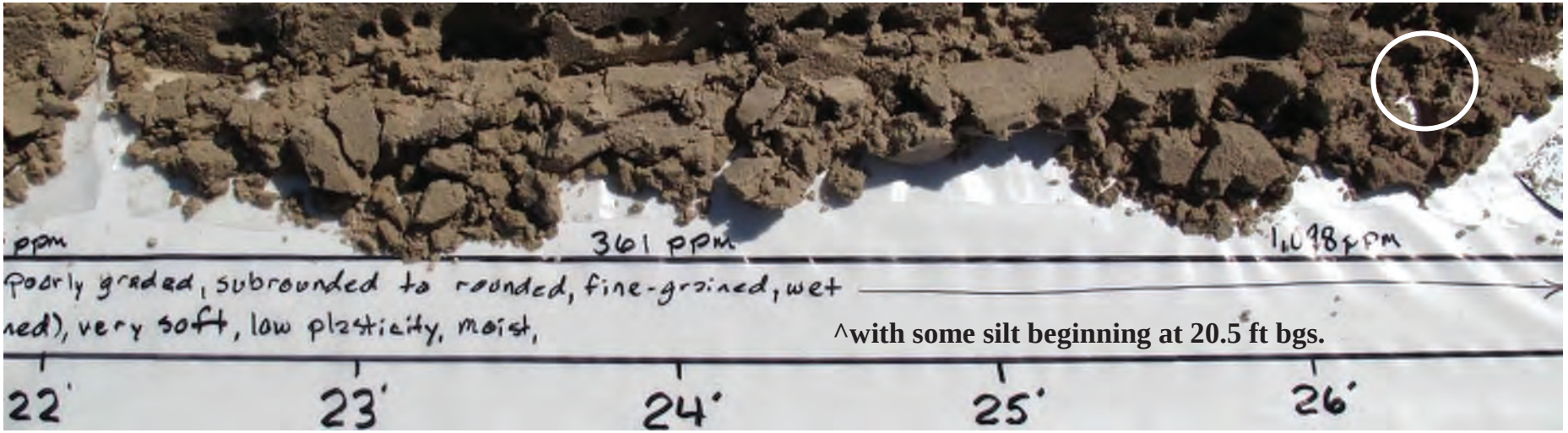
Photographic Record

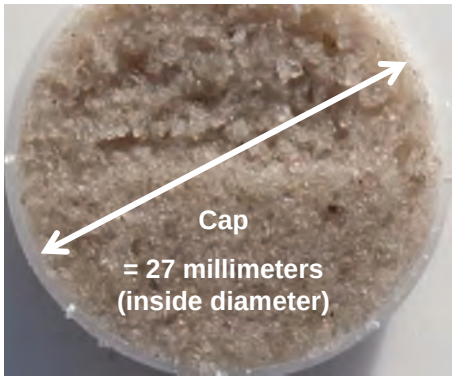
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	6
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 22 to 27 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

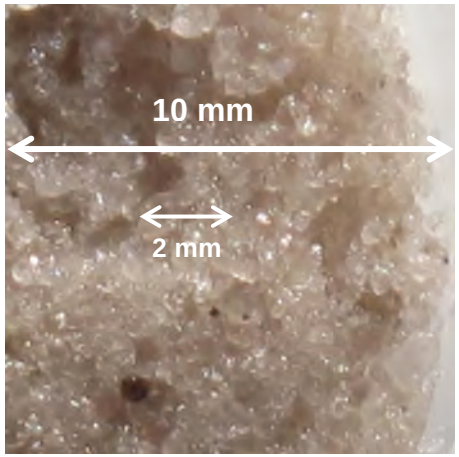
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	6A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11





SB525 @ 26.5 ft bgs



SB525 @ 26.5 ft bgs

SB525 @ 26.5 ft bgs

SB525 @ 26.5 ft bgs

Title: SB525 sonic core from 22 to 27 ft bgs. Magnified soil and settling jar test. The settling jar was vigorously shaken, and allowed ~30 minutes of settling. (The silt layer would settle given more with time.)

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	7
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 27 to 32 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

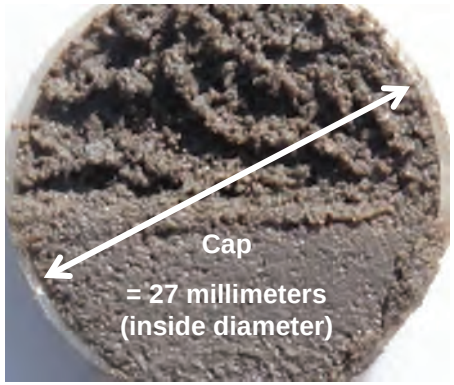
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	8
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

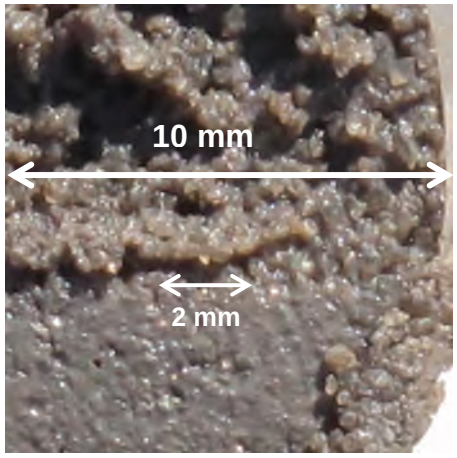
Title: SB525 sonic core from 32 to 37 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

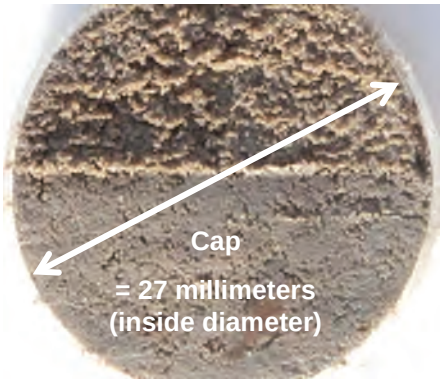
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	8A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



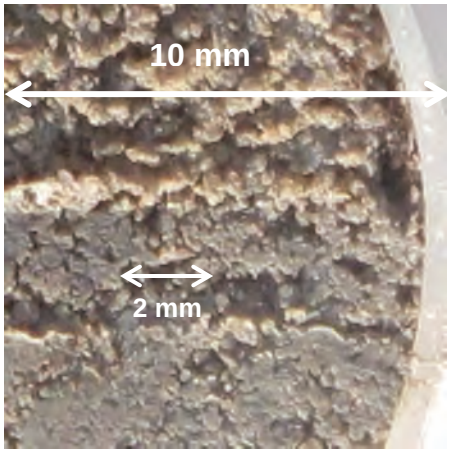
SB525 @ 33.7 ft bgs



SB525 @ 33.7 ft bgs



SB525 @ 34.8 ft bgs



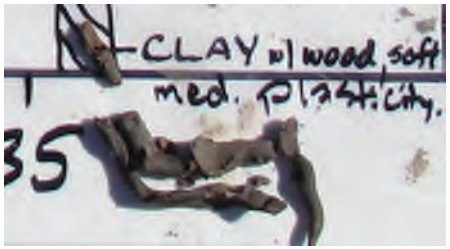
SB525 @ 34.8 ft bgs

Title: SB525 sonic core from 32 to 37 ft bgs. Magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over / smeared at 0-degrees.

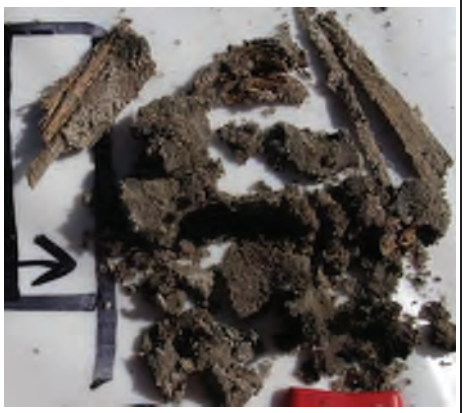
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	8B
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

SB525 @ 34 ft bgs



SB525 @ 35 ft bgs



SB525 @ 37 ft bgs

SB525 @ 37 ft bgs

Title: SB525 sonic core from 32 to 37 ft bgs. Clay lenses and high organic layers (wood).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	9
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

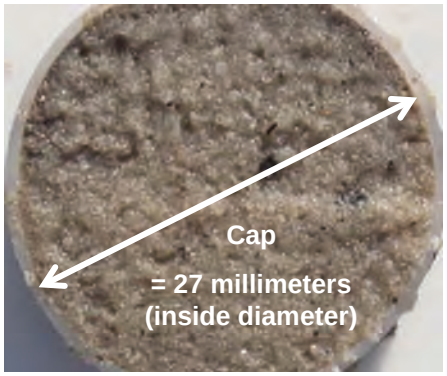
^ with some silt.

^ with some very fine-grained sand.

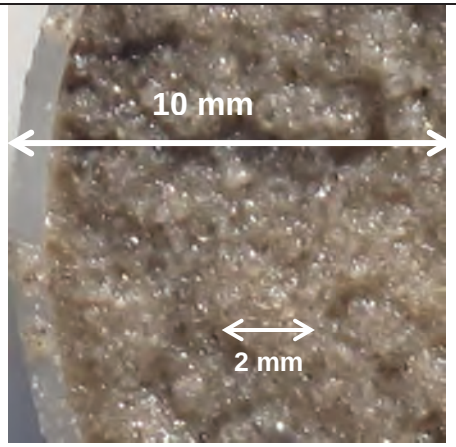
Title: SB525 sonic core from 37 to 42 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

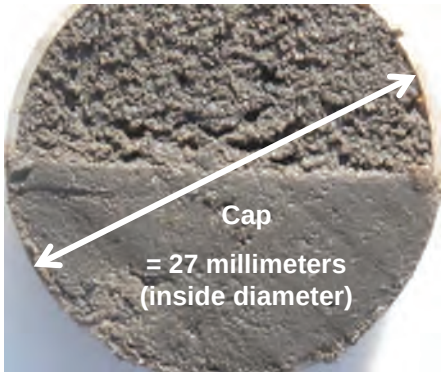
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	9A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



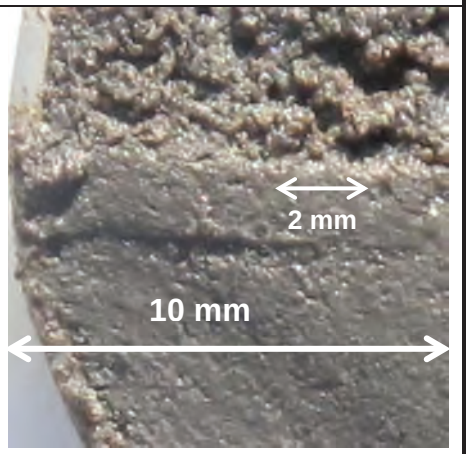
SB525 @ 38.5 ft bgs



SB525 @ 38.5 ft bgs



SB525 @ 40 ft bgs



SB525 @ 40 ft bgs

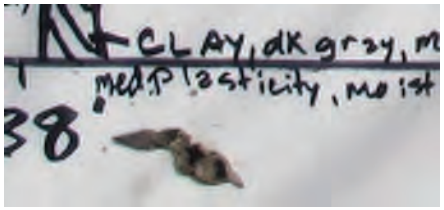
Title: SB525 sonic core from 37 to 42 ft bgs. Magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over / smeared at 0-degrees.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	9B
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

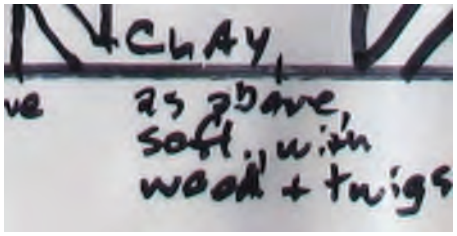
^ with some silt.

^ with some very fine-grained sand.

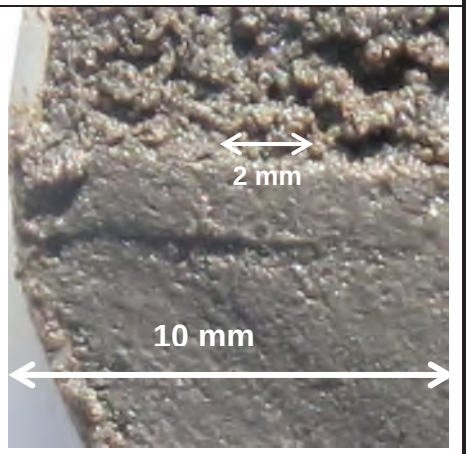


SB525 @ 38 ft bgs

SB525 @ 38.5 ft bgs



SB525 @ 39.3 ft bgs



SB525 @ 40 ft bgs

Title: SB525 sonic core from 37 to 42 ft bgs. Medium stiff clay at 38 ft bgs, sand with silt at 38.5 ft bgs, organic-rich (twigs) soft clay at 39.3 ft bgs, and silt at 40 ft bgs. As shown in the top photo, another clay lense exists at 39 ft bgs.

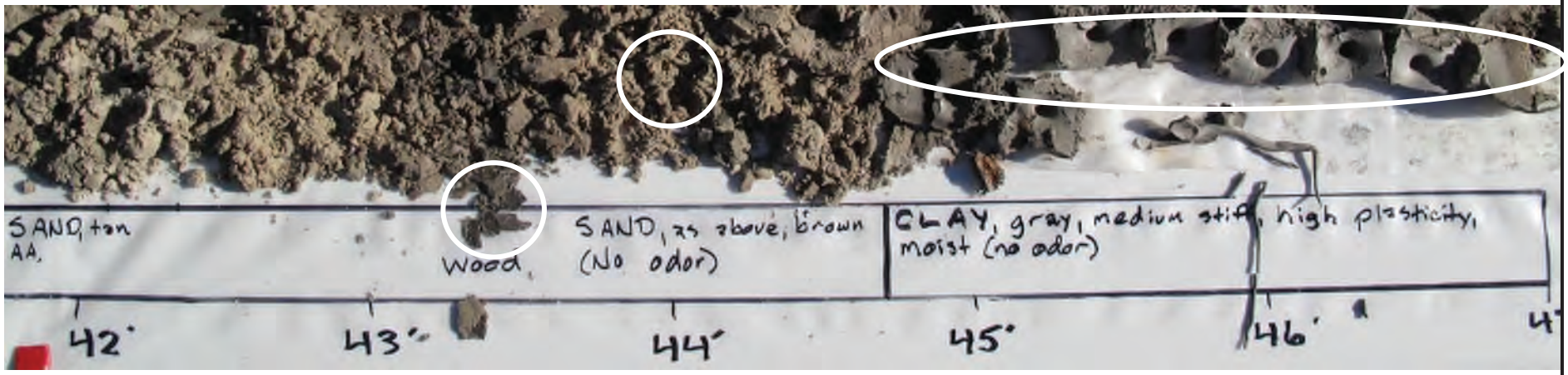
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	10
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

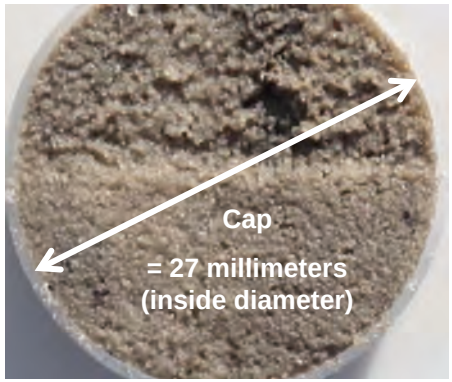
Title: SB525 sonic core from 42 to 47 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

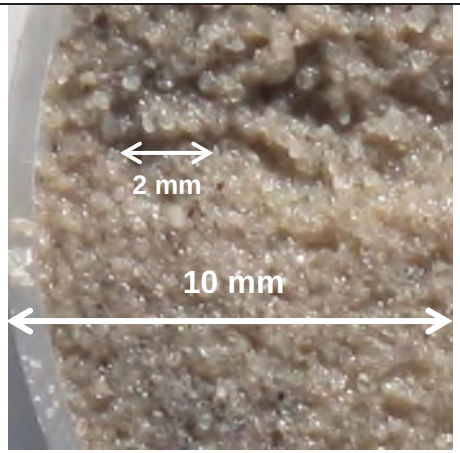
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	10A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



SB525 @ 43.3 ft bgs



SB525 @ 44 ft bgs



SB525 @ 44 ft bgs

SB525 @ 44.7 to 47 ft bgs

Title: SB525 sonic core from 42 to 47 ft bgs. 'Booklet' / deposit of thin wood bark at 43.3 ft bgs (high organics), very fine grained sand at 44 ft bgs, and clay sculpture / core standing on end on logging table (medium stiff clay of high plasticity beginning at 44.7 ft bgs).

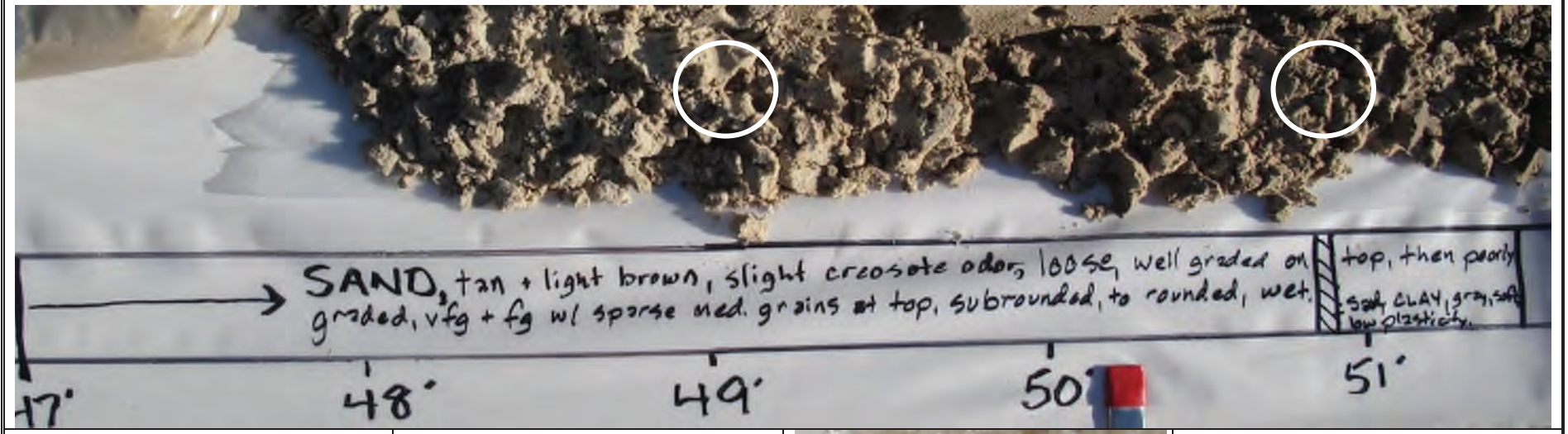
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	11
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 47 to 52 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	11A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



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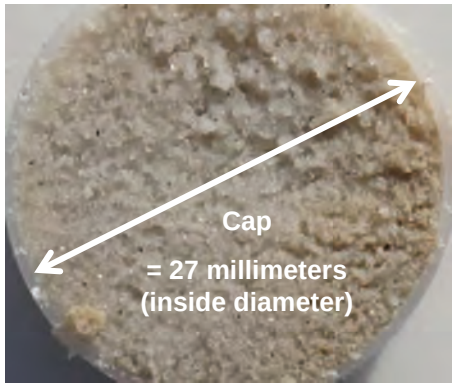
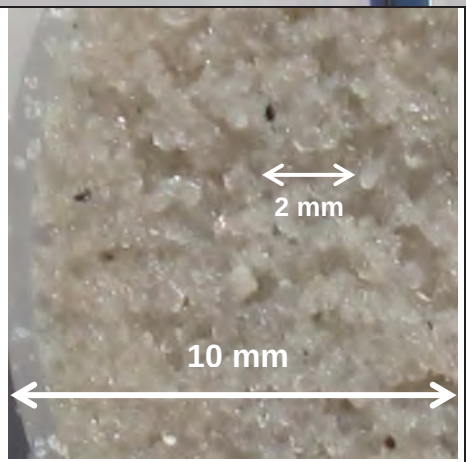
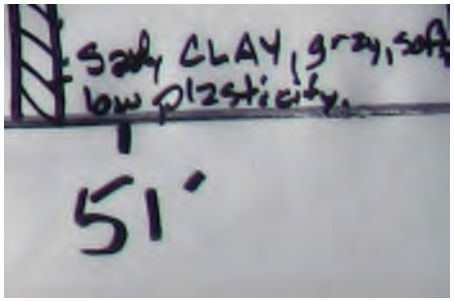


SB525 @ 49 ft bgs



SB525 @ 49 ft bgs



SB525 @ 50.9 ft bgs

Title: SB525 sonic core from 47 to 52 ft bgs. Sand at 49 ft bgs, and thin lense of sandy soft clay at 50.9 ft bgs.

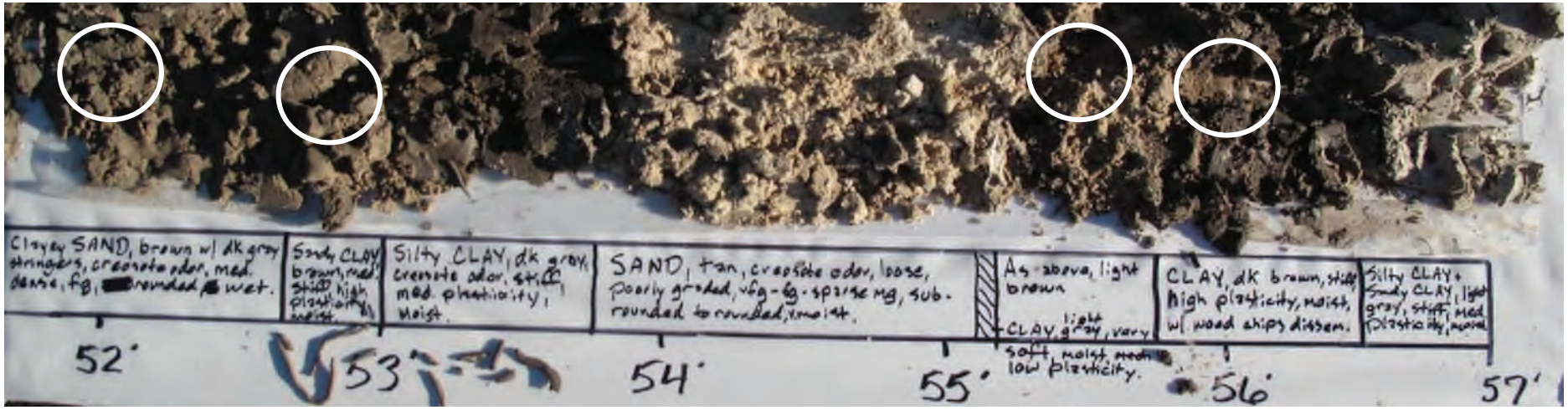
Photographic Record

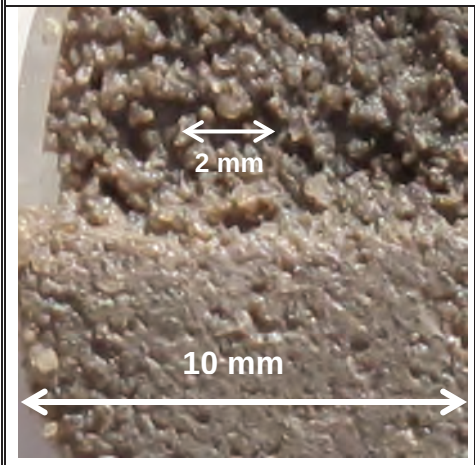
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	12
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 52 to 57 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

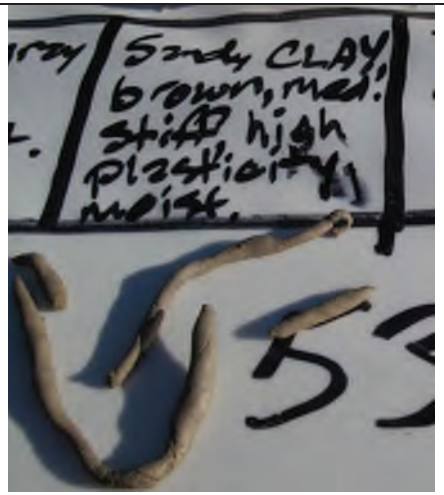
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	12A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

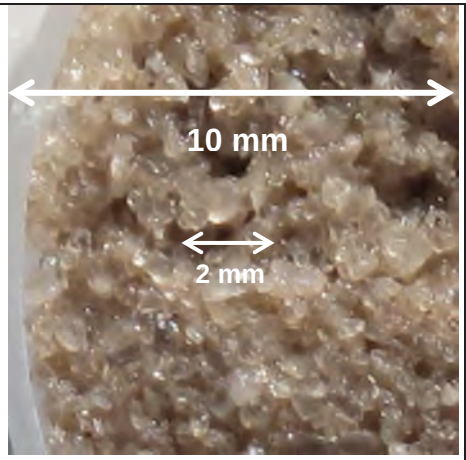




SB525 @ 52 ft bgs



SB525 @ 52.9 ft bgs



SB525 @ 55.5 ft bgs

SB525 @ 55.8 ft bgs

Title: SB525 sonic core from 52 to 57 ft bgs. Variable sediment deposits including clayey sand, sandy clay, sand, and clay along the bottom row. Locally high organic content is present as evident by the presence of wood chips in the clay at ~56 ft bgs.

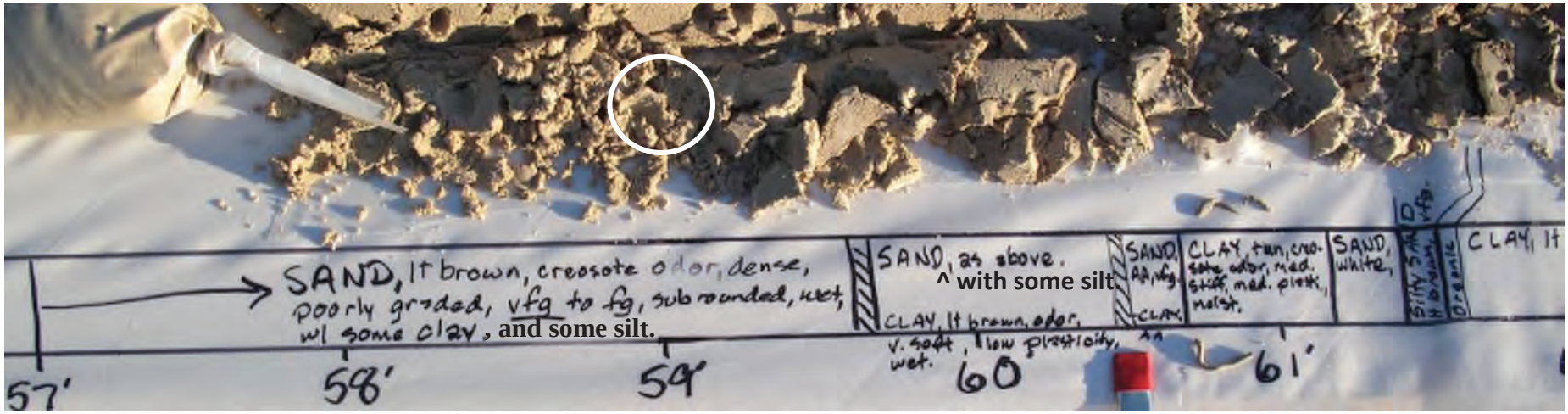
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	13
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 57 to 62 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	13A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



SB525 @ 59 ft bgs

SB525 @ 59 ft bgs

SB525 @ 59 ft bgs

SB525 @ 59 ft bgs

Title: SB525 sonic core from 57 to 62 ft bgs. Sand with some silt and clay at 59 ft bgs. Given enough time, the silt likely would have eventually settled out to less than 25-percent of the total soil volume. Therefore, the sample is classified as 'SAND with silt and clay' rather than a 'Silty SAND.'

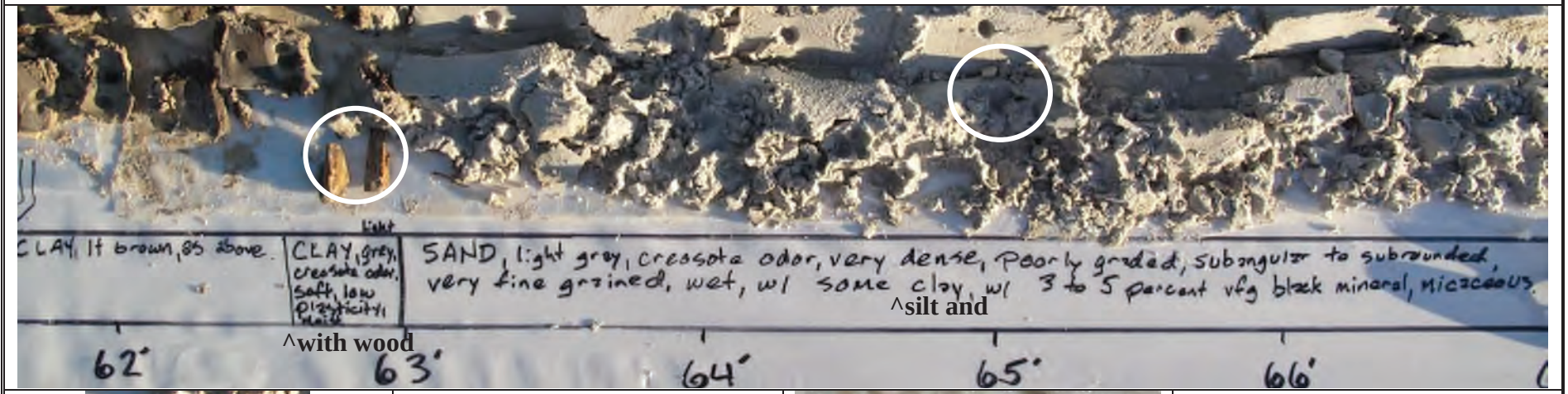
Photographic Record

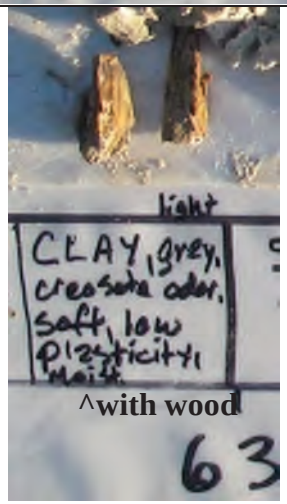
Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	14
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 62 to 67 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

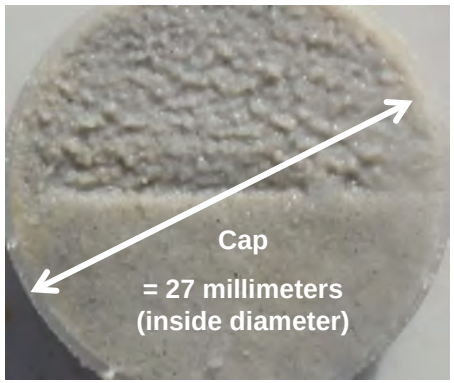
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	14A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

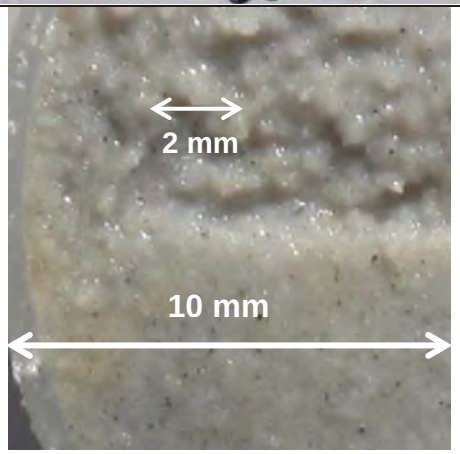




SB525 @ 62.7 ft bgs



SB525 @ 65 ft bgs



SB525 @ 65 ft bgs

SB525 @ 65 ft bgs

Title: SB525 sonic core from 62 to 67 ft bgs. Clay with fragments of wood/trees reflecting locally high organic content at 62.7 ft bgs, and 'SAND with some silt and clay' at 65 ft bgs.

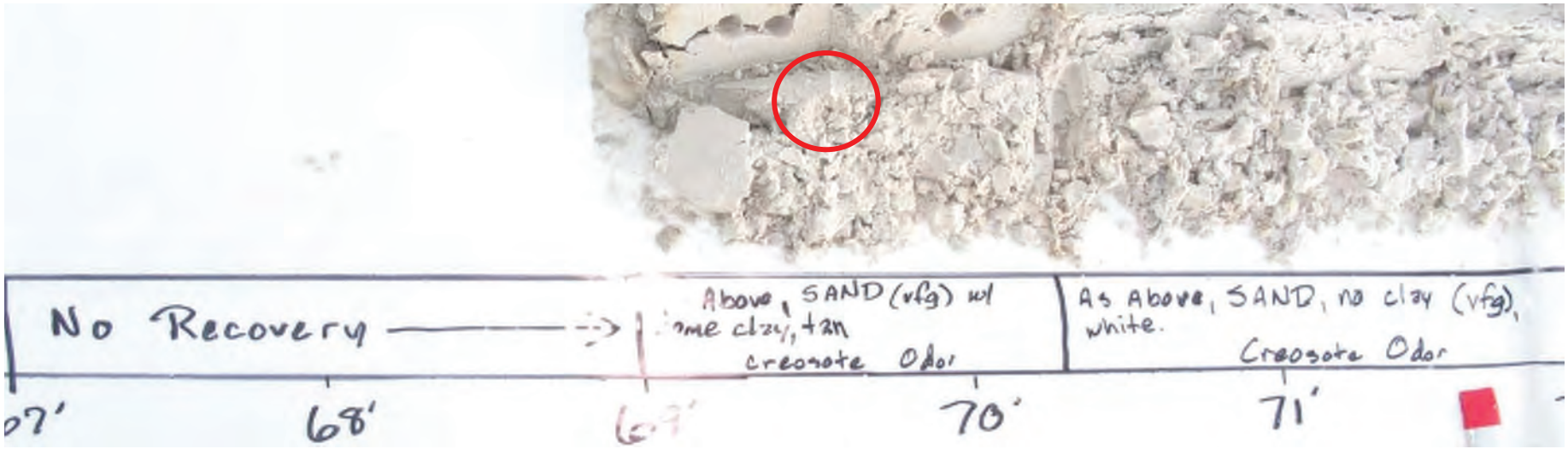
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	15
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 67 to 72 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	15A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11



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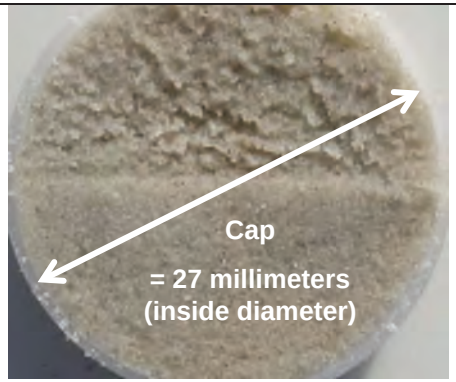
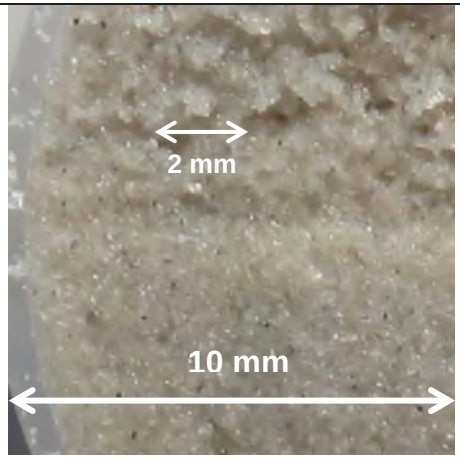


SB525 @ 69.5 ft bgs



SB525 @ 69.5 ft bgs

Intentionally Blank.

Title: SB525 sonic core from 67 to 72 ft bgs. Magnification of sand at 69.5 ft bgs. Upper photo was taken with the flash on.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	16
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

Title: SB525 sonic core from 72 to 77 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Cal Butler (B&V) + Ben Bentkowski (EPA)	**Plate Number:**	16A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/25/11

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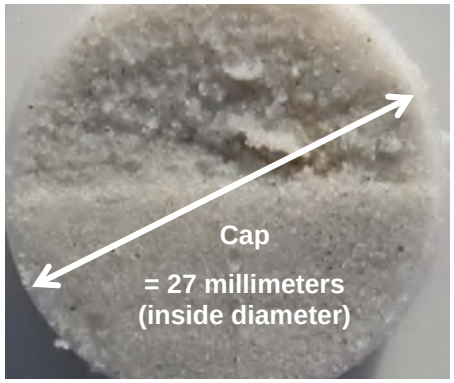
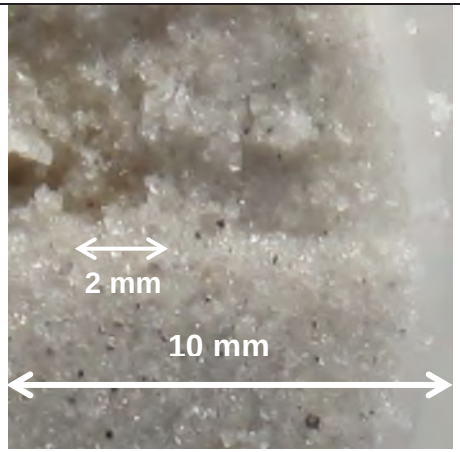


SB525 @ 75 ft bgs



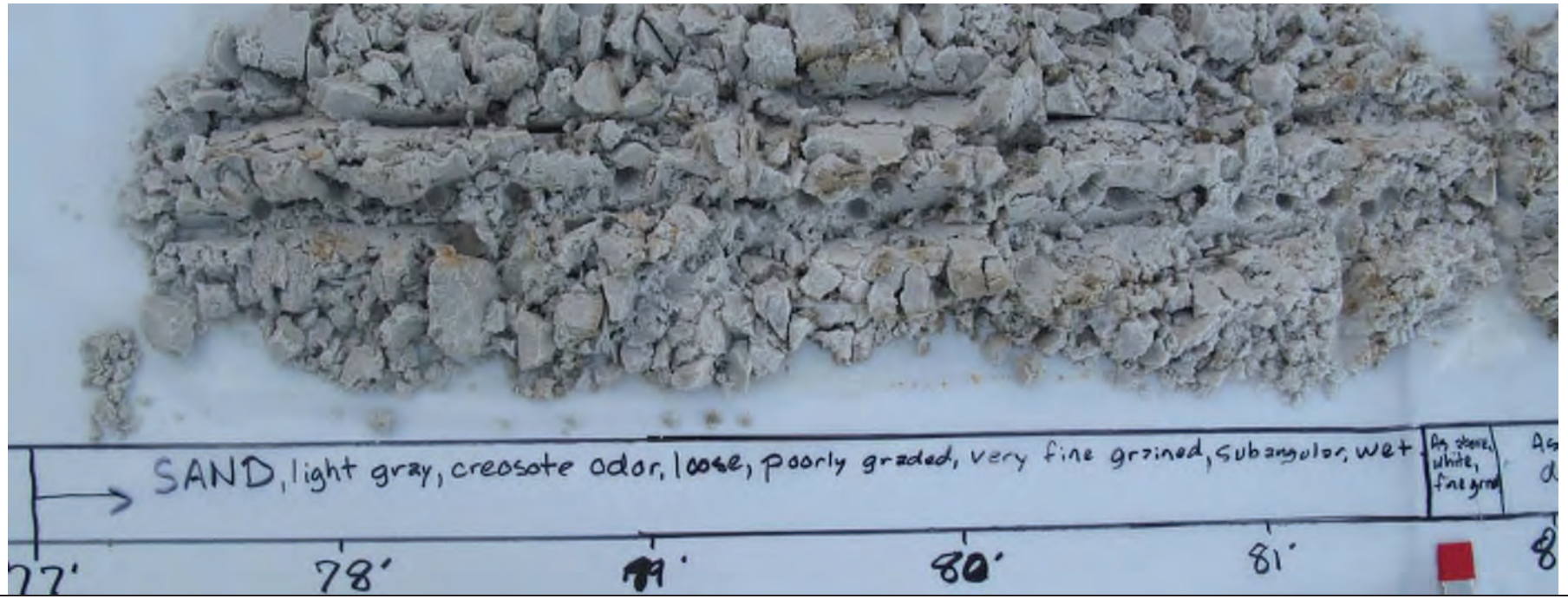
SB525 @ 75 ft bgs

Intentionally Blank.

Title: SB525 sonic core from 72 to 77 ft bgs. Magnification of very fine grained sand.

Photographic Record

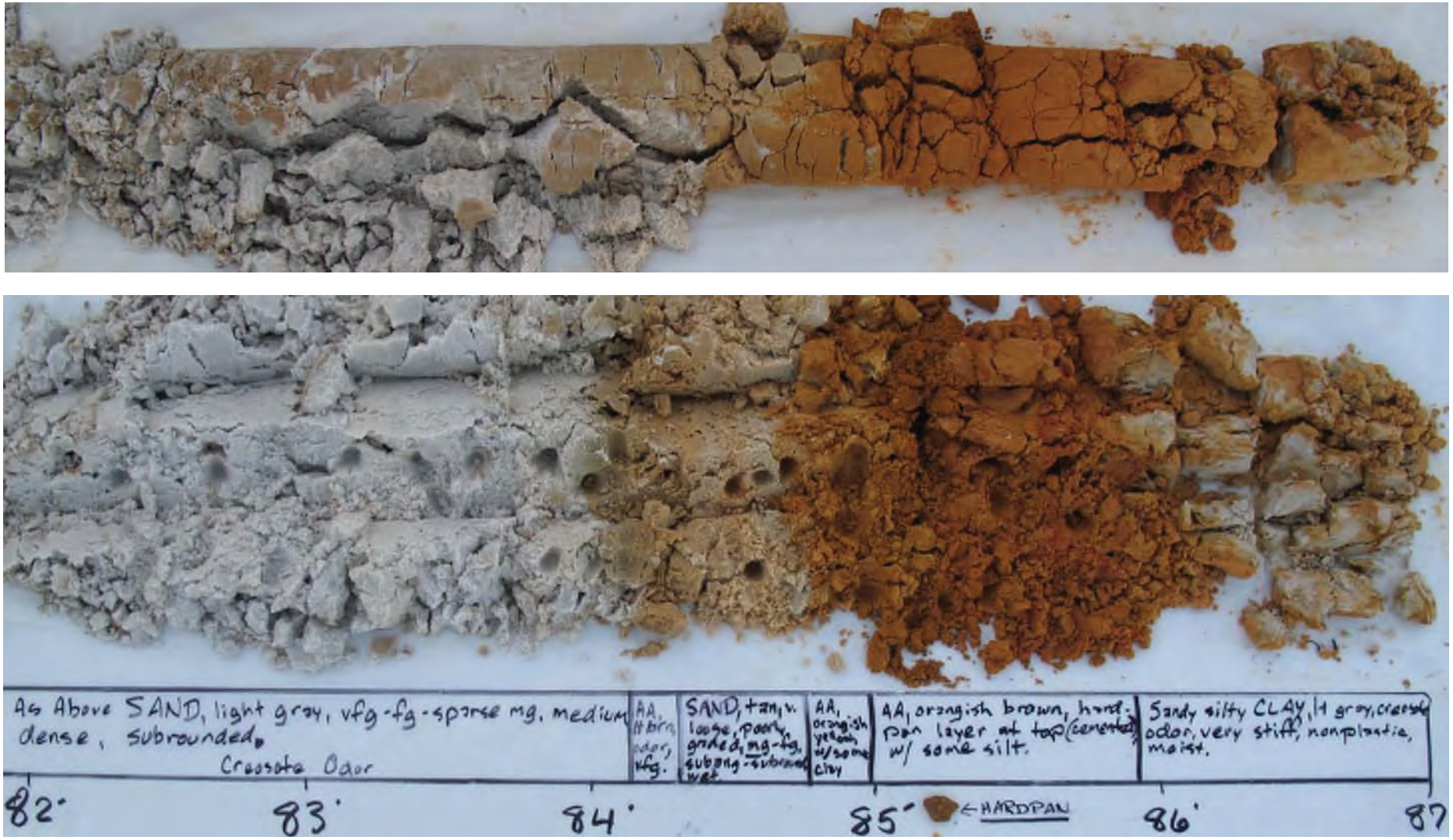
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	17
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB525 sonic core from 77 to 82 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

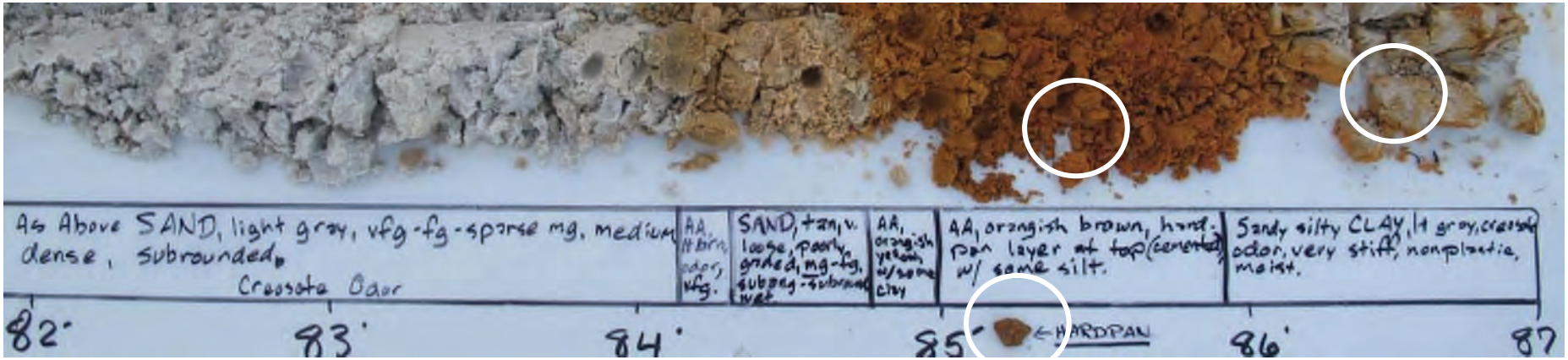
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	18
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



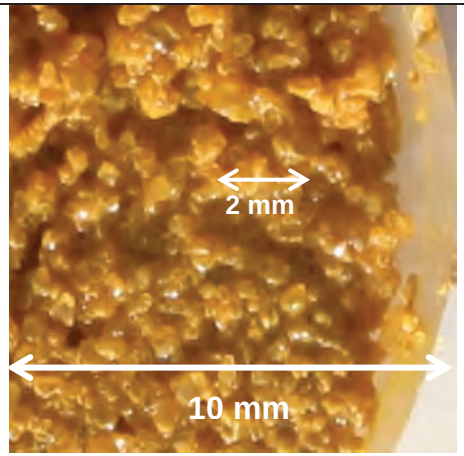
Title: SB525 sonic core from 82 to 87 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

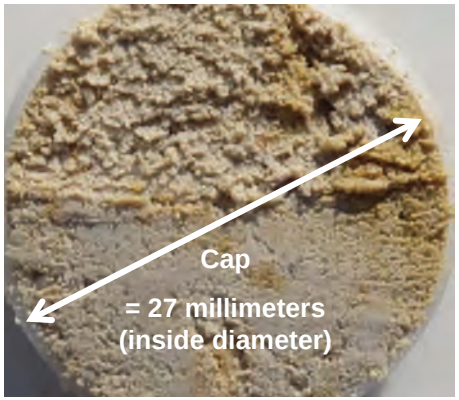
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	18A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



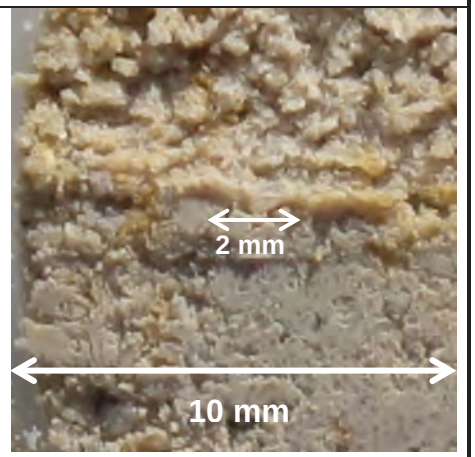
SB525 @ 85.2 ft bgs



SB525 @ 85.5 ft bgs



SB525 @ 86.5 ft bgs

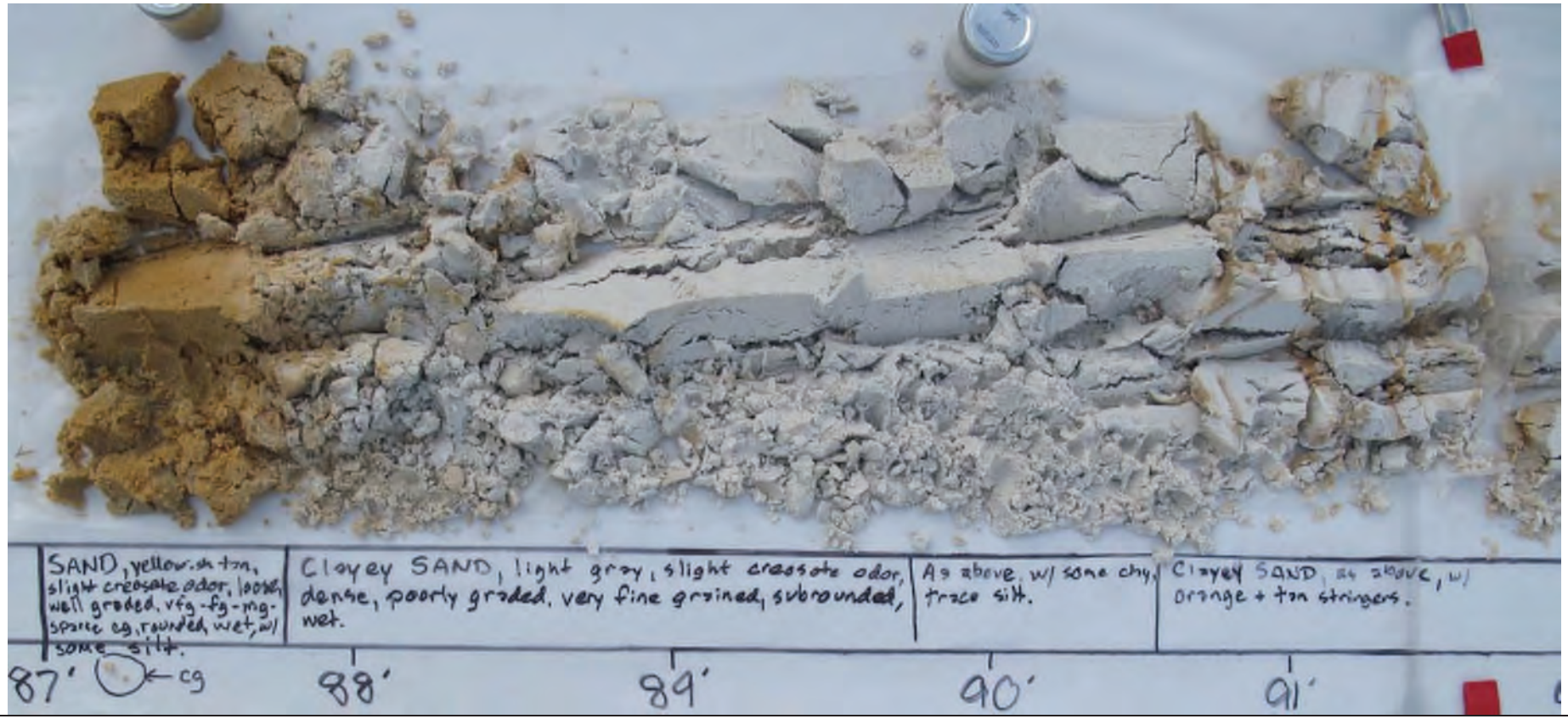


SB525 @ 86.5 ft bgs

Title: SB525 sonic core from 82 to 87 ft bgs. Hardpan represented by cemented sand grains at 85.2 ft bgs. Photos at 85.5 ft bgs (medium and fine grained SAND) and 86.5 ft bgs (Sandy silty CLAY) include magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over with the card (0-degrees).

Photographic Record

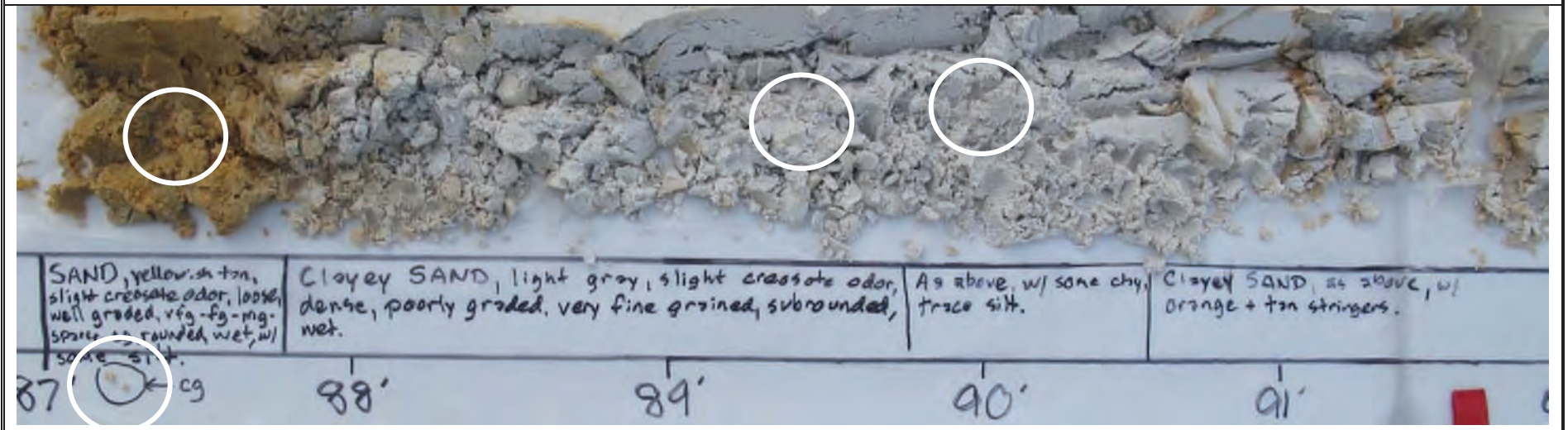
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	19
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB525 sonic core from 87 to 92 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	19A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



SB525 @ 87.2 ft bgs

SB525 @ 87.5 ft bgs

SB525 @ 89.5 ft bgs

SB525 @ 90 ft bgs

Title: SB525 sonic core from 87 to 92 ft bgs. Sparse coarse sand grains at 87.2 ft bgs. SAND with some silt and trace clay at 87.5 ft bgs in distilled water vigorously shaken with ~30 minutes of settling time. Clayey very fine grained SAND at 89.5 ft bgs. Very fine grained SAND with some clay and trace silt in jar shaken with deionized water after ~30 minutes of settling.

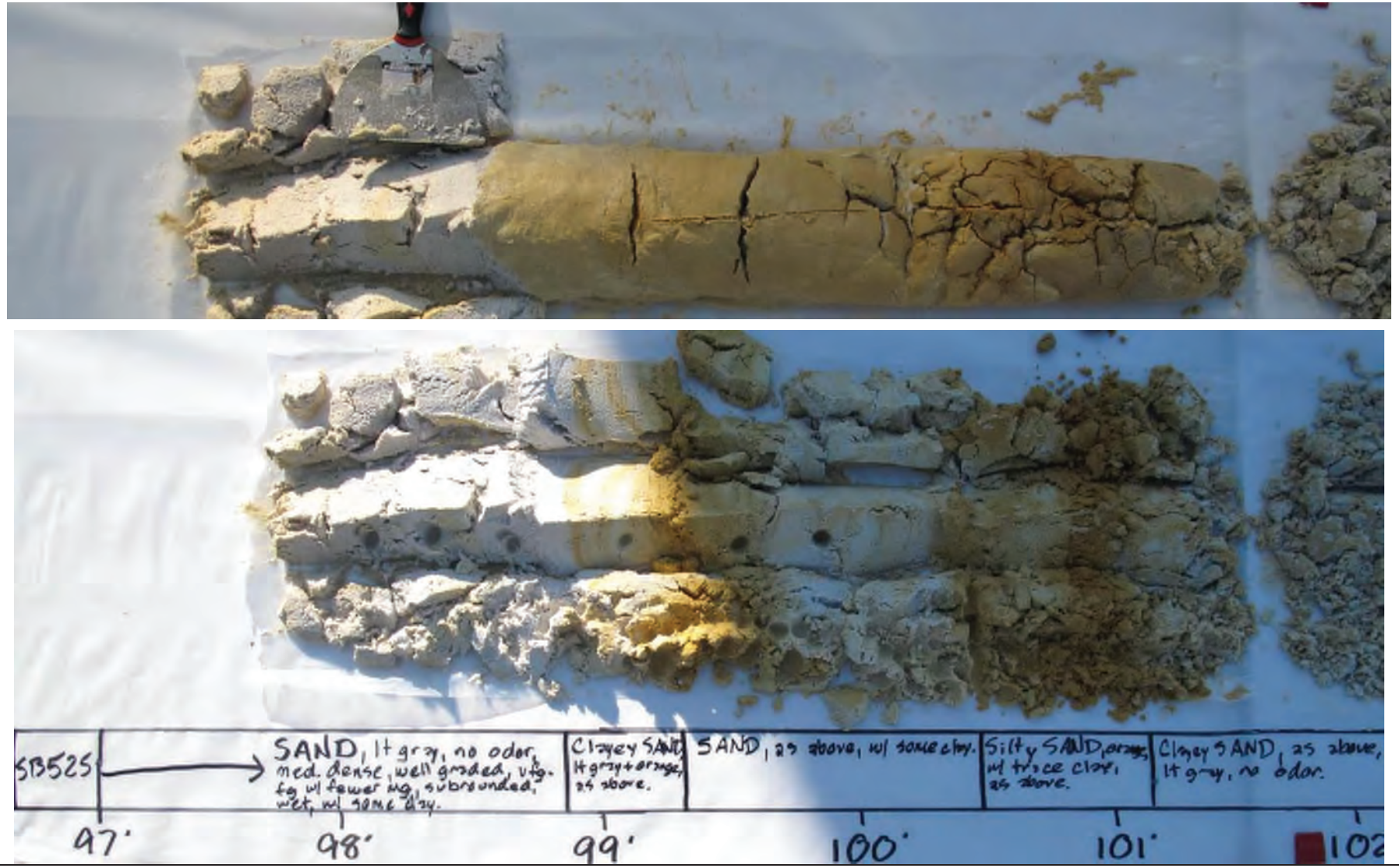
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	20
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB525 sonic core from 92 to 97 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	21
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB525 sonic core from 97 to 102 ft bgs. Top photo immed. after cutting plastic sleeve open (before splitting + logging core).

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	22
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB525 sonic core from 102 to 107 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	22A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

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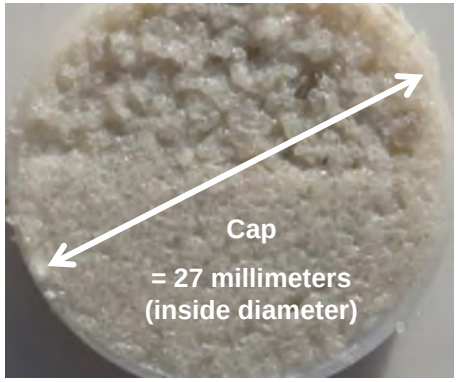
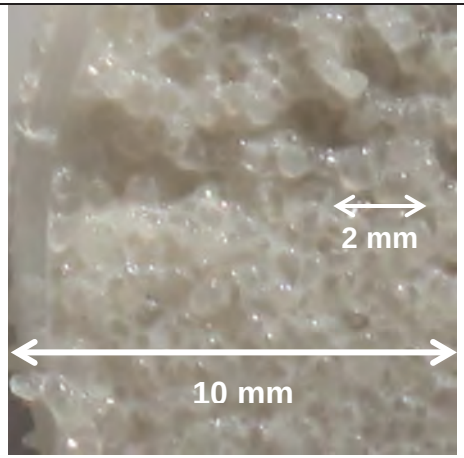


SB525 @ 104 ft bgs



SB525 @ 104 ft bgs

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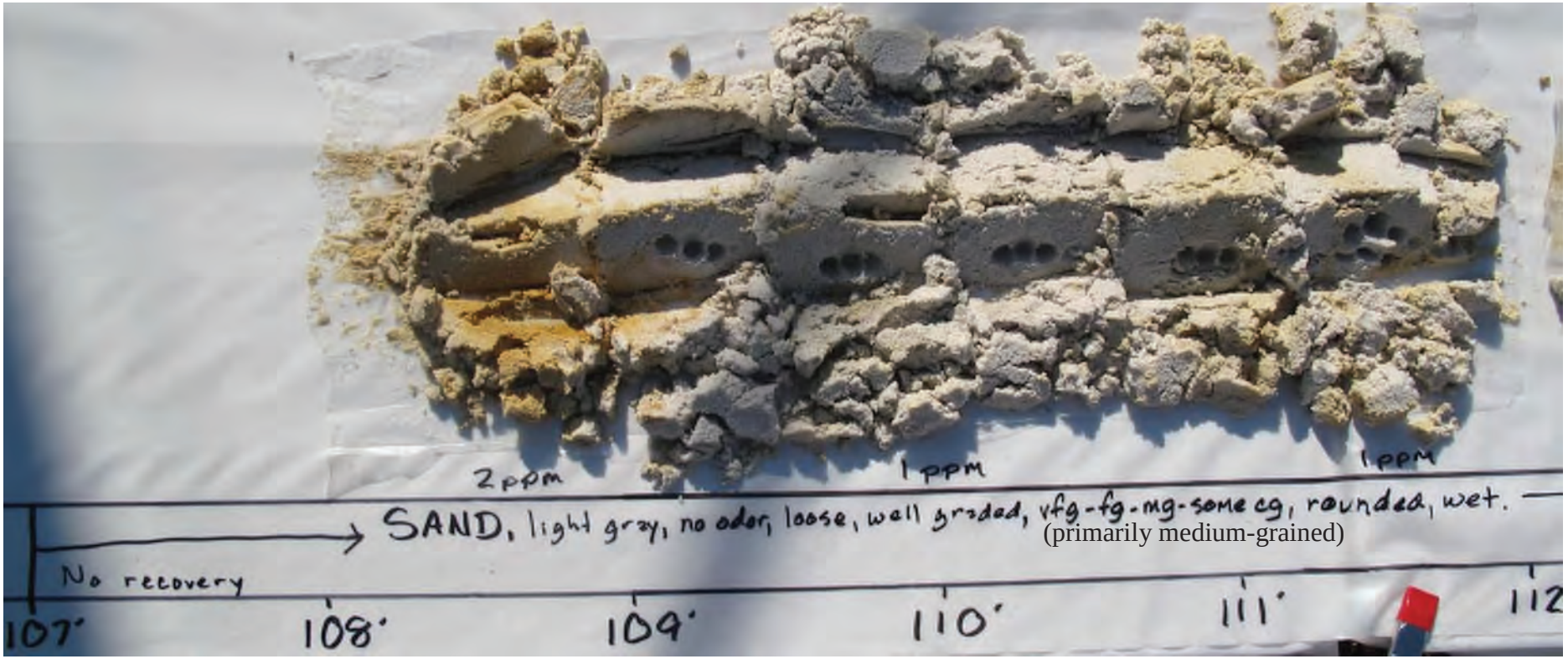
Title: SB525 sonic core from 102 to 107 ft bgs. Magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over (0-degrees).

Photographic Record

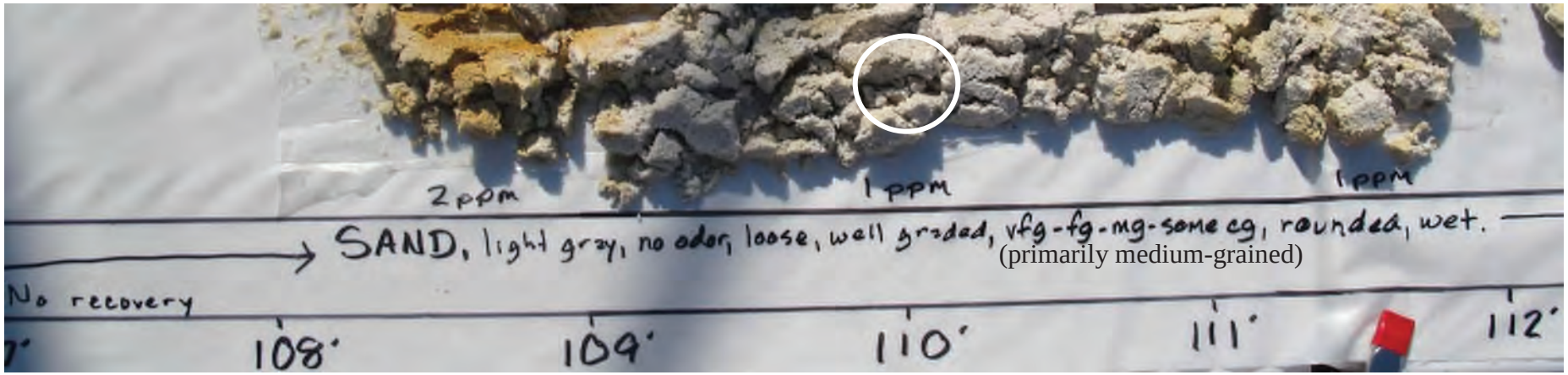
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	23
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB525 sonic core from 107 to 112 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	23A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



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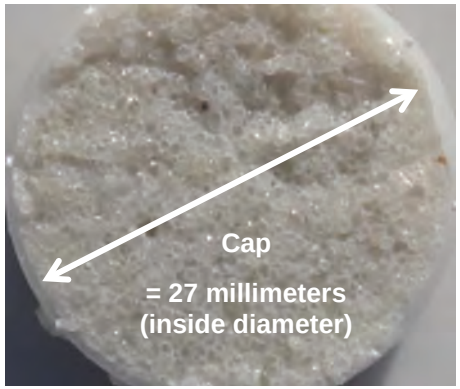
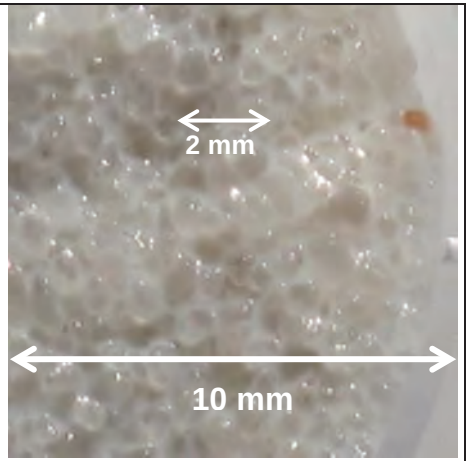


SB525 @ 110 ft bgs



SB525 @ 110 ft bgs

Intentionally blank

Title: SB525 sonic core from 107 to 112 ft bgs. Magnified soil placed into plastic caps with an inside diameter of 27 mm. A plastic card was used to swipe the top half of the caps at 45-degrees, with the bottom half smoothed over (0-degrees).

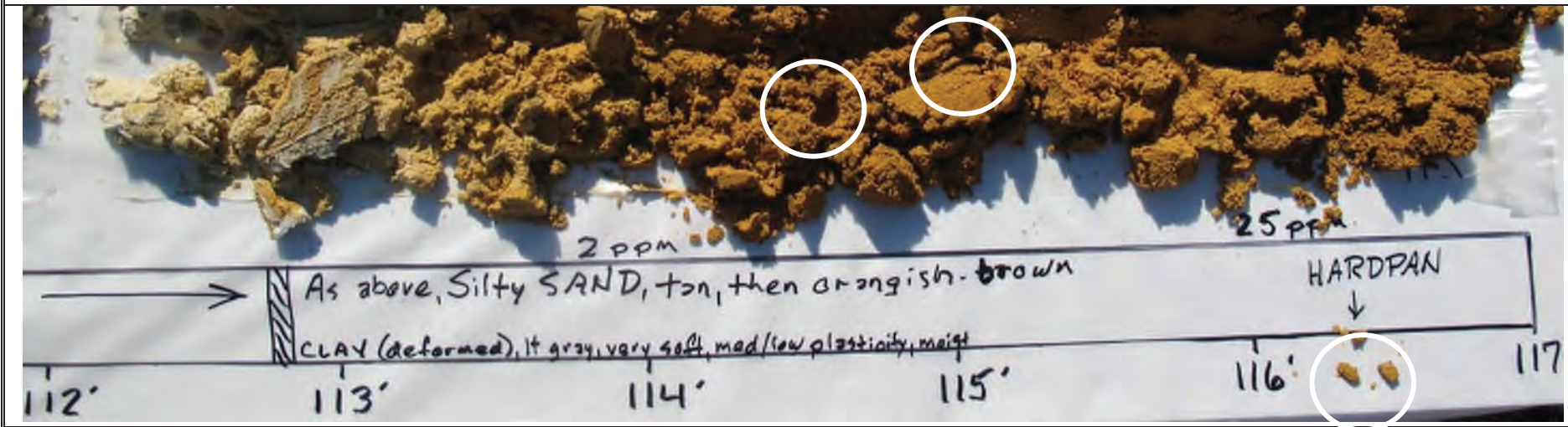
Photographic Record

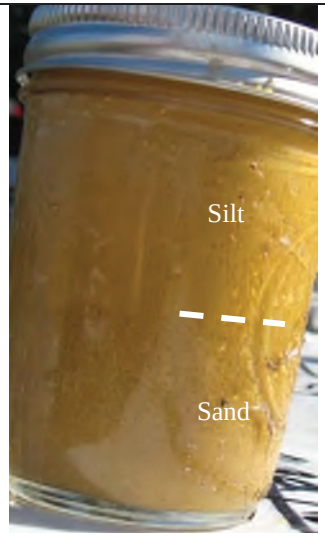
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	24
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB525 sonic core from 112 to 117 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

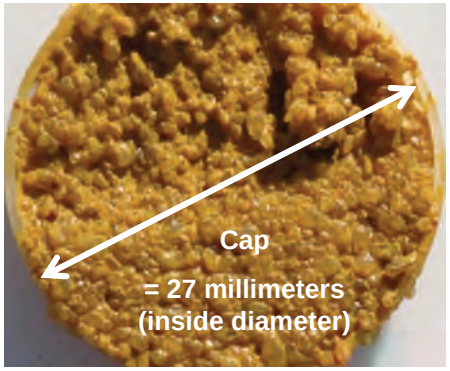
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	24A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

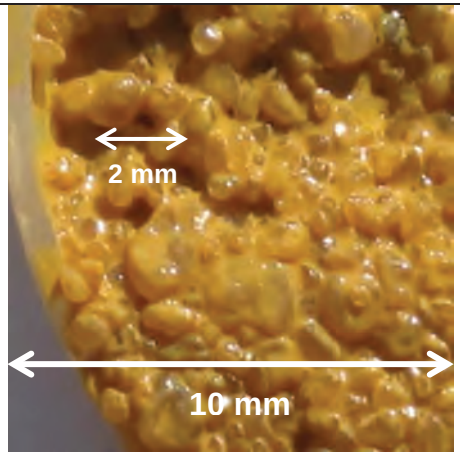




SB525 @ 114.5 ft bgs



SB525 @ 115 ft bgs



SB525 @ 115 ft bgs

SB525 @ 116.3 ft bgs

Title: SB525 sonic core from 112 to 117 ft bgs. Silty SAND in settling jar and magnified in cap. Hardpan at 116.3 ft bgs.

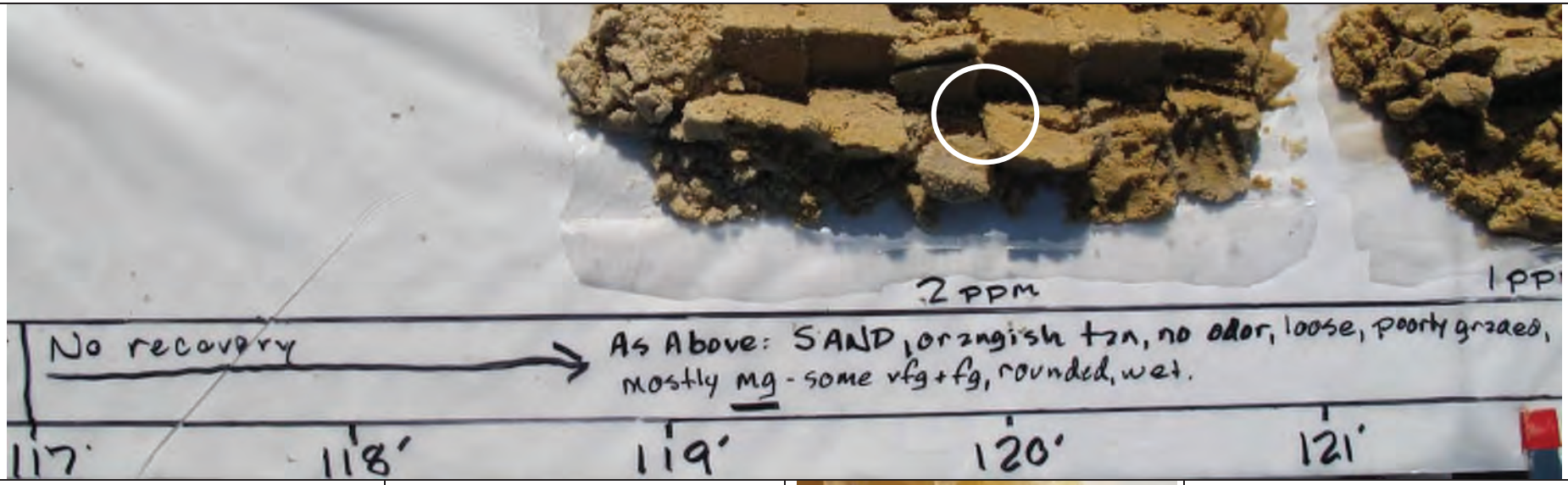
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	25
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB525 sonic core from 117 to 122 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	25A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



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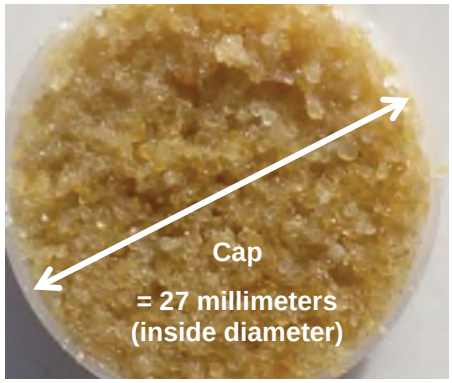
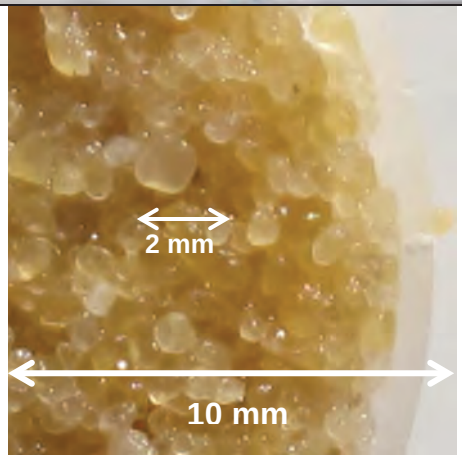


SB525 @ 120 ft bgs



SB525 @ 120 ft bgs

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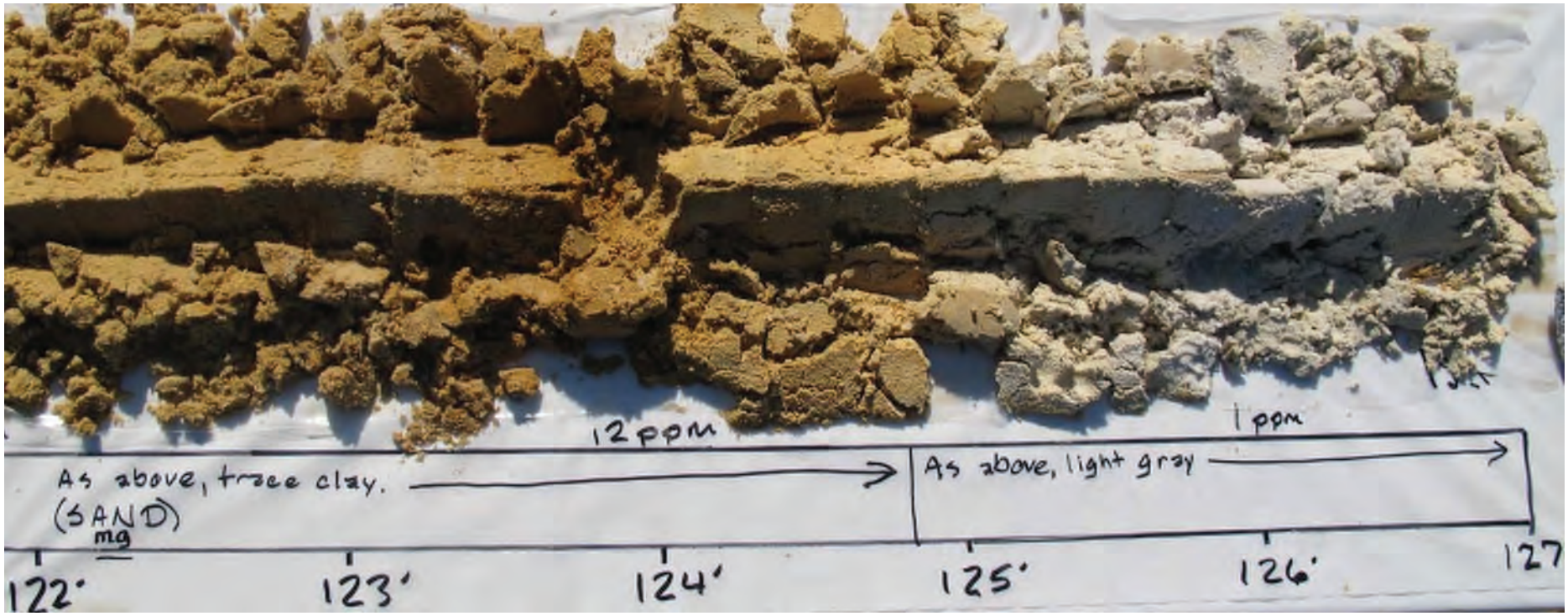
Title: SB525 sonic core from 117 to 122 ft bgs. Medium to fine to very fine grained SAND from at 120 ft bgs.

Photographic Record

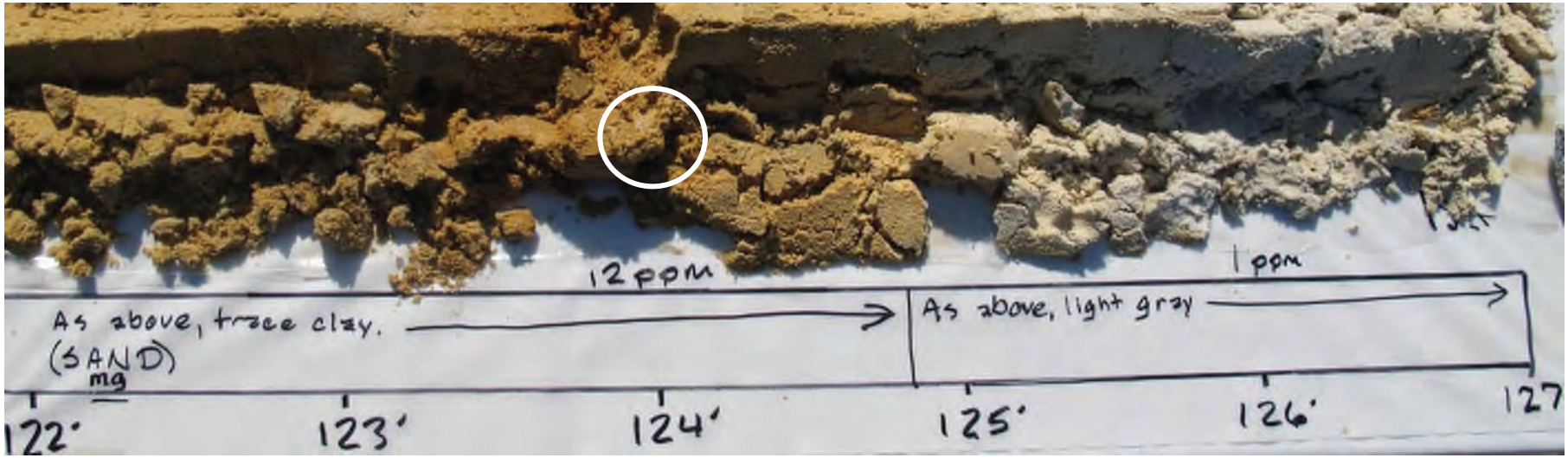
Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	26
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB525 sonic core from 122 to 127 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	26A
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



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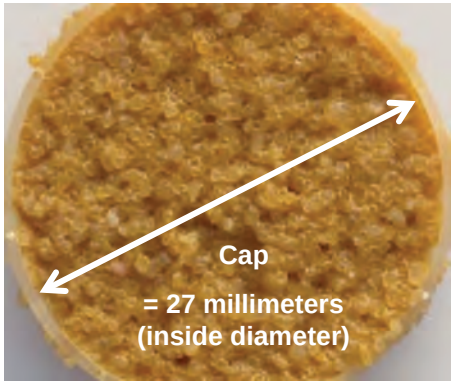
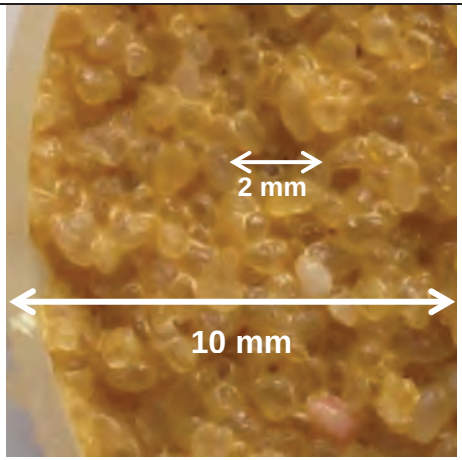


SB525 @ 124 ft bgs



SB525 @ 124 ft bgs

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Title: SB525 sonic core from 122 to 127 ft bgs. Medium to fine to very fine grained SAND at 124 ft bgs.

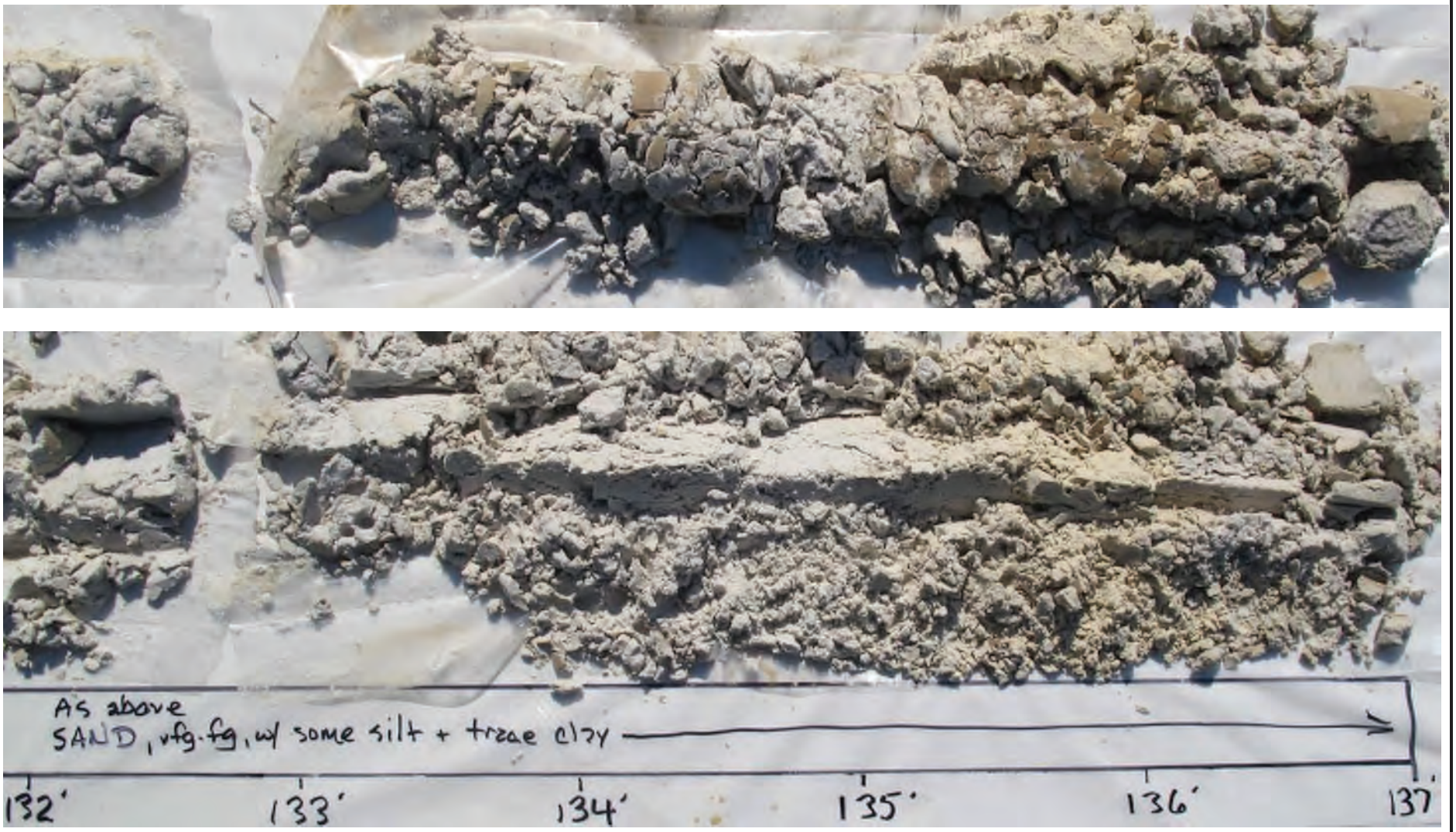
Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	27
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11

Title: SB525 sonic core from 127 to 132 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologist:**	Cal Butler (B&V)	**Plate Number:**	28
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/26/11



Title: SB525 sonic core from 132 to 137 ft bgs. Top photo immed. after cutting plastic sleeve open; before splitting + logging core.

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Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	1
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/27/11

Title: SB526 sonic core from 67 to 77 ft bgs. Top photo is ~67 to 72 ft bgs, and bottom photo is ~72 to 77 ft bgs. DNAPL zones identified by black discolored soil, which is more porous sand than the underlying light gray/white soil (e.g., sand with silt/clay). Flowing DNAPL is riding on top of a thin clay layer at ~76.4 ft bgs.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	2
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/27/11

Title: SB526 sonic core from 77 to 87 bgs. Top photo is ~77 to 82 ft bgs, and bottom photo is ~82 to 87 ft bgs. DNAPL zones identified by black, brown, and gray discolored soil, which is more porous sand than the underlying white soil (e.g., sand with silt/clay). Note smiley face drawn on oily sleeve where bag sample acquired from 83 to 84 ft bgs.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	3
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/27/11

Title: SB526 sonic core from 87 to 97 bgs. Top photo is ~87 to 92 ft bgs, and bottom photo is ~92 to 97 ft bgs. Samples collected for potential PTS analysis.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	4
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/27/11

Title: SB526 sonic core from 97 to 107 bgs. Top photo is ~97 to 102 ft bgs, and bottom photo is ~102 to 107 ft bgs. Samples collected for potential PTS analysis.

Photographic Record

Project:	American Creosote Works – Pensacola, Florida	**Geologists:**	Amy Calloway & Cal Butler (B&V)	**Plate Number:**	5
Client:	US Environmental Protection Agency Region 4	**Driller:**	Vernon Scott (Boart Longyear)	**Photo Date:**	10/28/11

Title: SB526 sonic core from 97 to 107 bgs. Settling jars primarily showing the sand and silt content from various horizons. The jars were collected on October 27, shaken vigorously, and allowed to settle overnight.

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Appendix C3 – Analytical Results

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

June 7, 2018

4SESD-MTSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0191, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)
Dioxin	Contract SOW (Water)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Report Narrative for Work Order: C181002

Site Name: American Creosote, Pensacola, FL
Case 47458, ELEMENT Sample Nos. C181002-01 through C181002-46,
C181003-01 through C181003-02 (PES)

Dioxin Analysis: Analytical Resources, Inc., Tukwila, WA

The ESAT Work Team reviewed data for the project cited above consisting of three water and 43 soil samples analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 02/20/18 and 02/22/18 and received by the laboratory between 02/22/18 and 02/24/18. The final data package was received by the EPA on 05/15/18. The analytical results were reported in three sample delivery groups (SDGs) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation samples (PES) blanks for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

The laboratory satisfied all technical holding time requirements.

The laboratory scored within warning limits for all spiked analytes in both of the soil PES blind blanks. All positive results reported were treated as method blank contaminants during data qualification.

The laboratory stated in the case narrative that "an application specific column [RTX-Dioxin2 - 60 meters long, 0.25 mm ID, 0.24 µm film thickness] recently developed by Restek" was used instead of the SOW specified DB-5 (primary) and DB-225 (2,3,7,8-TCDF confirmation) columns in Exhibit D, Sections 6.8.1.1.3 and 6.8.1.1.4. An alternative resolution test mixture consisting of 2,3,4,8-TCDF, 2,3,7,8-TCDF, and 3,4,6,7-TCDF was used at the beginning and ending of each analytical sequence to demonstrate that the method minimum valley between isomers of 25% was satisfied. The laboratory's performance provides comparable resolution for 2,3,7,8-TCDF analyzed on this single column as required by the SOW for the DB-225 confirmation column. The results for 2,3,7,8-TCDF are as reliable as those reported by other laboratories for other projects which have been identified (CLP10) as being confirmed on the DB-225 confirmation column. Additionally, retention time windows specified by the SOW do not apply to this specialty column, but data quality was not adversely impacted. The laboratory stated that "the column literature [included in submittals] may be used as a guide to the elution order. ARI has compiled data establishing retention time windows."

Only minimal Chlorodiphenyl Ether interferences with target congeners were observed for 2,3,7,8-TCDF in samples C181002-36, 37, 42, and 45, and for 1,2,3,4,7,8-PeCDF in samples C181002-12, 42, 45, and 46, and for 1,2,3,4,7,8-HxCDF in sample C181002-14 in this Case. These results were qualified "U" (D-4).

The concentration of OCDD exceeded the calibration range in samples C181002-09, 10, 11, 12, 14, 15, 19, 21, 23, 28, 30, 32, 34, 39, 40, and 45. These OCDD results were qualified "J" (CLP02). The SOW does not require the laboratory to perform dilutions for OCDD or OCDF.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL, the MDL or the EMPC as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

Results are reported as not detected at an elevated detection limit when method blank contamination is evident, or when one or more of the qualitative identification criteria have not been met. In the event of method blank contamination, detection limits may be raised as much as five times (10X for OCDD and OCDF) the level of contamination to discount false positive results. If qualitative identification criteria are not met for an analyte, an estimated maximum possible concentration (EMPC) value is reported, and is qualified as a non-detect "U" (CLP18).

The reporting limit was elevated for 1,2,3,4,6,7,8-HpCDD in sample C181002-43; and for OCDD and OCDF in samples C181002-37, 43, 44, and 46 due to method blank contamination (U, B-4). Many method blanks contained 1,2,3,4,6,7,8-HpCDD and OCDD at concentrations exceeding the maximum allowed by the SOW.

All analyte results except 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8-HpCDF, OCDD, and/or OCDF were either not detected or present at below the elevated CRQLs in samples C181002-04, 05, 13 and 17. The laboratory used preliminary screening by Gas Chromatography/Electron Capture Detector (GC-ECD) and Gas Chromatography/Flame Ionization Detector (GC-FID) to determine the amount of sample to be extracted. Consequently, the laboratory extracted approximately 1 gram instead of the usual 10 grams for samples C181002-04, 05, 13 and 17. The TEQs for these samples are likely artificially higher using these elevated proxy values (MDL) for the non-detected results.

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998. The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0191, American Creosote **Contract Lab Case: 47458**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
RB01_SS1042	C181002-01		AKT0	Rinse Water Blank	2/20/18 15:00
RB02_SS1035	C181002-02		AKW1	Rinse Water Blank	2/21/18 10:45
RB03_SS1047	C181002-03		AKZ7	Rinse Water Blank	2/22/18 15:45
SS1000A	C181002-04		AKR1	Surface Soil	2/20/18 09:20
SS1000B	C181002-05		AKR2	Surface Soil	2/20/18 09:30
SS1001A	C181002-06		AKR4	Surface Soil	2/20/18 10:30
SS1001B	C181002-07		AKR5	Surface Soil	2/20/18 10:40
SS1002A	C181002-08		AKR7	Surface Soil	2/20/18 13:00
SS1002B	C181002-09		AKR8	Surface Soil	2/20/18 13:10
SS1003A	C181002-10		AKS0	Surface Soil	2/20/18 13:25
SS1003B	C181002-11		AKS1	Surface Soil	2/20/18 13:35
SS91003A	C181002-12		AKS3	Surface Soil	2/20/18 13:25
SS1004A	C181002-13		AKS7	Surface Soil	2/20/18 15:10
SS1004B	C181002-14		AKS8	Surface Soil	2/20/18 15:20
SS1005A	C181002-15		AKX2	Surface Soil	2/22/18 08:10
SS1005B	C181002-16		AKX3	Surface Soil	2/22/18 08:20
SS1007A	C181002-17		AKX5	Surface Soil	2/22/18 08:55
SS1007B	C181002-18		AKX6	Surface Soil	2/22/18 09:05
SS1020A	C181002-19		AKX8	Surface Soil	2/22/18 09:55
SS1020B	C181002-20		AKX9	Surface Soil	2/22/18 10:05
SS1023A	C181002-21		AKY1	Surface Soil	2/22/18 10:25
SS1023B	C181002-22		AKY2	Surface Soil	2/22/18 10:35
SS1026A	C181002-23		AKZ1	Surface Soil	2/22/18 14:10
SS1026B	C181002-24		AKZ2	Surface Soil	2/22/18 14:20
SS1029A	C181002-25		AKY7	Surface Soil	2/22/18 13:25
SS1029B	C181002-26		AKY8	Surface Soil	2/22/18 13:35
SS91029A	C181002-27		AKZ0	Surface Soil	2/22/18 13:25
SS1031A	C181002-28		AKY4	Surface Soil	2/22/18 13:00
SS1031B	C181002-29		AKY5	Surface Soil	2/22/18 13:10
SS1035A	C181002-30		AKT8	Surface Soil	2/21/18 10:10
SS1035B	C181002-31		AKT9	Surface Soil	2/21/18 10:20
SS1036A	C181002-32		AKT5	Surface Soil	2/21/18 09:40
SS1036B	C181002-33		AKT6	Surface Soil	2/21/18 09:50
SS1037A	C181002-34		AKT1	Surface Soil	2/21/18 08:25

SS1037B	C181002-35	AKT2	Surface Soil	2/21/18 08:35
SS1038A	C181002-36	AKW2	Surface Soil	2/21/18 12:40
SS1038B	C181002-37	AKW3	Surface Soil	2/21/18 12:50
SS1042A	C181002-38	AKS4	Surface Soil	2/20/18 14:10
SS1042B	C181002-39	AKS5	Surface Soil	2/20/18 14:20
SS1047A	C181002-40	AKZ4	Surface Soil	2/22/18 15:15
SS1047B	C181002-41	AKZ5	Surface Soil	2/22/18 15:25
SS1052A	C181002-42	AKW5	Surface Soil	2/21/18 13:40
SS1052B	C181002-43	AKW6	Surface Soil	2/21/18 13:50
SS91052B	C181002-44	AKW8	Surface Soil	2/21/18 13:50
SS1053A	C181002-45	AKW9	Surface Soil	2/21/18 14:20
SS1053B	C181002-46	AKX0	Surface Soil	2/21/18 14:30

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
B-4	Level in blank impacts MRLs.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP18	Estimated Maximum Possible Concentration (EMPC) Reported
D-4	MRL elevated due to interferences.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.
QC-3	Analyte calibration criteria not met

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: RB01_SS1042
Station ID:

Lab ID: C181002-01
Matrix: Rinse Water Blank

MD No:
D No: AKT0 ARI

Date Collected: 2/20/18 15:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0063	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0056	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0026	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0039	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0042	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0026	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0028	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0025	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0046	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0027	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0011	U	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0010	U	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0063	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0041	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0037	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0038	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.039	U	ng/L	0.095	3/27/18	4/02/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.011	U	ng/L	0.095	3/27/18	4/02/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0028	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0026	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.010	U, J, D-5	ng/L	0.010	3/27/18	4/02/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0090	U, J, D-5	ng/L	0.0090	3/27/18	4/02/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0077	U, J, D-5	ng/L	0.0077	3/27/18	4/02/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0011	U, J, Q-3	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: RB01_SS1042
Station ID:

Lab ID: C181002-01
Matrix: Rinse Water Blank

MD No:
D No: AKT0 ARI

Date Collected: 2/20/18 15:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0010	U, J, Q-3	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: RB02_SS1035
Station ID:
Lab ID: C181002-02
Matrix: Rinse Water Blank
MD No:
D No: AKW1 ARI

Date Collected: 2/21/18 10:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0063	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0056	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0026	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0039	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0042	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0026	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0028	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0025	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0046	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0027	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0011	U	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0010	U	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0063	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0041	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0037	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0038	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.039	U	ng/L	0.095	3/27/18	4/02/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.011	U	ng/L	0.095	3/27/18	4/02/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0028	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0026	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.010	U, J, D-5	ng/L	0.010	3/27/18	4/02/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0090	U, J, D-5	ng/L	0.0090	3/27/18	4/02/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0077	U, J, D-5	ng/L	0.0077	3/27/18	4/02/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0011	U, J, Q-3	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2

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D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: RB02_SS1035
Station ID:

Lab ID: C181002-02
Matrix: Rinse Water Blank

MD No:
D No: AKW1 ARI

Date Collected: 2/21/18 10:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0010	U, J, Q-3	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: RB03_SS1047
Station ID:

Lab ID: C181002-03
Matrix: Rinse Water Blank

MD No:
D No: AKZ7 ARI

Date Collected: 2/22/18 15:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0063	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0056	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0026	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0039	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0042	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0036	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0026	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0028	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0025	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0046	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0027	U	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0011	U	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0010	U	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0063	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0041	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0038	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0036	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.039	U	ng/L	0.095	3/27/18	4/02/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.011	U	ng/L	0.095	3/27/18	4/02/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0028	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0026	U, J, Q-3	ng/L	0.047	3/27/18	4/02/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.010	U, J, D-5	ng/L	0.010	3/27/18	4/02/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0090	U, J, D-5	ng/L	0.0090	3/27/18	4/02/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0077	U, J, D-5	ng/L	0.0077	3/27/18	4/02/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0011	U, J, Q-3	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2

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D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: RB03_SS1047
Station ID:

Lab ID: C181002-03
Matrix: Rinse Water Blank

MD No:
D No: AKZ7 ARI

Date Collected: 2/22/18 15:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0010	U, J, Q-3	ng/L	0.0095	3/27/18	4/02/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1000A
Station ID: SS1000

Lab ID: C181002-04
Matrix: Surface Soil

MD No:
D No: AKR1 ARI

Date Collected: 2/20/18 9:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.8		%		4/05/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1600		ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	210		ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	15	U, CLP18	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	13	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	7.2	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	39	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.4	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	23	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	5.2	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	8.8	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.8	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	1.4	U, CLP18	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.87	U	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	3200	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	740	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	200	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	17000		ng/kg dry	110	4/05/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	850		ng/kg dry	110	4/05/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	25	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	21	J, D-5	ng/kg dry	21	4/05/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	23	J, D-5	ng/kg dry	23	4/05/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	41	J, D-5	ng/kg dry	41	4/05/18	5/04/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1000A
Station ID: SS1000

Lab ID: C181002-04
Matrix: Surface Soil

MD No:
D No: AKR1 ARI

Date Collected: 2/20/18 9:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.1	J, Q-3	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	6.5	J, Q-3	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1000B
Station ID: SS1000

Lab ID: C181002-05
Matrix: Surface Soil

MD No:
D No: AKR2 ARI

Date Collected: 2/20/18 9:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.7		%		4/05/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	210		ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	30	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.2	U, CLP18	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.1	U, CLP18	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.3	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.2	J, CLP01	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.5	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.2	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.8	U	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.72	U	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.88	U	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	440	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	91	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	63	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2300		ng/kg dry	110	4/05/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	100	J, CLP01	ng/kg dry	110	4/05/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.4	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	54	4/05/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.7	J, D-5	ng/kg dry	6.7	4/05/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.4	J, D-5	ng/kg dry	5.4	4/05/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.5	J, D-5	ng/kg dry	7.5	4/05/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1000B
Station ID: SS1000

Lab ID: C181002-05
Matrix: Surface Soil

MD No:
D No: AKR2 ARI

Date Collected: 2/20/18 9:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.4	J, Q-3	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1001A
Station ID: SS1001

Lab ID: C181002-06
Matrix: Surface Soil

MD No:
D No: AKR4 ARI

Date Collected: 2/20/18 10:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	150		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	26		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.96	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.3	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.98	U, CLP18	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.35	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.64	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.4	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.41	U, CLP18	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.080	U	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.23	U, CLP18	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	300	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	36	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1700		ng/kg dry	9.9	4/16/18	5/03/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	76		ng/kg dry	9.9	4/16/18	5/03/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.7	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	8.1	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.7	J, D-5	ng/kg dry	2.7	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.4	J, D-5	ng/kg dry	4.4	4/16/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1001A
Station ID: SS1001

Lab ID: C181002-06
Matrix: Surface Soil

MD No:
D No: AKR4 ARI

Date Collected: 2/20/18 10:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.6	J, Q-3	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	7.5	J, Q-3	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1001B
Station ID: SS1001

Lab ID: C181002-07
Matrix: Surface Soil

MD No:
D No: AKR5 ARI

Date Collected: 2/20/18 10:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	14		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	34		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.5		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.39	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.34	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.24	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.98	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.17	U, CLP18	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.66	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.17	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.33	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.12	U, CLP18	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.10	U	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	66	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	8.4	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	5.2	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	500		ng/kg dry	9.9	4/16/18	5/03/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	17		ng/kg dry	9.9	4/16/18	5/03/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.0	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.8	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.90	J, D-5	ng/kg dry	0.90	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.80	J, D-5	ng/kg dry	0.80	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.2	J, D-5	ng/kg dry	1.2	4/16/18	5/03/18	CL HRSM01.2

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Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1001B
Station ID: SS1001

Lab ID: C181002-07
Matrix: Surface Soil

MD No:
D No: AKR5 ARI

Date Collected: 2/20/18 10:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.2	J, Q-3	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	6.7	J, Q-3	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1002A
Station ID: SS1002

Lab ID: C181002-08
Matrix: Surface Soil

MD No:
D No: AKR7 ARI

Date Collected: 2/20/18 13:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.8		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	2800		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	510		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	32		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	30		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	84		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	57		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	14		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	33		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	4.2	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.52	U, CLP18	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.84	J, CLP01	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	5400	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1400	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	610	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	740	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	24000		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1200		ng/kg dry	10	4/16/18	5/03/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	70	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	47		ng/kg dry	47	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	52		ng/kg dry	52	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	82		ng/kg dry	82	4/16/18	5/03/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1002A
Station ID: SS1002

Lab ID: C181002-08
Matrix: Surface Soil

MD No:
D No: AKR7 ARI

Date Collected: 2/20/18 13:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	36	J, Q-3	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2

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D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1002B
Station ID: SS1002

Lab ID: C181002-09
Matrix: Surface Soil

MD No:
D No: AKR8 ARI

Date Collected: 2/20/18 13:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.5		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1200		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	260		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	15		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	8.2		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	38		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	9.4		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	14		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U, CLP18	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.55	J, CLP01	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2200	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	720	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	260	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	320	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	11000	J, CLP02	ng/kg dry	9.9	4/16/18	5/03/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	620		ng/kg dry	9.9	4/16/18	5/03/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	96	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	20	J, D-5	ng/kg dry	20	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	22	J, D-5	ng/kg dry	22	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	35	J, D-5	ng/kg dry	35	4/16/18	5/03/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1002B
Station ID: SS1002

Lab ID: C181002-09
Matrix: Surface Soil

MD No:
D No: AKR8 ARI

Date Collected: 2/20/18 13:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.4	J, Q-3	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	0.99	4/16/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1003A
Station ID: SS1003

Lab ID: C181002-10
Matrix: Surface Soil

MD No:
D No: AKS0 ARI

Date Collected: 2/20/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	9200		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1200		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	100		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	73		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	52		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	230		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	44		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	140		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	38	J	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	27		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	74		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.2		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	6.1		ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.5		ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	24000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	4100	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1700	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	87000	J, CLP02	ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	4500		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	270	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	110	J, D-5	ng/kg dry	110	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	130	J, D-5	ng/kg dry	130	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	230	J, D-5	ng/kg dry	230	4/16/18	5/03/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1003A
Station ID: SS1003

Lab ID: C181002-10
Matrix: Surface Soil

MD No:
D No: AKS0 ARI

Date Collected: 2/20/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	19	J, Q-3	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	67	J, Q-3	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1003B
Station ID: SS1003

Lab ID: C181002-11
Matrix: Surface Soil

MD No:
D No: AKS1 ARI

Date Collected: 2/20/18 13:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	15		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	9900		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1400		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	110		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	96		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	60		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	280		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	45	J, CLP01	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	180		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	18		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	34		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	6.5		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	29		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.3		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	7.1		ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.4		ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	21000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	5100	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1600	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	2000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	87000	J, CLP02	ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	5100		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	230	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	130	J, D-5	ng/kg dry	130	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	150	J, D-5	ng/kg dry	150	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	260	J, D-5	ng/kg dry	260	4/16/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1003B
Station ID: SS1003

Lab ID: C181002-11
Matrix: Surface Soil

MD No:
D No: AKS1 ARI

Date Collected: 2/20/18 13:35

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91003A
Station ID: SS1003
Lab ID: C181002-12
Matrix: Surface Soil
MD No:
D No: AKS3 ARI

Date Collected: 2/20/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	11000		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1400		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	120		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	86		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	62		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	270		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	51		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	160		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	88	J	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	32		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	4.9	U, D-4	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	90		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	8.2		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	4.9		ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.6		ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	28000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	4800	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	2000	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	2000	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	99000	J, CLP02	ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	5100		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	330	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	140	J, D-5	ng/kg dry	140	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	150	J, D-5	ng/kg dry	150	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	280	J, D-5	ng/kg dry	280	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91003A
Station ID: SS1003

Lab ID: C181002-12
Matrix: Surface Soil

MD No:
D No: AKS3 ARI

Date Collected: 2/20/18 13:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	66	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1004A
Station ID: SS1004

Lab ID: C181002-13
Matrix: Surface Soil

MD No:
D No: AKS7 ARI

Date Collected: 2/20/18 15:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		4/05/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3200		ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	490		ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	31	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	18	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	13	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	69		ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	11	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	34	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.3	U, CLP18	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	6.8	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.3	U, CLP18	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	17	J, CLP01	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.3	U, CLP18	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.76	U	ng/kg dry	11	4/05/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.93	U	ng/kg dry	11	4/05/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	5600	J, Q-3	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1500	J, Q-3	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	560	J, Q-3	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	400	J, Q-3	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	29000		ng/kg dry	110	4/05/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1700		ng/kg dry	110	4/05/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	72	J, Q-3	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	84	J, Q-3	ng/kg dry	57	4/05/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	32	J, D-5	ng/kg dry	32	4/05/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	35	J, D-5	ng/kg dry	35	4/05/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	71	J, D-5	ng/kg dry	71	4/05/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1004A
Station ID: SS1004

Lab ID: C181002-13
Matrix: Surface Soil

MD No:
D No: AKS7 ARI

Date Collected: 2/20/18 15:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.3	J, Q-3	ng/kg dry	11	4/05/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	11	4/05/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1004B
Station ID: SS1004

Lab ID: C181002-14
Matrix: Surface Soil

MD No:
D No: AKS8 ARI

Date Collected: 2/20/18 15:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	19		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	790		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	140		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.1		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.7	U, D-4	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.0		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.47	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	6.0		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.3	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.32	U	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	430	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	170	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	7200	J, CLP02	ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	450		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	32	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	53	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.3	J, D-5	ng/kg dry	9.3	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.7	J, D-5	ng/kg dry	9.7	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	19	J, D-5	ng/kg dry	19	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1004B
Station ID: SS1004

Lab ID: C181002-14
Matrix: Surface Soil

MD No:
D No: AKS8 ARI

Date Collected: 2/20/18 15:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.3	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1005A
Station ID: SS1005

Lab ID: C181002-15
Matrix: Surface Soil

MD No:
D No: AKX2 ARI

Date Collected: 2/22/18 8:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		4/23/18	5/08/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	600		ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	120		ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	6.1		ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.6	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	16		ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	8.5		ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.35	U	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.7	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.53	U	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1100	J, Q-3	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	380	J, Q-3	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5300	J, CLP02	ng/kg dry	9.9	4/23/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	410		ng/kg dry	9.9	4/23/18	5/08/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	28	J, Q-3	ng/kg dry	4.9	4/23/18	5/08/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.5	J, D-5	ng/kg dry	9.5	4/23/18	5/08/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	16	J, D-5	ng/kg dry	16	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1005A
Station ID: SS1005

Lab ID: C181002-15
Matrix: Surface Soil

MD No:
D No: AKX2 ARI

Date Collected: 2/22/18 8:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.4	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	9.6	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1005B
Station ID: SS1005

Lab ID: C181002-16
Matrix: Surface Soil

MD No:
D No: AKX3 ARI

Date Collected: 2/22/18 8:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	15		%		4/23/18	5/08/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	76		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	15		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.77	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.53	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.41	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.27	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.91	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.20	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.21	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.14	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.45	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.44	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	48	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	9.9	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	900		ng/kg dry	9.9	4/23/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	52		ng/kg dry	9.9	4/23/18	5/08/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.87	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.3	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.5	J, D-5	ng/kg dry	1.5	4/23/18	5/08/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.3	J, D-5	ng/kg dry	1.3	4/23/18	5/08/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.2	J, D-5	ng/kg dry	2.2	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1005B
Station ID: SS1005

Lab ID: C181002-16
Matrix: Surface Soil

MD No:
D No: AKX3 ARI

Date Collected: 2/22/18 8:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.30	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	0.16	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1007A
Station ID: SS1007

Lab ID: C181002-17
Matrix: Surface Soil

MD No:
D No: AKX5 ARI

Date Collected: 2/22/18 8:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		4/05/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	550		ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	120		ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.5	J, CLP01	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.4	U, CLP18	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.2	J, CLP01	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	19	J, CLP01	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.2	U, CLP18	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	11	J, CLP01	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.6	U	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.4	U	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.5	U, CLP18	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.9	U	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.74	U	ng/kg dry	11	4/05/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	11	4/05/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1000	J, Q-3	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	300	J, Q-3	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4800		ng/kg dry	110	4/05/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	270		ng/kg dry	110	4/05/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	27	J, Q-3	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	56	4/05/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	4/05/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.9	J, D-5	ng/kg dry	10	4/05/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	17	J, D-5	ng/kg dry	17	4/05/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1007A
Station ID: SS1007

Lab ID: C181002-17
Matrix: Surface Soil

MD No:
D No: AKX5 ARI

Date Collected: 2/22/18 8:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	11	4/05/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	41	J, Q-3	ng/kg dry	11	4/05/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1007B
Station ID: SS1007

Lab ID: C181002-18
Matrix: Surface Soil

MD No:
D No: AKX6 ARI

Date Collected: 2/22/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		4/23/18	5/08/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	90		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	16		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.92	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.93	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.89	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.94	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.62	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.63	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.45	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.16	U, CLP18	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.97	J, CLP01	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	170	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	29	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	690		ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	41		ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.6	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.2	J, D-5	ng/kg dry	5.2	4/23/18	5/08/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.3	J, D-5	ng/kg dry	3.3	4/23/18	5/08/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.9	J, D-5	ng/kg dry	3.9	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1007B
Station ID: SS1007

Lab ID: C181002-18
Matrix: Surface Soil

MD No:
D No: AKX6 ARI

Date Collected: 2/22/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.3	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1020A
Station ID: SS1020

Lab ID: C181002-19
Matrix: Surface Soil

MD No:
D No: AKX8 ARI

Date Collected: 2/22/18 9:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.6		%		4/23/18	5/08/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	650		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	110		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	6.3		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	6.0		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	17		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.0	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.83	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.68	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.58	U	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1300	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	340	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5900	J, CLP02	ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	360		ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	24	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	34	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	17	J, D-5	ng/kg dry	17	4/23/18	5/08/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1020A
Station ID: SS1020

Lab ID: C181002-19
Matrix: Surface Soil

MD No:
D No: AKX8 ARI

Date Collected: 2/22/18 9:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.0	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	0.99	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1020B
Station ID: SS1020

Lab ID: C181002-20
Matrix: Surface Soil

MD No:
D No: AKX9 ARI

Date Collected: 2/22/18 10:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.4		%		4/23/18	5/08/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	35		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	6.0		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.38	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.39	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.19	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.0	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.18	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.74	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.21	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.32	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.20	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.11	U, CLP18	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	70	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	9.1	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	360		ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	19		ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.6	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.9	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.94	J, D-5	ng/kg dry	0.94	4/23/18	5/08/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.86	J, D-5	ng/kg dry	0.86	4/23/18	5/08/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.2	J, D-5	ng/kg dry	1.2	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1020B
Station ID: SS1020

Lab ID: C181002-20
Matrix: Surface Soil

MD No:
D No: AKX9 ARI

Date Collected: 2/22/18 10:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.68	J, Q-3	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.1	J, Q-3	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1023A
Station ID: SS1023

Lab ID: C181002-21
Matrix: Surface Soil

MD No:
D No: AKY1 ARI

Date Collected: 2/22/18 10:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.1		%		4/23/18	5/08/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	540		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	100		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.4		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	15		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.0	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.5		ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.93	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.61	U	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.7	U, CLP18	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.0		ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1100	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	310	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5000	J, CLP02	ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	320		ng/kg dry	10	4/23/18	5/08/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	4/23/18	5/08/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	4/23/18	5/08/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.5	J, D-5	ng/kg dry	9.0	4/23/18	5/08/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	15	J, D-5	ng/kg dry	15	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1023A
Station ID: SS1023

Lab ID: C181002-21
Matrix: Surface Soil

MD No:
D No: AKY1 ARI

Date Collected: 2/22/18 10:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.2	J, Q-3	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	21	J, Q-3	ng/kg dry	1.0	4/23/18	5/08/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1023B
Station ID: SS1023

Lab ID: C181002-22
Matrix: Surface Soil

MD No:
D No: AKY2 ARI

Date Collected: 2/22/18 10:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.1		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	170		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	49		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.3	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.42	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.69	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.30	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.55	U, CLP18	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	300	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	52	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1400		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	180		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.1	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.2	J, D-5	ng/kg dry	4.2	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.5	J, D-5	ng/kg dry	3.5	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.2	J, D-5	ng/kg dry	5.2	4/23/18	5/09/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1023B
Station ID: SS1023

Lab ID: C181002-22
Matrix: Surface Soil

MD No:
D No: AKY2 ARI

Date Collected: 2/22/18 10:35

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1026A
Station ID: SS1026
Lab ID: C181002-23
Matrix: Surface Soil
MD No:
D No: AKZ1 ARI

Date Collected: 2/22/18 14:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	10		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	640		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	130		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.0		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	8.6		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.5	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.8		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.63	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	6.7		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.91	U	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.2		ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1200	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	360	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	6300	J, CLP02	ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	340		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	20	J, D-5	ng/kg dry	20	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1026A
Station ID: SS1026

Lab ID: C181002-23
Matrix: Surface Soil

MD No:
D No: AKZ1 ARI

Date Collected: 2/22/18 14:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	67	J, Q-3	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1026B
Station ID: SS1026

Lab ID: C181002-24
Matrix: Surface Soil

MD No:
D No: AKZ2 ARI

Date Collected: 2/22/18 14:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	10		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	190		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	37		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.77	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.75	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.36	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.5	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.33	U, CLP18	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.35	U	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	360	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	42	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1800		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	98		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.3	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	29	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.0	J, D-5	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.3	J, D-5	ng/kg dry	4.3	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	6.3	J, D-5	ng/kg dry	6.3	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1026B
Station ID: SS1026

Lab ID: C181002-24
Matrix: Surface Soil

MD No:
D No: AKZ2 ARI

Date Collected: 2/22/18 14:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1029A
Station ID: SS1029

Lab ID: C181002-25
Matrix: Surface Soil

MD No:
D No: AKY7 ARI

Date Collected: 2/22/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.2		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	320		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	55		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.7		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.72	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.98	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U, CLP18	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.75	J, CLP01	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	620	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	64	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	55	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3200		ng/kg dry	9.9	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	180		ng/kg dry	9.9	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	22	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.0	J, D-5	ng/kg dry	6.0	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.4	J, D-5	ng/kg dry	5.4	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.1	J, D-5	ng/kg dry	9.1	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1029A
Station ID: SS1029

Lab ID: C181002-25
Matrix: Surface Soil

MD No:
D No: AKY7 ARI

Date Collected: 2/22/18 13:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.9	J, Q-3	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1029B
Station ID: SS1029

Lab ID: C181002-26
Matrix: Surface Soil

MD No:
D No: AKY8 ARI

Date Collected: 2/22/18 13:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.1		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	260		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	26		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.2	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.99	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.57	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.76	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.36	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.95	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.73	J, CLP01	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	540	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	85	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	39	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	32	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3700		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	91		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.0	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.4	J, D-5	ng/kg dry	4.4	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.5	J, D-5	ng/kg dry	3.5	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	6.7	J, D-5	ng/kg dry	6.7	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1029B
Station ID: SS1029

Lab ID: C181002-26
Matrix: Surface Soil

MD No:
D No: AKY8 ARI

Date Collected: 2/22/18 13:35

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.7	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91029A
Station ID: SS1029

Lab ID: C181002-27
Matrix: Surface Soil

MD No:
D No: AKZ0 ARI

Date Collected: 2/22/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.0		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	310		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	51		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.0	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.6	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.2		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.72	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.59	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.26	U, CLP18	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.92	J, CLP01	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	600	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	66	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	57	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3000		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	170		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	30	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.3	J, D-5	ng/kg dry	6.3	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.6	J, D-5	ng/kg dry	5.6	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.0	J, D-5	ng/kg dry	9.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91029A
Station ID: SS1029

Lab ID: C181002-27
Matrix: Surface Soil

MD No:
D No: AKZ0 ARI

Date Collected: 2/22/18 13:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.1	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	21	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1031A
Station ID: SS1031

Lab ID: C181002-28
Matrix: Surface Soil

MD No:
D No: AKY4 ARI

Date Collected: 2/22/18 13:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.0		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	420		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	110		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.2		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.5	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	6.8		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.0		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.20	U, CLP18	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.1		ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	790	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	320	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	92	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4100	J, CLP02	ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	290		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	8.8	J, D-5	ng/kg dry	9.0	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	13	J, D-5	ng/kg dry	13	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1031A
Station ID: SS1031

Lab ID: C181002-28
Matrix: Surface Soil

MD No:
D No: AKY4 ARI

Date Collected: 2/22/18 13:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.3	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	34	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1031B
Station ID: SS1031

Lab ID: C181002-29
Matrix: Surface Soil

MD No:
D No: AKY5 ARI

Date Collected: 2/22/18 13:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.9		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	80		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	21		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.90	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.84	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.95	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.5	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.82	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.7	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.49	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.62	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.28	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.2	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.43	U	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	22	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	770		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	49		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.3	J, D-5	ng/kg dry	3.3	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.5	J, D-5	ng/kg dry	2.5	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.2	J, D-5	ng/kg dry	3.2	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1031B
Station ID: SS1031

Lab ID: C181002-29
Matrix: Surface Soil

MD No:
D No: AKY5 ARI

Date Collected: 2/22/18 13:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.8	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1035A
Station ID: SS1035

Lab ID: C181002-30
Matrix: Surface Soil

MD No:
D No: AKT8 ARI

Date Collected: 2/21/18 10:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	17		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	950		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	180		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	9.2		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.4		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	6.4		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	27		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.3		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	15		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.3	U, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.9	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.3	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	7.8	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.64	J, CLP01	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	520	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	170	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	190	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9500	J, CLP02	ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	480		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	26	J, D-5	ng/kg dry	26	4/16/18	5/04/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1035A
Station ID: SS1035

Lab ID: C181002-30
Matrix: Surface Soil

MD No:
D No: AKT8 ARI

Date Collected: 2/21/18 10:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.1	J, Q-3	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1035B
Station ID: SS1035

Lab ID: C181002-31
Matrix: Surface Soil

MD No:
D No: AKT9 ARI

Date Collected: 2/21/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	20		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.1	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.0	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.75	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.0	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.64	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.34	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.44	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.18	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.91	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.71	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.11	U, CLP18	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	21	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1100		ng/kg dry	9.9	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	53		ng/kg dry	9.9	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.0	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.8	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.3	J, D-5	ng/kg dry	2.3	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.1	J, D-5	ng/kg dry	2.1	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.3	J, D-5	ng/kg dry	3.3	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1035B
Station ID: SS1035

Lab ID: C181002-31
Matrix: Surface Soil

MD No:
D No: AKT9 ARI

Date Collected: 2/21/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.2	J, Q-3	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1036A
Station ID: SS1036

Lab ID: C181002-32
Matrix: Surface Soil

MD No:
D No: AKT5 ARI

Date Collected: 2/21/18 9:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	780		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	170		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	9.8		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	6.8		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	7.0		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	23		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	6.3		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	13		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	3.1	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	11		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	11		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.0		ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	500	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	160	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	7300	J, CLP02	ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	460		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	26	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	23	J, D-5	ng/kg dry	23	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	19	J, D-5	ng/kg dry	19	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	26	J, D-5	ng/kg dry	26	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1036A
Station ID: SS1036

Lab ID: C181002-32
Matrix: Surface Soil

MD No:
D No: AKT5 ARI

Date Collected: 2/21/18 9:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.6	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1036B
Station ID: SS1036
Lab ID: C181002-33
Matrix: Surface Soil
MD No:
D No: AKT6 ARI

Date Collected: 2/21/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	20		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	62		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	14		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.91	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.61	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.65	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.71	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.28	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.33	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.23	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.1	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.0	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.18	U	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	37	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	22	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	620		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	33		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.3	J, D-5	ng/kg dry	4.3	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.9	J, D-5	ng/kg dry	2.9	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1036B
Station ID: SS1036

Lab ID: C181002-33
Matrix: Surface Soil

MD No:
D No: AKT6 ARI

Date Collected: 2/21/18 9:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	8.0	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1037A
Station ID: SS1037

Lab ID: C181002-34
Matrix: Surface Soil

MD No:
D No: AKT1 ARI

Date Collected: 2/21/18 8:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1100		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	190		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	12		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.6		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	8.9		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	7.0		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	15		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.0	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	9.9		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.1	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U, CLP18	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.59	U	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2100	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	570	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	230	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	10000	J, CLP02	ng/kg dry	9.9	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	510		ng/kg dry	9.9	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	51	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	28	J, D-5	ng/kg dry	28	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1037A
Station ID: SS1037

Lab ID: C181002-34
Matrix: Surface Soil

MD No:
D No: AKT1 ARI

Date Collected: 2/21/18 8:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.8	J, Q-3	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	0.99	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1037B
Station ID: SS1037

Lab ID: C181002-35
Matrix: Surface Soil

MD No:
D No: AKT2 ARI

Date Collected: 2/21/18 8:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	180		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	35		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.5	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.3	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.91	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.92	U	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.67	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.94	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.70	J, CLP01	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	390	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	99	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	41	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1800		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	94		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	9.1	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.6	J, D-5	ng/kg dry	4.6	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.0	J, D-5	ng/kg dry	4.0	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.9	J, D-5	ng/kg dry	5.8	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1037B
Station ID: SS1037

Lab ID: C181002-35
Matrix: Surface Soil

MD No:
D No: AKT2 ARI

Date Collected: 2/21/18 8:35

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.5	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1038A
Station ID: SS1038

Lab ID: C181002-36
Matrix: Surface Soil

MD No:
D No: AKW2 ARI

Date Collected: 2/21/18 12:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	14		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	4800		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	660		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	48		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	27		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	39		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	150		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	23		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	53		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	11		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	8.8		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	3.4	U, CLP18	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	37		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.8		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.36	U, CLP18	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.5	U, D-4	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	9400	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2200	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	680	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	950	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	39000		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2000		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	60	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	53		ng/kg dry	53	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	55		ng/kg dry	55	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	110		ng/kg dry	110	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1038A
Station ID: SS1038

Lab ID: C181002-36
Matrix: Surface Soil

MD No:
D No: AKW2 ARI

Date Collected: 2/21/18 12:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.2	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	46	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1038B
Station ID: SS1038

Lab ID: C181002-37
Matrix: Surface Soil

MD No:
D No: AKW3 ARI

Date Collected: 2/21/18 12:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	15		%		3/12/18	3/23/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	200		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	39		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.7		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.5	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.93	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.73	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.1	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.2	U, CLP18	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.0	U, D-4	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	380	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	46	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1700	U, B-4	ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	94	U, B-4	ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.8	J, D-5	ng/kg dry	6.8	3/12/18	3/23/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.2	J, D-5	ng/kg dry	5.2	3/12/18	3/23/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.2	J, D-5	ng/kg dry	7.2	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1038B
Station ID: SS1038

Lab ID: C181002-37
Matrix: Surface Soil

MD No:
D No: AKW3 ARI

Date Collected: 2/21/18 12:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.1	J, Q-3	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1042A
Station ID: SS1042

Lab ID: C181002-38
Matrix: Surface Soil

MD No:
D No: AKS4 ARI

Date Collected: 2/20/18 14:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		4/05/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	34000		ng/kg dry	570	4/05/18	5/08/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	5200		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	440		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	180		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	170		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	820		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	130		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	350		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	48	J, CLP01	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	59		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	16	J, CLP01	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	230		ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	19	U, CLP18	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	2.0	U, CLP18	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	55000	J, Q-3	ng/kg dry	570	4/05/18	5/08/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	18000	J, Q-3	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	3700	J, Q-3	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	5600	J, Q-3	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	360000		ng/kg dry	1100	4/05/18	5/08/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	18000		ng/kg dry	110	4/05/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	270	J, Q-3	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	770	J, Q-3	ng/kg dry	57	4/05/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	320		ng/kg dry	320	4/05/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	360		ng/kg dry	360	4/05/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	770		ng/kg dry	770	4/05/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1042A
Station ID: SS1042

Lab ID: C181002-38
Matrix: Surface Soil

MD No:
D No: AKS4 ARI

Date Collected: 2/20/18 14:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	30	J, Q-3	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	91	J, Q-3	ng/kg dry	11	4/05/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1042B
Station ID: SS1042

Lab ID: C181002-39
Matrix: Surface Soil

MD No:
D No: AKS5 ARI

Date Collected: 2/20/18 14:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	15000		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	2300		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	250		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	63		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	90		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	350		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	62		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	120		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	75		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	23		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	5.0		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	120		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.5		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.42	U, CLP18	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.1		ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	23000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	9000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	2800	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	170000	J, CLP02	ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	9000		ng/kg dry	10	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	380	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	150	J, D-5	ng/kg dry	150	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	160	J, D-5	ng/kg dry	160	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	340	J, D-5	ng/kg dry	340	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1042B
Station ID: SS1042

Lab ID: C181002-39
Matrix: Surface Soil

MD No:
D No: AKS5 ARI

Date Collected: 2/20/18 14:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	35	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1047A
Station ID: SS1047

Lab ID: C181002-40
Matrix: Surface Soil

MD No:
D No: AKZ4 ARI

Date Collected: 2/22/18 15:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	580		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	94		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	4.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	15		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	10		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.87	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.70	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.2		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.29	U, CLP18	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.74	J, CLP01	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1200	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	270	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	160	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	92	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5200	J, CLP02	ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	280		ng/kg dry	10	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	26	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	60	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.9	J, D-5	ng/kg dry	9.9	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.5	J, D-5	ng/kg dry	9.5	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	16	J, D-5	ng/kg dry	16	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1047A
Station ID: SS1047

Lab ID: C181002-40
Matrix: Surface Soil

MD No:
D No: AKZ4 ARI

Date Collected: 2/22/18 15:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.4	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	1.0	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1047B
Station ID: SS1047

Lab ID: C181002-41
Matrix: Surface Soil

MD No:
D No: AKZ5 ARI

Date Collected: 2/22/18 15:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	15		%		4/23/18	5/09/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	83		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	18		ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.95	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.81	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.65	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.40	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.46	U	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.26	U, CLP18	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.89	J, CLP01	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.13	U, CLP18	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.25	U, CLP18	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	160	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	26	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	36	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	820		ng/kg dry	9.9	4/23/18	5/09/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	44		ng/kg dry	9.9	4/23/18	5/09/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.1	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	54	J, Q-3	ng/kg dry	5.0	4/23/18	5/09/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	4/23/18	5/09/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	4/23/18	5/09/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.1	J, D-5	ng/kg dry	3.1	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1047B
Station ID: SS1047

Lab ID: C181002-41
Matrix: Surface Soil

MD No:
D No: AKZ5 ARI

Date Collected: 2/22/18 15:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.8	J, Q-3	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	0.99	4/23/18	5/09/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1052A
Station ID: SS1052

Lab ID: C181002-42
Matrix: Surface Soil

MD No:
D No: AKW5 ARI

Date Collected: 2/21/18 13:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		3/12/18	3/23/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	340		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	61		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.1	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	9.7		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	6.3		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.80	U, D-4	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.21	U, CLP18	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.76	U, D-4	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	680	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	69	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3000		ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	150		ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	8.2	J, D-5	ng/kg dry	8.2	3/12/18	3/23/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.2	J, D-5	ng/kg dry	7.2	3/12/18	3/23/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1052A
Station ID: SS1052

Lab ID: C181002-42
Matrix: Surface Soil

MD No:
D No: AKW5 ARI

Date Collected: 2/21/18 13:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.8	J, Q-3	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1052B
Station ID: SS1052

Lab ID: C181002-43
Matrix: Surface Soil

MD No:
D No: AKW6 ARI

Date Collected: 2/21/18 13:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.3		%		3/12/18	3/23/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	52	U, B-4 J	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	14	J	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.88	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.70	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.81	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.66	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.59	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.50	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.69	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.2	U, CLP18	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.87	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.34	U	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	31	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	510	U, B-4	ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	26	U, B-4	ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.2	J, QC-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.7	J, D-5	ng/kg dry	2.7	3/12/18	3/23/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.1	J, D-5	ng/kg dry	2.1	3/12/18	3/23/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.6	J, D-5	ng/kg dry	2.6	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1052B
Station ID: SS1052

Lab ID: C181002-43
Matrix: Surface Soil

MD No:
D No: AKW6 ARI

Date Collected: 2/21/18 13:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.7	J, Q-3	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	9.7	J, Q-3	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91052B
Station ID: SS1052
Lab ID: C181002-44
Matrix: Surface Soil
MD No:
D No: AKW8 ARI

Date Collected: 2/21/18 13:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.8	J	%		3/12/18	3/23/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	180		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	25	J	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.90	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.75	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.93	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.7	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.99	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.59	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.68	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.69	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	0.99	3/12/18	3/23/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.40	U, CLP18	ng/kg dry	0.99	3/12/18	3/23/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	360	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	34	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500	U, B-4	ng/kg dry	9.9	3/12/18	3/23/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	45	U, B-4	ng/kg dry	9.9	3/12/18	3/23/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.8	J, D-5	ng/kg dry	3.8	3/12/18	3/23/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.0	J, D-5	ng/kg dry	3.0	3/12/18	3/23/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.9	J, D-5	ng/kg dry	4.9	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91052B
Station ID: SS1052

Lab ID: C181002-44
Matrix: Surface Soil

MD No:
D No: AKW8 ARI

Date Collected: 2/21/18 13:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.1	J, Q-3	ng/kg dry	0.99	3/12/18	3/23/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	0.99	3/12/18	3/23/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1053A
Station ID: SS1053

Lab ID: C181002-45
Matrix: Surface Soil

MD No:
D No: AKW9 ARI

Date Collected: 2/21/18 14:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.8		%		3/12/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	650		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	130		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.9		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.3		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	6.1		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	8.0		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.9	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	5.4	U, D-4	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	13		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.41	U, CLP18	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	4.5	U, D-4	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1200	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	320	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	220	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5000	J, CLP02	ng/kg dry	10	3/12/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	250		ng/kg dry	10	3/12/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	39	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	240	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	31	J, D-5	ng/kg dry	31	3/12/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	22	J, D-5	ng/kg dry	22	3/12/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	27	J, D-5	ng/kg dry	27	3/12/18	3/24/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1053A
Station ID: SS1053

Lab ID: C181002-45
Matrix: Surface Soil

MD No:
D No: AKW9 ARI

Date Collected: 2/21/18 14:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	240	J, Q-3	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1053B
Station ID: SS1053

Lab ID: C181002-46
Matrix: Surface Soil

MD No:
D No: AKX0 ARI

Date Collected: 2/21/18 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.8		%		3/12/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	200		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	36		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.2		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.6		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.9	U, D-4	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.4		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.5		ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.21	U, CLP18	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.2	U, CLP18	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	360	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	97	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	60	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	85	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1600	U, B-4	ng/kg dry	10	3/12/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	76	U, B-4	ng/kg dry	10	3/12/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	3/12/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	3/12/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	8.6	J, D-5	ng/kg dry	8.6	3/12/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.6	J, D-5	ng/kg dry	9.6	3/12/18	3/24/18	CL HRSM01.2

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Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1053B
Station ID: SS1053

Lab ID: C181002-46
Matrix: Surface Soil

MD No:
D No: AKX0 ARI

Date Collected: 2/21/18 14:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	1.0	3/12/18	3/24/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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May 4, 2018

4SESD-MTSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0192, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)
Dioxin	Contract SOW (Water)

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Report Narrative for Work Order: C181214 Analysis: DIO

Site Name: American Creosote, Pensacola, FL
Case 47459, ELEMENT Sample Nos. C181214-01 through C181214-42
C181215-01 and C181215-02 (PES)

Dioxin Analysis: Frontier Analytical Laboratory, El Dorado Hills, CA

The ESAT Work Team reviewed data for the project cited above consisting of 39 soil and three water samples analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 02/23/18 and 02/25/18 and received by the laboratory on 02/27/18. The final data package was received by the EPA on 04/10/18. The analytical results were reported in three sample delivery groups (SDGs) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation sample (PES) blanks for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

The laboratory satisfied all contractual and technical holding time requirements.

All congeners were reported as not detected or at concentrations that were less than the Contract Required Quantitation Limit (CRQL) in both soil PES blanks. All positive hits reported in either PES blank were treated as method blank contaminants during data validation. Accordingly, the reporting limit was elevated for 2,3,7,8-TCDD in sample C181214-19 and qualified (U, B-4).

Significant Chlorodiphenyl Ether interferences with target congeners were not observed for any samples in this Case.

Poor chromatography was observed for 1,2,3,7,8-PeCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; and 2,3,4,6,7,8-HxCDF in sample C181214-04 and those results were qualified "J" (CLP33).

OCDD results exceeded the established calibration range for samples C181214-05, 07, 12, 14, 17, 20, 22, 26, 28, 31, 41, and 42 and were qualified "J" (CLP02).

All positive 2,3,7,8-TCDF results reported by the laboratory were confirmed (CLP10) and reported from a second column identified as a Phenomenex Quadrex column (007-225).

The laboratory used one instrument for both primary analysis (DB-5MS) and confirmatory analysis (007-225) along with another instrument for primary analysis only. Method blanks were analyzed on the primary columns but not on the confirmation column. Instrument blanks on the confirmatory column. The SOW requires that the

actual extracted blank be analyzed on each system. However, the SOW also states that "in cases when there is no more method blank volume available, the Contractor should use the instrument blank for analysis."

Continuing calibration verifications (CCVs) were not performed at the frequency required by the SOW. When the frequency criteria are not met, the National Functional Guidelines allow professional judgment to qualify detects and non-detects. Since the CCVs satisfied all criteria except frequency, data was not qualified on this basis.

The laboratory did not follow the current SOW equations for calculation of EDLs. The laboratory multiplied by 2.5 incorrectly on instrument "FAL4" and correctly by 3 on instrument "FAL3". Only slight changes to the TEQ results would be observed.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL or the MDL as a proxy value. Thus a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0192, American Creosote **Contract Lab Case: 47459**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
RB04_SS1010	C181214-01		ALS7	Equipment Rinse Blank	2/23/18 13:45
RB05_SS1041	C181214-02		ALW8	Equipment Rinse Blank	2/24/18 13:45
RB06_SS1040	C181214-03		ALY2	Equipment Rinse Blank	2/25/18 10:00
SS1008A	C181214-04		ALQ2	Surface Soil	2/23/18 07:40
SS1008B	C181214-05		ALQ3	Surface Soil	2/23/18 07:50
SS1009A	C181214-06		ALR2	Surface Soil	2/23/18 09:40
SS1009B	C181214-07		ALR3	Surface Soil	2/23/18 09:50
SS1010A	C181214-08		ALS4	Surface Soil	2/23/18 13:10
SS1010B	C181214-09		ALS5	Surface Soil	2/23/18 13:20
SS1011A	C181214-10		ALR5	Surface Soil	2/23/18 10:10
SS1011B	C181214-11		ALR6	Surface Soil	2/23/18 10:20
SS1012A	C181214-12		ALQ5	Surface Soil	2/23/18 08:10
SS1012B	C181214-13		ALQ6	Surface Soil	2/23/18 08:20
SS1013A	C181214-14		ALQ8	Surface Soil	2/23/18 08:55
SS1013B	C181214-15		ALQ9	Surface Soil	2/23/18 09:05
SS91013B	C181214-16		ALR1	Surface Soil	2/23/18 09:05
SS1016A	C181214-17		ALX2	Surface Soil	2/25/18 08:20
SS1016B	C181214-18		ALX3	Surface Soil	2/25/18 08:30
SS91016B	C181214-19		ALX5	Surface Soil	2/25/18 08:30
SS1017A	C181214-20		ALW9	Surface Soil	2/25/18 07:55
SS1017B	C181214-21		ALX0	Surface Soil	2/25/18 08:05
SS1018A	C181214-22		ALS1	Surface Soil	2/23/18 12:40
SS1018B	C181214-23		ALS2	Surface Soil	2/23/18 12:50
SS1019A	C181214-24		ALR8	Surface Soil	2/23/18 12:05
SS1019B	C181214-25		ALR9	Surface Soil	2/23/18 12:15
SS1030A	C181214-26		ALW0	Surface Soil	2/24/18 10:45
SS1030B	C181214-27		ALW1	Surface Soil	2/24/18 10:55
SS91030A	C181214-28		ALW3	Surface Soil	2/24/18 10:45
SS1039A	C181214-29		ALX6	Surface Soil	2/25/18 08:55
SS1039B	C181214-30		ALX7	Surface Soil	2/25/18 09:05
SS1040A	C181214-31		ALX9	Surface Soil	2/25/18 09:20
SS1040B	C181214-32		ALY0	Surface Soil	2/25/18 09:30
SS1041A	C181214-33		ALW5	Surface Soil	2/24/18 13:10
SS1041B	C181214-34		ALW6	Surface Soil	2/24/18 13:20

SS1043A	C181214-35	ALS8	Surface Soil	2/24/18 08:05
SS1043B	C181214-36	ALS9	Surface Soil	2/24/18 08:15
SS1044A	C181214-37	ALT1	Surface Soil	2/24/18 08:30
SS1044B	C181214-38	ALT2	Surface Soil	2/24/18 08:40
SS1045A	C181214-39	ALT4	Surface Soil	2/24/18 09:05
SS1045B	C181214-40	ALT5	Surface Soil	2/24/18 09:15
SS1046A	C181214-41	ALT7	Surface Soil	2/24/18 10:00
SS1046B	C181214-42	ALT8	Surface Soil	2/24/18 10:10

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
B-4	Level in blank impacts MRLs.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP10	2,3,7,8-TCDF confirmed by second column.
CLP33	Poor Chromatography - Split Peaks and/or Poor Peak Shape Present
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: RB04_SS1010
Station ID:

Lab ID: C181214-01
Matrix: Equipment Rinse Blank

MD No:
D No: ALS7 FRONT

Date Collected: 2/23/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0041	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0017	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0023	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0025	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0025	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0017	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0025	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0023	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0019	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0016	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0017	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00087	U	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00075	U	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0041	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0020	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0025	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0018	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.0079	U	ng/L	0.097	3/23/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0050	U	ng/L	0.097	3/23/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0019	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0065	U, J, D-5	ng/L	0.0065	3/23/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0058	U, J, D-5	ng/L	0.0058	3/23/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0049	U, J, D-5	ng/L	0.0049	3/23/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00087	U, J, Q-3	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: RB04_SS1010
Station ID:

Lab ID: C181214-01
Matrix: Equipment Rinse Blank

MD No:
D No: ALS7 FRONT

Date Collected: 2/23/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00075	U, J, Q-3	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: RB05_SS1041
Station ID:

Lab ID: C181214-02
Matrix: Equipment Rinse Blank

MD No:
D No: ALW8 FRONT

Date Collected: 2/24/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0029	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0017	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0022	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0022	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0017	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0022	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0015	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0017	U	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0011	U	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00092	U	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0029	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0022	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.0055	U	ng/L	0.097	3/23/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0030	U	ng/L	0.097	3/23/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0015	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	3/23/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0064	U, J, D-5	ng/L	0.0064	3/23/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0054	U, J, D-5	ng/L	0.0054	3/23/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0046	U, J, D-5	ng/L	0.0046	3/23/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0011	U, J, Q-3	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: RB05_SS1041
Station ID:

Lab ID: C181214-02
Matrix: Equipment Rinse Blank

MD No:
D No: ALW8 FRONT

Date Collected: 2/24/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00092	U, J, Q-3	ng/L	0.0097	3/23/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: RB06_SS1040
Station ID:

Lab ID: C181214-03
Matrix: Equipment Rinse Blank

MD No:
D No: ALY2 FRONT

Date Collected: 2/25/18 10:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0036	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0018	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0023	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0028	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0015	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0028	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0018	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0027	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0015	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0019	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0015	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0015	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0018	U	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0010	U	ng/L	0.010	3/23/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00097	U	ng/L	0.010	3/23/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0036	U, J, Q-3	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0020	U, J, Q-3	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0028	U, J, Q-3	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.0067	U	ng/L	0.10	3/23/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0031	U	ng/L	0.10	3/23/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0019	U, J, Q-3	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.051	3/23/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0069	U, J, D-5	ng/L	0.0069	3/23/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0061	U, J, D-5	ng/L	0.0061	3/23/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0051	U, J, D-5	ng/L	0.0051	3/23/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0010	U, J, Q-3	ng/L	0.010	3/23/18	3/24/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: RB06_SS1040
Station ID:

Lab ID: C181214-03
Matrix: Equipment Rinse Blank

MD No:
D No: ALY2 FRONT

Date Collected: 2/25/18 10:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00097	U, J, Q-3	ng/L	0.010	3/23/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1008A
Station ID: SS1008

Lab ID: C181214-04
Matrix: Surface Soil

MD No:
D No: ALQ2 FRONT

Date Collected: 2/23/18 7:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	4100		ng/kg dry	50	3/22/18	3/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	680		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	45		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	40	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	27	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	130	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	14	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	44	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	9.7	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	10	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	27	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.6	J, CLP33	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.58	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.93	J, CLP01, CLP10	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	7500	J, Q-3	ng/kg dry	50	3/22/18	3/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2200	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	830	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	570	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	37000		ng/kg dry	100	3/22/18	3/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2300		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	98	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	49	J, D-5	ng/kg dry	49	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	58	J, D-5	ng/kg dry	58	3/22/18	3/24/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1008A

Station ID: SS1008

Lab ID: C181214-04

Matrix: Surface Soil

MD No:

D No: ALQ2 FRONT

Date Collected: 2/23/18 7:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	100	J, D-5	ng/kg dry	100	3/22/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1008B
Station ID: SS1008

Lab ID: C181214-05
Matrix: Surface Soil

MD No:
D No: ALQ3 FRONT

Date Collected: 2/23/18 7:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	20		%		3/22/18	4/02/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	440		ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	70		ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	4.6	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.1		ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.86	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.75	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.38	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.78	J, CLP01	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.10	U	ng/kg dry	1.0	3/22/18	4/02/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.14	U	ng/kg dry	1.0	3/22/18	4/02/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	820	J, Q-3	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	220	J, Q-3	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	77	J, Q-3	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4400	J, CLP02	ng/kg dry	10	3/22/18	4/02/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	250		ng/kg dry	10	3/22/18	4/02/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	3/22/18	4/02/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.9	J, D-5	ng/kg dry	4.9	3/22/18	4/02/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.4	J, D-5	ng/kg dry	5.4	3/22/18	4/02/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	10	J, D-5	ng/kg dry	10	3/22/18	4/02/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1008B

Lab ID: C181214-05

MD No:

Station ID: SS1008

Matrix: Surface Soil

D No: ALQ3 FRONT

Date Collected: 2/23/18 7:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.9	J, Q-3	ng/kg dry	1.0	3/22/18	4/02/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.1	J, Q-3	ng/kg dry	1.0	3/22/18	4/02/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1009A
Station ID: SS1009

Lab ID: C181214-06
Matrix: Surface Soil

MD No:
D No: ALR2 FRONT

Date Collected: 2/23/18 9:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	15		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	120		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	25		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.4	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.2	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.95	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.2	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.56	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.37	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.53	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.12	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.36	J, CLP10, CLP01	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	250	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	37	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	26	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1000		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	70		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	9.8	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.6	J, D-5	ng/kg dry	2.6	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1009A
Station ID: SS1009

Lab ID: C181214-06
Matrix: Surface Soil

MD No:
D No: ALR2 FRONT

Date Collected: 2/23/18 9:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.9	J, D-5	ng/kg dry	3.9	3/22/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1009B
Station ID: SS1009

Lab ID: C181214-07
Matrix: Surface Soil

MD No:
D No: ALR3 FRONT

Date Collected: 2/23/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	770		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	150		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	8.1		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.0		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.2		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	25		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.9	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.91	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	7.0		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.33	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.85	J, CLP01, CLP10	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	420	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	6400	J, CLP02	ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	430		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	41	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1009B

Lab ID: C181214-07

MD No:

Station ID: SS1009

Matrix: Surface Soil

D No: ALR3 FRONT

Date Collected: 2/23/18 9:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	21	J, D-5	ng/kg dry	21	3/22/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1010A
Station ID: SS1010

Lab ID: C181214-08
Matrix: Surface Soil

MD No:
D No: ALS4 FRONT

Date Collected: 2/23/18 13:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	240		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	60		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.9		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.7	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.3	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.63	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	8.1		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.8		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.10	U	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.56	J, CLP10, CLP01	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	480	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	72	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2100		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	130		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1010A
Station ID: SS1010

Lab ID: C181214-08
Matrix: Surface Soil

MD No:
D No: ALS4 FRONT

Date Collected: 2/23/18 13:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	3/26/18	3/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.9	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	39	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1010B
Station ID: SS1010

Lab ID: C181214-09
Matrix: Surface Soil

MD No:
D No: ALS5 FRONT

Date Collected: 2/23/18 13:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	25		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	230		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	53		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.5	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.3		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.8	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.95	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.80	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	9.5		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	13		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.097	U	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.64	J, CLP10, CLP01	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	460	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	56	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2300		ng/kg dry	9.9	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	110		ng/kg dry	9.9	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	18	J, D-5	ng/kg dry	18	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1010B

Lab ID: C181214-09

MD No:

Station ID: SS1010

Matrix: Surface Soil

D No: ALS5 FRONT

Date Collected: 2/23/18 13:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	12	J, D-5	ng/kg dry	12	3/26/18	3/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.5	J, Q-3	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1011A
Station ID: SS1011

Lab ID: C181214-10
Matrix: Surface Soil

MD No:
D No: ALR5 FRONT

Date Collected: 2/23/18 10:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	62		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	21		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.89	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.68	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.68	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.34	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.27	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.22	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.11	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.11	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	48	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	630		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	34		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.80	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.0	J, D-5	ng/kg dry	2.0	3/22/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.4	J, D-5	ng/kg dry	2.4	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1011A
Station ID: SS1011

Lab ID: C181214-10
Matrix: Surface Soil

MD No:
D No: ALR5 FRONT

Date Collected: 2/23/18 10:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.11	U, J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.7	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1011B
Station ID: SS1011

Lab ID: C181214-11
Matrix: Surface Soil

MD No:
D No: ALR6 FRONT

Date Collected: 2/23/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	20		%		3/22/18	3/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	280		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	73		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.8	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	9.1		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.9	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.90	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	8.4		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	11		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.10	U	ng/kg dry	0.99	3/22/18	3/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.86	J, CLP10, CLP01	ng/kg dry	0.99	3/22/18	3/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	590	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	79	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2600		ng/kg dry	10	3/22/18	3/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	160		ng/kg dry	10	3/22/18	3/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	17	J, D-5	ng/kg dry	17	3/22/18	3/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	3/22/18	3/25/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1011B

Lab ID: C181214-11

MD No:

Station ID: SS1011

Matrix: Surface Soil

D No: ALR6 FRONT

Date Collected: 2/23/18 10:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	12	J, D-5	ng/kg dry	12	3/22/18	3/25/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.5	J, Q-3	ng/kg dry	0.99	3/22/18	3/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	44	J, Q-3	ng/kg dry	0.99	3/22/18	3/25/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1012A
Station ID: SS1012

Lab ID: C181214-12
Matrix: Surface Soil

MD No:
D No: ALQ5 FRONT

Date Collected: 2/23/18 8:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		3/30/18	4/02/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1400		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	250		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	16		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	14		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	46		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	5.4		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	21		ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.58	U	ng/kg dry	0.99	3/30/18	4/02/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.0	CLP10	ng/kg dry	0.99	3/30/18	4/02/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2800	J, Q-3	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	720	J, Q-3	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	420	J, Q-3	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	340	J, Q-3	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	12000	J, CLP02	ng/kg dry	9.9	3/30/18	4/02/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	740		ng/kg dry	9.9	3/30/18	4/02/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	80	J, Q-3	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	310	J, Q-3	ng/kg dry	5.0	3/30/18	4/02/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	43		ng/kg dry	43	3/30/18	4/02/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	34		ng/kg dry	34	3/30/18	4/02/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	46		ng/kg dry	46	3/30/18	4/02/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1012A
Station ID: SS1012

Lab ID: C181214-12
Matrix: Surface Soil

MD No:
D No: ALQ5 FRONT

Date Collected: 2/23/18 8:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	19	J, Q-3	ng/kg dry	0.99	3/30/18	4/02/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	0.99	3/30/18	4/02/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1012B
Station ID: SS1012

Lab ID: C181214-13
Matrix: Surface Soil

MD No:
D No: ALQ6 FRONT

Date Collected: 2/23/18 8:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	160		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	33		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.9	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.1		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.66	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.28	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.13	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.14	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	320	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	99	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	44	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	44	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	100		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.5	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.2	J, D-5	ng/kg dry	5.2	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.2	J, D-5	ng/kg dry	4.2	3/22/18	3/24/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.6	J, D-5	ng/kg dry	5.6	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1012B
Station ID: SS1012

Lab ID: C181214-13
Matrix: Surface Soil

MD No:
D No: ALQ6 FRONT

Date Collected: 2/23/18 8:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1013A
Station ID: SS1013

Lab ID: C181214-14
Matrix: Surface Soil

MD No:
D No: ALQ8 FRONT

Date Collected: 2/23/18 8:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.3		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1000		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	200		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	11		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	7.5		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	35		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	8.4		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	23		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	5.0		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	13		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.5		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.38	U	ng/kg dry	0.99	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.95	J, CLP01, CLP10	ng/kg dry	0.99	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	500	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8400	J, CLP02	ng/kg dry	9.9	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	510		ng/kg dry	9.9	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	49	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	26		ng/kg dry	26	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	24		ng/kg dry	24	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1013A
Station ID: SS1013

Lab ID: C181214-14
Matrix: Surface Soil

MD No:
D No: ALQ8 FRONT

Date Collected: 2/23/18 8:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	33		ng/kg dry	33	3/22/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	0.99	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	58	J, Q-3	ng/kg dry	0.99	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1013B

Lab ID: C181214-15

MD No:

Station ID: SS1013

Matrix: Surface Soil

D No: ALQ9 FRONT

Date Collected: 2/23/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	25		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	150		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	33		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.0	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.0		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.86	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.70	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.68	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	5.6		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.11	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.44	J, CLP01, CLP10	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	290	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	84	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	47	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	63	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1200		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	80		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	61	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.0	J, D-5	ng/kg dry	9.0	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	6.4	J, D-5	ng/kg dry	6.4	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1013B
Station ID: SS1013

Lab ID: C181214-15
Matrix: Surface Soil

MD No:
D No: ALQ9 FRONT

Date Collected: 2/23/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	6.9	J, D-5	ng/kg dry	6.9	3/22/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.8	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	28	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91013B
Station ID: SS1013

Lab ID: C181214-16
Matrix: Surface Soil

MD No:
D No: ALR1 FRONT

Date Collected: 2/23/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.5		%		3/22/18	3/24/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	93		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	22		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.7	U	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.82	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.59	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.58	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.2		ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.10	U	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.39	J, CLP01, CLP10	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	180	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	750		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	51		ng/kg dry	10	3/22/18	3/24/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	3/22/18	3/24/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.0	J, D-5	ng/kg dry	9.0	3/22/18	3/24/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.8	J, D-5	ng/kg dry	5.8	3/22/18	3/24/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91013B
Station ID: SS1013

Lab ID: C181214-16
Matrix: Surface Soil

MD No:
D No: ALR1 FRONT

Date Collected: 2/23/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.7	J, D-5	ng/kg dry	5.6	3/22/18	3/24/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.5	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	32	J, Q-3	ng/kg dry	1.0	3/22/18	3/24/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1016A
Station ID: SS1016

Lab ID: C181214-17
Matrix: Surface Soil

MD No:
D No: ALX2 FRONT

Date Collected: 2/25/18 8:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.6		%		3/28/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	43000		ng/kg dry	380	3/28/18	4/01/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	7700		ng/kg dry	380	3/28/18	4/01/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	740		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	420		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	250		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1100		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	270		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	860		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	49		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	140		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	17		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	430		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	48		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	5.6		ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.6	CLP10	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	65000	J, Q-3	ng/kg dry	380	3/28/18	4/01/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	22000	J, Q-3	ng/kg dry	380	3/28/18	4/01/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	6100	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	7100	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	310000	J, CLP02	ng/kg dry	750	3/28/18	4/01/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	25000		ng/kg dry	750	3/28/18	4/01/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	570	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1100	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	580		ng/kg dry	580	3/28/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	660		ng/kg dry	660	3/28/18	3/29/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1100		ng/kg dry	1100	3/28/18	3/29/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1016A
Station ID: SS1016

Lab ID: C181214-17
Matrix: Surface Soil

MD No:
D No: ALX2 FRONT

Date Collected: 2/25/18 8:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	59	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1016B

Lab ID: C181214-18

MD No:

Station ID: SS1016

Matrix: Surface Soil

D No: ALX3 FRONT

Date Collected: 2/25/18 8:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.1		%		3/28/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	4500		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	860		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	74		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	47		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	27		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	110		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	29		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	94		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	13		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	15		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	48		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	13		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.95	U	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.88	J, CLP01, CLP10	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	7100	J, Q-3	ng/kg dry	50	3/28/18	4/01/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2400	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	690	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	770	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	37000		ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2800		ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	97	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	190	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	72		ng/kg dry	72	3/28/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	78		ng/kg dry	78	3/28/18	3/29/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1016B
Station ID: SS1016

Lab ID: C181214-18
Matrix: Surface Soil

MD No:
D No: ALX3 FRONT

Date Collected: 2/25/18 8:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	120		ng/kg dry	120	3/28/18	3/29/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	23	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	54	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91016B
Station ID: SS1016
Lab ID: C181214-19
Matrix: Surface Soil
MD No:
D No: ALX5 FRONT

Date Collected: 2/25/18 8:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		3/28/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	6600		ng/kg dry	75	3/28/18	4/01/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1300		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	110		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	68		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	41		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	160		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	43		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	130		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	17		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	22		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	69		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	16		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	1.2	U, B-4	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.86	J, CLP01, CLP10	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	10000	J, Q-3	ng/kg dry	75	3/28/18	4/01/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	3600	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1000	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1100	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	52000		ng/kg dry	150	3/28/18	4/01/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	4200		ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	260	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	100		ng/kg dry	100	3/28/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	110		ng/kg dry	110	3/28/18	3/29/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91016B
Station ID: SS1016

Lab ID: C181214-19
Matrix: Surface Soil

MD No:
D No: ALX5 FRONT

Date Collected: 2/25/18 8:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	180		ng/kg dry	180	3/28/18	3/29/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	27	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1017A
Station ID: SS1017

Lab ID: C181214-20
Matrix: Surface Soil

MD No:
D No: ALW9 FRONT

Date Collected: 2/25/18 7:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		3/28/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1100		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	230		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	17		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	8.8		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	32		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	8.0		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	23		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.31	U	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.76	J	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1800	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	710	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9800	J, CLP02	ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	730		ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	27	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	51	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	19	J, D-5	ng/kg dry	19	3/28/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	20	J, D-5	ng/kg dry	20	3/28/18	3/29/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	32	J, D-5	ng/kg dry	32	3/28/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1017A
Station ID: SS1017

Lab ID: C181214-20
Matrix: Surface Soil

MD No:
D No: ALW9 FRONT

Date Collected: 2/25/18 7:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.9	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	26	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1017B
Station ID: SS1017

Lab ID: C181214-21
Matrix: Surface Soil

MD No:
D No: ALX0 FRONT

Date Collected: 2/25/18 8:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.8		%		3/28/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	180		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	43		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.0	U	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.3		ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.8	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.62	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.50	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.064	U	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.51	J, CLP10, CLP01	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	330	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	42	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	45	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1700		ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	130		ng/kg dry	10	3/28/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.6	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.4	J, D-5	ng/kg dry	5.0	3/28/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.5	J, D-5	ng/kg dry	4.0	3/28/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1017B
Station ID: SS1017

Lab ID: C181214-21
Matrix: Surface Soil

MD No:
D No: ALX0 FRONT

Date Collected: 2/25/18 8:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	6.3	J, D-5	ng/kg dry	6.0	3/28/18	3/29/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.4	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	3/28/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1018A
Station ID: SS1018

Lab ID: C181214-22
Matrix: Surface Soil

MD No:
D No: ALS1 FRONT

Date Collected: 2/23/18 12:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.8		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1200		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	350		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	16		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	11		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	42		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	11		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	21		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.1	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	19		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	10		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.44	U	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.6	CLP10	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2200	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1100	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	260	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	350	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9100	J, CLP02	ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1200		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	43	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	30	J, D-5	ng/kg dry	30	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	27	J, D-5	ng/kg dry	27	3/26/18	3/27/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	38	J, D-5	ng/kg dry	38	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1018A
Station ID: SS1018

Lab ID: C181214-22
Matrix: Surface Soil

MD No:
D No: ALS1 FRONT

Date Collected: 2/23/18 12:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1018B
Station ID: SS1018

Lab ID: C181214-23
Matrix: Surface Soil

MD No:
D No: ALS2 FRONT

Date Collected: 2/23/18 12:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	24		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	38		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.9	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.38	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.65	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.33	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.0	U	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.96	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.10	U	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.32	J, CLP01, CLP10	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	270	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	32	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1100		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	120		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	13	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.6	J, D-5	ng/kg dry	3.6	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.3	J, D-5	ng/kg dry	3.3	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1018B

Lab ID: C181214-23

MD No:

Station ID: SS1018

Matrix: Surface Soil

D No: ALS2 FRONT

Date Collected: 2/23/18 12:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.7	J, D-5	ng/kg dry	4.7	3/26/18	3/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.5	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1019A
Station ID: SS1019

Lab ID: C181214-24
Matrix: Surface Soil

MD No:
D No: ALR8 FRONT

Date Collected: 2/23/18 12:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.7		%		3/22/18	3/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	450		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	89		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	6.4		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	15		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	8.6		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.93	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.54	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.9		ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.12	U	ng/kg dry	1.0	3/22/18	3/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.43	J, CLP10, CLP01	ng/kg dry	1.0	3/22/18	3/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	880	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	260	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4000		ng/kg dry	10	3/22/18	3/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	270		ng/kg dry	10	3/22/18	3/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	52	J, Q-3	ng/kg dry	5.0	3/22/18	3/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	3/22/18	3/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	3/22/18	3/25/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1019A
Station ID: SS1019

Lab ID: C181214-24
Matrix: Surface Soil

MD No:
D No: ALR8 FRONT

Date Collected: 2/23/18 12:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	14	J, D-5	ng/kg dry	14	3/22/18	3/25/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.1	J, Q-3	ng/kg dry	1.0	3/22/18	3/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	1.0	3/22/18	3/25/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1019B
Station ID: SS1019

Lab ID: C181214-25
Matrix: Surface Soil

MD No:
D No: ALR9 FRONT

Date Collected: 2/23/18 12:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.5		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	62		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	17		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.81	U	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.44	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.49	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.22	U	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.082	U	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.32	J, CLP01, CLP10	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	46	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	31	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	560		ng/kg dry	9.9	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	41		ng/kg dry	9.9	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.4	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.7	J, D-5	ng/kg dry	4.7	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.3	J, D-5	ng/kg dry	3.3	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1019B

Lab ID: C181214-25

MD No:

Station ID: SS1019

Matrix: Surface Soil

D No: ALR9 FRONT

Date Collected: 2/23/18 12:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.4	J, D-5	ng/kg dry	3.4	3/26/18	3/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.5	J, Q-3	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	0.99	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1030A
Station ID: SS1030

Lab ID: C181214-26
Matrix: Surface Soil

MD No:
D No: ALW0 FRONT

Date Collected: 2/24/18 10:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.7		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1000		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	230		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	14		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	9.9		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	11		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	34		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	9.9		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	3.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	6.1	J	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	14		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	27	J	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.42	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.5	CLP10 J	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	630	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	230	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9600	J, CLP02	ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	600		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	45	J, D-5	ng/kg dry	45	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	32	J, D-5	ng/kg dry	32	3/27/18	3/28/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	38	J, D-5	ng/kg dry	38	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1030A
Station ID: SS1030

Lab ID: C181214-26
Matrix: Surface Soil

MD No:
D No: ALW0 FRONT

Date Collected: 2/24/18 10:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1030B

Lab ID: C181214-27

MD No:

Station ID: SS1030

Matrix: Surface Soil

D No: ALW1 FRONT

Date Collected: 2/24/18 10:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.4		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	210		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	60		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.4		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.4		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.4	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	8.4		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.0		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	38		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.27	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.8	CLP10	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	380	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	53	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1800		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	120		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	45	J, D-5	ng/kg dry	45	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	25	J, D-5	ng/kg dry	25	3/27/18	3/28/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	19	J, D-5	ng/kg dry	19	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1030B

Lab ID: C181214-27

MD No:

Station ID: SS1030

Matrix: Surface Soil

D No: ALW1 FRONT

Date Collected: 2/24/18 10:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.4	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91030A
Station ID: SS1030
Lab ID: C181214-28
Matrix: Surface Soil
MD No:
D No: ALW3 FRONT

Date Collected: 2/24/18 10:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.6		%		3/27/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	920		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	260		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	15		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	9.6		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	15		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	16		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	4.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	20	J	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	20		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	95	J	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.55	U	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	4.4	CLP10 J	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	660	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	280	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8500	J, CLP02	ng/kg dry	10	3/27/18	3/29/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	530		ng/kg dry	10	3/27/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	40	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	440	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	120	J, D-5	ng/kg dry	120	3/27/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	69	J, D-5	ng/kg dry	69	3/27/18	3/29/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	61	J, D-5	ng/kg dry	61	3/27/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91030A
Station ID: SS1030

Lab ID: C181214-28
Matrix: Surface Soil

MD No:
D No: ALW3 FRONT

Date Collected: 2/24/18 10:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	380	J, Q-3	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1039A
Station ID: SS1039

Lab ID: C181214-29
Matrix: Surface Soil

MD No:
D No: ALX6 FRONT

Date Collected: 2/25/18 8:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.2		%		3/28/18	3/30/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	270		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	61		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.6	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.5		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.1	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.61	U	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	11		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.38	U	ng/kg dry	0.99	3/28/18	3/30/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.76	J, CLP01, CLP10	ng/kg dry	0.99	3/28/18	3/30/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	540	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	190	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	61	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2600		ng/kg dry	9.9	3/28/18	3/30/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	160		ng/kg dry	9.9	3/28/18	3/30/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	17	J, D-5	ng/kg dry	17	3/28/18	3/30/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	3/28/18	3/30/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1039A
Station ID: SS1039

Lab ID: C181214-29
Matrix: Surface Soil

MD No:
D No: ALX6 FRONT

Date Collected: 2/25/18 8:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	13	J, D-5	ng/kg dry	13	3/28/18	3/30/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.2	J, Q-3	ng/kg dry	0.99	3/28/18	3/30/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	37	J, Q-3	ng/kg dry	0.99	3/28/18	3/30/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1039B
Station ID: SS1039

Lab ID: C181214-30
Matrix: Surface Soil

MD No:
D No: ALX7 FRONT

Date Collected: 2/25/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.8		%		3/28/18	3/30/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	150		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	43		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.7	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.6		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.80	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	15		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	22		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.93	J, CLP01, CLP10	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	300	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	36	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	190	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500		ng/kg dry	10	3/28/18	3/30/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	120		ng/kg dry	10	3/28/18	3/30/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.7	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	260	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	28	J, D-5	ng/kg dry	28	3/28/18	3/30/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	16	J, D-5	ng/kg dry	16	3/28/18	3/30/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1039B
Station ID: SS1039

Lab ID: C181214-30
Matrix: Surface Soil

MD No:
D No: ALX7 FRONT

Date Collected: 2/25/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	14	J, D-5	ng/kg dry	14	3/28/18	3/30/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.5	J, Q-3	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1040A
Station ID: SS1040

Lab ID: C181214-31
Matrix: Surface Soil

MD No:
D No: ALX9 FRONT

Date Collected: 2/25/18 9:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.9		%		3/28/18	3/30/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	470		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	110		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.7		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.6	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.9	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	19		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	7.1		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	7.3		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	4.1	J, CLP01	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.091	U	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.1	CLP10	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	810	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	270	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	110	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4800	J, CLP02	ng/kg dry	10	3/28/18	3/30/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	240		ng/kg dry	10	3/28/18	3/30/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	74	J, Q-3	ng/kg dry	5.0	3/28/18	3/30/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	3/28/18	3/30/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	3/28/18	3/30/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	16	J, D-5	ng/kg dry	16	3/28/18	3/30/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1040A
Station ID: SS1040

Lab ID: C181214-31
Matrix: Surface Soil

MD No:
D No: ALX9 FRONT

Date Collected: 2/25/18 9:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.9	J, Q-3	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	1.0	3/28/18	3/30/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1040B

Lab ID: C181214-32

MD No:

Station ID: SS1040

Matrix: Surface Soil

D No: ALY0 FRONT

Date Collected: 2/25/18 9:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		3/26/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	47		ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	10		ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.78	J, CLP01	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.45	J, CLP01	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.53	U	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.73	J, CLP01	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.97	J, CLP01	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.33	U	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.27	U	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.22	U	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.0	U	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.58	J, CLP01	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.079	U	ng/kg dry	0.99	3/26/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.36	J, CLP10, CLP01	ng/kg dry	0.99	3/26/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	81	J, Q-3	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	26	J, Q-3	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	430		ng/kg dry	9.9	3/26/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	23		ng/kg dry	9.9	3/26/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.3	J, Q-3	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	9.1	J, Q-3	ng/kg dry	5.0	3/26/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	3/26/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.4	J, D-5	ng/kg dry	1.4	3/26/18	3/28/18	CL HRSM01.2

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Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1040B

Lab ID: C181214-32

MD No:

Station ID: SS1040

Matrix: Surface Soil

D No: ALY0 FRONT

Date Collected: 2/25/18 9:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.9	J, D-5	ng/kg dry	1.9	3/26/18	3/28/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.4	J, Q-3	ng/kg dry	0.99	3/26/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	9.7	J, Q-3	ng/kg dry	0.99	3/26/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1041A
Station ID: SS1041

Lab ID: C181214-33
Matrix: Surface Soil

MD No:
D No: ALW5 FRONT

Date Collected: 2/24/18 13:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.3		%		3/27/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	72		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	20		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.0	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.57	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.48	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.085	U	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.58	J, CLP10, CLP01	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	23	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	640		ng/kg dry	10	3/27/18	3/29/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	37		ng/kg dry	10	3/27/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.7	J, D-5	ng/kg dry	5.7	3/27/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.8	J, D-5	ng/kg dry	3.8	3/27/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1041A
Station ID: SS1041

Lab ID: C181214-33
Matrix: Surface Soil

MD No:
D No: ALW5 FRONT

Date Collected: 2/24/18 13:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.0	J, D-5	ng/kg dry	4.0	3/27/18	3/29/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.2	J, Q-3	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1041B
Station ID: SS1041

Lab ID: C181214-34
Matrix: Surface Soil

MD No:
D No: ALW6 FRONT

Date Collected: 2/24/18 13:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.6		%		3/27/18	4/01/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	15		ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.46	U	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.47	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.54	U	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.90	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.76	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.27	U	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.43	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.80	U	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.88	J, CLP01	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.11	U	ng/kg dry	1.0	3/27/18	4/01/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.71	J, CLP01, CLP10	ng/kg dry	1.0	3/27/18	4/01/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	29	J, Q-3	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	8.1	J, Q-3	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	7.8	J, Q-3	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	7.9	J, Q-3	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	150		ng/kg dry	10	3/27/18	4/01/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	6.2	J, CLP01	ng/kg dry	10	3/27/18	4/01/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.5	J, Q-3	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	9.7	J, Q-3	ng/kg dry	5.0	3/27/18	4/01/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	3/27/18	4/01/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.4	J, D-5	ng/kg dry	1.4	3/27/18	4/01/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1041B
Station ID: SS1041

Lab ID: C181214-34
Matrix: Surface Soil

MD No:
D No: ALW6 FRONT

Date Collected: 2/24/18 13:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.4	J, D-5	ng/kg dry	1.4	3/27/18	4/01/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.2	J, Q-3	ng/kg dry	1.0	3/27/18	4/01/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	3/27/18	4/01/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1043A
Station ID: SS1043

Lab ID: C181214-35
Matrix: Surface Soil

MD No:
D No: ALS8 FRONT

Date Collected: 2/24/18 8:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.5		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	100		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	27		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.3	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.84	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	8.6		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	12		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.090	U	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.75	J, CLP10, CLP01	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	44	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	910		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	54		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	17	J, D-5	ng/kg dry	17	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1043A
Station ID: SS1043

Lab ID: C181214-35
Matrix: Surface Soil

MD No:
D No: ALS8 FRONT

Date Collected: 2/24/18 8:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.1	J, D-5	ng/kg dry	9.1	3/26/18	3/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.8	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	40	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1043B
Station ID: SS1043

Lab ID: C181214-36
Matrix: Surface Soil

MD No:
D No: ALS9 FRONT

Date Collected: 2/24/18 8:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.1		%		3/26/18	3/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	46		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	14		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.92	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	U	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.6	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.5	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.84	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.75	J, CLP01	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	8.1		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	13		ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.71	J, CLP10, CLP01	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	96	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	37	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	31	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	99	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	410		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	27		ng/kg dry	10	3/26/18	3/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	9.2	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	3/26/18	3/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	17	J, D-5	ng/kg dry	17	3/26/18	3/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.9	J, D-5	ng/kg dry	9.8	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1043B

Lab ID: C181214-36

MD No:

Station ID: SS1043

Matrix: Surface Soil

D No: ALS9 FRONT

Date Collected: 2/24/18 8:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.8	J, D-5	ng/kg dry	7.8	3/26/18	3/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.8	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	40	J, Q-3	ng/kg dry	1.0	3/26/18	3/27/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1044A
Station ID: SS1044

Lab ID: C181214-37
Matrix: Surface Soil

MD No:
D No: ALT1 FRONT

Date Collected: 2/24/18 8:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.4		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	21		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.49	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.38	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.64	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.96	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.58	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.71	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.35	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.35	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.65	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.92	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.066	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.71	J, CLP10, CLP01	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	46	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	8.3	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	190		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	9.4	J, CLP01	ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.8	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.0	J, D-5	ng/kg dry	3.0	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.7	J, D-5	ng/kg dry	1.7	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1044A
Station ID: SS1044

Lab ID: C181214-37
Matrix: Surface Soil

MD No:
D No: ALT1 FRONT

Date Collected: 2/24/18 8:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.7	J, D-5	ng/kg dry	1.7	3/27/18	3/28/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.4	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1044B
Station ID: SS1044

Lab ID: C181214-38
Matrix: Surface Soil

MD No:
D No: ALT2 FRONT

Date Collected: 2/24/18 8:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.6		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	11		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.52	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.18	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.31	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.39	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.42	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.40	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.37	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.27	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.23	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.39	U	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.083	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.23	J, CLP01, CLP10	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	4.4	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	4.1	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	2.2	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	110		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	4.4	J, CLP01	ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.65	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	2.8	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.85	J, D-5	ng/kg dry	0.85	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1044B

Lab ID: C181214-38

MD No:

Station ID: SS1044

Matrix: Surface Soil

D No: ALT2 FRONT

Date Collected: 2/24/18 8:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.91	J, D-5	ng/kg dry	0.91	3/27/18	3/28/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.083	U, J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.3	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1045A
Station ID: SS1045

Lab ID: C181214-39
Matrix: Surface Soil

MD No:
D No: ALT4 FRONT

Date Collected: 2/24/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.6		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3100		ng/kg dry	50	3/27/18	4/01/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	510		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	32		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	28		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	88		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	11		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	37		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	5.3		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	5.4		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	21		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	14		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.091	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.3	CLP10	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	6200	J, Q-3	ng/kg dry	50	3/27/18	4/01/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1900	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	400	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	540	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	33000		ng/kg dry	100	3/27/18	4/01/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2100		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	26	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	45		ng/kg dry	45	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	41		ng/kg dry	41	3/27/18	3/28/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	78		ng/kg dry	78	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1045A
Station ID: SS1045

Lab ID: C181214-39
Matrix: Surface Soil

MD No:
D No: ALT4 FRONT

Date Collected: 2/24/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.5	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	48	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1045B
Station ID: SS1045

Lab ID: C181214-40
Matrix: Surface Soil

MD No:
D No: ALT5 FRONT

Date Collected: 2/24/18 9:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.0		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3400		ng/kg dry	50	3/27/18	4/01/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	580		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	37		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	25		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	29		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	100		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	51		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	6.6		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	7.8		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	12		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.29	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.3	CLP10	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	6500	J, Q-3	ng/kg dry	50	3/27/18	4/01/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2200	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	450	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	610	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	34000		ng/kg dry	100	3/27/18	4/01/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2300		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	32	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	50		ng/kg dry	50	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	49		ng/kg dry	49	3/27/18	3/28/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	88		ng/kg dry	88	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1045B

Lab ID: C181214-40

MD No:

Station ID: SS1045

Matrix: Surface Soil

D No: ALT5 FRONT

Date Collected: 2/24/18 9:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.2	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	44	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1046A
Station ID: SS1046

Lab ID: C181214-41
Matrix: Surface Soil

MD No:
D No: ALT7 FRONT

Date Collected: 2/24/18 10:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.9		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	770		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	120		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.8		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	5.1		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.9		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.1	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.6		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	7.4		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.9		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.24	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.96	J, CLP10, CLP01	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1600	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	410	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	7800	J, CLP02	ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	440		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	16	J, D-5	ng/kg dry	16	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1046A
Station ID: SS1046

Lab ID: C181214-41
Matrix: Surface Soil

MD No:
D No: ALT7 FRONT

Date Collected: 2/24/18 10:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	22	J, D-5	ng/kg dry	22	3/27/18	3/28/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	32	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1046B
Station ID: SS1046

Lab ID: C181214-42
Matrix: Surface Soil

MD No:
D No: ALT8 FRONT

Date Collected: 2/24/18 10:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	570		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	96		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	6.3		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.2	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.1		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	17		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	8.1		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	6.0		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	5.6		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.20	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.0	CLP10	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1200	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	320	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	110	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5900	J, CLP02	ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	340		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	3/27/18	3/28/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	17	J, D-5	ng/kg dry	17	3/27/18	3/28/18	CL HRSM01.2

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Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1046B
Station ID: SS1046

Lab ID: C181214-42
Matrix: Surface Soil

MD No:
D No: ALT8 FRONT

Date Collected: 2/24/18 10:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.7	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

September 6, 2018

4SESD-QATSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0530, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Report Narrative for Work Order: C183005 Analysis: DIO

Site Name: American Creosote, Pensacola, FL
Case 47722, ELEMENT Sample Nos. C183005-01 through C183005-19,
C183006-01 through C183006-02 (PES)

Dioxin Analysis: Analytical Resources, Inc., Tukwila, WA

The ESAT Work Team reviewed data for the project cited above consisting of 19 soil samples analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 2/20/18 and 2/25/18 and received by the laboratory on 6/26/2018. The final data package was received by the EPA on 8/01/18. The analytical results were reported in one sample delivery group (SDG) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation samples (PES) for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

Samples were collected between 2/20/18 and 2/25/18 and stored at < 6º C until shipment to the laboratory

The laboratory satisfied all technical holding time requirements.

The laboratory scored within warning limits for all analytes in the PES blind spike. Additionally, 1,2,3,4,6,7,8-HpCDD and OCDD were scored as PES contaminants at less than the Contract Required Quantitation Limit (CRQL). The laboratory scored within warning limits for all spiked analytes in the spiked PES.

The laboratory stated in the case narrative that "an application specific column [RTX-Dioxin2 - 60 meters long, 0.25 mm ID, 0.24 µm film thickness] recently developed by Restek" was used instead of the SOW specified DB-5 (primary) and DB-225 (2,3,7,8-TCDF confirmation) columns in Exhibit D, Sections 6.8.1.1.3 and 6.8.1.1.4. An alternative resolution test mixture consisting of 2,3,4,8-TCDF, 2,3,7,8-TCDF, and 3,4,6,7-TCDF was used at the beginning and ending of each analytical sequence to demonstrate that the method minimum valley between isomers of 25% was satisfied. The laboratory's performance provides comparable resolution for 2,3,7,8-TCDF analyzed on this single column as required by the SOW for the DB-225 confirmation column. The results for 2,3,7,8-TCDF are as reliable as those reported by other laboratories for other projects which have been identified (CLP10) as being confirmed on the DB-225 confirmation column. Additionally, retention time windows specified by the SOW do not apply to this specialty column, but data quality was not adversely impacted. The laboratory stated that "the column literature [included in submittals] may be used as a guide to the elution order. ARI has compiled data establishing retention time windows."

Recoveries of the labeled compound 13C12-1,2,3,7,8,9 HxCDF were less than the lower quality control limit in samples C183005-02 and 08. The corresponding 1,2,3,7,8,9 HxCDF results for these samples were qualified "J" (QI-1).

Only minimal Chlorodiphenyl Ether interferences with target congeners were observed for 2,3,7,8-TCDF in samples C183005-07 and 17, and for 1,2,3,7,8-PeCDF in samples C182506-15, 17, 25, 36, and 48, and for 2,3,4,7,8-PeCDF in sample C183005-19. These results were qualified "U" (D-4).

The concentration of OCDD exceeded the calibration range in samples C183005-02, 03, 15, and 17. These OCDD results were qualified "J" (CLP02). The SOW does not require the laboratory to perform dilutions for OCDD or OCDF.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL, the MDL or the EMPC as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

Results are reported as not detected at an elevated detection limit when method blank contamination is evident, or when one or more of the qualitative identification criteria have not been met. In the event of method blank contamination, detection limits may be raised as much as five times (10X for OCDD and OCDF) the level of contamination to discount false positive results. If qualitative identification criteria are not met for an analyte, an estimated maximum possible concentration (EMPC) value is reported, and is qualified as a non-detect "U" (CLP18).

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

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SAMPLES INCLUDED IN THIS REPORT

Project: 18-0530, American Creosote **Contract Lab Case: 47722**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
SS1000C	C183005-01		B0D6	Subsurface Soil	2/20/18 09:40
SS1002C	C183005-02		B0D7	Subsurface Soil	2/20/18 13:20
SS1003C	C183005-03		B0D8	Subsurface Soil	2/20/18 13:45
SS1004C	C183005-04		B0E0	Subsurface Soil	2/20/18 15:30
SS1008C	C183005-05		B0E4	Subsurface Soil	2/23/18 08:00
SS1009C	C183005-06		B0E5	Subsurface Soil	2/23/18 10:00
SS1010C	C183005-07		B0E7	Subsurface Soil	2/23/18 13:30
SS1011C	C183005-08		B0E6	Subsurface Soil	2/23/18 10:30
SS1016C	C183005-09		B0F3	Subsurface Soil	2/25/18 08:40
SS1029C	C183005-10		B0E3	Subsurface Soil	2/22/18 13:45
SS1030C	C183005-11		B0F1	Subsurface Soil	2/24/18 11:05
SS91030C	C183005-12		B0F2	Subsurface Soil	2/24/18 11:05
SS1038C	C183005-13		B0E1	Subsurface Soil	2/21/18 13:00
SS1039C	C183005-14		B0F4	Subsurface Soil	2/25/18 09:15
SS1042C	C183005-15		B0D9	Subsurface Soil	2/20/18 14:30
SS1043C	C183005-16		B0E8	Subsurface Soil	2/24/18 08:25
SS1045C	C183005-17		B0E9	Subsurface Soil	2/24/18 09:25
SS1046C	C183005-18		B0F0	Subsurface Soil	2/24/18 10:20
SS1053C	C183005-19		B0E2	Subsurface Soil	2/21/18 14:40

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP18	Estimated Maximum Possible Concentration (EMPC) Reported
D-4	MRL elevated due to interferences.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.
QI-1	Internal standard was outside of method control limits.

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1000C
Station ID: SS1000

Lab ID: C183005-01
Matrix: Subsurface Soil

MD No:
D No: B0D6 ARI

Date Collected: 2/20/18 9:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	16		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.96	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.32	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.55	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.24	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.37	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.22	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	60	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	61		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.0	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	2.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.0	J, D-5	ng/kg dry	2.0	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.2	J, D-5	ng/kg dry	3.2	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1000C
Station ID: SS1000

Lab ID: C183005-01
Matrix: Subsurface Soil

MD No:
D No: B0D6 ARI

Date Collected: 2/20/18 9:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.8	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.2	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1002C
Station ID: SS1002

Lab ID: C183005-02
Matrix: Subsurface Soil

MD No:
D No: B0D7 ARI

Date Collected: 2/20/18 13:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	970		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	180		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	12		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	10		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	6.3		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	7.1		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	19		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.7	J, CLP01, QI-1	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.9		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.41	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.43	J, CLP01	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	520	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	200	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9600	J, CLP02	ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	44	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	18	J, D-5	ng/kg dry	18	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	18	J, D-5	ng/kg dry	18	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	29	J, D-5	ng/kg dry	29	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1002C
Station ID: SS1002

Lab ID: C183005-02
Matrix: Subsurface Soil

MD No:
D No: B0D7 ARI

Date Collected: 2/20/18 13:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1003C
Station ID: SS1003

Lab ID: C183005-03
Matrix: Subsurface Soil

MD No:
D No: B0D8 ARI

Date Collected: 2/20/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	710		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	110		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	8.0		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.1		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.7		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	13		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.9	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.3	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.7	U	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.66	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.81	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	360	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	6600	CLP02	ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	370		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.5	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	20	J, D-5	ng/kg dry	20	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1003C
Station ID: SS1003

Lab ID: C183005-03
Matrix: Subsurface Soil

MD No:
D No: B0D8 ARI

Date Collected: 2/20/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1004C
Station ID: SS1004
Lab ID: C183005-04
Matrix: Subsurface Soil
MD No:
D No: B0E0 ARI

Date Collected: 2/20/18 15:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	72		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	11		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.67	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.49	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.18	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.82	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.24	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.35	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	32	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	7.2	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	720		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	36		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.1	J, D-5	ng/kg dry	1.1	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.1	J, D-5	ng/kg dry	1.1	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.9	J, D-5	ng/kg dry	1.9	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1004C
Station ID: SS1004

Lab ID: C183005-04
Matrix: Subsurface Soil

MD No:
D No: B0E0 ARI

Date Collected: 2/20/18 15:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.86	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.2	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1008C
Station ID: SS1008

Lab ID: C183005-05
Matrix: Subsurface Soil

MD No:
D No: B0E4 ARI

Date Collected: 2/23/18 8:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	220		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	32		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.88	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.56	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.18	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	380	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	32	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	25	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	100		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.3	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.8	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.3	J, D-5	ng/kg dry	2.3	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.1	J, D-5	ng/kg dry	5.1	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1008C
Station ID: SS1008

Lab ID: C183005-05
Matrix: Subsurface Soil

MD No:
D No: B0E4 ARI

Date Collected: 2/23/18 8:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.4	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.3	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1009C
Station ID: SS1009

Lab ID: C183005-06
Matrix: Subsurface Soil

MD No:
D No: B0E5 ARI

Date Collected: 2/23/18 10:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	79		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	15		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.59	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.78	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.28	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.25	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.51	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.15	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.54	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.21	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.11	J, CLP01	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	39	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	750		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	38		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.1	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.4	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.4	J, D-5	ng/kg dry	2.4	7/01/18	7/10/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1009C
Station ID: SS1009

Lab ID: C183005-06
Matrix: Subsurface Soil

MD No:
D No: B0E5 ARI

Date Collected: 2/23/18 10:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.1	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1010C
Station ID: SS1010

Lab ID: C183005-07
Matrix: Subsurface Soil

MD No:
D No: B0E7 ARI

Date Collected: 2/23/18 13:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	84		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	33		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.97	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	8.1		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.94	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	23		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.5		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.25	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.5	U, D-4	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	78	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	30	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	310	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	930		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	38		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	9.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	510	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.4	J, D-5	ng/kg dry	9.4	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.2	J, D-5	ng/kg dry	9.2	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1010C
Station ID: SS1010

Lab ID: C183005-07
Matrix: Subsurface Soil

MD No:
D No: B0E7 ARI

Date Collected: 2/23/18 13:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1011C
Station ID: SS1011

Lab ID: C183005-08
Matrix: Subsurface Soil

MD No:
D No: B0E6 ARI

Date Collected: 2/23/18 10:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		7/01/18	7/13/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	100		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.4	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.2		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	9.7		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.7	J, CLP01, QI-1	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.4	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	7.1		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.22	U, CLP18	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.7		ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	200	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	51	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	400	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	96		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	470	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	7/01/18	7/13/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	7/01/18	7/13/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1011C
Station ID: SS1011

Lab ID: C183005-08
Matrix: Subsurface Soil

MD No:
D No: B0E6 ARI

Date Collected: 2/23/18 10:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1016C
Station ID: SS1016

Lab ID: C183005-09
Matrix: Subsurface Soil

MD No:
D No: B0F3 ARI

Date Collected: 2/25/18 8:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3800		ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	630		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	16		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	78		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	17		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	64		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	7.3	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	10		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	28		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.47	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.30	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	5500	J, Q-3	ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1900	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	460	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	470	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	33000		ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2000		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	42		ng/kg dry	42	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	49		ng/kg dry	49	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	91		ng/kg dry	91	7/01/18	7/11/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1016C
Station ID: SS1016

Lab ID: C183005-09
Matrix: Subsurface Soil

MD No:
D No: B0F3 ARI

Date Collected: 2/25/18 8:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	9.3	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	22	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1029C
Station ID: SS1029

Lab ID: C183005-10
Matrix: Subsurface Soil

MD No:
D No: B0E3 ARI

Date Collected: 2/22/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.3		%		7/01/18	7/13/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	12		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.93	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.63	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.3	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.27	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.41	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.31	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.33	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.16	U, CLP18	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.22	U, CLP18	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2200		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	45		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	2.0	7/01/18	7/13/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.7	J, D-5	ng/kg dry	1.7	7/01/18	7/13/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.5	J, D-5	ng/kg dry	3.5	7/01/18	7/13/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1029C
Station ID: SS1029

Lab ID: C183005-10
Matrix: Subsurface Soil

MD No:
D No: B0E3 ARI

Date Collected: 2/22/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.0	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.9	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1030C
Station ID: SS1030

Lab ID: C183005-11
Matrix: Subsurface Soil

MD No:
D No: B0F1 ARI

Date Collected: 2/24/18 11:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	52		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	9.3		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.43	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.34	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.92	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.33	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.12	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.54	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.28	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.13	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	89	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	8.5	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	550		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	26		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.3	J, D-5	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.7	J, D-5	ng/kg dry	2.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1030C
Station ID: SS1030

Lab ID: C183005-11
Matrix: Subsurface Soil

MD No:
D No: B0F1 ARI

Date Collected: 2/24/18 11:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.0	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS91030C
Station ID: SS1030
Lab ID: C183005-12
Matrix: Subsurface Soil
MD No:
D No: B0F2 ARI

Date Collected: 2/24/18 11:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.7		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	72		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	13		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.90	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.64	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.55	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.23	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.44	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.49	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.24	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	760		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	35		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.1	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.8	J, D-5	ng/kg dry	1.8	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.4	J, D-5	ng/kg dry	2.4	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS91030C
Station ID: SS1030

Lab ID: C183005-12
Matrix: Subsurface Soil

MD No:
D No: B0F2 ARI

Date Collected: 2/24/18 11:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1038C
Station ID: SS1038

Lab ID: C183005-13
Matrix: Subsurface Soil

MD No:
D No: B0E1 ARI

Date Collected: 2/21/18 13:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	280		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	46		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.8		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.78	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.97	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	510	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	45	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	120		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.0	J, D-5	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.5	J, D-5	ng/kg dry	4.5	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.8	J, D-5	ng/kg dry	7.8	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1038C
Station ID: SS1038

Lab ID: C183005-13
Matrix: Subsurface Soil

MD No:
D No: B0E1 ARI

Date Collected: 2/21/18 13:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.2	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1039C
Station ID: SS1039

Lab ID: C183005-14
Matrix: Subsurface Soil

MD No:
D No: B0F4 ARI

Date Collected: 2/25/18 9:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	57		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	32		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.71	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.45	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.99	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.87	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.38	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.33	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	530		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	33		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.2	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	81	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.0	J, D-5	ng/kg dry	4.0	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.9	J, D-5	ng/kg dry	2.9	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.3	J, D-5	ng/kg dry	3.3	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1039C
Station ID: SS1039

Lab ID: C183005-14
Matrix: Subsurface Soil

MD No:
D No: B0F4 ARI

Date Collected: 2/25/18 9:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1042C
Station ID: SS1042

Lab ID: C183005-15
Matrix: Subsurface Soil

MD No:
D No: B0D9 ARI

Date Collected: 2/20/18 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	5600		ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	810		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	77		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	26		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	27		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	130		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	46		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	9.7		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	42		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.39	U, CLP18	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	8600	J, Q-3	ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	3000	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	530	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	830	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	64000	J, CLP02	ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	3200		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	42	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	54	J, D-5	ng/kg dry	54	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	59	J, D-5	ng/kg dry	59	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	130	J, D-5	ng/kg dry	130	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1042C
Station ID: SS1042

Lab ID: C183005-15
Matrix: Subsurface Soil

MD No:
D No: B0D9 ARI

Date Collected: 2/20/18 14:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	26	J, Q-3	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1043C
Station ID: SS1043

Lab ID: C183005-16
Matrix: Subsurface Soil

MD No:
D No: B0E8 ARI

Date Collected: 2/24/18 8:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	46		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.53	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.70	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.54	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.47	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.69	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	81	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	50	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	81	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	440		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	42		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.9	J, D-5	ng/kg dry	4.9	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.2	J, D-5	ng/kg dry	3.2	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.3	J, D-5	ng/kg dry	3.3	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1043C
Station ID: SS1043

Lab ID: C183005-16
Matrix: Subsurface Soil

MD No:
D No: B0E8 ARI

Date Collected: 2/24/18 8:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.4	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1045C
Station ID: SS1045

Lab ID: C183005-17
Matrix: Subsurface Soil

MD No:
D No: B0E9 ARI

Date Collected: 2/24/18 9:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.5		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	9100		ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1200		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	78		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	33		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	43		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	200		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	17		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	76		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	20		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	9.1		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	4.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	40		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.6		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.25	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.4	U, D-4	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	18000	J, Q-3	ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	5200	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	900	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1200	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	110000	J, CLP02	ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	5700		ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	300	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	78	J, D-5	ng/kg dry	78	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	79	J, D-5	ng/kg dry	79	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	190	J, D-5	ng/kg dry	190	7/01/18	7/11/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1045C
Station ID: SS1045

Lab ID: C183005-17
Matrix: Subsurface Soil

MD No:
D No: B0E9 ARI

Date Collected: 2/24/18 9:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	79	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1046C
Station ID: SS1046

Lab ID: C183005-18
Matrix: Subsurface Soil

MD No:
D No: B0F0 ARI

Date Collected: 2/24/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	14		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	120		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.74	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.63	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.18	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.22	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.82	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.38	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.21	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	230	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1300		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	59		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.6	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	6.8	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.8	J, D-5	ng/kg dry	1.8	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.1	J, D-5	ng/kg dry	3.1	7/01/18	7/11/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1046C
Station ID: SS1046

Lab ID: C183005-18
Matrix: Subsurface Soil

MD No:
D No: B0F0 ARI

Date Collected: 2/24/18 10:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.50	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.0	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1053C
Station ID: SS1053

Lab ID: C183005-19
Matrix: Subsurface Soil

MD No:
D No: B0E2 ARI

Date Collected: 2/21/18 14:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.8		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.92	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.32	U, D-4	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.22	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.0		ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	31	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	39	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	910		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	35		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.5	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	51	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.2	J, D-5	ng/kg dry	7.2	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.2	J, D-5	ng/kg dry	4.2	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.0	J, D-5	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1053C
Station ID: SS1053

Lab ID: C183005-19
Matrix: Subsurface Soil

MD No:
D No: B0E2 ARI

Date Collected: 2/21/18 14:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.9	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	67	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

June 21, 2018

4SESD-MTSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0335, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)
Dioxin	Contract SOW (Water)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Report Narrative for Work Order: C181806

Site Name: American Creosote, Pensacola, FL
Case 47555, ELEMENT Sample Nos. C181806-01 through C181806-22,
C181807-01 through C181807-03 (PES)

Dioxin Analysis: Frontier Analytical Laboratory, El Dorado Hills, CA

The ESAT Work Team reviewed data for the project cited above consisting of 13 soil and 9 water samples. analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 04/08/18 and 04/11/18 and received by the laboratory between 04/11/18 and 04/13/18. The final data package was received by the EPA on 05/24/18. The analytical results were reported in two sample delivery groups (SDGs) by the laboratory. In addition to the field samples, the laboratory also analyzed three performance evaluation samples (PES) for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

All positive results associated with erratic continuing calibration (CCAL) performance were flagged "J" with the appropriate Element qualifier (QC-2).

The laboratory satisfied all technical and contractual holding time requirements.

The laboratory scored within warning limits for all spiked compounds in the water PES. All congeners were reported as not detected or at concentrations that were less than the Contract Required Quantitation Limit (CRQL) in the soil PES blanks. All positive hits reported in the PES blanks were treated as method blank contaminants during data validation.

Significant Chlorodiphenyl Ether interferences with target congeners were not observed for any samples in this Case.

All positive 2,3,7,8-TCDF results reported by the laboratory were confirmed (CLP10) and reported from a second confirmatory column identified as a Phenomenex Quadrex column (007-225).

Low recoveries for the labeled compounds C13-1,2,3,4,7,8 HxCDD, C13-1,2,3,4,7,8 HxCDF, C13-1,2,3,6,7,8 HxCDF, and C13-1,2,3,4,6,7,8 HpCDF were observed for sample C181806-06. The corresponding 1,2,3,4,7,8 HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,7,8 HxCDF, 1,2,3,6,7,8 HxCDF, and 1,2,3,4,6,7,8 HpCDF results for this sample were qualified "J" (QI-1).

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL or the MDL as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0335, American Creosote **Contract Lab Case: 47555**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
RB001	C181806-01		ARZ3	Rinse Water Blank	4/11/18 15:15
ACW-MW2B	C181806-02		ARY7	Groundwater	4/11/18 15:10
ACW-MW92B	C181806-03		ARY8	Groundwater	4/11/18 15:10
ACW-MW3D	C181806-04		ARZ2	Groundwater	4/10/18 14:00
MW10A	C181806-05		ARY5	Groundwater	4/11/18 10:50
MW10B	C181806-06		ARY6	Groundwater	4/11/18 09:28
MW7A	C181806-07		ARY9	Groundwater	4/10/18 10:30
MW7B	C181806-08		ARZ0	Groundwater	4/10/18 12:05
MW9A	C181806-09		ARZ1	Groundwater	4/11/18 14:00
SS1021F_A	C181806-10		ARZ4	Surface Soil	4/8/18 09:10
SS1021F_B	C181806-11		ARZ5	Surface Soil	4/8/18 09:12
SS1021R_A	C181806-12		ARZ7	Surface Soil	4/8/18 09:20
SS1021R_B	C181806-13		ARZ9	Surface Soil	4/8/18 09:22
SS91021R_A	C181806-14		ARZ8	Surface Soil	4/8/18 09:20
SS1027F_A	C181806-15		AS07	Surface Soil	4/8/18 08:45
SS1027F_B	C181806-16		AS08	Surface Soil	4/8/18 08:47
SS1027R_A	C181806-17		AS10	Surface Soil	4/8/18 08:55
SS1027R_B	C181806-18		AS11	Surface Soil	4/8/18 08:57
SS1051F_A	C181806-19		AS01	Surface Soil	4/8/18 10:15
SS1051F_B	C181806-20		AS02	Surface Soil	4/8/18 10:17
SS1051R_A	C181806-21		AS04	Surface Soil	4/8/18 10:26
SS1051R_B	C181806-22		AS05	Surface Soil	4/8/18 10:28

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP10	2,3,7,8-TCDF confirmed by second column.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.
QC-2	Analyte concentration high in continuing calibration verification standard
QI-1	Internal standard was outside of method control limits.

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

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D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: RB001
Station ID:

Lab ID: C181806-01
Matrix: Rinse Water Blank

MD No:
D No: ARZ3 FRONT

Date Collected: 4/11/18 15:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.034	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0058	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0019	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0048	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0018	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0047	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0047	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0025	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00096	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0012	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.074	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.018	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0048	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0022	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.42		ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.021	J, CLP01	ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0022	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.010	J, D-5	ng/L	0.010	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0087	J, D-5	ng/L	0.0087	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0073	J, D-5	ng/L	0.0073	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00096	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: RB001

Lab ID: C181806-01

MD No:

Station ID:

Matrix: Rinse Water Blank

D No: ARZ3 FRONT

Date Collected: 4/11/18 15:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0012	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: ACW-MW2B
Station ID: ACW-MW2B

Lab ID: C181806-02
Matrix: Groundwater

MD No:
D No: ARY7 FRONT

Date Collected: 4/11/18 15:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.10		ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0031	J	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0019	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0041	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0018	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0040	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0079	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0024	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0011	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0011	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.34	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0093	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.11	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0028	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2.3		ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.015	J, CLP01	ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.010	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.011	J, D-5	ng/L	0.011	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0089	J, D-5	ng/L	0.0089	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0090	J, D-5	ng/L	0.0090	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0062	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: ACW-MW2B
Station ID: ACW-MW2B

Lab ID: C181806-02
Matrix: Groundwater

MD No:
D No: ARY7 FRONT

Date Collected: 4/11/18 15:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0092	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: ACW-MW92B
Station ID: ACW-MW2B
Lab ID: C181806-03
Matrix: Groundwater
MD No:
D No: ARY8 FRONT
Date Collected: 4/11/18 15:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.10		ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0034	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0022	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0045	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0020	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0045	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0097	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0027	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0024	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00096	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0011	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.35	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.010	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.11	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0024	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2.3		ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.010	J, CLP01	ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.011	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.011	J, D-5	ng/L	0.011	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0091	J, D-5	ng/L	0.0091	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0092	J, D-5	ng/L	0.0092	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0070	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: ACW-MW92B
Station ID: ACW-MW2B

Lab ID: C181806-03
Matrix: Groundwater

MD No:
D No: ARY8 FRONT

Date Collected: 4/11/18 15:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0038	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: ACW-MW3D
Station ID: ACW-MW3D

Lab ID: C181806-04
Matrix: Groundwater

MD No:
D No: ARZ2 FRONT

Date Collected: 4/10/18 14:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.015	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0035	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0028	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0016	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0029	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0028	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0025	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0025	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0011	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0011	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.031	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.013	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.025	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0034	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.13		ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.011	J, CLP01	ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.020	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.010	J, D-5	ng/L	0.010	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0080	J, D-5	ng/L	0.0080	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0068	J, D-5	ng/L	0.0068	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0011	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: ACW-MW3D
Station ID: ACW-MW3D

Lab ID: C181806-04
Matrix: Groundwater

MD No:
D No: ARZ2 FRONT

Date Collected: 4/10/18 14:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0031	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW10A
Station ID: MW10A

Lab ID: C181806-05
Matrix: Groundwater

MD No:
D No: ARY5 FRONT

Date Collected: 4/11/18 10:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.017	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0028	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0038	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0041	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0023	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0041	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0040	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0033	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0024	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00096	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0011	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.046	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0033	U, J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.020	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0028	U, J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.38		ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0063	U	ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0052	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	U, J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0099	J, D-5	ng/L	0.0099	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0085	J, D-5	ng/L	0.0085	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0071	J, D-5	ng/L	0.0071	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0033	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW10A
Station ID: MW10A

Lab ID: C181806-05
Matrix: Groundwater

MD No:
D No: ARY5 FRONT

Date Collected: 4/11/18 10:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0011	U, J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW10B
Station ID: MW10B

Lab ID: C181806-06
Matrix: Groundwater

MD No:
D No: ARY6 FRONT

Date Collected: 4/11/18 9:28

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.45		ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.014	J, CLP01, QI-1	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0050	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0089	J, CLP01, QI-1	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0058	U, J, QI-1	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.014	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0059	U, J, QI-1	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.14	J, QI-1	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0029	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0076	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0031	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0035	J, CLP01, QC-2	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0010	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.057	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.64	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0061	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9.8		ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.062		ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.082	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.034	J, D-5	ng/L	0.034	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.022	J, D-5	ng/L	0.022	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.038	J, D-5	ng/L	0.038	5/08/18	5/10/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW10B
Station ID: MW10B

Lab ID: C181806-06
Matrix: Groundwater

MD No:
D No: ARY6 FRONT

Date Collected: 4/11/18 9:28

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.038	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0010	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW7A
Station ID: MW7A

Lab ID: C181806-07
Matrix: Groundwater

MD No:
D No: ARY9 FRONT

Date Collected: 4/10/18 10:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0087	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0028	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0025	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0043	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0019	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0044	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0043	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0027	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0032	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0037	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0017	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0011	U	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.028	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0026	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.023	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0023	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.17		ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0045	U	ng/L	0.096	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0040	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.012	J, D-5	ng/L	0.012	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.010	J, D-5	ng/L	0.010	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0086	J, D-5	ng/L	0.0086	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.0017	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW7A
Station ID: MW7A

Lab ID: C181806-07
Matrix: Groundwater

MD No:
D No: ARY9 FRONT

Date Collected: 4/10/18 10:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0038	J, Q-3	ng/L	0.0096	5/08/18	5/10/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW7B

Station ID: MW7B

Lab ID: C181806-08

Matrix: Groundwater

MD No:

D No: ARZ0 FRONT

Date Collected: 4/10/18 12:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.011	J, CLP01	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0028	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0026	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0032	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0019	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0032	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0031	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0027	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0037	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00097	U	ng/L	0.0097	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0011	U	ng/L	0.0097	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.028	J, Q-3	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0034	J, Q-3	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0064	J, Q-3	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0023	J, Q-3	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.15		ng/L	0.097	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0076	U	ng/L	0.097	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0022	J, Q-3	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.049	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0098	J, D-5	ng/L	0.0098	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0079	J, D-5	ng/L	0.0079	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0066	J, D-5	ng/L	0.0066	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00097	J, Q-3	ng/L	0.0097	5/08/18	5/10/18	CL HRSM01.2

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D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW7B
Station ID: MW7B

Lab ID: C181806-08
Matrix: Groundwater

MD No:
D No: ARZ0 FRONT

Date Collected: 4/10/18 12:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0011	J, Q-3	ng/L	0.0097	5/08/18	5/10/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW9A
Station ID: MW9A

Lab ID: C181806-09
Matrix: Groundwater

MD No:
D No: ARZ1 FRONT

Date Collected: 4/11/18 14:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.20		ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0068	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0019	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0033	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0018	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0054	J, CLP01	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.062		ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0026	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0028	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0036	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0021	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0035	U	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.0010	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.0010	U	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.53	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.023	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.47	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3.8		ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.024	J, CLP01	ng/L	0.095	5/08/18	5/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.092	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0036	J, Q-3	ng/L	0.048	5/08/18	5/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.017	J, D-5	ng/L	0.017	5/08/18	5/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0097	J, D-5	ng/L	0.0097	5/08/18	5/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.016	J, D-5	ng/L	0.016	5/08/18	5/10/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.046	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: MW9A
Station ID: MW9A

Lab ID: C181806-09
Matrix: Groundwater

MD No:
D No: ARZ1 FRONT

Date Collected: 4/11/18 14:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.0013	J, Q-3	ng/L	0.0095	5/08/18	5/10/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021F_A
Station ID: SS1021F

Lab ID: C181806-10
Matrix: Surface Soil

MD No:
D No: ARZ4 FRONT

Date Collected: 4/8/18 9:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.4		%		5/03/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	280		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	58		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	4.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.6	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.8	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.8		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.88	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.93	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.4		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	5.0		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.0	CLP10	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	590	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	98	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2500		ng/kg dry	9.9	5/03/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	170		ng/kg dry	9.9	5/03/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	5/03/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.2	J, D-5	ng/kg dry	9.2	5/03/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	5/03/18	5/04/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021F_A
Station ID: SS1021F

Lab ID: C181806-10
Matrix: Surface Soil

MD No:
D No: ARZ4 FRONT

Date Collected: 4/8/18 9:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	9.3	J, Q-3	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021F_B
Station ID: SS1021F

Lab ID: C181806-11
Matrix: Surface Soil

MD No:
D No: ARZ5 FRONT

Date Collected: 4/8/18 9:12

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.7		%		5/03/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	44		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	8.0		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.75	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.98	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.50	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.44	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.42	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.38	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.30	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.63	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.30	U	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	88	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	420		ng/kg dry	9.9	5/03/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	24		ng/kg dry	9.9	5/03/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.4	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	7.5	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.1	J, D-5	ng/kg dry	2.1	5/03/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.8	J, D-5	ng/kg dry	1.8	5/03/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.0	J, D-5	ng/kg dry	0.0	5/03/18	5/04/18	CL HRSM01.2

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Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0318
Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021F_B
Station ID: SS1021F

Lab ID: C181806-11
Matrix: Surface Soil

MD No:
D No: ARZ5 FRONT

Date Collected: 4/8/18 9:12

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.8	J, Q-3	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	7.8	J, Q-3	ng/kg dry	0.99	5/03/18	5/04/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021R_A
Station ID: SS1021R

Lab ID: C181806-12
Matrix: Surface Soil

MD No:
D No: ARZ7 FRONT

Date Collected: 4/8/18 9:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		5/03/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	73		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	17		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.80	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.2	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.1	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.75	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.0	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.2	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.32	U	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	3.7	CLP10	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	40	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	43	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	32	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	710		ng/kg dry	10	5/03/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	27		ng/kg dry	10	5/03/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	54	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	8.8	J, D-5	ng/kg dry	8.8	5/03/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.2	J, D-5	ng/kg dry	4.2	5/03/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.8	J, D-5	ng/kg dry	4.8	5/03/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021R_A
Station ID: SS1021R

Lab ID: C181806-12
Matrix: Surface Soil

MD No:
D No: ARZ7 FRONT

Date Collected: 4/8/18 9:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	41	J, Q-3	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	290	J, Q-3	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021R_B
Station ID: SS1021R

Lab ID: C181806-13
Matrix: Surface Soil

MD No:
D No: ARZ9 FRONT

Date Collected: 4/8/18 9:22

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.4		%		5/03/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	13		ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.6	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.63	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.66	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.57	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.65	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.55	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.64	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.55	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.45	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.58	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.60	U	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.76	J, CLP01	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.90	U	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	27	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	7.5	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	7.4	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	140		ng/kg dry	10	5/03/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	5.2	J, CLP01	ng/kg dry	10	5/03/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.3	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	5/03/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	5/03/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.7	J, D-5	ng/kg dry	1.7	5/03/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.6	J, D-5	ng/kg dry	1.6	5/03/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1021R_B
Station ID: SS1021R

Lab ID: C181806-13
Matrix: Surface Soil

MD No:
D No: ARZ9 FRONT

Date Collected: 4/8/18 9:22

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.9	J, Q-3	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	51	J, Q-3	ng/kg dry	1.0	5/03/18	5/04/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS91021R_A
Station ID: SS1021R

Lab ID: C181806-14
Matrix: Surface Soil

MD No:
D No: ARZ8 FRONT

Date Collected: 4/8/18 9:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		5/03/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	71		ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	15		ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.1	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.94	U	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.7	U	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.27	U	ng/kg dry	1.0	5/03/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.3	CLP10	ng/kg dry	1.0	5/03/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	46	J, Q-3	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	770		ng/kg dry	10	5/03/18	5/03/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	26		ng/kg dry	10	5/03/18	5/03/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	30	J, Q-3	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	5.0	5/03/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.5	J, D-5	ng/kg dry	7.5	5/03/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.2	J, D-5	ng/kg dry	4.2	5/03/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.7	J, D-5	ng/kg dry	4.7	5/03/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS91021R_A
Station ID: SS1021R

Lab ID: C181806-14
Matrix: Surface Soil

MD No:
D No: ARZ8 FRONT

Date Collected: 4/8/18 9:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	49	J, Q-3	ng/kg dry	1.0	5/03/18	5/03/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	230	J, Q-3	ng/kg dry	1.0	5/03/18	5/03/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027F_A
Station ID: SS1027F

Lab ID: C181806-15
Matrix: Surface Soil

MD No:
D No: AS07 FRONT

Date Collected: 4/8/18 8:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	10		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	480		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	88		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.4		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	6.2		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	14		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	8.8		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.66	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.76	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.2		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.7	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.99	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	950	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	250	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4800		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	240		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	15	J, D-5	ng/kg dry	15	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027F_A
Station ID: SS1027F

Lab ID: C181806-15
Matrix: Surface Soil

MD No:
D No: AS07 FRONT

Date Collected: 4/8/18 8:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027F_B
Station ID: SS1027F

Lab ID: C181806-16
Matrix: Surface Soil

MD No:
D No: AS08 FRONT

Date Collected: 4/8/18 8:47

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.8		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	24		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	4.1	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.64	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.74	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.29	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.42	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.72	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.70	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.51	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.37	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.39	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.38	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.35	U	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	49	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	4.8	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	250		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	11		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.4	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	4.4	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.7	J, D-5	ng/kg dry	1.7	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027F_B
Station ID: SS1027F

Lab ID: C181806-16
Matrix: Surface Soil

MD No:
D No: AS08 FRONT

Date Collected: 4/8/18 8:47

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.0	J, Q-3	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	13	J, Q-3	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027R_A
Station ID: SS1027R

Lab ID: C181806-17
Matrix: Surface Soil

MD No:
D No: AS10 FRONT

Date Collected: 4/8/18 8:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	300		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	65		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.6	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.8	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	10		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.6		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.64	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.94	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.4	CLP10	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	580	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	78	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2900		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	170		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	46	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.6	J, D-5	ng/kg dry	9.6	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.5	J, D-5	ng/kg dry	7.6	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	10	J, D-5	ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027R_A
Station ID: SS1027R

Lab ID: C181806-17
Matrix: Surface Soil

MD No:
D No: AS10 FRONT

Date Collected: 4/8/18 8:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.4	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027R_B
Station ID: SS1027R

Lab ID: C181806-18
Matrix: Surface Soil

MD No:
D No: AS11 FRONT

Date Collected: 4/8/18 8:57

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.5		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	43		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	7.5		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.82	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.78	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.52	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.44	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.51	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.27	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.63	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.72	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.35	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	86	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	21	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	410		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	19		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.4	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	8.1	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.2	J, D-5	ng/kg dry	2.2	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1027R_B
Station ID: SS1027R

Lab ID: C181806-18
Matrix: Surface Soil

MD No:
D No: AS11 FRONT

Date Collected: 4/8/18 8:57

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.8	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051F_A
Station ID: SS1051F

Lab ID: C181806-19
Matrix: Surface Soil

MD No:
D No: AS01 FRONT

Date Collected: 4/8/18 10:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	250		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	52		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	5.6		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	9.1		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	7.1		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.79	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.52	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.42	U	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.70	U	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	540	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	90	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2400		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	140		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	8.9	J, D-5	ng/kg dry	8.9	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.0	J, D-5	ng/kg dry	9.0	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051F_A
Station ID: SS1051F

Lab ID: C181806-19
Matrix: Surface Soil

MD No:
D No: AS01 FRONT

Date Collected: 4/8/18 10:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.4	J, Q-3	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	29	J, Q-3	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051F_B
Station ID: SS1051F

Lab ID: C181806-20
Matrix: Surface Soil

MD No:
D No: AS02 FRONT

Date Collected: 4/8/18 10:17

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.5		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	16		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.0	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.53	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.57	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.43	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.71	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.43	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.55	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.56	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.39	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.24	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.46	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.31	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.16	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.14	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	7.9	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	3.9	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	170		ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	7.6	J, CLP01	ng/kg dry	9.9	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.48	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	2.1	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.4	J, D-5	ng/kg dry	1.4	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.3	J, D-5	ng/kg dry	1.3	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.3	J, D-5	ng/kg dry	1.3	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051F_B
Station ID: SS1051F

Lab ID: C181806-20
Matrix: Surface Soil

MD No:
D No: AS02 FRONT

Date Collected: 4/8/18 10:17

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.34	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.3	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051R_A
Station ID: SS1051R

Lab ID: C181806-21
Matrix: Surface Soil

MD No:
D No: AS04 FRONT

Date Collected: 4/8/18 10:26

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.6		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	220		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	57		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.0	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.1	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.6	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.2		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.2		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.82	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.2	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.96	U	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	430	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	76	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	78	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1900		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	130		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	8.6	J, D-5	ng/kg dry	8.6	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	6.9	J, D-5	ng/kg dry	6.9	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	8.6	J, D-5	ng/kg dry	8.6	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051R_A
Station ID: SS1051R

Lab ID: C181806-21
Matrix: Surface Soil

MD No:
D No: AS04 FRONT

Date Collected: 4/8/18 10:26

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	9.6	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	34	J, Q-3	ng/kg dry	0.99	5/03/18	5/05/18	CL HRSM01.2

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Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051R_B
Station ID: SS1051R

Lab ID: C181806-22
Matrix: Surface Soil

MD No:
D No: AS05 FRONT

Date Collected: 4/8/18 10:28

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.0		%		5/03/18	5/05/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	47		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	11		ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.79	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.52	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.53	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.34	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.54	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.24	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.82	U	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.71	J, CLP01	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.20	U	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.22	U	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	90	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	30	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	440		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	25		ng/kg dry	10	5/03/18	5/05/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.0	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	8.6	J, Q-3	ng/kg dry	5.0	5/03/18	5/05/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.3	J, D-5	ng/kg dry	2.0	5/03/18	5/05/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.0	J, D-5	ng/kg dry	2.0	5/03/18	5/05/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.3	J, D-5	ng/kg dry	2.0	5/03/18	5/05/18	CL HRSM01.2

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Project: 18-0335, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0335, American Creosote

Contract Lab Case: 47555

Sample ID: SS1051R_B
Station ID: SS1051R

Lab ID: C181806-22
Matrix: Surface Soil

MD No:
D No: AS05 FRONT

Date Collected: 4/8/18 10:28

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	8.5	J, Q-3	ng/kg dry	1.0	5/03/18	5/05/18	CL HRSM01.2

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Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0421
Project: 18-0421, American Creosote - Reported by Diana Burdette

June 7, 2018

4SESD-ASB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0421, American Creosote
Superfund Remedial

FROM: Diana Burdette
OCS Analyst

THRU: Floyd Wellborn, Chief
ASB Organic Chemistry Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and have been qualified by this laboratory if the applicable quality control criteria were not met. Verification is defined in Section 5.2 of the ASB LOQAM. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:	Method Used:	Accreditations:
Semi Volatile Organics (SVOA)		
Semivolatile organic compounds	EPA 8270D (Water)	ISO

Sample Disposal Policy

Due to limited space for long term sample storage, ASB's policy is to dispose of samples on a periodic schedule. Air samples collected in summa canisters will be disposed of 30 days following the issuance of this report. All other sample media including original samples, sample extracts and or digestates will be disposed of, in accordance with applicable regulations, 60 days from the date of this report.

This sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time. If samples require storage beyond the 60-day period, please contact the Sample Control Coordinator by e-mail at R4SampleCustody@epa.gov.

cc: Nardina Turner

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SAMPLES INCLUDED IN THIS REPORT

Project: 18-0421, American Creosote

Sample ID	Laboratory ID	Matrix	Date Collected	Date Received
MW8B	E182004-02	Groundwater	5/16/18 09:35	5/17/18 10:10
MW98B	E182004-03	Groundwater	5/16/18 09:35	5/17/18 10:10

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DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
QS-4	Surrogate recovery less than 10%

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

ACCREDITATIONS:

ISO ASB is accredited by ISO/IEC 17025, including an amplification for forensic accreditation through ANSI-ASQ National Accreditation Board.

Refer to the certificate and scope of accreditation AT-1644 at:
http://www.epa.gov/aboutepa/about-region-4s-science-and-ecosystem-support-division-sesd

NR The EPA Region 4 Laboratory has not requested accreditation for this test.

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Semi Volatile Organics

Project: 18-0421, American Creosote

Sample ID: MW8B
Station ID: MW8B
Lab ID: E182004-02
Matrix: Groundwater

Date Collected: 5/16/18 9:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
1319-77-3	(3-and/or 4-)Methylphenol	9.9	U	ug/L	9.9	5/23/18 9:13	5/30/18 15:04	EPA 8270D
92-52-4	1,1-Biphenyl	2.0	U, J, QS-4	ug/L	2.0	5/23/18 9:13	5/30/18 15:04	EPA 8270D
105-67-9	2,4-Dimethylphenol	9.9	U	ug/L	9.9	5/23/18 9:13	5/30/18 15:04	EPA 8270D
95-48-7	2-Methylphenol	9.9	U	ug/L	9.9	5/23/18 9:13	5/30/18 15:04	EPA 8270D
83-32-9	Acenaphthene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
120-12-7	Anthracene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
56-55-3	Benzo(a)anthracene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
50-32-8	Benzo(a)pyrene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
205-99-2	Benzo(b)fluoranthene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
191-24-2	Benzo(g,h,i)perylene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
207-08-9	Benzo(k)fluoranthene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
86-74-8	Carbazole	2.0	U, J, QS-4	ug/L	2.0	5/23/18 9:13	5/30/18 15:04	EPA 8270D
218-01-9	Chrysene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
53-70-3	Dibenz(a,h)anthracene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
132-64-9	Dibenzofuran	2.0	U, J, QS-4	ug/L	2.0	5/23/18 9:13	5/30/18 15:04	EPA 8270D
206-44-0	Fluoranthene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
86-73-7	Fluorene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
193-39-5	Indeno (1,2,3-cd) pyrene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
91-20-3	Naphthalene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
87-86-5	Pentachlorophenol	6.9	U	ug/L	6.9	5/23/18 9:13	5/30/18 15:04	EPA 8270D
85-01-8	Phenanthrene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D
108-95-2	Phenol	5.9	U	ug/L	5.9	5/23/18 9:13	5/30/18 15:04	EPA 8270D
129-00-0	Pyrene	0.30	U, J, QS-4	ug/L	0.30	5/23/18 9:13	5/30/18 15:04	EPA 8270D

Semi Volatile Organics

Project: 18-0421, American Creosote

Sample ID: MW98B **Lab ID:** E182004-03

Station ID: MW8B **Matrix:** Groundwater

Date Collected: 5/16/18 9:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
1319-77-3	(3-and/or 4-)Methylphenol	9.8	U	ug/L	9.8	5/23/18 9:13	5/30/18 15:34	EPA 8270D
92-52-4	1,1-Biphenyl	2.0	U, J, QS-4	ug/L	2.0	5/23/18 9:13	5/30/18 15:34	EPA 8270D
105-67-9	2,4-Dimethylphenol	9.8	U	ug/L	9.8	5/23/18 9:13	5/30/18 15:34	EPA 8270D
95-48-7	2-Methylphenol	9.8	U	ug/L	9.8	5/23/18 9:13	5/30/18 15:34	EPA 8270D
83-32-9	Acenaphthene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
120-12-7	Anthracene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
56-55-3	Benzo(a)anthracene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
50-32-8	Benzo(a)pyrene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
205-99-2	Benzo(b)fluoranthene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
191-24-2	Benzo(g,h,i)perylene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
207-08-9	Benzo(k)fluoranthene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
86-74-8	Carbazole	2.0	U, J, QS-4	ug/L	2.0	5/23/18 9:13	5/30/18 15:34	EPA 8270D
218-01-9	Chrysene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
53-70-3	Dibenz(a,h)anthracene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
132-64-9	Dibenzofuran	2.0	U, J, QS-4	ug/L	2.0	5/23/18 9:13	5/30/18 15:34	EPA 8270D
206-44-0	Fluoranthene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
86-73-7	Fluorene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
193-39-5	Indeno (1,2,3-cd) pyrene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
91-20-3	Naphthalene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
87-86-5	Pentachlorophenol	6.9	U	ug/L	6.9	5/23/18 9:13	5/30/18 15:34	EPA 8270D
85-01-8	Phenanthrene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D
108-95-2	Phenol	5.9	U	ug/L	5.9	5/23/18 9:13	5/30/18 15:34	EPA 8270D
129-00-0	Pyrene	0.29	U, J, QS-4	ug/L	0.29	5/23/18 9:13	5/30/18 15:34	EPA 8270D

Semi Volatile Organics (SVOA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1805080 - E 3520 LLE										
Blank (1805080-BLK1)				Prepared: 05/23/18 Analyzed: 05/30/18						
EPA 8270D										
(3-and/or 4-)Methylphenol	U	10	ug/L							U
1,1-Biphenyl	U	2.0	"							U
2,4-Dimethylphenol	U	10	"							U
2-Methylphenol	U	10	"							U
Acenaphthene	U	0.30	"							U
Anthracene	U	0.30	"							U
Benzo(a)anthracene	U	0.30	"							U
Benzo(a)pyrene	U	0.30	"							U
Benzo(b)fluoranthene	U	0.30	"							U
Benzo(g,h,i)perylene	U	0.30	"							U
Benzo(k)fluoranthene	U	0.30	"							U
Carbazole	U	2.0	"							U
Chrysene	U	0.30	"							U
Dibenz(a,h)anthracene	U	0.30	"							U
Dibenzofuran	U	2.0	"							U
Fluoranthene	U	0.30	"							U
Fluorene	U	0.30	"							U
Indeno (1,2,3-cd) pyrene	U	0.30	"							U
Naphthalene	U	0.30	"							U
Pentachlorophenol	U	7.0	"							U
Phenanthrene	U	0.30	"							U
Phenol	U	6.0	"							U
Pyrene	U	0.30	"							U
LCS (1805080-BS1)				Prepared: 05/23/18 Analyzed: 05/30/18						
EPA 8270D										
(3-and/or 4-)Methylphenol	47.648	10	ug/L	60.000		79.4	50-102			
1,1-Biphenyl	57.226	2.0	"	60.000		95.4	58-103			
2,4-Dimethylphenol	49.815	10	"	60.000		83.0	46-96			
2-Methylphenol	49.555	10	"	60.000		82.6	49-101			
Acenaphthene	62.370	0.30	"	60.000		104	62-101			QL-2
Anthracene	63.014	0.30	"	60.000		105	62-112			
Benzo(a)anthracene	58.649	0.30	"	60.000		97.7	64-113			
Benzo(a)pyrene	61.100	0.30	"	60.000		102	59-128			
Benzo(b)fluoranthene	63.805	0.30	"	60.000		106	59-128			
Benzo(g,h,i)perylene	41.208	0.30	"	60.000		68.7	45-123			
Benzo(k)fluoranthene	64.287	0.30	"	60.000		107	63-125			
Carbazole	62.271	2.0	"	60.000		104	64-116			
Chrysene	59.634	0.30	"	60.000		99.4	63-113			

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Semi Volatile Organics (SVOA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1805080 - E 3520 LLE										
LCS (1805080-BS1)				Prepared: 05/23/18 Analyzed: 05/30/18						
Dibenz(a,h)anthracene	47.310	0.30	ug/L	60.000		78.8	50-126			
Dibenzofuran	56.348	2.0	"	60.000		93.9	66-104			
Fluoranthene	61.384	0.30	"	60.000		102	65-117			
Fluorene	63.970	0.30	"	60.000		107	64-110			
Indeno (1,2,3-cd) pyrene	46.762	0.30	"	60.000		77.9	48-129			
Naphthalene	55.108	0.30	"	60.000		91.8	50-100			
Pentachlorophenol	60.870	7.0	"	60.000		101	60-116			
Phenanthrene	60.727	0.30	"	60.000		101	62-109			
Phenol	45.390	6.0	"	60.000		75.6	44-98			
Pyrene	57.869	0.30	"	60.000		96.4	60-117			
LCS Dup (1805080-BSD1)				Prepared: 05/23/18 Analyzed: 05/30/18						
EPA 8270D										
(3-and/or 4-)Methylphenol	47.340	10	ug/L	60.000		78.9	50-102	0.649	30	
1,1-Biphenyl	57.478	2.0	"	60.000		95.8	58-103	0.439	18	
2,4-Dimethylphenol	50.427	10	"	60.000		84.0	46-96	1.22	27	
2-Methylphenol	50.073	10	"	60.000		83.5	49-101	1.04	33	
Acenaphthene	61.579	0.30	"	60.000		103	62-101	1.28	14	QL-2
Anthracene	62.360	0.30	"	60.000		104	62-112	1.04	10	
Benzo(a)anthracene	59.285	0.30	"	60.000		98.8	64-113	1.08	10	
Benzo(a)pyrene	62.120	0.30	"	60.000		104	59-128	1.66	10	
Benzo(b)fluoranthene	63.707	0.30	"	60.000		106	59-128	0.154	22	
Benzo(g,h,i)perylene	45.706	0.30	"	60.000		76.2	45-123	10.4	20	
Benzo(k)fluoranthene	63.541	0.30	"	60.000		106	63-125	1.17	19	
Carbazole	62.230	2.0	"	60.000		104	64-116	0.0659	14	
Chrysene	59.950	0.30	"	60.000		99.9	63-113	0.529	10	
Dibenz(a,h)anthracene	51.204	0.30	"	60.000		85.3	50-126	7.91	20	
Dibenzofuran	55.905	2.0	"	60.000		93.2	66-104	0.789	13	
Fluoranthene	61.483	0.30	"	60.000		102	65-117	0.161	10	
Fluorene	62.734	0.30	"	60.000		105	64-110	1.95	12	
Indeno (1,2,3-cd) pyrene	50.357	0.30	"	60.000		83.9	48-129	7.40	20	
Naphthalene	55.372	0.30	"	60.000		92.3	50-100	0.478	27	
Pentachlorophenol	59.001	7.0	"	60.000		98.3	60-116	3.12	11	
Phenanthrene	59.726	0.30	"	60.000		99.5	62-109	1.66	10	
Phenol	46.977	6.0	"	60.000		78.3	44-98	3.44	38	
Pyrene	57.403	0.30	"	60.000		95.7	60-117	0.809	10	

Semi Volatile Organics (SVOA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1805080 - E 3520 LLE										
Duplicate (1805080-DUP1)	**Source: E182004-02**			Prepared: 05/23/18 Analyzed: 05/30/18						
EPA 8270D										
(3-and/or 4-)Methylphenol	U	9.9	ug/L		U				200	U
1,1-Biphenyl	U	2.0	"		U				200	J, QS-4, U
2,4-Dimethylphenol	U	9.9	"		U				200	U
2-Methylphenol	U	9.9	"		U				200	U
Acenaphthene	U	0.30	"		U				200	J, QS-4, U
Anthracene	U	0.30	"		U				200	J, QS-4, U
Benzo(a)anthracene	U	0.30	"		U				200	J, QS-4, U
Benzo(a)pyrene	U	0.30	"		U				200	J, QS-4, U
Benzo(b)fluoranthene	U	0.30	"		U				200	J, QS-4, U
Benzo(g,h,i)perylene	U	0.30	"		U				200	J, QS-4, U
Benzo(k)fluoranthene	U	0.30	"		U				200	J, QS-4, U
Carbazole	U	2.0	"		U				200	J, QS-4, U
Chrysene	U	0.30	"		U				200	J, QS-4, U
Dibenz(a,h)anthracene	U	0.30	"		U				200	J, QS-4, U
Dibenzofuran	U	2.0	"		U				200	J, QS-4, U
Fluoranthene	U	0.30	"		U				200	J, QS-4, U
Fluorene	U	0.30	"		U				200	J, QS-4, U
Indeno (1,2,3-cd) pyrene	U	0.30	"		U				200	J, QS-4, U
Naphthalene	U	0.30	"		U				200	J, QS-4, U
Pentachlorophenol	U	6.9	"		U				200	U
Phenanthrene	U	0.30	"		U				200	J, QS-4, U
Phenol	U	5.9	"		U				200	U
Pyrene	U	0.30	"		U				200	J, QS-4, U
MRL Verification (1805080-PS1)				Prepared: 05/23/18 Analyzed: 05/30/18						
EPA 8270D										
(3-and/or 4-)Methylphenol	6.7480	10	ug/L	10.000		67.5	30-122			MRL-2, Q-2, J

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Semi Volatile Organics (SVOA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1805080 - E 3520 LLE										
MRL Verification (1805080-PS1)				Prepared: 05/23/18 Analyzed: 05/30/18						
1,1-Biphenyl	1.5680	2.0	ug/L	2.0000		78.4	38-113			MRL-2, Q-2, J
2,4-Dimethylphenol	6.6930	10	"	10.000		66.9	26-116			MRL-2, Q-2, J
2-Methylphenol	6.8340	10	"	10.000		68.3	29-121			MRL-2, Q-2, J
Carbazole	2.1560	2.0	"	2.0000		108	44-136			MRL-2
Dibenzofuran	1.3580	2.0	"	2.0000		67.9	46-124			MRL-2, Q-2, J
Pentachlorophenol	7.5710	7.0	"	10.000		75.7	40-126			MRL-2
Phenol	6.8400	6.0	"	10.000		68.4	24-118			MRL-2
MRL Verification (1805080-PS2)				Prepared: 05/23/18 Analyzed: 05/30/18						
EPA 8270D										
Acenaphthene	0.24100	0.30	ug/L	0.30000		80.3	42-121			MRL-2, Q-2, J
Anthracene	0.24400	0.30	"	0.30000		81.3	42-132			MRL-2, Q-2, J
Benzo(a)anthracene	0.31500	0.30	"	0.30000		105	44-133			MRL-2
Benzo(a)pyrene	0.33800	0.30	"	0.30000		113	39-148			MRL-2
Benzo(b)fluoranthene	0.32000	0.30	"	0.30000		107	39-148			MRL-2
Benzo(g,h,i)perylene	0.32100	0.30	"	0.30000		107	25-143			MRL-2
Benzo(k)fluoranthene	0.29900	0.30	"	0.30000		99.7	43-145			MRL-2, Q-2, J
Chrysene	0.26400	0.30	"	0.30000		88.0	43-133			MRL-2, Q-2, J
Dibenz(a,h)anthracene	0.32000	0.30	"	0.30000		107	30-146			MRL-2
Fluoranthene	0.25800	0.30	"	0.30000		86.0	45-137			MRL-2, Q-2, J
Fluorene	0.24600	0.30	"	0.30000		82.0	44-130			MRL-2, Q-2, J
Indeno (1,2,3-cd) pyrene	0.29300	0.30	"	0.30000		97.7	28-149			MRL-2, Q-2, J
Naphthalene	0.22200	0.30	"	0.30000		74.0	30-120			MRL-2, Q-2, J
Phenanthrene	0.28900	0.30	"	0.30000		96.3	42-129			MRL-2, Q-2, J
Pyrene	0.26500	0.30	"	0.30000		88.3	40-137			MRL-2, Q-2, J

Notes and Definitions for QC Samples

U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
MRL-2	MRL verification for Non-Potable Water matrix
Q-2	Result greater than MDL but less than MRL.
QL-2	Laboratory Control Spike Recovery greater than method control limits
QS-4	Surrogate recovery less than 10%

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0421
Project: 18-0421, American Creosote - Reported by Sallie Hale

June 77, 2071

FUMUN4RUS

8 MB E ORAND8

UDS JMBCT FINAL Analytical Report
Project: 18-0421, American Creosote
Superfund Remedial

: OE8 T Sallie Hale
OCS Analyst

C- ODT Floyd Wellborn, Chief
ASB Organic Chemistry Section

CE T Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and have been qualified by this laboratory if the applicable quality control criteria were not met. Verification is defined in Section 5.2 of the ASB LOQAM. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:	Method Used:	Accreditations:
Volatile Organics (VOA)		
Volatile organic compounds	EPA 8260C (Water)	ISO

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OeHampAlmulpise oamP amc E myemTM71200F RnltvdidTr ER

6/9/18 SJH: Samples E182004-02 and -03 had to be diluted 2-fold due to the presence of dirt (up to one-third of the volume) in the VOA vials.

Ul x Hte NidHadl t Latibv

Due to limited space for long term sample storage, ASB's policy is to dispose of samples on a periodic schedule. Air samples collected in summa canisters will be disposed of 30 days following the issuance of this report. All other sample media including original samples, sample extracts and or digestates will be disposed of, in accordance with applicable regulations, 60 days from the date of this report.

This sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time. If samples require storage beyond the 60-day period, please contact the Sample Control Coordinator by e-mail at R4SampleCustody@epa.gov.

cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Project: 18-0421, American Creosote - Reported by Sallie Hale

UR8 Lj MUYABj DNMN YA C- YUOMLEOC

LmaVébpJ7140F27, Rx enibl n Bmeadape

Ul x Hte YN	j l Qaml pamv YN	8 l pmil	Nl pe Battebpey	Nl pe Oebeis ey
TB001	E182004-01	Trip Blank - Water	5/16/18 09:45	5/17/18 10:10
MW8B	E182004-02	Groundwater	5/16/18 09:35	5/17/18 10:10
MW98B	E182004-03	Groundwater	5/16/18 09:35	5/17/18 10:10

NRCR g DRj Y: YMO NM: YAYCYE AU

U The analyte was not detected at or above the reporting limit.

T-6 Sample storage temperature criteria not met.

RBOE AW8 URAN RSSOM- YRCYE AU

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

ACCREDITATIONS:

ISO ASB is accredited by ISO/IEC 17025, including an amplification for forensic accreditation through ANSI-ASQ National Accreditation Board.

Refer to the certificate and scope of accreditation AT-1644 at:
http://www.epa.gov/aboutepa/about-region-4s-science-and-ecosystem-support-division-sesd

NR The EPA Region 4 Laboratory has not requested accreditation for this test.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0421
Project: 18-0421, American Creosote - Reported by Sallie Hale

r atl pite E mCl nibd

LmaVébpT7140F27, Rx emibl n Bmeadape

Ul x Hte YNTCS007 **j l QYNT M71200F407**

Upl pian YNT **8 l pmil T CmiHS tl nc 4P l pem**

Nl pe BattebpeyT w57/571 6TFw

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 17:31	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
271-89-6	2,3-Benzofuran	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
67-64-1	Acetone	4.0	U, T-6	ug/L	4.0	5/21/18 16:53	5/21/18 17:31	EPA 8260C
71-43-2	Benzene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
108-90-7	Chlorobenzene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
100-41-4	Ethyl Benzene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
78-93-3	Methyl Ethyl Ketone	4.0	U, T-6	ug/L	4.0	5/21/18 16:53	5/21/18 17:31	EPA 8260C
95-47-6	o-Xylene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
100-42-5	Styrene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
108-88-3	Toluene	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C
75-01-4	Vinyl chloride	0.50	U, T-6	ug/L	0.50	5/21/18 16:53	5/21/18 17:31	EPA 8260C

r atl pite E mCl nibd

LmaVébpiT7140F27, Rx emibl n Bmeadape

Ul x Hte YNT8 P 1S **j l QYNT M71200F402**

Upl pian YNT8 P 1S **8 l pmil T9 mauny3 l pem**

Nl pe BattebpeyT w57/571 6T(w

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	2.0	U, T-6	ug/L	2.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
271-89-6	2,3-Benzofuran	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
67-64-1	Acetone	8.0	U, T-6	ug/L	8.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
71-43-2	Benzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
108-90-7	Chlorobenzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
100-41-4	Ethyl Benzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
78-93-3	Methyl Ethyl Ketone	8.0	U, T-6	ug/L	8.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
95-47-6	o-Xylene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
100-42-5	Styrene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
108-88-3	Toluene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C
75-01-4	Vinyl chloride	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:28	EPA 8260C

r atl pite E mCl nibd

LmaVébpT7140F27, Rx emibl n Bmeadape

Ul x Hte YNT8_P_61S **j l QYNT M71200F40(**

Upl pian YNT8_P_1S **8 l pmil T9 mauny3 l pem**

Nl pe BattebpeyT w57/571 6T(w

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	2.0	U, T-6	ug/L	2.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
271-89-6	2,3-Benzofuran	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
67-64-1	Acetone	8.0	U, T-6	ug/L	8.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
71-43-2	Benzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
108-90-7	Chlorobenzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
100-41-4	Ethyl Benzene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
78-93-3	Methyl Ethyl Ketone	8.0	U, T-6	ug/L	8.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
95-47-6	o-Xylene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
100-42-5	Styrene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
108-88-3	Toluene	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C
75-01-4	Vinyl chloride	1.0	U, T-6	ug/L	1.0	5/21/18 16:53	5/21/18 21:54	EPA 8260C

r atl pite EnGl nibd)r E Rh4g ul tipv Banpmat

DU4MLR, OeGan F, UMUN

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Slpbk 710w0Kw4r w0(0S r ERP pmLneH										
Stl nc)710w0Kw4Sj f 7h				Prepared & Analyzed: 05/21/18						
EPA 8260C										
(m- and/or p-)Xylene	U	1.0	ug/L							U
1,1,1,2-Tetrachloroethane	U	0.50	"							U
1,1,1-Trichloroethane	U	0.50	"							U
1,1,2,2-Tetrachloroethane	U	0.50	"							U
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	U	0.50	"							U
1,1,2-Trichloroethane	U	0.50	"							U
1,1-Dichloroethane	U	0.50	"							U
1,1-Dichloroethene (1,1-Dichloroethylene)	U	0.50	"							U
1,1-Dichloropropene	U	0.50	"							U
1,2,3-Trichlorobenzene	U	0.50	"							U
1,2,3-Trichloropropane	U	0.50	"							U
1,2,4-Trichlorobenzene	U	0.50	"							U
1,2,4-Trimethylbenzene	U	0.50	"							U
1,2-Dibromo-3-Chloropropane (DBCP)	U	1.0	"							U
1,2-Dibromoethane (EDB)	U	0.50	"							U
1,2-Dichlorobenzene	U	0.50	"							U
1,2-Dichloroethane	U	0.50	"							U
1,2-Dichloropropane	U	0.50	"							U
1,3,5-Trimethylbenzene	U	0.50	"							U
1,3-Dichlorobenzene	U	0.50	"							U
1,3-Dichloropropane	U	0.50	"							U
1,4-Dichlorobenzene	U	0.50	"							U
2,2-Dichloropropane	U	0.50	"							U
2,3-Benzofuran	U	0.50	"							U
Acetone	U	4.0	"							U
Benzene	U	0.50	"							U
Bromobenzene	U	0.50	"							U
Bromochloromethane	U	0.50	"							U
Bromodichloromethane	U	0.50	"							U
Bromoform	U	1.0	"							U
Bromomethane	U	2.0	"							U
Carbon disulfide	U	2.0	"							U
Carbon Tetrachloride	U	0.50	"							U
Chlorobenzene	U	0.50	"							U
Chloroethane	U	2.0	"							U
Chloroform	U	0.50	"							U
Chloromethane	U	0.50	"							U
cis-1,2-Dichloroethene	U	0.50	"							U

r atl pite EnCl nibd)r E Rh4g ul tipv Banpmat

DU4MLR, OeGan F, UMUN

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
S1pbk 710w0Kw4r w0(0S r ERP pmLneH										
Stl nc)710w0Kw4Sj f 7h				Prepared & Analyzed: 05/21/18						
cis-1,3-Dichloropropene	U	0.50	ug/L							U
Cyclohexane	U	0.50	"							U
Dibromochloromethane	U	0.50	"							U
Dibromomethane	U	0.50	"							U
Dichlorodifluoromethane (Freon 12)	U	0.50	"							U
Ethyl Benzene	U	0.50	"							U
Hexachlorobutadiene	U	0.50	"							U
Isopropylbenzene	U	0.50	"							U
Methyl Acetate	U	1.0	"							U
Methyl Butyl Ketone	U	1.0	"							U
Methyl Ethyl Ketone	U	4.0	"							U
Methyl Isobutyl Ketone	U	1.0	"							U
Methyl T-Butyl Ether (MTBE)	U	0.50	"							U
Methylcyclohexane	U	0.50	"							U
Methylene Chloride	U	0.50	"							U
n-Butylbenzene	U	0.50	"							U
n-Propylbenzene	U	0.50	"							U
o-Chlorotoluene	U	0.50	"							U
o-Xylene	U	0.50	"							U
p-Chlorotoluene	U	0.50	"							U
p-Isopropyltoluene	U	0.50	"							U
sec-Butylbenzene	U	0.50	"							U
Styrene	U	0.50	"							U
tert-Butylbenzene	U	0.50	"							U
Tetrachloroethene (Tetrachloroethylene)	U	0.50	"							U
Toluene	U	0.50	"							U
trans-1,2-Dichloroethene	U	0.50	"							U
trans-1,3-Dichloropropene	U	0.50	"							U
Trichloroethene (Trichloroethylene)	U	0.50	"							U
Trichlorofluoromethane (Freon 11)	U	0.50	"							U
Vinyl chloride	U	0.50	"							U

r atl pite EnCl nibd)r E Rh4g ul tipv Banpmat
DU4MLR, OeGan F, UMUN

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
S1pbk 710w0Kw4r w0(0S r ERP pmLneH										
j BU)710w0Kw4SU7h				Prepared & Analyzed: 05/21/18						
EPA 8260C										
(m- and/or p-)Xylene	40.130		ug/L	40.000		100	91.3-117			
1,1,1,2-Tetrachloroethane	20.210		"	20.000		101	76.5-128			
1,1,1-Trichloroethane	20.870		"	20.000		104	79.3-126			
1,1,2,2-Tetrachloroethane	19.790		"	20.000		99.0	80.2-118			
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	21.150		"	20.000		106	80-124			
1,1,2-Trichloroethane	19.610		"	20.000		98.0	87.1-111			
1,1-Dichloroethane	20.250		"	20.000		101	87.8-113			
1,1-Dichloroethene (1,1-Dichloroethylene)	20.810		"	20.000		104	85.4-116			
1,1-Dichloropropene	20.840		"	20.000		104	89.4-115			
1,2,3-Trichlorobenzene	19.510		"	20.000		97.6	85-117			
1,2,3-Trichloropropane	19.330		"	20.000		96.6	83.4-114			
1,2,4-Trichlorobenzene	19.390		"	20.000		97.0	83.9-117			
1,2,4-Trimethylbenzene	19.770		"	20.000		98.8	86.5-121			
1,2-Dibromo-3-Chloropropane (DBCP)	38.960		"	40.000		97.4	72.3-136			
1,2-Dibromoethane (EDB)	19.950		"	20.000		99.8	87.3-115			
1,2-Dichlorobenzene	18.860		"	20.000		94.3	86.4-111			
1,2-Dichloroethane	19.590		"	20.000		98.0	83.9-122			
1,2-Dichloropropane	20.320		"	20.000		102	88-113			
1,3,5-Trimethylbenzene	19.890		"	20.000		99.4	86.8-119			
1,3-Dichlorobenzene	18.990		"	20.000		95.0	86.4-112			
1,3-Dichloropropane	19.550		"	20.000		97.8	87.4-113			
1,4-Dichlorobenzene	18.440		"	20.000		92.2	86.5-110			
2,2-Dichloropropane	20.060		"	20.000		100	53.4-154			
2,3-Benzofuran	20.230		"	20.000		101	70-130			
Acetone	36.400		"	40.000		91.0	49.7-153			
Benzene	20.120		"	20.000		101	89.6-113			
Bromobenzene	19.250		"	20.000		96.2	84.6-112			
Bromochloromethane	20.530		"	20.000		103	83.6-117			
Bromodichloromethane	20.710		"	20.000		104	80-125			
Bromoform	40.460		"	40.000		101	63.1-142			
Bromomethane	19.720		"	20.000		98.6	49.9-140			
Carbon disulfide	20.180		"	20.000		101	81.7-114			
Carbon Tetrachloride	21.070		"	20.000		105	68.8-140			
Chlorobenzene	19.470		"	20.000		97.4	88.4-109			
Chloroethane	21.530		"	20.000		108	76.7-118			
Chloroform	20.240		"	20.000		101	87.9-115			
Chloromethane	19.510		"	20.000		97.6	68.9-118			
cis-1,2-Dichloroethene	20.420		"	20.000		102	87.6-115			

r atl pite EnGl nibd)r E Rh4g ul tipv Banpmat

DU4MLR, OeGan F, UMUN

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
S1pbk 710w0Kw4r w0(0S r ERP pmLneH										
j BU)710w0Kw4SU7h				Prepared & Analyzed: 05/21/18						
cis-1,3-Dichloropropene	20.890		ug/L	20.000		104	81-121			
Cyclohexane	21.000		"	20.000		105	83.5-122			
Dibromochloromethane	20.610		"	20.000		103	71.7-133			
Dibromomethane	19.730		"	20.000		98.6	87.3-117			
Dichlorodifluoromethane (Freon 12)	20.930		"	20.000		105	63.5-132			
Ethyl Benzene	19.610		"	20.000		98.0	90-114			
Hexachlorobutadiene	19.130		"	20.000		95.6	80.2-116			
Isopropylbenzene	20.170		"	20.000		101	84.5-120			
Methyl Acetate	39.630		"	40.000		99.1	75.8-121			
Methyl Butyl Ketone	39.450		"	40.000		98.6	69.9-136			
Methyl Ethyl Ketone	38.860		"	40.000		97.2	68.1-135			
Methyl Isobutyl Ketone	38.840		"	40.000		97.1	77-127			
Methyl T-Butyl Ether (MTBE)	20.120		"	20.000		101	80.1-123			
Methylcyclohexane	21.050		"	20.000		105	82.6-124			
Methylene Chloride	20.350		"	20.000		102	81.2-118			
n-Butylbenzene	19.630		"	20.000		98.2	85.7-121			
n-Propylbenzene	19.900		"	20.000		99.5	87-117			
o-Chlorotoluene	19.430		"	20.000		97.2	85.8-114			
o-Xylene	19.840		"	20.000		99.2	88.9-116			
p-Chlorotoluene	19.390		"	20.000		97.0	86.5-114			
p-Isopropyltoluene	19.850		"	20.000		99.2	86.3-123			
sec-Butylbenzene	19.840		"	20.000		99.2	86.2-120			
Styrene	20.800		"	20.000		104	89.9-119			
tert-Butylbenzene	19.840		"	20.000		99.2	85.2-119			
Tetrachloroethene (Tetrachloroethylene)	20.130		"	20.000		101	85.1-113			
Toluene	19.850		"	20.000		99.2	87.7-111			
trans-1,2-Dichloroethene	20.860		"	20.000		104	86.6-114			
trans-1,3-Dichloropropene	20.470		"	20.000		102	77.4-127			
Trichloroethene (Trichloroethylene)	20.100		"	20.000		100	87.8-114			
Trichlorofluoromethane (Freon 11)	21.120		"	20.000		106	78-129			
Vinyl chloride	20.670		"	20.000		103	78.8-115			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
S1pbk 710w0Kw4r w0(0S r ERP pmLneH										
8 Oj r emicibl pian)710w0Kw4LU7h				Prepared & Analyzed: 05/21/18						
EPA 8260C										
(m- and/or p-)Xylene	1.0100		ug/L	1.0000		101	71.3-137			MRL-2
1,1,1,2-Tetrachloroethane	0.45000		"	0.50000		90.0	56.5-148			MRL-2
1,1,1-Trichloroethane	0.42000		"	0.50000		84.0	59.3-146			MRL-2
1,1,2,2-Tetrachloroethane	0.43000		"	0.50000		86.0	60.2-138			MRL-2
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	0.40000		"	0.50000		80.0	60-144			MRL-2
1,1,2-Trichloroethane	0.46000		"	0.50000		92.0	67.1-131			MRL-2
1,1-Dichloroethane	0.48000		"	0.50000		96.0	67.8-133			MRL-2
1,1-Dichloroethene (1,1-Dichloroethylene)	0.45000		"	0.50000		90.0	65.4-136			MRL-2
1,1-Dichloropropene	0.44000		"	0.50000		88.0	69.4-135			MRL-2
1,2,3-Trichlorobenzene	0.51000		"	0.50000		102	65-137			MRL-2
1,2,3-Trichloropropane	0.46000		"	0.50000		92.0	63.4-134			MRL-2
1,2,4-Trichlorobenzene	0.51000		"	0.50000		102	63.9-137			MRL-2
1,2,4-Trimethylbenzene	0.51000		"	0.50000		102	66.5-141			MRL-2
1,2-Dibromo-3-Chloropropane (DBCP)	0.88000		"	1.0000		88.0	52.3-156			MRL-2
1,2-Dibromoethane (EDB)	0.44000		"	0.50000		88.0	67.3-135			MRL-2
1,2-Dichlorobenzene	0.55000		"	0.50000		110	66.4-131			MRL-2
1,2-Dichloroethane	0.52000		"	0.50000		104	63.9-142			MRL-2
1,2-Dichloropropane	0.45000		"	0.50000		90.0	68-133			MRL-2
1,3,5-Trimethylbenzene	0.50000		"	0.50000		100	66.8-139			MRL-2
1,3-Dichlorobenzene	0.56000		"	0.50000		112	66.4-132			MRL-2
1,3-Dichloropropane	0.51000		"	0.50000		102	67.4-133			MRL-2
1,4-Dichlorobenzene	0.58000		"	0.50000		116	66.5-130			MRL-2
2,2-Dichloropropane	0.51000		"	0.50000		102	33.4-174			MRL-2
2,3-Benzofuran	0.39000		"	0.50000		78.0	50-150			MRL-2
Acetone	1.7900		"	1.0000		179	29.7-173			
Benzene	0.49000		"	0.50000		98.0	69.6-133			MRL-2
Bromobenzene	0.53000		"	0.50000		106	64.6-132			MRL-2
Bromochloromethane	0.40000		"	0.50000		80.0	63.6-137			MRL-2
Bromodichloromethane	0.43000		"	0.50000		86.0	60-145			MRL-2
Bromoform	0.87000		"	1.0000		87.0	43.1-162			MRL-2
Bromomethane	0.48000		"	0.50000		96.0	29.9-160			
Carbon disulfide	0.62000		"	0.50000		124	61.7-134			
Carbon Tetrachloride	0.45000		"	0.50000		90.0	48.8-160			MRL-2
Chlorobenzene	0.51000		"	0.50000		102	68.4-129			MRL-2
Chloroethane	0.44000		"	0.50000		88.0	56.7-138			
Chloroform	0.48000		"	0.50000		96.0	67.9-135			MRL-2
Chloromethane	0.56000		"	0.50000		112	48.9-138			MRL-2
cis-1,2-Dichloroethene	0.46000		"	0.50000		92.0	67.6-135			MRL-2

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
S1pbk 710w0Kw4r w0(0S r ERP pmLneH										
8 Oj r enicibl pian)710w0Kw4LU7h				Prepared & Analyzed: 05/21/18						
cis-1,3-Dichloropropene	0.42000		ug/L	0.50000		84.0	61-141			MRL-2
Cyclohexane	0.45000		"	0.50000		90.0	63.5-142			MRL-2
Dibromochloromethane	0.42000		"	0.50000		84.0	51.7-153			MRL-2
Dibromomethane	0.49000		"	0.50000		98.0	67.3-137			MRL-2
Dichlorodifluoromethane (Freon 12)	0.47000		"	0.50000		94.0	43.5-152			MRL-2
Ethyl Benzene	0.53000		"	0.50000		106	70-134			MRL-2
Hexachlorobutadiene	0.58000		"	0.50000		116	60.2-136			MRL-2
Isopropylbenzene	0.50000		"	0.50000		100	64.5-140			MRL-2
Methyl Acetate	0.93000		"	1.0000		93.0	55.8-141			MRL-2
Methyl Butyl Ketone	0.86000		"	1.0000		86.0	49.9-156			MRL-2
Methyl Ethyl Ketone	0.90000		"	1.0000		90.0	48.1-155			
Methyl Isobutyl Ketone	0.92000		"	1.0000		92.0	57-147			MRL-2
Methyl T-Butyl Ether (MTBE)	0.47000		"	0.50000		94.0	60.1-143			MRL-2
Methylcyclohexane	0.46000		"	0.50000		92.0	62.6-144			MRL-2
Methylene Chloride	0.44000		"	0.50000		88.0	61.2-138			MRL-2
n-Butylbenzene	0.55000		"	0.50000		110	65.7-141			MRL-2
n-Propylbenzene	0.51000		"	0.50000		102	67-137			MRL-2
o-Chlorotoluene	0.52000		"	0.50000		104	65.8-134			MRL-2
o-Xylene	0.54000		"	0.50000		108	68.9-136			MRL-2
p-Chlorotoluene	0.53000		"	0.50000		106	66.5-134			MRL-2
p-Isopropyltoluene	0.50000		"	0.50000		100	66.3-143			MRL-2
sec-Butylbenzene	0.53000		"	0.50000		106	66.2-140			MRL-2
Styrene	0.43000		"	0.50000		86.0	69.9-139			MRL-2
tert-Butylbenzene	0.55000		"	0.50000		110	65.2-139			MRL-2
Tetrachloroethene (Tetrachloroethylene)	0.50000		"	0.50000		100	65.1-133			MRL-2
Toluene	0.52000		"	0.50000		104	67.7-131			MRL-2
trans-1,2-Dichloroethene	0.44000		"	0.50000		88.0	66.6-134			MRL-2
trans-1,3-Dichloropropene	0.44000		"	0.50000		88.0	57.4-147			MRL-2
Trichloroethene (Trichloroethylene)	0.48000		"	0.50000		96.0	67.8-134			MRL-2
Trichlorofluoromethane (Freon 11)	0.41000		"	0.50000		82.0	58-149			MRL-2
Vinyl chloride	0.46000		"	0.50000		92.0	58.8-135			MRL-2

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U	The analyte was not detected at or above the reporting limit.
MRL-2	MRL verification for Non-Potable Water matrix

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Black and Veatch
1120 Sanctuary Parkway
Suite 200
Alpharetta, GA 30009
Attention: Amy Callaway

Project Name: American Creosote Works

Project Number: 49089

Lot Number:**TE22045**

Date Completed:06/07/2018

N. Saikaly

06/08/2018 7:39 AM
Approved and released by:
Project Manager: Nisreen Saikaly

The electronic signature above is the equivalent of a handwritten signature.
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Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Black and Veatch
Lot Number: TE22045

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Samples were received at a temperature of 7.4C.

Semivolatile Organic Compounds

The surrogate recovery TE22045-003 was outside the acceptance limit. This sample was diluted. The dilution impacted the surrogate recoveries, thus negating their usefulness concerning quality control. The sample results are reported and no corrective action is required.

Sample Summary
Black and Veatch
Lot Number: TE22045

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	BW16GW65	Aqueous	05/18/2018 1130	05/22/2018
002	BW916GW65	Aqueous	05/18/2018 1130	05/22/2018
003	BW16GW12	Aqueous	05/18/2018 0855	05/22/2018

(3 samples)

Detection Summary
Black and Veatch
Lot Number: TE22045

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	BW16GW65	Aqueous	1,1'-Biphenyl	8270D	9.6	J	ug/L	5
001	BW16GW65	Aqueous	2,4-Dimethylphenol	8270D	35		ug/L	5
001	BW16GW65	Aqueous	Acenaphthene	8270D	38		ug/L	5
001	BW16GW65	Aqueous	Anthracene	8270D	5.5		ug/L	5
001	BW16GW65	Aqueous	Benzo(a)anthracene	8270D	1.6	J	ug/L	5
001	BW16GW65	Aqueous	Carbazole	8270D	40		ug/L	5
001	BW16GW65	Aqueous	Dibenzofuran	8270D	14	J	ug/L	6
001	BW16GW65	Aqueous	Fluoranthene	8270D	17		ug/L	6
001	BW16GW65	Aqueous	Fluorene	8270D	22		ug/L	6
001	BW16GW65	Aqueous	Pentachlorophenol	8270D	190		ug/L	6
001	BW16GW65	Aqueous	Pyrene	8270D	8.8		ug/L	6
002	BW916GW65	Aqueous	1,1'-Biphenyl	8270D	9.4	J	ug/L	7
002	BW916GW65	Aqueous	2,4-Dimethylphenol	8270D	33		ug/L	7
002	BW916GW65	Aqueous	Acenaphthene	8270D	40		ug/L	7
002	BW916GW65	Aqueous	Anthracene	8270D	2.8	J	ug/L	7
002	BW916GW65	Aqueous	Dibenzofuran	8270D	16	J	ug/L	8
002	BW916GW65	Aqueous	Fluoranthene	8270D	18		ug/L	8
002	BW916GW65	Aqueous	Fluorene	8270D	22		ug/L	8
002	BW916GW65	Aqueous	Pentachlorophenol	8270D	200		ug/L	8
002	BW916GW65	Aqueous	Pyrene	8270D	9.1		ug/L	8
003	BW16GW12	Aqueous	1,1'-Biphenyl	8270D	160	J	ug/L	9
003	BW16GW12	Aqueous	2,4-Dimethylphenol	8270D	3800		ug/L	9
003	BW16GW12	Aqueous	2-Methylnaphthalene	8270D	850		ug/L	9
003	BW16GW12	Aqueous	2-Methylphenol	8270D	2000		ug/L	9
003	BW16GW12	Aqueous	3+4-Methylphenol	8270D	4900		ug/L	9
003	BW16GW12	Aqueous	Acenaphthene	8270D	670		ug/L	9
003	BW16GW12	Aqueous	Acenaphthylene	8270D	23	J	ug/L	9
003	BW16GW12	Aqueous	Acetophenone	8270D	650		ug/L	9
003	BW16GW12	Aqueous	Anthracene	8270D	100		ug/L	9
003	BW16GW12	Aqueous	Carbazole	8270D	1000		ug/L	9
003	BW16GW12	Aqueous	Dibenzofuran	8270D	520		ug/L	10
003	BW16GW12	Aqueous	Fluoranthene	8270D	90		ug/L	10
003	BW16GW12	Aqueous	Fluorene	8270D	400		ug/L	10
003	BW16GW12	Aqueous	Naphthalene	8270D	8100		ug/L	10
003	BW16GW12	Aqueous	Pentachlorophenol	8270D	2400		ug/L	10
003	BW16GW12	Aqueous	Phenanthrene	8270D	580		ug/L	10
003	BW16GW12	Aqueous	Phenol	8270D	2300		ug/L	10
003	BW16GW12	Aqueous	Pyrene	8270D	50	J	ug/L	10

(38 detections)

Semivolatile Organic Compounds by GC/MS

Client: **Black and Veatch** Laboratory ID: **TE22045-001**

Description: **BW16GW65** Matrix: **Aqueous**

Date Sampled: **05/18/2018 1130**

Date Received: **05/22/2018**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2026	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	**92-52-4**	**8270D**	**9.6**	**J**	**20**	**2.5**	**ug/L**	**1**
2,4,5-Trichlorophenol	95-95-4	8270D	20	U	20	2.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	20	U	20	2.5	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	40	U	40	5.0	ug/L	1
2,4-Dimethylphenol	**105-67-9**	**8270D**	**35**		**20**	**5.0**	**ug/L**	**1**
2,4-Dinitrophenol	51-28-5	8270D	100	U	100	5.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	40	U	40	2.5	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	40	U	40	2.5	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	20	U	20	2.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	20	U	20	2.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	4.0	U	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	20	U	20	5.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	40	U	40	2.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	20	U	20	5.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	20	U	20	8.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	20	U	20	7.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	40	U	40	5.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	100	U	100	5.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	20	U	20	2.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	20	U	20	2.5	ug/L	1
4-Chloroaniline	106-47-8	8270D	40	U	40	2.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	20	U	20	2.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	40	U	40	7.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	100	U	100	10	ug/L	1
Acenaphthene	**83-32-9**	**8270D**	**38**		**4.0**	**1.0**	**ug/L**	**1**
Acenaphthylene	208-96-8	8270D	4.0	U	4.0	1.0	ug/L	1
Acetophenone	98-86-2	8270D	20	U	20	2.5	ug/L	1
Anthracene	**120-12-7**	**8270D**	**5.5**	**J**	**4.0**	**1.0**	**ug/L**	**1**
Atrazine	1912-24-9	8270D	20	U	20	2.5	ug/L	1
Benzaldehyde	100-52-7	8270D	40	U	40	2.5	ug/L	1
Benzo(a)anthracene	**56-55-3**	**8270D**	**1.6**	**J**	**4.0**	**1.0**	**ug/L**	**1**
Benzo(a)pyrene	50-32-8	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	4.0	U	4.0	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	20	U	20	2.5	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	20	U	20	2.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	20	U	20	2.5	ug/L	1
Caprolactam	105-60-2	8270D	40	U	40	5.0	ug/L	1
Carbazole	**86-74-8**	**8270D**	**40**	**J**	**20**	**2.5**	**ug/L**	**1**
Chrysene	218-01-9	8270D	4.0	U	4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	4.0	U	4.0	1.0	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: **Black and Veatch** Laboratory ID: **TE22045-001**

Description: **BW16GW65** Matrix: **Aqueous**

Date Sampled: **05/18/2018 1130**

Date Received: **05/22/2018**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2026	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	**132-64-9**	**8270D**	**14**	**J**	**20**	**2.5**	**ug/L**	**1**
Diethylphthalate	84-66-2	8270D	20	U	20	2.5	ug/L	1
Dimethyl phthalate	131-11-3	8270D	20	U	20	2.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	20	U	20	2.5	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	20	U	20	2.5	ug/L	1
Fluoranthene	**206-44-0**	**8270D**	**17**		**4.0**	**1.0**	**ug/L**	**1**
Fluorene	**86-73-7**	**8270D**	**22**		**4.0**	**1.0**	**ug/L**	**1**
Hexachlorobenzene	118-74-1	8270D	20	U	20	2.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	20	U	20	2.5	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	100	U	100	10	ug/L	1
Hexachloroethane	67-72-1	8270D	20	U	20	5.0	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	4.0	U	4.0	1.0	ug/L	1
Isophorone	78-59-1	8270D	20	U	20	2.5	ug/L	1
Naphthalene	91-20-3	8270D	4.0	U	4.0	1.0	ug/L	1
Nitrobenzene	98-95-3	8270D	20	U	20	7.5	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	20	U	20	2.5	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	20	U	20	2.5	ug/L	1
Pentachlorophenol	**87-86-5**	**8270D**	**190**		**100**	**10**	**ug/L**	**1**
Phenanthrene	85-01-8	8270D	4.0	U	4.0	1.0	ug/L	1
Phenol	108-95-2	8270D	20	U	20	2.5	ug/L	1
Pyrene	**129-00-0**	**8270D**	**8.8**		**4.0**	**1.0**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		71	37-129
2-Fluorophenol		73	24-127
Nitrobenzene-d5		84	38-127
Phenol-d5		81	28-128
Terphenyl-d14		62	10-148
2,4,6-Tribromophenol		57	35-144

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

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Semivolatile Organic Compounds by GC/MS

Client: **Black and Veatch** Laboratory ID: **TE22045-002**

Description: **BW916GW65** Matrix: **Aqueous**

Date Sampled: **05/18/2018 1130**

Date Received: **05/22/2018**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2050	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	**92-52-4**	**8270D**	**9.4**	**J**	**20**	**2.5**	**ug/L**	**1**
2,4,5-Trichlorophenol	95-95-4	8270D	20	U	20	2.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	20	U	20	2.5	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	40	U	40	5.0	ug/L	1
2,4-Dimethylphenol	**105-67-9**	**8270D**	**33**		**20**	**5.0**	**ug/L**	**1**
2,4-Dinitrophenol	51-28-5	8270D	100	U	100	5.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	40	U	40	2.5	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	40	U	40	2.5	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	20	U	20	2.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	20	U	20	2.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	4.0	U	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	20	U	20	5.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	40	U	40	2.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	20	U	20	5.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	20	U	20	8.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	20	U	20	7.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	40	U	40	5.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	100	U	100	5.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	20	U	20	2.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	20	U	20	2.5	ug/L	1
4-Chloroaniline	106-47-8	8270D	40	U	40	2.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	20	U	20	2.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	40	U	40	7.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	100	U	100	10	ug/L	1
Acenaphthene	**83-32-9**	**8270D**	**40**		**4.0**	**1.0**	**ug/L**	**1**
Acenaphthylene	208-96-8	8270D	4.0	U	4.0	1.0	ug/L	1
Acetophenone	98-86-2	8270D	20	U	20	2.5	ug/L	1
Anthracene	**120-12-7**	**8270D**	**2.8**	**J**	**4.0**	**1.0**	**ug/L**	**1**
Atrazine	1912-24-9	8270D	20	U	20	2.5	ug/L	1
Benzaldehyde	100-52-7	8270D	40	U	40	2.5	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	4.0	U	4.0	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	20	U	20	2.5	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	20	U	20	2.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	20	U	20	2.5	ug/L	1
Caprolactam	105-60-2	8270D	40	U	40	5.0	ug/L	1
Carbazole	86-74-8	8270D	20	U J	20	2.5	ug/L	1
Chrysene	218-01-9	8270D	4.0	U	4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	4.0	U	4.0	1.0	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
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N = Recovery is out of criteria
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

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Semivolatile Organic Compounds by GC/MS

Client: **Black and Veatch**
Description: **BW916GW65**
Date Sampled: **05/18/2018 1130**
Date Received: **05/22/2018**
Laboratory ID: **TE22045-002**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2050	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	**132-64-9**	**8270D**	**16**	**J**	**20**	**2.5**	**ug/L**	**1**
Diethylphthalate	84-66-2	8270D	20	U	20	2.5	ug/L	1
Dimethyl phthalate	131-11-3	8270D	20	U	20	2.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	20	U	20	2.5	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	20	U	20	2.5	ug/L	1
Fluoranthene	**206-44-0**	**8270D**	**18**		**4.0**	**1.0**	**ug/L**	**1**
Fluorene	**86-73-7**	**8270D**	**22**		**4.0**	**1.0**	**ug/L**	**1**
Hexachlorobenzene	118-74-1	8270D	20	U	20	2.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	20	U	20	2.5	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	100	U	100	10	ug/L	1
Hexachloroethane	67-72-1	8270D	20	U	20	5.0	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	4.0	U	4.0	1.0	ug/L	1
Isophorone	78-59-1	8270D	20	U	20	2.5	ug/L	1
Naphthalene	91-20-3	8270D	4.0	U	4.0	1.0	ug/L	1
Nitrobenzene	98-95-3	8270D	20	U	20	7.5	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	20	U	20	2.5	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	20	U	20	2.5	ug/L	1
Pentachlorophenol	**87-86-5**	**8270D**	**200**		**100**	**10**	**ug/L**	**1**
Phenanthrene	85-01-8	8270D	4.0	U	4.0	1.0	ug/L	1
Phenol	108-95-2	8270D	20	U	20	2.5	ug/L	1
Pyrene	**129-00-0**	**8270D**	**9.1**		**4.0**	**1.0**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		70	37-129
2-Fluorophenol		70	24-127
Nitrobenzene-d5		82	38-127
Phenol-d5		81	28-128
Terphenyl-d14		53	10-148
2,4,6-Tribromophenol		55	35-144

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: **Black and Veatch** Laboratory ID: **TE22045-003**

Description: **BW16GW12** Matrix: **Aqueous**

Date Sampled: **05/18/2018 0855**

Date Received: **05/22/2018**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	100	05/29/2018 2115	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	**92-52-4**	**8270D**	**160**	**J**	**400**	**50**	**ug/L**	**1**
2,4,5-Trichlorophenol	95-95-4	8270D	400	U	400	50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	400	U	400	50	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	800	U	800	100	ug/L	1
2,4-Dimethylphenol	**105-67-9**	**8270D**	**3800**		**400**	**100**	**ug/L**	**1**
2,4-Dinitrophenol	51-28-5	8270D	2000	U	2000	100	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	800	U	800	50	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	800	U	800	50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	400	U	400	50	ug/L	1
2-Chlorophenol	95-57-8	8270D	400	U	400	50	ug/L	1
2-Methylnaphthalene	**91-57-6**	**8270D**	**850**		**80**	**20**	**ug/L**	**1**
2-Methylphenol	**95-48-7**	**8270D**	**2000**		**400**	**100**	**ug/L**	**1**
2-Nitroaniline	88-74-4	8270D	800	U	800	50	ug/L	1
2-Nitrophenol	88-75-5	8270D	400	U	400	100	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	400	U	400	180	ug/L	1
3+4-Methylphenol	**106-44-5**	**8270D**	**4900**		**400**	**150**	**ug/L**	**1**
3-Nitroaniline	99-09-2	8270D	800	U	800	100	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	2000	U	2000	100	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	400	U	400	50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	400	U	400	50	ug/L	1
4-Chloroaniline	106-47-8	8270D	800	U	800	50	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	400	U	400	50	ug/L	1
4-Nitroaniline	100-01-6	8270D	800	U	800	150	ug/L	1
4-Nitrophenol	100-02-7	8270D	2000	U	2000	200	ug/L	1
Acenaphthene	**83-32-9**	**8270D**	**670**		**80**	**20**	**ug/L**	**1**
Acenaphthylene	**208-96-8**	**8270D**	**23**	**J**	**80**	**20**	**ug/L**	**1**
Acetophenone	**98-86-2**	**8270D**	**650**		**400**	**50**	**ug/L**	**1**
Anthracene	**120-12-7**	**8270D**	**100**		**80**	**20**	**ug/L**	**1**
Atrazine	1912-24-9	8270D	400	U	400	50	ug/L	1
Benzaldehyde	100-52-7	8270D	800	U	800	50	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	80	U	80	20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	80	U	80	20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	80	U	80	20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	80	U	80	20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	80	U	80	20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	400	U	400	50	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	400	U	400	50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	400	U	400	50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	400	U	400	50	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	400	U	400	50	ug/L	1
Caprolactam	105-60-2	8270D	800	U	800	100	ug/L	1
Carbazole	**86-74-8**	**8270D**	**1000**		**400**	**50**	**ug/L**	**1**
Chrysene	218-01-9	8270D	80	U	80	20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	80	U	80	20	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
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Semivolatile Organic Compounds by GC/MS

Client: **Black and Veatch** Laboratory ID: **TE22045-003**

Description: **BW16GW12** Matrix: **Aqueous**

Date Sampled: **05/18/2018 0855**

Date Received: **05/22/2018**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	100	05/29/2018 2115	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	**132-64-9**	**8270D**	**520**		**400**	**50**	**ug/L**	**1**
Diethylphthalate	84-66-2	8270D	400	U	400	50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	400	U	400	50	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	400	U	400	50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	400	U	400	50	ug/L	1
Fluoranthene	**206-44-0**	**8270D**	**90**		**80**	**20**	**ug/L**	**1**
Fluorene	**86-73-7**	**8270D**	**400**		**80**	**20**	**ug/L**	**1**
Hexachlorobenzene	118-74-1	8270D	400	U	400	50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	400	U	400	50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	2000	U	2000	200	ug/L	1
Hexachloroethane	67-72-1	8270D	400	U	400	100	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	80	U	80	20	ug/L	1
Isophorone	78-59-1	8270D	400	U	400	50	ug/L	1
Naphthalene	**91-20-3**	**8270D**	**8100**		**80**	**20**	**ug/L**	**1**
Nitrobenzene	98-95-3	8270D	400	U	400	150	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	400	U	400	50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	400	U	400	50	ug/L	1
Pentachlorophenol	**87-86-5**	**8270D**	**2400**		**2000**	**200**	**ug/L**	**1**
Phenanthrene	**85-01-8**	**8270D**	**580**		**80**	**20**	**ug/L**	**1**
Phenol	**108-95-2**	**8270D**	**2300**		**400**	**50**	**ug/L**	**1**
Pyrene	**129-00-0**	**8270D**	**50**	**J**	**80**	**20**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		64	24-127
Nitrobenzene-d5		92	38-127
Phenol-d5		93	28-128
Terphenyl-d14		12	10-148
2,4,6-Tribromophenol	N	18	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
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QC Summary

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ72993-001
Batch: 72993
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,1'-Biphenyl	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2,4,5-Trichlorophenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2,4,6-Trichlorophenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2,4-Dichlorophenol	8.0	U	1	8.0	1.0	ug/L	05/27/2018 1234
2,4-Dimethylphenol	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
2,4-Dinitrophenol	20	U	1	20	1.0	ug/L	05/27/2018 1234
2,4-Dinitrotoluene	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
2,6-Dinitrotoluene	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
2-Chloronaphthalene	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2-Chlorophenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2-Methylnaphthalene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
2-Methylphenol	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
2-Nitroaniline	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
2-Nitrophenol	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
3,3'-Dichlorobenzidine	4.0	U	1	4.0	1.8	ug/L	05/27/2018 1234
3+4-Methylphenol	4.0	U	1	4.0	1.5	ug/L	05/27/2018 1234
3-Nitroaniline	8.0	U	1	8.0	1.0	ug/L	05/27/2018 1234
4,6-Dinitro-2-methylphenol	20	U	1	20	1.0	ug/L	05/27/2018 1234
4-Bromophenyl phenyl ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
4-Chloro-3-methyl phenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
4-Chloroaniline	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
4-Chlorophenyl phenyl ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
4-Nitroaniline	8.0	U	1	8.0	1.5	ug/L	05/27/2018 1234
4-Nitrophenol	20	U	1	20	2.0	ug/L	05/27/2018 1234
Acenaphthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Acenaphthylene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Acetophenone	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Anthracene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Atrazine	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Benzaldehyde	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
Benzo(a)anthracene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(a)pyrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(b)fluoranthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(g,h,i)perylene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(k)fluoranthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
bis (2-Chloro-1-methylethyl) ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
bis(2-Chloroethoxy)methane	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
bis(2-Chloroethyl)ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
bis(2-Ethylhexyl)phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Butyl benzyl phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Caprolactam	8.0	U	1	8.0	1.0	ug/L	05/27/2018 1234
Carbazole	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Chrysene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Dibenzo(a,h)anthracene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ72993-001
Batch: 72993
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Dibenzofuran	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Diethylphthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Dimethyl phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Di-n-butyl phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Di-n-octylphthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Fluoranthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Fluorene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Hexachlorobenzene	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Hexachlorobutadiene	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Hexachlorocyclopentadiene	20	U	1	20	2.0	ug/L	05/27/2018 1234
Hexachloroethane	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
Indeno(1,2,3-c,d)pyrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Isophorone	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Naphthalene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Nitrobenzene	4.0	U	1	4.0	1.5	ug/L	05/27/2018 1234
N-Nitrosodi-n-propylamine	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
N-Nitrosodiphenylamine (Diphenylamine)	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Pentachlorophenol	20	U	1	20	2.0	ug/L	05/27/2018 1234
Phenanthrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Phenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Pyrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		65	24-127
Nitrobenzene-d5		79	38-127
Phenol-d5		71	28-128
Terphenyl-d14		85	10-148
2,4,6-Tribromophenol		54	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ72993-002
Batch: 72993
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,1'-Biphenyl	40	31		1	78	30-130	05/27/2018 1258
2,4,5-Trichlorophenol	40	30		1	74	30-123	05/27/2018 1258
2,4,6-Trichlorophenol	40	31		1	77	30-130	05/27/2018 1258
2,4-Dichlorophenol	40	28		1	71	30-121	05/27/2018 1258
2,4-Dimethylphenol	40	24		1	61	20-125	05/27/2018 1258
2,4-Dinitrophenol	80	54		1	67	11-126	05/27/2018 1258
2,4-Dinitrotoluene	40	32		1	79	30-130	05/27/2018 1258
2,6-Dinitrotoluene	40	33		1	81	30-130	05/27/2018 1258
2-Chloronaphthalene	40	31		1	76	30-130	05/27/2018 1258
2-Chlorophenol	40	32		1	81	30-130	05/27/2018 1258
2-Methylnaphthalene	40	31		1	78	40-132	05/27/2018 1258
2-Methylphenol	40	33		1	81	30-130	05/27/2018 1258
2-Nitroaniline	40	35		1	88	30-130	05/27/2018 1258
2-Nitrophenol	40	30		1	75	30-130	05/27/2018 1258
3,3'-Dichlorobenzidine	40	28		1	71	10-126	05/27/2018 1258
3+4-Methylphenol	40	34		1	86	30-130	05/27/2018 1258
3-Nitroaniline	40	28		1	70	30-130	05/27/2018 1258
4,6-Dinitro-2-methylphenol	40	33		1	83	30-130	05/27/2018 1258
4-Bromophenyl phenyl ether	40	30		1	74	30-124	05/27/2018 1258
4-Chloro-3-methyl phenol	40	34		1	86	30-123	05/27/2018 1258
4-Chloroaniline	40	24		1	59	12-157	05/27/2018 1258
4-Chlorophenyl phenyl ether	40	30		1	74	30-121	05/27/2018 1258
4-Nitroaniline	40	37		1	92	30-135	05/27/2018 1258
4-Nitrophenol	80	62		1	78	30-130	05/27/2018 1258
Acenaphthene	40	31		1	77	30-122	05/27/2018 1258
Acenaphthylene	40	33		1	82	30-130	05/27/2018 1258
Acetophenone	40	33		1	84	30-130	05/27/2018 1258
Anthracene	40	34		1	84	30-123	05/27/2018 1258
Atrazine	40	35		1	87	30-130	05/27/2018 1258
Benzaldehyde	40	15		1	37	20-115	05/27/2018 1258
Benzo(a)anthracene	40	33		1	83	40-125	05/27/2018 1258
Benzo(a)pyrene	40	31		1	78	40-128	05/27/2018 1258
Benzo(b)fluoranthene	40	31		1	78	30-130	05/27/2018 1258
Benzo(g,h,i)perylene	40	33		1	83	30-130	05/27/2018 1258
Benzo(k)fluoranthene	40	31		1	77	30-130	05/27/2018 1258
bis (2-Chloro-1-methylethyl) ether	40	39		1	98	30-130	05/27/2018 1258
bis(2-Chloroethoxy)methane	40	35		1	87	30-130	05/27/2018 1258
bis(2-Chloroethyl)ether	40	38		1	96	30-130	05/27/2018 1258
bis(2-Ethylhexyl)phthalate	40	34		1	84	30-130	05/27/2018 1258
Butyl benzyl phthalate	40	35		1	88	30-130	05/27/2018 1258
Caprolactam	40	38		1	94	30-130	05/27/2018 1258
Carbazole	40	34		1	84	30-130	05/27/2018 1258
Chrysene	40	33		1	82	30-130	05/27/2018 1258
Dibenzo(a,h)anthracene	40	33		1	81	30-130	05/27/2018 1258

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ72993-002
Batch: 72993
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Dibenzofuran	40	31		1	77	30-118	05/27/2018 1258
Diethylphthalate	40	33		1	84	40-125	05/27/2018 1258
Dimethyl phthalate	40	33		1	82	40-127	05/27/2018 1258
Di-n-butyl phthalate	40	36		1	89	40-127	05/27/2018 1258
Di-n-octylphthalate	40	30		1	76	30-130	05/27/2018 1258
Fluoranthene	40	32		1	80	40-128	05/27/2018 1258
Fluorene	40	31		1	77	30-124	05/27/2018 1258
Hexachlorobenzene	40	29		1	73	30-125	05/27/2018 1258
Hexachlorobutadiene	40	28		1	71	24-110	05/27/2018 1258
Hexachlorocyclopentadiene	200	85		1	43	22-122	05/27/2018 1258
Hexachloroethane	40	31		1	77	30-130	05/27/2018 1258
Indeno(1,2,3-c,d)pyrene	40	32		1	80	30-130	05/27/2018 1258
Isophorone	40	36		1	90	30-130	05/27/2018 1258
Naphthalene	40	31		1	77	30-130	05/27/2018 1258
Nitrobenzene	40	36		1	89	30-130	05/27/2018 1258
N-Nitrosodi-n-propylamine	40	36		1	91	30-130	05/27/2018 1258
N-Nitrosodiphenylamine (Diphenylamine)	40	29		1	73	30-123	05/27/2018 1258
Pentachlorophenol	80	56		1	70	30-130	05/27/2018 1258
Phenanthrene	40	31		1	78	40-123	05/27/2018 1258
Phenol	40	31		1	78	30-130	05/27/2018 1258
Pyrene	40	36		1	90	40-126	05/27/2018 1258

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		73	37-129
2-Fluorophenol		85	24-127
Nitrobenzene-d5		93	38-127
Phenol-d5		88	28-128
Terphenyl-d14		87	10-148
2,4,6-Tribromophenol		68	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Chain of Custody
and
Miscellaneous Documents

USEPA Region 4 COC (LAB COPY)

DateShipped: 5/21/2018
CarrierName: FedEx
AirbillNo: 772278831447

CHAIN OF CUSTODY RECORD

Project Number:
Cooler #: 1

21131

No: Shealy_SVOCs

Lab: Shealy
Lab Contact: Nisreen Saikaly
Lab Phone:

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
BW16GW65		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 11:30	
BW916GW65		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 11:30	
BW16GW12		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 08:55	

TE22045

NMS

Special Instructions:

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
samples for analysis	B+V	5/21/18 1800			
			Lindsey Hahn SESI/EQI	5-22-18 0850	OK

T= 7.4°C

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

SHEALY ENVIRONMENTAL SERVICES, INC.

QC

Shealy Environmental Services, Inc.
Document Number: ME0018C-13

Page 1 of 1
Effective Date: 4/5/2018

Sample Receipt Checklist (SRC)

Client: USEPA Region 4 Cooler Inspected by/date: LKH/ 5-22-18 Lot #: TE22045

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☐ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: _____ Chlorine Strip ID: _____

Cooler ID / Original temperature upon receipt / Derived (Corrected) temperature upon receipt:

17.4 /17.4 °C _____/_____/_____ °C _____/_____/_____ °C _____/_____/_____ °C

Method: ☐ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number used taken from the container label?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ (H2SO4, HNO3, HCl, NaOH) using SR # _____.
Time of preservation _____.

Sample(s) _____ were received with bubbles >6 mm in diameter.

Samples(s) _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: _____.

SR barcode labels applied by: LKH Date: 5-22-18

Comments:

SEMIVOLATILE

QC SUMMARY

FORM 2
DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: Shealy Environmental Services, Inc. Lot No.: TE22045

Project No.: 49089

AnalyticalMethod: SVOA Matrix: Water

QC

CLIENT SAMPLE ID	DMC1	DMC2	DMC3	DMC4	DMC5	DMC6			TOT OUT
BW16GW65	71	73	84	81	62	57			0
BW916GW65	70	70	82	81	53	55			0
BW16GW12	50	64	92	93	12	18 D			0
SBLK93	62	65	79	71	85	54			0
SLCS92	73	85	93	88	87	68			0

		QC LIMITS
DMC1	= 2-Fluorobiphenyl	37-129
DMC2	= 2-Fluorophenol	24-127
DMC3	= Nitrobenzene-d5	38-127
DMC4	= Phenol-d5	28-128
DMC5	= Terphenyl-d14	10-148
DMC6	= 2,4,6-Tribromophenol	35-144

* Values outside of contract required QC limits
D DMC diluted out

FORM 3
LABORATORY CONTROL/LABORATORY CONTROL DUPLICATE SAMPLE RECOVERY

Lab Name: Shealy Environmental Services, Inc. Lot No.: TE22045

Project No.: 49089

Analytical Method: SVOA Matrix: Water

Client Sample ID: SLCS92

Instrument ID: Agilent__MSD11

Concentration Units (ug/L, mg/L, ug/kg): ug/L

ANALYTE	SPIKE ADDED	LCS CONCENTRATION	LCS %REC #	QC LIMITS REC.
1,1'-Biphenyl	40	31	78	30-130
2,4,5-Trichlorophenol	40	30	74	30-123
2,4,6-Trichlorophenol	40	31	77	30-130
2,4-Dichlorophenol	40	28	71	30-121
2,4-Dimethylphenol	40	24	61	20-125
2,4-Dinitrophenol	80	54	67	11-126
2,4-Dinitrotoluene	40	32	79	30-130
2,6-Dinitrotoluene	40	33	81	30-130
2-Chloronaphthalene	40	31	76	30-130
2-Chlorophenol	40	32	81	30-130
2-Methylnaphthalene	40	31	78	40-132
2-Methylphenol	40	33	81	30-130
2-Nitroaniline	40	35	88	30-130
2-Nitrophenol	40	30	75	30-130
3+4-Methylphenol	40	34	86	30-130
3,3'-Dichlorobenzidine	40	28	71	10-126
3-Nitroaniline	40	28	70	30-130
4,6-Dinitro-2-methylphenol	40	33	83	30-130
4-Bromophenyl phenyl ether	40	30	74	30-124
4-Chloro-3-methyl phenol	40	34	86	30-123
4-Chloroaniline	40	24	59	12-157
4-Chlorophenyl phenyl ether	40	30	74	30-121
4-Nitroaniline	40	37	92	30-135
4-Nitrophenol	80	62	78	30-130
Acenaphthene	40	31	77	30-122
Acenaphthylene	40	33	82	30-130
Acetophenone	40	33	84	30-130
Anthracene	40	34	84	30-123
Atrazine	40	35	87	30-130
Benzaldehyde	40	15	37	20-115
Benzo(a)anthracene	40	33	83	40-125
Benzo(a)pyrene	40	31	78	40-128
Benzo(b)fluoranthene	40	31	78	30-130
Benzo(g,h,i)perylene	40	33	83	30-130
Benzo(k)fluoranthene	40	31	77	30-130
bis (2-Chloro-1-	40	39	98	30-130

* Values outside of QC Limits

FORM 3
LABORATORY CONTROL/LABORATORY CONTROL DUPLICATE SAMPLE RECOVERY

Lab Name: Shealy Environmental Services, Inc. Lot No.: TE22045

Project No.: 49089

Analytical Method: SVOA Matrix: Water

Client Sample ID: SLCS92

Instrument ID: Agilent__MSD11

Concentration Units (ug/L, mg/L, ug/kg): ug/L

ANALYTE	SPIKE ADDED	LCS CONCENTRATION	LCS %REC #	QC LIMITS REC.
bis(2-Chloroethoxy)methane	40	35	87	30-130
bis(2-Chloroethyl)ether	40	38	96	30-130
bis(2-Ethylhexyl)phthalate	40	34	84	30-130
Butyl benzyl phthalate	40	35	88	30-130
Caprolactam	40	38	94	30-130
Carbazole	40	34	84	30-130
Chrysene	40	33	82	30-130
Di-n-butyl phthalate	40	36	89	40-127
Di-n-octylphthalate	40	30	76	30-130
Dibenzo(a,h)anthracene	40	33	81	30-130
Dibenzofuran	40	31	77	30-118
Diethylphthalate	40	33	84	40-125
Dimethyl phthalate	40	33	82	40-127
Fluoranthene	40	32	80	40-128
Fluorene	40	31	77	30-124
Hexachlorobenzene	40	29	73	30-125
Hexachlorobutadiene	40	28	71	24-110
Hexachlorocyclopentadiene	200	85	43	22-122
Hexachloroethane	40	31	77	30-130
Indeno(1,2,3-c,d)pyrene	40	32	80	30-130
Isophorone	40	36	90	30-130
N-Nitrosodi-n-propylamine	40	36	91	30-130
N-Nitrosodiphenylamine	40	29	73	30-123
Naphthalene	40	31	77	30-130
Nitrobenzene	40	36	89	30-130
Pentachlorophenol	80	56	70	30-130
Phenanthrene	40	31	78	40-123
Phenol	40	31	78	30-130
Pyrene	40	36	90	40-126

* Values outside of QC Limits

CLIENT SAMPLE ID

SBLK93

FORM 4
METHOD BLANK SUMMARY

Lab Name: Shealy Environmental Services, Inc. Lot No.: TE22045

Project No.: 49089 Lab Sample ID: TQ72993-001

Analytical Method: SVOA Matrix: Water

Instrument ID: Agilent MSD11 Lab File ID: 100527B05

Extraction Type: 3520C Date Extracted: 05/23/2018

GC Column(1): ZEBRON ZB-SV ID: 0.25 (mm) Date Analyzed: 05/27/2018

GC Column(2): ID: (mm) Time Analyzed: 12:34

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE/TIME ANALYZED
BW16GW65	TE22045-001	100529C25	05/29/2018
BW916GW65	TE22045-002	100529C26	05/29/2018
BW16GW12	TE22045-003	100529C27	05/29/2018
SLCS92	TQ72993-002	100527B06	05/27/2018

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

MS Tune Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D01.d		
Injection Date:	22-May-2018 18:01:30	Inst. ID:	msd10.i
Method:	8270D-tun.m	Tune Type:	DFTPP
Client ID:	DFTPPCA	Lab ID:	SVMS 3462
Sample Info:	10052218D.b, SVMS 3462		
Injection Vol.		Dil. Factor:	1.0
Operator:	CMP2		
Column:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

m/z	Ion Abundance Criteria	% Relative Abundance
198	Base Peak, 100% relative abundance	100.0
51	10.00 - 80.00% of mass 198	34.0
68	Less than 2.00% of mass 69	0.0 (0.0)
69	Present	34.4
70	Less than 2.00% of mass 69	0.2 (0.6)
127	10.00 - 80.00% of mass 198	48.0
197	Less than 2.00% of mass 198	0.0
199	5.00 - 9.00% of mass 198	6.8
275	10.00 - 60.00% of mass 198	25.9
365	Greater than 1.00% of mass 198	3.0
441	0.01 - 24.00% of mass 442	13.3 (14.9)
442	Greater than 50.00% of mass 198	89.1
443	15.00 - 24.00% of mass 442	17.1 (19.2)

Sample Type	Data File	Lab Sample ID	Client Sample ID	Injection Date/Time	Tune Clock (HH:MM:SS)
DFTPP	100522D01.d	SVMS 3462	DFTPPCA	22-May-2018 18:01:30	00:00:00
Client	100522D02.d	SVMS IBLK	IBLK	22-May-2018 18:18:30	00:17:00
Ical	100522D03.d	SVMS 3451	1STD0.2CB	22-May-2018 18:42:30	00:41:00
Ical	100522D04.d	SVMS 3452	1STD001CB	22-May-2018 19:07:30	01:06:00
Ical	100522D05.d	SVMS 3453	1STD002CB	22-May-2018 19:31:30	01:30:00
Ical	100522D06.d	SVMS 3454	1STD005CB	22-May-2018 19:56:30	01:55:00
Ical	100522D07.d	SVMS 3455	1STD010CB	22-May-2018 20:20:30	02:19:00
Ical	100522D08.d	SVMS 3456	1STD015CB	22-May-2018 20:45:30	02:44:00
Ical	100522D09.d	SVMS 3457	1STD020CB	22-May-2018 21:09:30	03:08:00
Ical	100522D10.d	SVMS 3458	1STD025CB	22-May-2018 21:34:30	03:33:00
Ical	100522D11.d	SVMS 3459	1STD030CB	22-May-2018 21:58:30	03:57:00
LCS	100522D12.d	SVMS 3460	1STDICV	22-May-2018 22:23:30	04:22:00
Ical	100522D13.d	SVMS 3482	3STD001CC	22-May-2018 22:47:30	04:46:00
Ical	100522D14.d	SVMS 3483	3STD002CC	22-May-2018 23:11:30	05:10:00
Ical	100522D15.d	SVMS 3484	3STD005CC	22-May-2018 23:36:30	05:35:00
Ical	100522D16.d	SVMS 3485	3STD010CC	23-May-2018 00:00:30	05:59:00
Ical	100522D17.d	SVMS 3486	3STD015CC	23-May-2018 00:24:30	06:23:00
Ical	100522D18.d	SVMS 3487	3STD020CC	23-May-2018 00:48:30	06:47:00
Ical	100522D19.d	SVMS 3488	3STD025CC	23-May-2018 01:12:30	07:11:00
Ical	100522D20.d	SVMS 3489	3STD030CC	23-May-2018 01:37:30	07:36:00

Sample Type	Data File	Lab Sample ID	Client Sample ID	Injection Date/Time	Tune Clock (HH:MM:SS)
LCS	100522D21.d	SVMS 3480	3STDICV	23-May-2018 02:01:30	08:00:00
Ical	100522D22.d	SVMS 3390	DPE001CD	23-May-2018 02:25:30	08:24:00
Ical	100522D23.d	SVMS 3391	DPE002CD	23-May-2018 02:49:30	08:48:00
Ical	100522D24.d	SVMS 3392	DPE005CD	23-May-2018 03:13:30	09:12:00
Ical	100522D25.d	SVMS 3393	DPE010CD	23-May-2018 03:37:30	09:36:00
Ical	100522D26.d	SVMS 3394	DPE015CD	23-May-2018 04:01:30	10:00:00
Ical	100522D27.d	SVMS 3395	DPE020CD	23-May-2018 04:25:30	10:24:00
Client	100522D28.d	SVMS IBLK		23-May-2018 04:49:30	10:48:00
Client	100522D29.d	SVMS IBLK		23-May-2018 05:13:30	11:12:00

Report Date: 29-May-2018 11:06:23 AIM Revision: 1.0 20-Sep-2017 14:04:40

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MS Tune Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B02.d		
Injection Date:	27-May-2018 11:30:30	Inst. ID:	msd10.i
Method:	8270D-tun.m	Tune Type:	DFTPP
Client ID:	DFTPPCR	Lab ID:	SVMS 3462
Sample Info:	10052718B.b, SVMS 3462		
Injection Vol.		Dil. Factor:	1.0
Operator:	CMP2		
Column:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

m/z	Ion Abundance Criteria	% Relative Abundance
198	Base Peak, 100% relative abundance	100.0
51	10.00 - 80.00% of mass 198	31.4
68	Less than 2.00% of mass 69	0.0 (0.0)
69	Present	34.2
70	Less than 2.00% of mass 69	0.2 (0.5)
127	10.00 - 80.00% of mass 198	47.3
197	Less than 2.00% of mass 198	0.0
199	5.00 - 9.00% of mass 198	6.8
275	10.00 - 60.00% of mass 198	26.2
365	Greater than 1.00% of mass 198	2.6
441	0.01 - 24.00% of mass 442	13.3 (14.7)
442	Greater than 50.00% of mass 198	90.6
443	15.00 - 24.00% of mass 442	17.4 (19.1)

Sample Type	Data File	Lab Sample ID	Client Sample ID	Injection Date/Time	Tune Clock (HH:MM:SS)
DFTPP	100527B02.d	SVMS 3462	DFTPPCR	27-May-2018 11:30:30	00:00:00
Ccv	100527B03.d	SVMS 3455	1STD010CS	27-May-2018 11:46:30	00:16:00
Ccv	100527B04.d	SVMS 3485	3STD010CT	27-May-2018 12:10:30	00:40:00
BLANK	100527B05.d	TQ72993-001	SBLK93	27-May-2018 12:34:30	01:04:00
LCS	100527B06.d	TQ72993-002	SLCS92	27-May-2018 12:58:30	01:28:00
BLANK	100527B07.d	TQ72835-001	SBLK35	27-May-2018 13:22:30	01:52:00
LCS	100527B08.d	TQ72835-002	SLCS35	27-May-2018 13:46:30	02:16:00
Client	100527B09.d	TE18077-010	TMW-4	27-May-2018 14:10:30	02:40:00
Client	100527B10.d	TE18011-002	WSW-50	27-May-2018 14:34:30	03:04:00
Client	100527B11.d	TE18077-007	SB-7, 6-8	27-May-2018 14:58:30	03:28:00
Client	100527B12.d	TE18077-008	SB-9, 4-6	27-May-2018 15:23:30	03:53:00
Client	100527B13.d	TE18009-002	MET-MW-1-DUP	27-May-2018 15:47:30	04:17:00
Client	100527B14.d	TE18010-003	BS-17 (4-5)	27-May-2018 16:11:30	04:41:00
Client	100527B15.d	TE18010-004	BS-18 (4-5)	27-May-2018 16:35:30	05:05:00
Client	100527B16.d	TE18010-005	BS-19 (4-5)	27-May-2018 16:59:30	05:29:00
Client	100527B17.d	TE18066-001	35 MW-1	27-May-2018 17:23:30	05:53:00
Client	100527B18.d	TE18066-002	35 Dup MW-1	27-May-2018 17:47:30	06:17:00
Client	100527B19.d	TE22007-001	SB-1-06066	27-May-2018 18:11:30	06:41:00
MS	100527B20.d	TE22007-001MS	SB-1-06066MS	27-May-2018 18:35:30	07:05:00
MSD	100527B21.d	TE22007-001MD	SB-1-06066MSD	27-May-2018 18:59:30	07:29:00

Sample Type	Data File	Lab Sample ID	Client Sample ID	Injection Date/Time	Tune Clock (HH:MM:SS)
Client	100527B22.d	TE22045-001	BW16GW65	27-May-2018 19:23:30	07:53:00
Client	100527B23.d	TE22045-002	BW916GW65	27-May-2018 19:47:30	08:17:00
Client	100527B24.d	TE22045-003	BW16GW12	27-May-2018 20:11:30	08:41:00
Client	100527B25.d	TE22036-001	GW-1	27-May-2018 20:35:30	09:05:00
Client	100527B26.d	TE22036-002	GW-2	27-May-2018 21:00:30	09:30:00
Client	100527B27.d	TE22036-003	GW-3	27-May-2018 21:24:30	09:54:00
Client	100527B28.d	TE17073-004	MW05s	27-May-2018 21:48:30	10:18:00
Client	100527B29.d	TE17073-022	MW45s	27-May-2018 22:12:30	10:42:00
Client	100527B30.d	TE18039-001	Filter cake	27-May-2018 22:36:30	11:06:00
Client	100527B31.d	SVMS IBLK		27-May-2018 23:00:30	11:30:00
Client	100527B32.d	SVMS IBLK		27-May-2018 23:24:30	11:54:00
Client	100527B33.d	SVMS IBLK		27-May-2018 23:48:30	12:18:00

Report Date: 30-May-2018 08:30:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

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MS Tune Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C02.d		
Injection Date:	29-May-2018 11:06:30	Inst. ID:	msd10.i
Method:	8270D-tun.m	Tune Type:	DFTPP
Client ID:	DFTPPCU	Lab ID:	SVMS 3462
Sample Info:	10052918C.b, SVMS 3462		
Injection Vol.		Dil. Factor:	1.0
Operator:	CMP2		
Column:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

m/z	Ion Abundance Criteria	% Relative Abundance
198	Base Peak, 100% relative abundance	100.0
51	10.00 - 80.00% of mass 198	29.7
68	Less than 2.00% of mass 69	0.0 (0.0)
69	Present	32.4
70	Less than 2.00% of mass 69	0.2 (0.5)
127	10.00 - 80.00% of mass 198	45.5
197	Less than 2.00% of mass 198	0.0
199	5.00 - 9.00% of mass 198	6.7
275	10.00 - 60.00% of mass 198	26.7
365	Greater than 1.00% of mass 198	2.7
441	0.01 - 24.00% of mass 442	15.0 (14.8)
442	Greater than 50.00% of mass 198	101.2
443	15.00 - 24.00% of mass 442	19.7 (19.5)

Sample Type	Data File	Lab Sample ID	Client Sample ID	Injection Date/Time	Tune Clock (HH:MM:SS)
DFTPP	100529C02.d	SVMS 3462	DFTPPCU	29-May-2018 11:06:30	00:00:00
Ccv	100529C03.d	SVMS 3455	1STD010CV	29-May-2018 11:23:30	00:17:00
Ccv	100529C04.d	SVMS 3485	3STD010CW	29-May-2018 11:48:30	00:42:00
BLANK	100529C05.d	TQ73259-001	SBLK59	29-May-2018 12:12:30	01:06:00
LCS	100529C06.d	TQ73259-002	SLCS59	29-May-2018 12:37:30	01:31:00
BLANK	100529C07.d	TQ73193-001	SBLK93	29-May-2018 13:02:30	01:56:00
LCS	100529C08.d	TQ73193-002	SLCS93	29-May-2018 13:26:30	02:20:00
Client	100529C09.d	TQ73264-001	SBLK64	29-May-2018 13:51:30	02:45:00
LCS	100529C10.d	TQ73264-002	SLCS64	29-May-2018 14:16:30	03:10:00
Client	100529C11.d	TE24006-016	LF003-SSS-72	29-May-2018 14:40:30	03:34:00
Client	100529C12.d	TE24006-017	LF003-SSS-73	29-May-2018 15:05:30	03:59:00
Client	100529C13.d	TE24006-018	LF003-SSS-74	29-May-2018 15:30:30	04:24:00
Client	100529C14.d	TE24006-019	LF003-SSS-75	29-May-2018 15:54:30	04:48:00
Client	100529C15.d	TE24006-020	LF003-SSS-76	29-May-2018 16:19:30	05:13:00
Client	100529C16.d	TE24006-018	LF003-SSS-74	29-May-2018 16:44:30	05:38:00
Client	100529C17.d	TE08059-005	TCLP-Stockpile 1	29-May-2018 17:09:30	06:03:00
Client	100529C18.d	TE22072-001	Comp 4ft.	29-May-2018 17:33:30	06:27:00
MS	100529C19.d	TE22072-001MS	Comp 4ft.MS	29-May-2018 17:58:30	06:52:00
MSD	100529C20.d	TE22072-001MD	Comp 4ft.MSD	29-May-2018 18:23:30	07:17:00
Client	100529C21.d	TE22072-002	Comp 8ft.	29-May-2018 18:48:30	07:42:00

Sample Type	Data File	Lab Sample ID	Client Sample ID	Injection Date/Time	Tune Clock (HH:MM:SS)
Client	100529C22.d	TE22072-003	Comp 12ft.	29-May-2018 19:12:30	08:06:00
Client	100529C23.d	TE22072-008	CompDUP 052118	29-May-2018 19:37:30	08:31:00
Client	100529C24.d	TE18011-002	WSW-50	29-May-2018 20:01:30	08:55:00
Client	100529C25.d	TE22045-001	BW16GW65	29-May-2018 20:26:30	09:20:00
Client	100529C26.d	TE22045-002	BW916GW65	29-May-2018 20:50:30	09:44:00
Client	100529C27.d	TE22045-003	BW16GW12	29-May-2018 21:15:30	10:09:00
Ccv	100529C28.d	SVMS 3455	1STD010CX	29-May-2018 21:40:30	10:34:00
Ccv	100529C29.d	SVMS 3485	3STD010CY	29-May-2018 22:04:30	10:58:00
Client	100529C30.d	SVMS IBLK		29-May-2018 22:28:30	11:22:00
Client	100529C31.d	SVMS IBLK		29-May-2018 22:53:30	11:47:00
Client	100529C32.d	SVMS IBLK		29-May-2018 23:17:30	12:11:00

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40

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Form 8 - Istd Recovery Report

Batch Path: \\Organics\hh\chem\msd10.i\10052218D.b

Instrument: msd10.m Method: 8270DLVI-10.m

Column: ZebronZB-SV (0.25 mm) Detector: MS Scan

Initial Calibration Samples

Standard File: /chem/msd10.i/10052218D.b/100522D07.D.d

Injection Date: 22-May-2018 20:20:30 Lab ID: SVMS 3455

Sublist: 1STD.sub Sample Type: IcalIS, Level: 5

IS-1: * 16 1,4-Dichlorobenzene-d4

IS-2: * 41 Naphthalene-d8

IS-3: * 67 Acenaphthene-d10

IS-4: * 102 Phenanthrene-d10

IS-5: * 128 Chrysene-d12

IS-6: * 136 Perylene-d12

Lab Sample ID	IS-1 Area	RT	IS-2 Area	RT	IS-3 Area	RT	IS-4 Area	RT	IS-5 Area	RT	IS-6 Area	RT
Std. Results	838571	5.78	3589710	6.80	1906633	8.27	3249997	9.53	2945037	12.31	2906387	14.49
Upper Limit	1677142	6.28	7179420	7.30	3813266	8.77	6499994	10.03	5890074	12.81	5812774	14.99
Lower Limit	419286	5.28	1794855	6.30	953317	7.77	1624999	9.03	1472519	11.81	1453194	13.99
SVMS 3451	782811	5.78	3328891	6.80	1752785	8.26	2816074	9.53	2549194	12.31	2618014	14.49
SVMS 3452	856031	5.78	3513235	6.80	1785387	8.26	2886592	9.53	2643050	12.31	2710903	14.49
SVMS 3453	828367	5.78	3371334	6.80	1766005	8.26	2855640	9.53	2630469	12.31	2595242	14.48
SVMS 3454	657765	5.78	3316749	6.80	1718931	8.26	2811629	9.53	2539417	12.31	2477674	14.49
SVMS 3455	838571	5.78	3589710	6.80	1906633	8.27	3249997	9.53	2945037	12.31	2906387	14.49
SVMS 3456	785413	5.78	3993401	6.80	2067192	8.27	3596924	9.53	3268785	12.31	3113201	14.49
SVMS 3457	905073	5.78	3627362	6.80	1901976	8.27	3362144	9.53	3092188	12.31	2876235	14.49
SVMS 3458	775821	5.78	3260630	6.80	1700610	8.27	2962324	9.53	2683568	12.31	2456761	14.49
SVMS 3459	869616	5.78	3540664	6.80	1847052	8.27	3224773	9.54	2965295	12.31	2678247	14.49
SVMS 3482	759834	5.78	3659297	6.80	1883269	8.26	3021359	9.53	2748076	12.31	2787197	14.48
SVMS 3483	738962	5.78	3564296	6.80	1827033	8.26	2925591	9.53	2664687	12.31	2712092	14.48
SVMS 3484	797583	5.78	3425941	6.80	1749102	8.26	2782180	9.53	2485430	12.31	2560382	14.48
SVMS 3485	712024	5.78	3737672	6.80	1884358	8.26	3032171	9.53	2693624	12.31	2791187	14.48
SVMS 3486	697785	5.78	3587998	6.80	1846142	8.26	2961190	9.53	2645207	12.31	2722393	14.48
SVMS 3487	729963	5.78	3499345	6.80	1786354	8.26	2883460	9.53	2566099	12.30	2559926	14.48
SVMS 3488	858738	5.78	3583728	6.80	1869265	8.26	3050014	9.53	2781643	12.31	2712761	14.48
SVMS 3489	748830	5.78	3469698	6.80	1786670	8.26	2907746	9.53	2593682	12.31	2522930	14.48
SVMS 3390	1003177	5.78	3817183	6.79	1899267	8.26	2941534	9.53	2838847	12.31	2935500	14.48
SVMS 3391	1024127	5.78	3941569	6.79	1930494	8.26	3039950	9.53	2945605	12.30	3006624	14.48
SVMS 3392	956784	5.78	3673477	6.79	1803364	8.26	2864392	9.53	2721975	12.30	2742971	14.48
SVMS 3393	1024908	5.78	3939173	6.79	1940695	8.26	3087288	9.53	2952373	12.30	3042742	14.48
SVMS 3394	990638	5.78	3836208	6.79	1871650	8.26	2933396	9.53	2914655	12.30	2981555	14.48
SVMS 3395	1009829	5.78	3872412	6.79	1925559	8.26	2959693	9.53	2931693	12.30	2998195	14.48

AREA UPPER LIMIT = + 50% of internal standard area.

RT UPPER LIMIT = + 0.5 minutes of internal standard RT.

AREA LOWER LIMIT = -100% of internal standard area.

RT LOWER LIMIT = - 0.5 minutes of internal standard RT.

Report Date: 29-May-2018 11:06:24 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Form 8 - Istd Recovery Report

Batch Path: \\Organics\hh\chem\msd10.i\10052718B.b

Instrument: msd10.m Method: 8270DLVI-10.m

Column: ZebronZB-SV (0.25 mm) Detector: MS Scan

CCV Samples

Standard File: /chem/msd10.i/10052218D.b/100522D07.D.d

Injection Date: 22-May-2018 20:20:30 Lab ID: SVMS 3455

Sublist: 1STD.sub Sample Type: Ical, Level: 5

IS-1: * 16 1,4-Dichlorobenzene-d4 IS-4: * 102 Phenanthrene-d10

IS-2: * 41 Naphthalene-d8 IS-5: * 128 Chrysene-d12

IS-3: * 67 Acenaphthene-d10 IS-6: * 136 Perylene-d12

Lab Sample ID	IS-1 Area	RT	IS-2 Area	RT	IS-3 Area	RT	IS-4 Area	RT	IS-5 Area	RT	IS-6 Area	RT
Std. Results	838571	5.74	3589710	6.76	1906633	8.23	3249997	9.49	2945037	12.24	2906387	14.40
Upper Limit	1677142	6.24	7179420	7.26	3813266	8.73	6499994	9.99	5890074	12.74	5812774	14.90
Lower Limit	419286	5.24	1794855	6.26	953317	7.73	1624999	8.99	1472519	11.74	1453194	13.90
SVMS 3455	953062	5.74	3946449	6.76	2056843	8.23	3414658	9.49	3143474	12.24	3349372	14.40
SVMS 3485	875637	5.74	3793143	6.76	1876791	8.22	2997283	9.48	2572494	12.23	2822920	14.39

AREA UPPER LIMIT = + 50% of internal standard area. AREA LOWER LIMIT = -100% of internal standard area.

RT UPPER LIMIT = + 0.5 minutes of internal standard RT. RT LOWER LIMIT = - 0.5 minutes of internal standard RT.

Non-CCV Samples

Standard File: /chem/msd10.i/10052718B.b/100527B03.D.d

Injection Date: 27-May-2018 11:46:30 Lab ID: SVMS 3455

Sublist: 1STD.sub Sample Type: CCVIS

IS-1: * 16 1,4-Dichlorobenzene-d4 IS-4: * 102 Phenanthrene-d10

IS-2: * 41 Naphthalene-d8 IS-5: * 128 Chrysene-d12

IS-3: * 67 Acenaphthene-d10 IS-6: * 136 Perylene-d12

Lab Sample ID	IS-1 Area	RT	IS-2 Area	RT	IS-3 Area	RT	IS-4 Area	RT	IS-5 Area	RT	IS-6 Area	RT
Std. Results	953062	5.74	3946449	6.76	2056843	8.23	3414658	9.49	3143474	12.24	3349372	14.40
Upper Limit	1906124	6.24	7892898	7.26	4113686	8.73	6829316	9.99	6286948	12.74	6698744	14.90
Lower Limit	476531	5.24	1973225	6.26	1028422	7.73	1707329	8.99	1571737	11.74	1674686	13.90
TQ72993-001	1014412	5.73	4053321	6.76	2045540	8.22	3157929	9.48	2784742	12.23	3194427	14.40
TQ72993-002	906446	5.74	3892289	6.76	2072907	8.22	3469469	9.49	2821549	12.24	3053002	14.40
TQ72835-001	999381	5.74	3985589	6.76	2013997	8.22	3022491	9.48	2860149	12.23	3207051	14.40
TQ72835-002	824510	5.74	3676428	6.76	1949777	8.22	3317818	9.49	2791718	12.24	3007891	14.39
TE18077-010	808362	5.74	3971335	6.76	1977754	8.22	3063558	9.48	2707992	12.23	2953612	14.39
TE18011-002	906294	5.73	3704960	6.76	1826135	8.22	2762757	9.48	2554517	12.23	2905816	14.39
TE18077-007	736607	5.74	3447075	6.76	2009430	8.22	3333265	9.48	2969688	12.24	3073934	14.39
TE18077-008	774134	5.74	3674758	6.76	1978742	8.22	3231424	9.48	3056708	12.24	3189562	14.39
TE18009-002	955990	5.73	3918231	6.76	1948440	8.22	3024878	9.48	2707127	12.23	3032698	14.39
TE18010-003	746625	5.74	3474785	6.76	2001604	8.22	3273965	9.48	3091650	12.24	3230581	14.39
TE18010-004	789490	5.74	3692822	6.76	2084348	8.22	3394994	9.48	3078496	12.24	3325758	14.39
TE18010-005	779156	5.74	3864681	6.75	2035886	8.22	3357867	9.48	3112087	12.24	3379616	14.39
TE18066-001	739926	5.74	3557383	6.76	2006415	8.22	3368340	9.48	3269973	12.23	3451687	14.39
TE18066-002	777605	5.74	3860521	6.76	2067693	8.22	3438565	9.48	3222918	12.24	3357400	14.39
TE22007-001	739958	5.74	3650102	6.76	2050080	8.22	3433422	9.48	3405766	12.24	3521778	14.40
TE22007-001MS	776320	5.74	3733514	6.76	2053711	8.22	3512262	9.48	3503854	12.24	3378772	14.39
TE22007-001MD	772245	5.74	3749825	6.76	2070117	8.22	3479564	9.48	3474007	12.24	3346218	14.40
TE22045-001	838435	5.74	4197045	6.75	2128514	8.22	3609386	9.48	3064465	12.23	3269878	14.39
TE22045-002	865896	5.73	4044889	6.76	2058003	8.22	3475499	9.48	2907097	12.23	3112178	14.39
TE22045-003	870691	5.73	4097587	6.76	2033951	8.22	3784132	9.49	3041357	12.24	2927208	14.39

IS-1: * 16 1,4-Dichlorobenzene-d4
IS-2: * 41 Naphthalene-d8
IS-3: * 67 Acenaphthene-d10
IS-4: * 102 Phenanthrene-d10
IS-5: * 128 Chrysene-d12
IS-6: * 136 Perylene-d12

Lab Sample ID	IS-1 Area	RT	IS-2 Area	RT	IS-3 Area	RT	IS-4 Area	RT	IS-5 Area	RT	IS-6 Area	RT
TE22036-001	850527	5.74	4139893	6.75	2112546	8.22	3361140	9.48	2978342	12.23	3251926	14.39
TE22036-002	757901	5.74	4142235	6.75	2089257	8.22	3345100	9.48	3028435	12.23	3338929	14.39
TE22036-003	975918	5.73	3966462	6.76	2003256	8.22	3171566	9.48	3033294	12.23	3318890	14.39
TE17073-004	988353	5.73	4024274	6.76	2005086	8.22	3009836	9.48	3002357	12.23	3320046	14.39
TE17073-022	969343	5.73	3937332	6.76	1972940	8.22	2925936	9.48	2833190	12.23	3161584	14.39
TE18039-001	1081852	5.74	4190562	6.76	2267228	8.22	3881549	9.48	3539762	12.23	2677099	14.39
SVMS IBLK	983839	5.73	3940729	6.76	1939313	8.22	2837097	9.48	2997466	12.23	2932412	14.39
SVMS IBLK	960551	5.73	3898359	6.76	1935257	8.22	2794492	9.48	2924467	12.23	2837810	14.39
SVMS IBLK	946643	5.73	3856346	6.75	1907945	8.22	2820191	9.48	2914406	12.23	2802837	14.39

AREA UPPER LIMIT = + 50% of internal standard area.
AREA LOWER LIMIT = -100% of internal standard area.
RT UPPER LIMIT = + 0.5 minutes of internal standard RT.
RT LOWER LIMIT = - 0.5 minutes of internal standard RT.

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SHEALY ENVIRONMENTAL Contract: AMERICAN CRESOTE WORKS

Lab Code: SHEALY Case No.: B&V SAS No.: SDG No.: TE22045

Lab File ID (Standard): 100529C03 Date Analyzed: 05/29/18

Instrument ID: MSD10 Time Analyzed: 1123

		IS1(PRY) AREA #	RT #	IS2(DCB) AREA #	RT #	IS3(NPT) AREA #	RT #
	12 HOUR STD	2952509	14.35	864684	5.72	3715211	6.73
	UPPER LIMIT	5905018	14.85	1729368	6.22	7430422	7.23
	LOWER LIMIT	1476255	13.85	432342	5.22	1857606	6.23
	CLIENT SAMPLE NO.						
01	BW16GW65	3481548	14.34	1094863	5.71	4372830	6.73
02	BW916GW65	3412954	14.34	1071911	5.71	4276961	6.73
03	BW16GW12	3211011	14.34	1057932	5.71	4282022	6.73
04							
05							
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20							

IS1 (PRY) = Perylene-d12
IS2 (DCB) = 1,4-Dichlorobenzene-d4
IS3 (NPT) = Naphthalene-d8

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SHEALY ENVIRONMENTAL Contract: AMERICAN CRESOTE WORKS

Lab Code: SHEALY Case No.: B&V SAS No.: SDG No.: TE22045

Lab File ID (Standard): 100529C03 Date Analyzed: 05/29/18

Instrument ID: MSD10 Time Analyzed: 1123

		IS4 (CRY) AREA #	RT #	IS5 (ANT) AREA #	RT #	IS6 (PHN) AREA #	RT #
	12 HOUR STD	2767197	12.20	1932733	8.20	3186149	9.46
	UPPER LIMIT	5534394	12.70	3865466	8.70	6372298	9.96
	LOWER LIMIT	1383599	11.70	966367	7.70	1593075	8.96
	CLIENT SAMPLE NO.						
01	BW16GW65	3394061	12.19	2266327	8.19	3652385	9.46
02	BW916GW65	3309180	12.19	2156200	8.19	3405964	9.46
03	BW16GW12	3204680	12.19	2178583	8.19	3512017	9.46
04							
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18							
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20							

IS4 (CRY) = Chrysene-d12
IS5 (ANT) = Acenaphthene-d10
IS6 (PHN) = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

RAW SAMPLE DATA

Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW16GW65
Date Sampled: 05/18/2018 1130
Date Received: 05/22/2018

Laboratory ID: TE22045-001
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2026	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	9.6	J	20	2.5	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	20	U	20	2.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	20	U	20	2.5	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	40	U	40	5.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	35		20	5.0	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	100	U	100	5.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	40	U	40	2.5	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	40	U	40	2.5	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	20	U	20	2.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	20	U	20	2.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	4.0	U	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	20	U	20	5.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	40	U	40	2.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	20	U	20	5.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	20	U	20	8.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	20	U	20	7.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	40	U	40	5.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	100	U	100	5.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	20	U	20	2.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	20	U	20	2.5	ug/L	1
4-Chloroaniline	106-47-8	8270D	40	U	40	2.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	20	U	20	2.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	40	U	40	7.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	100	U	100	10	ug/L	1
Acenaphthene	83-32-9	8270D	38		4.0	1.0	ug/L	1
Acenaphthylene	208-96-8	8270D	4.0	U	4.0	1.0	ug/L	1
Acetophenone	98-86-2	8270D	20	U	20	2.5	ug/L	1
Anthracene	120-12-7	8270D	5.5		4.0	1.0	ug/L	1
Atrazine	1912-24-9	8270D	20	U	20	2.5	ug/L	1
Benzaldehyde	100-52-7	8270D	40	U	40	2.5	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	1.6	J	4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	4.0	U	4.0	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	20	U	20	2.5	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	20	U	20	2.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	20	U	20	2.5	ug/L	1
Caprolactam	105-60-2	8270D	40	U	40	5.0	ug/L	1
Carbazole	86-74-8	8270D	40		20	2.5	ug/L	1
Chrysene	218-01-9	8270D	4.0	U	4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	4.0	U	4.0	1.0	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW16GW65
Date Sampled: 05/18/2018 1130
Date Received: 05/22/2018

Laboratory ID: TE22045-001
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2026	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	132-64-9	8270D	14	J	20	2.5	ug/L	1
Diethylphthalate	84-66-2	8270D	20	U	20	2.5	ug/L	1
Dimethyl phthalate	131-11-3	8270D	20	U	20	2.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	20	U	20	2.5	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	20	U	20	2.5	ug/L	1
Fluoranthene	206-44-0	8270D	17		4.0	1.0	ug/L	1
Fluorene	86-73-7	8270D	22		4.0	1.0	ug/L	1
Hexachlorobenzene	118-74-1	8270D	20	U	20	2.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	20	U	20	2.5	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	100	U	100	10	ug/L	1
Hexachloroethane	67-72-1	8270D	20	U	20	5.0	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	4.0	U	4.0	1.0	ug/L	1
Isophorone	78-59-1	8270D	20	U	20	2.5	ug/L	1
Naphthalene	91-20-3	8270D	4.0	U	4.0	1.0	ug/L	1
Nitrobenzene	98-95-3	8270D	20	U	20	7.5	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	20	U	20	2.5	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	20	U	20	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	190		100	10	ug/L	1
Phenanthrene	85-01-8	8270D	4.0	U	4.0	1.0	ug/L	1
Phenol	108-95-2	8270D	20	U	20	2.5	ug/L	1
Pyrene	129-00-0	8270D	8.8		4.0	1.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		71	37-129
2-Fluorophenol		73	24-127
Nitrobenzene-d5		84	38-127
Phenol-d5		81	28-128
Terphenyl-d14		62	10-148
2,4,6-Tribromophenol		57	35-144

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Report Date: 30-May-2018 08:28:50 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C25.D
Lab Sample ID: TE22045-001 Client Sample ID: BW16GW65
Injection Date: 29-May-2018 20:26:30 Dil. Factor: 5.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, TE22045-001
Misc. Info: 5X 72993
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Client ALS Bottle: 22
Cpnd Sublist: sample.sb
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	5.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 30-May-2018 08:23:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.712	5.717	-0.005	1094863	20.000	400.00	
* 41 Naphthalene-d8	136.0	6.734	6.734	0.000	4372830	20.000	400.00	
* 67 Acenaphthene-d10	164.0	8.194	8.199	-0.005	2266327	20.000	400.00	
* 102 Phenanthrene-d10	188.0	9.456	9.462	-0.006	3652385	20.000	400.00	
* 128 Chrysene-d12	240.0	12.195	12.195	0.000	3394061	20.000	400.00	
* 136 Perylene-d12	264.0	14.345	14.345	0.000	3481548	20.000	400.00	
$ 6 2-Fluorophenol	112.0	4.765	4.776	-0.011	119366	1.4532	29.065	e
199 Benzaldehyde	77.0		5.397		ND			
$ 9 Phenol-d5	99.0	5.412	5.413	-0.001	170460	1.6173	32.347	e
10 Phenol	94.0		5.423		ND			
12 bis(2-Chloroethyl)ether	63.0		5.482		ND			
13 2-Chlorophenol	128.0		5.568		ND			
20 o-Cresol	108.0		5.883		ND			
21 bis(2Chloro1methylethyl)ether	45.0		5.883		ND			
26 n-Nitroso-di-n-propylamine	70.0		5.990		ND			
23 m+p-Cresol	107.0		5.996		ND			
24 Acetophenone	105.0		6.017		ND			
28 Hexachloroethane	117.0		6.119		ND			
$ 29 Nitrobenzene-d5	82.0	6.145	6.151	-0.006	130377	1.6764	33.528	e
30 Nitrobenzene	77.0		6.167		ND			
32 Isophorone	82.0		6.333		ND			
33 2-Nitrophenol	139.0		6.418		ND			
34 2,4-Dimethylphenol	107.0	6.445	6.423	0.022	94645	1.7308	34.616	Qe

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
35 bis(2-Chloroethoxy)methane	93.0		6.482		ND			
38 2,4-Dichlorophenol	162.0		6.616		ND			
43 Naphthalene	128.0		6.755		ND			
44 4-Chloroaniline	127.0		6.787		ND			
47 Hexachlorobutadiene	224.6		6.825		ND			
196 Caprolactam	113.0		7.071		ND			
49 4-Chloro-3-methylphenol	107.0		7.172		ND			
51 2-Methylnaphthalene	142.0		7.317		ND			
53 Hexachlorocyclopentadiene	237.0		7.434		ND			
54 2,4,6-Trichlorophenol	196.0		7.547		ND			
55 2,4,5-Trichlorophenol	196.0		7.589		ND			
$ 56 2-Fluorobiphenyl	172.0	7.600	7.606	-0.006	240560	1.4253	28.507	e
184 Biphenyl	154.0	7.691	7.691	0.000	90042	0.47974	9.5949	e
58 2-Chloronaphthalene	162.0		7.729		ND			
60 2-Nitroaniline	138.0		7.819		ND			
62 Dimethylphthalate	163.0		7.926		ND			
65 2,6-Dinitrotoluene	165.0		7.996		ND			
64 Acenaphthylene	152.0		8.087		ND			
66 3-Nitroaniline	138.0		8.167		ND			
68 Acenaphthene	153.0	8.221	8.226	-0.006	275917	1.9080	38.161	e
69 2,4-Dinitrophenol	184.0		8.237		ND			
70 4-Nitrophenol	109.0		8.301		ND			
73 2,4-Dinitrotoluene	165.0		8.338		ND			
71 Dibenzofuran	168.0	8.365	8.370	-0.005	131433	0.69244	13.849	e
78 Diethylphthalate	149.0		8.504		ND			
80 4-Chlorophenylphenylether	204.0		8.627		ND			
79 Fluorene	166.0	8.654	8.659	-0.005	184104	1.1191	22.383	e
84 4,6-Dinitro-2-methylphenol	198.0		8.681		ND			
83 4-Nitroaniline	138.0		8.686		ND			
86 n-Nitrosodiphenylamine	169.0		8.729		ND			
$ 88 2,4,6-Tribromophenol	330.0	8.862	8.868	-0.006	18686	1.1425	22.849	e
94 4-Bromophenylphenylether	248.0		9.044		ND			
96 Hexachlorobenzene	284.0		9.125		ND			
200 Atrazine	200.0		9.146		ND			
99 Pentachlorophenol	266.0	9.301	9.296	0.005	205471	9.4884	189.77	e
103 Phenanthrene	178.0		9.483		ND			
104 Anthracene	178.0	9.520	9.526	-0.006	52594	0.27585	5.5170	Qe
106 Carbazole	167.0	9.654	9.654	0.000	359696	2.0164	40.329	e
109 Di-n-butylphthalate	149.0		9.857		ND			
114 Fluoranthene	202.0	10.531	10.537	-0.006	165180	0.83784	16.757	e
116 Pyrene	202.0	10.772	10.772	0.000	91031	0.43953	8.7907	e
$ 117 Terphenyl-d14	244.0	10.863	10.863	0.000	181670	1.2320	24.640	e
122 Butylbenzylphthalate	149.0		11.360		ND			
130 bis(2-Ethylhexyl)phthalate	149.0		12.029		ND			
125 3,3'-Dichlorobenzidine	252.0		12.114		ND			
127 Benzo(a)Anthracene	228.0	12.195	12.179	0.016	15349	0.08137	1.6274	Qe
129 Chrysene	228.0		12.232		ND			
131 Di-n-octylphthalate	149.0		12.949		ND			
132 Benzo(b)fluoranthene	252.0		13.740		ND			
134 Benzo(k)fluoranthene	252.0		13.783		ND			
135 Benzo(a)pyrene	252.0		14.254		ND			

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
138 Indeno(1,2,3-c,d)pyrene	276.0		16.217		ND			
139 Dibenzo(a,h)anthracene	278.0		16.228		ND			
140 Benzo(g,h,i)perylene	276.0		16.784		ND			

Compound Type Legend

* - ISTD

$ - Surrogate

QC Flag Legend

Processing Flags

e - Compound Concentration Below Quantitation Limit

Q - Qualifier Signal(s) Fails Ratio Test

Review Flags

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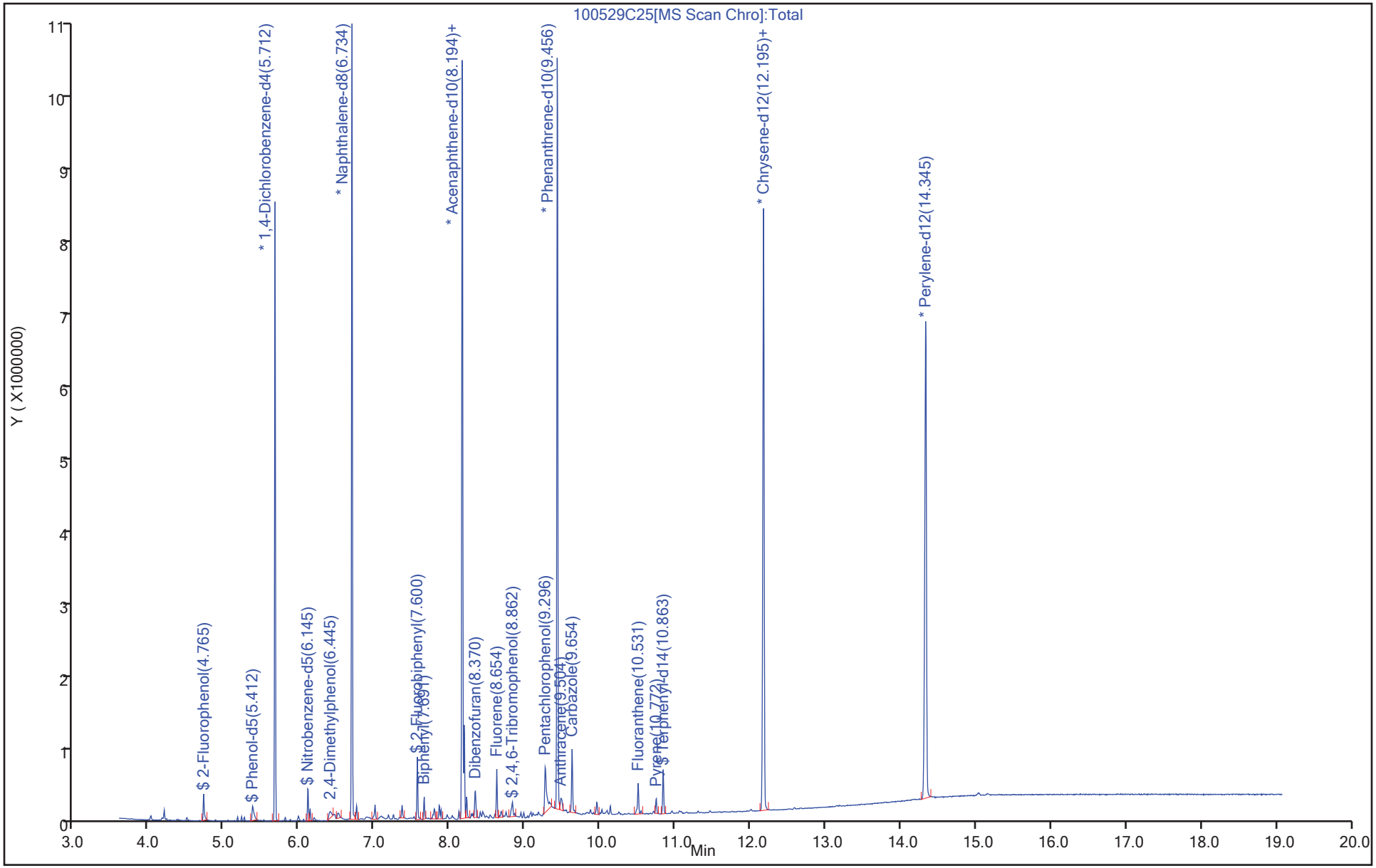
Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C25.D				
Injection Date:	29-May-2018 20:26:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	BW16GW65	Lab ID:	TE22045-001		
Sample Info:	10052918C.b, TE22045-001				
Injection Vol.	5.00 uL	Dil. Factor:	5.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



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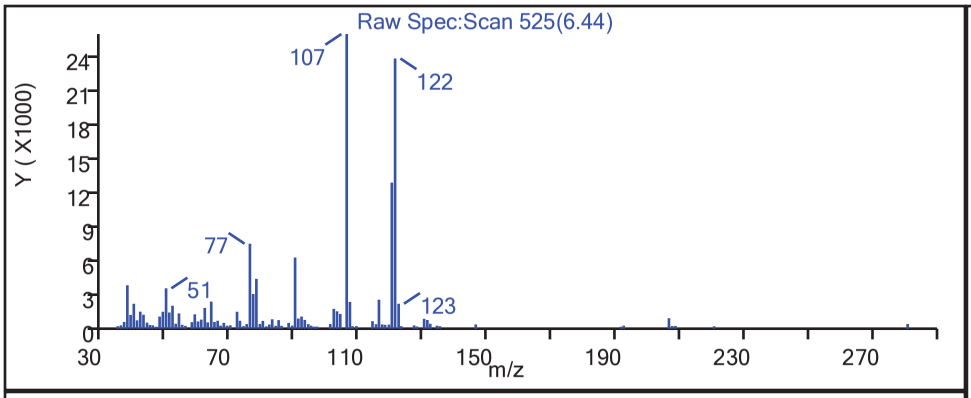
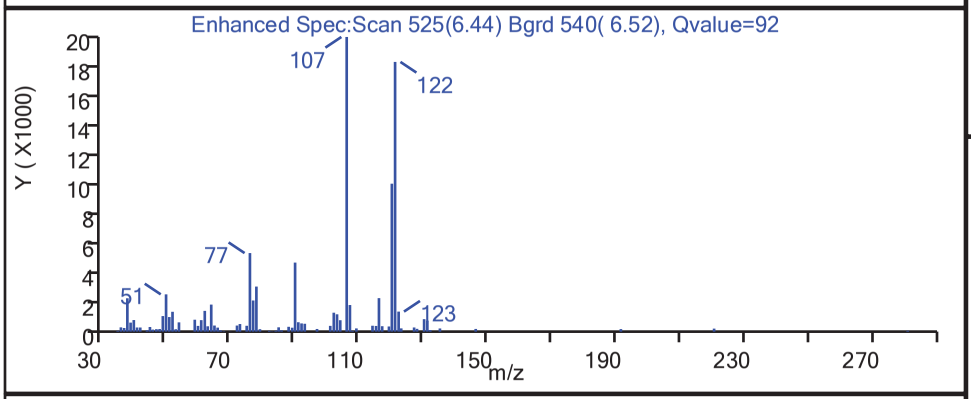
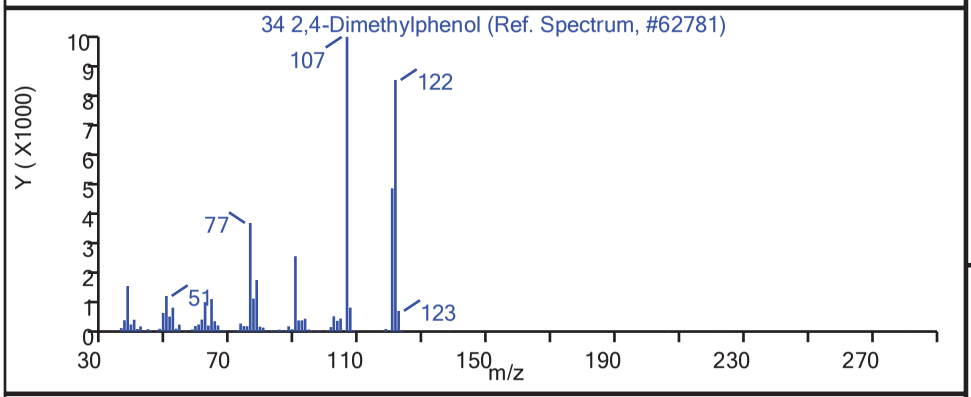
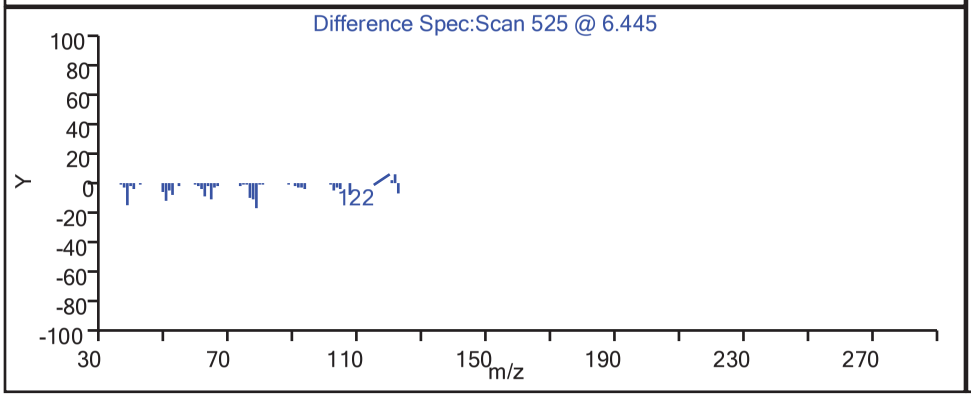
Client ID:	BW16GW65	Lab ID:	TE22045-001
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

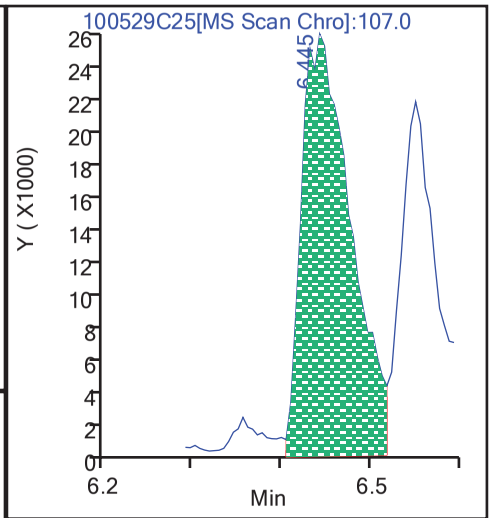
34 2,4-Dimethylphenol

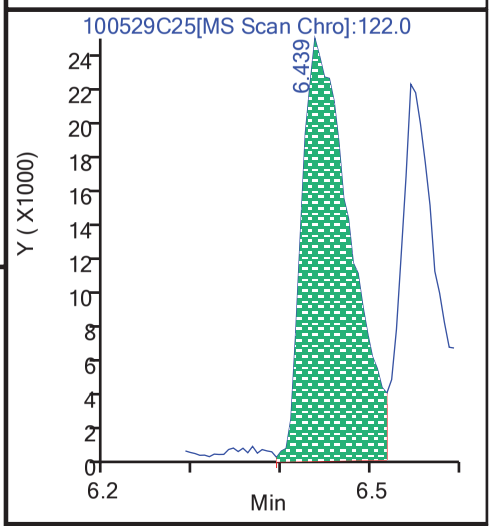


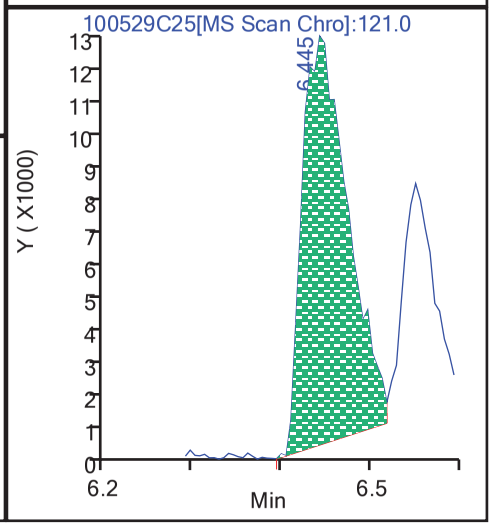












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Shealy Environmental Services

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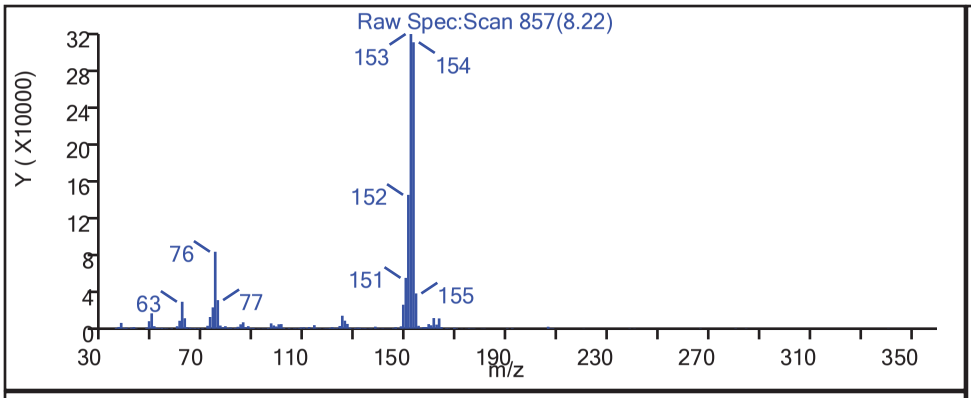
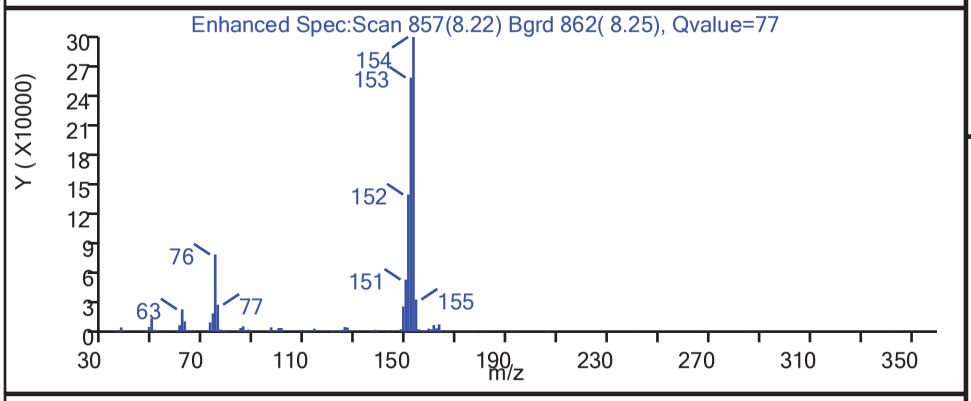
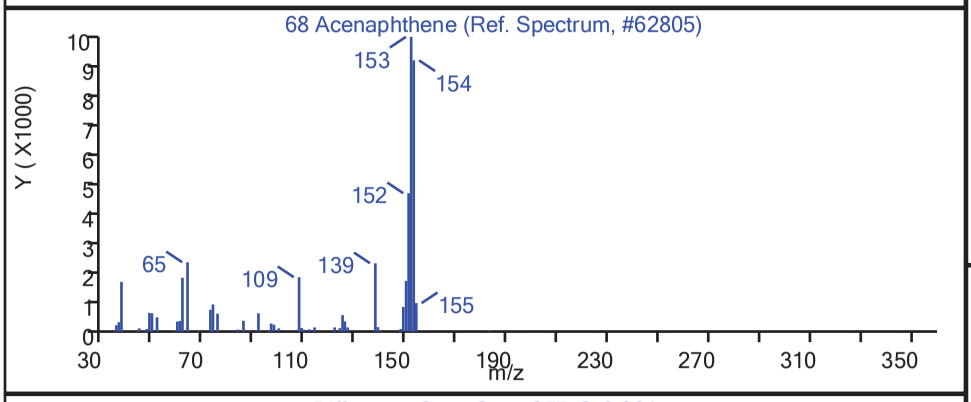
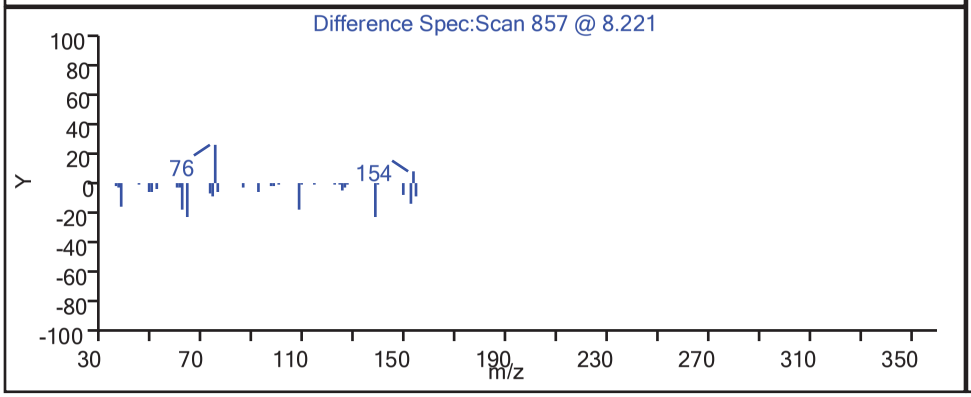
Client ID:	BW16GW65	Lab ID:	TE22045-001
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

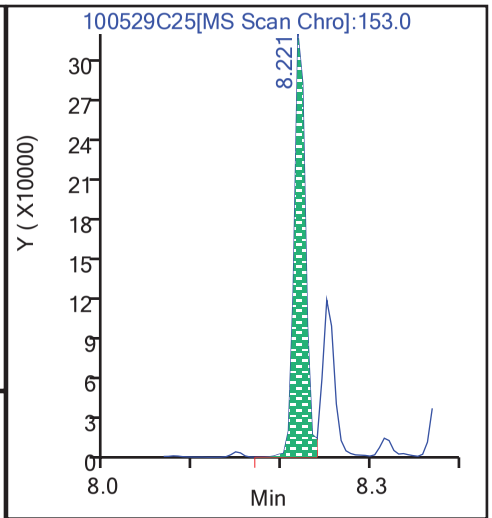
68 Acenaphthene

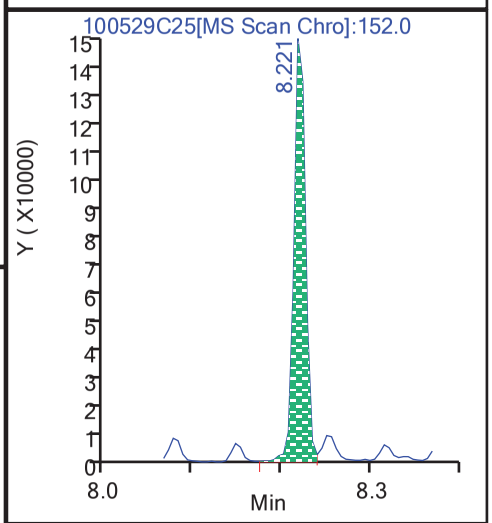


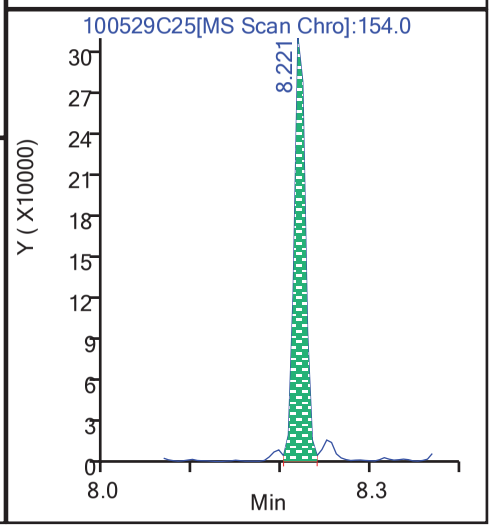












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Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C25.D		
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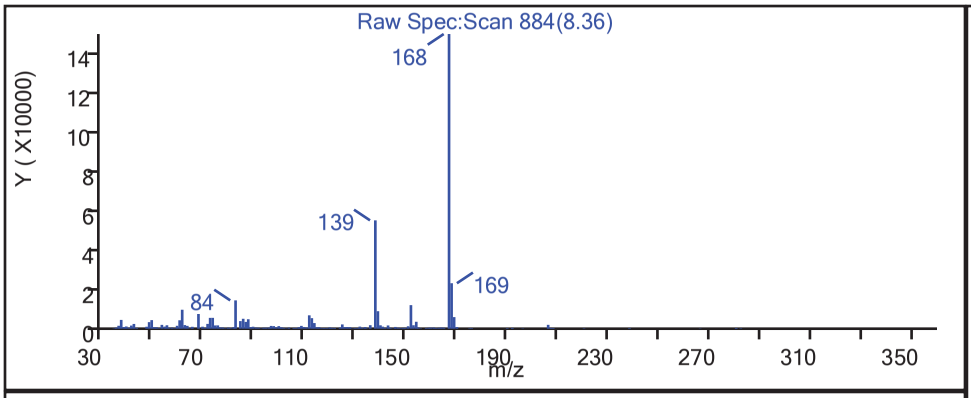
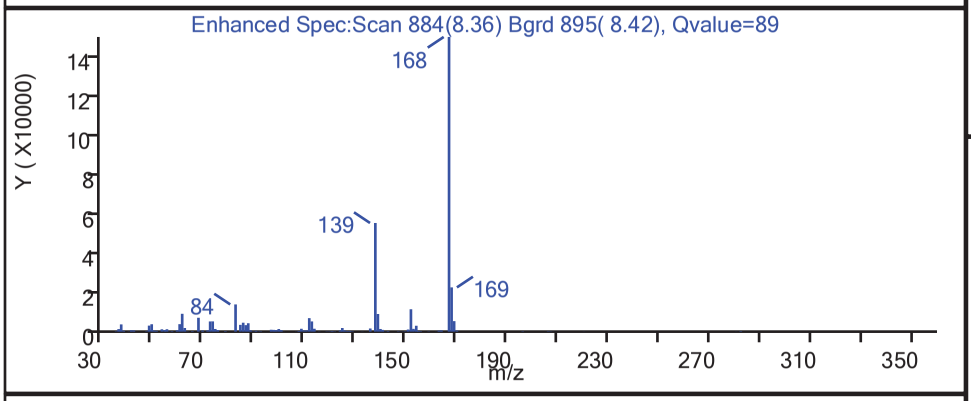
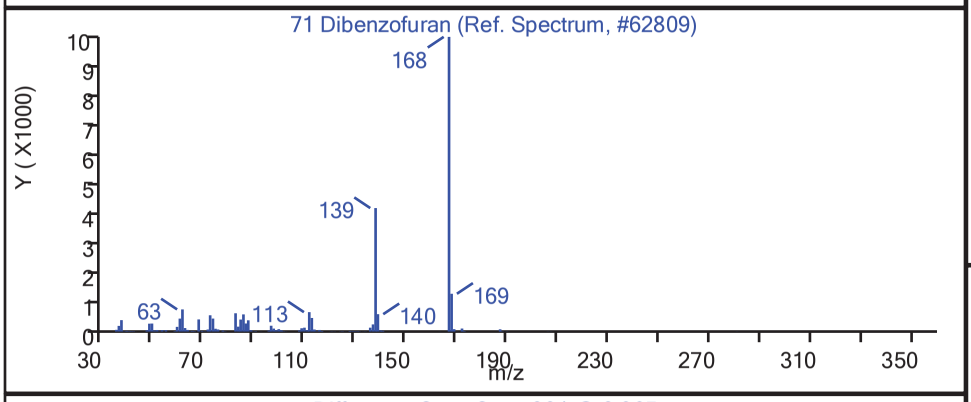
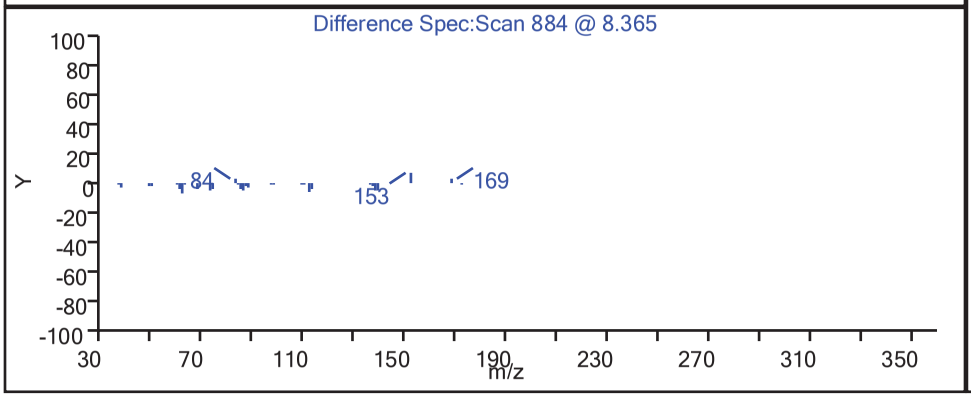
Client ID:	BW16GW65	Lab ID:	TE22045-001
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

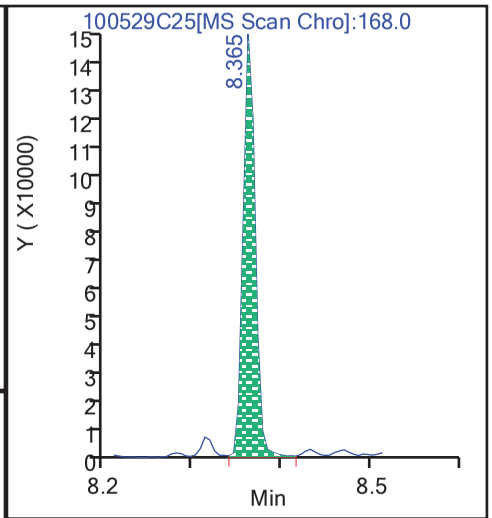
71 Dibenzofuran

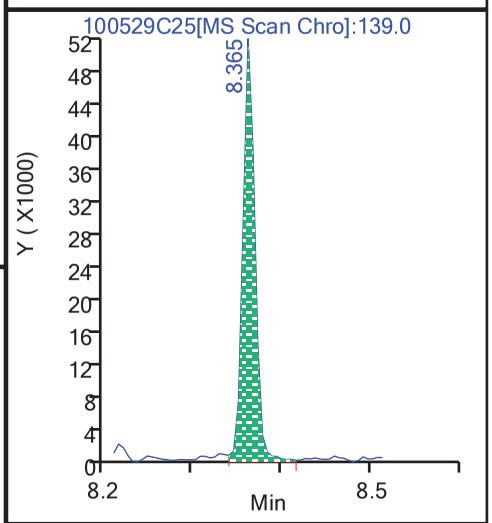


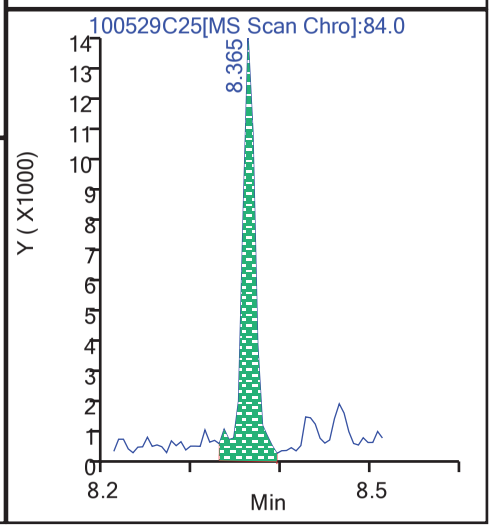












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Shealy Environmental Services

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Injection Date:	29-May-2018 20:26:30	Inst. ID:	msd10.i
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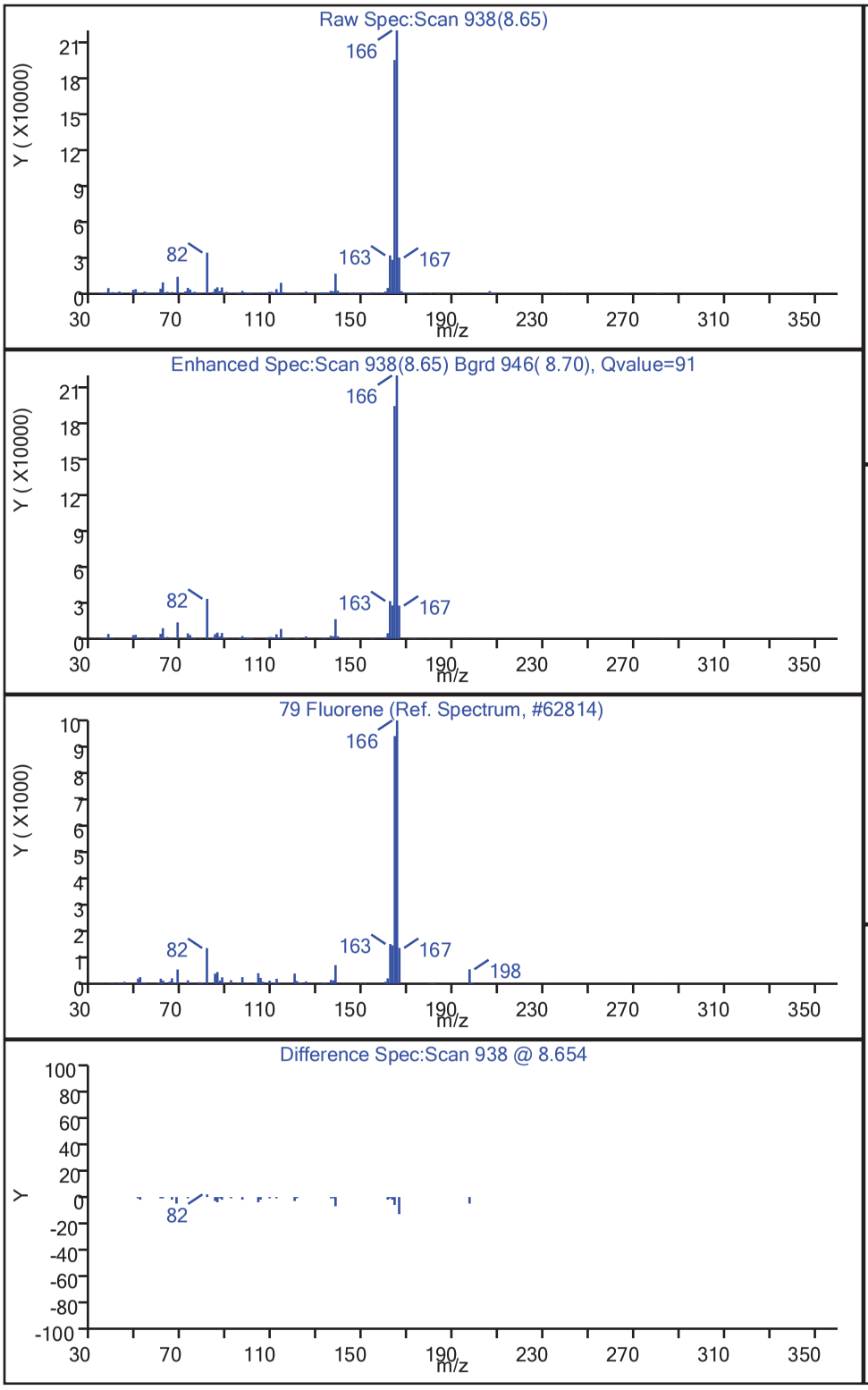
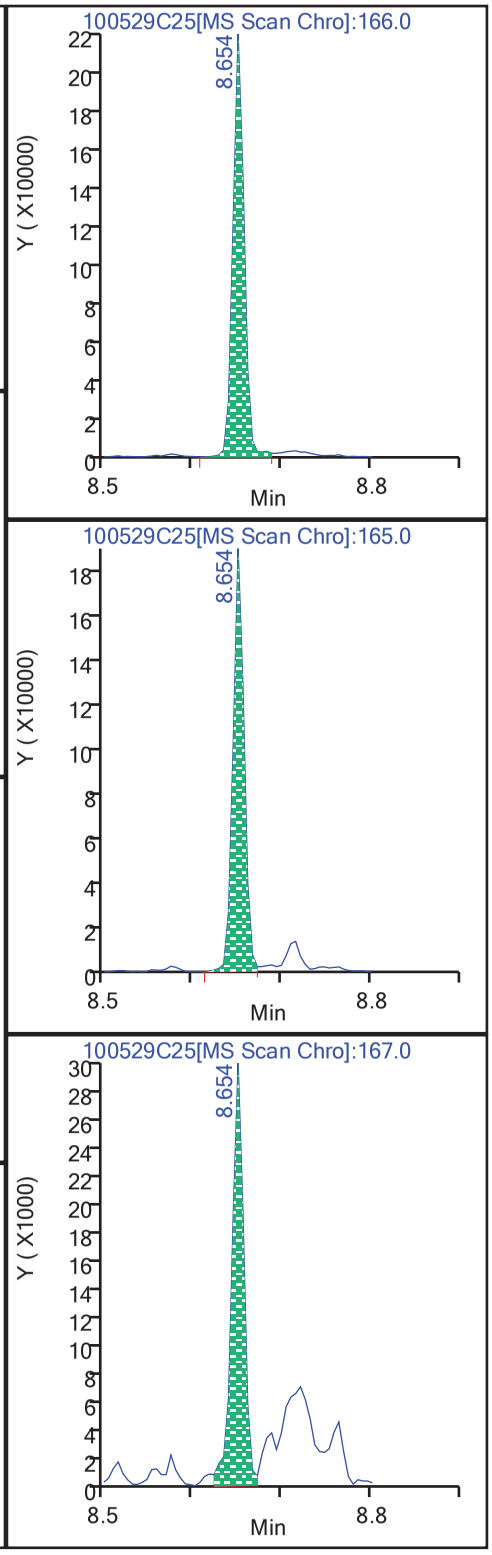
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

79 Fluorene





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Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
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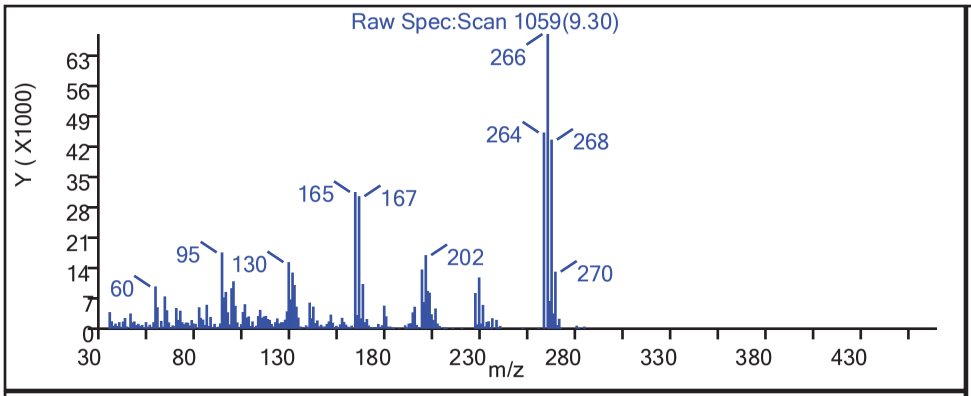
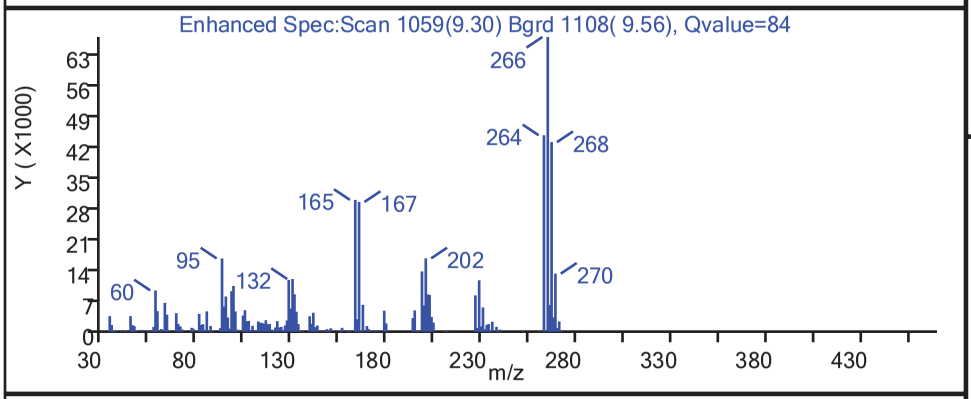
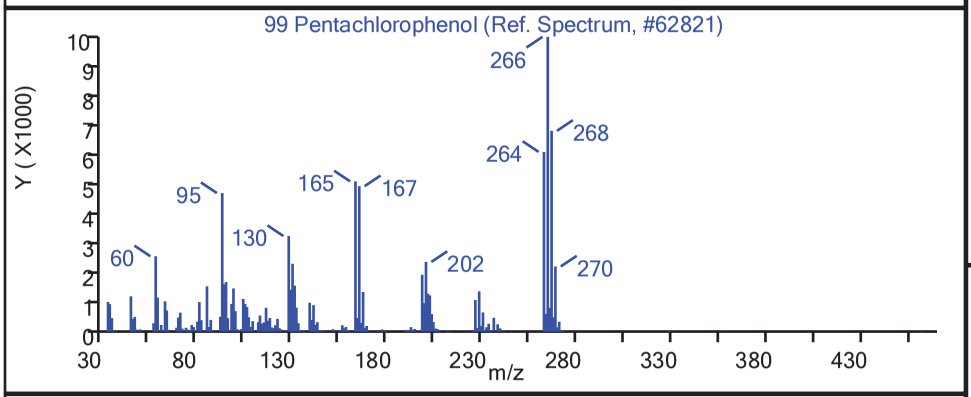
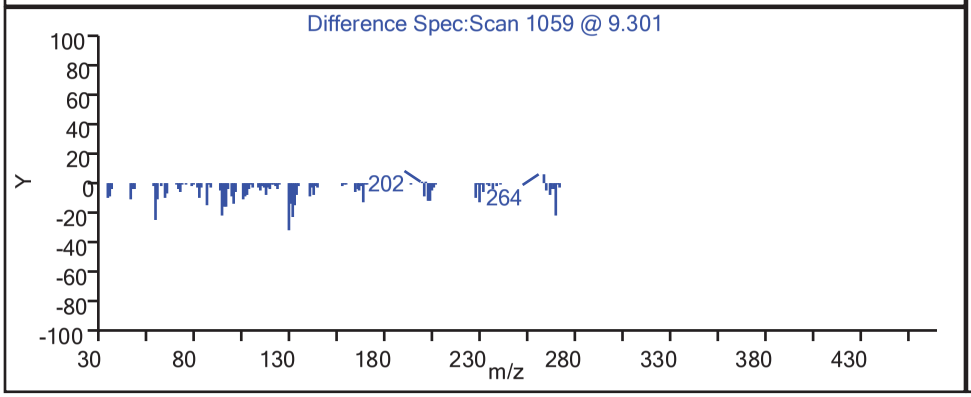
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

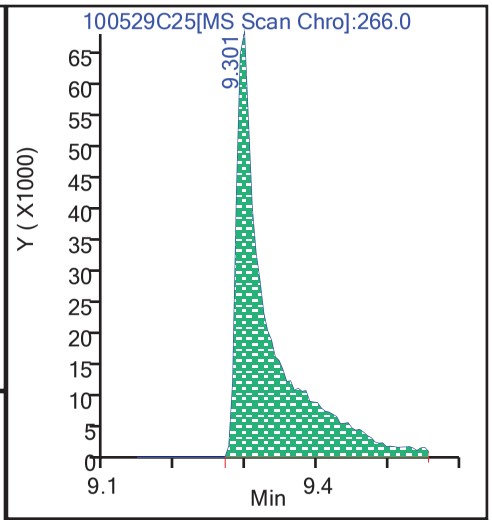
99 Pentachlorophenol

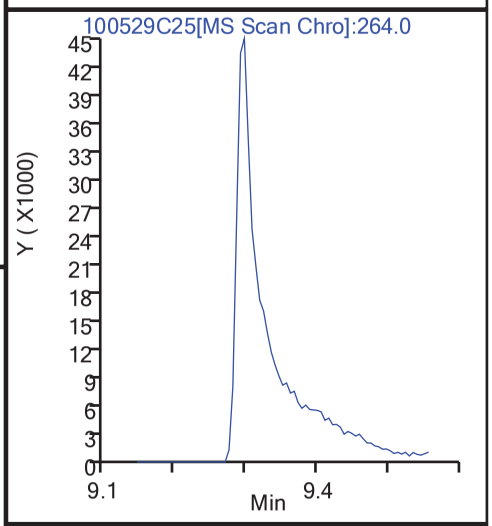


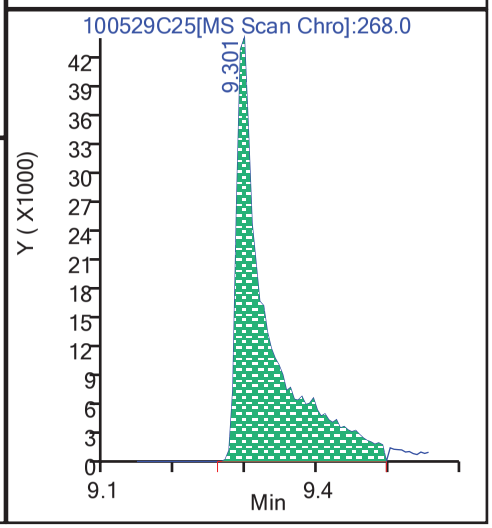












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Sample Info:	10052918C.b, TE22045-001		
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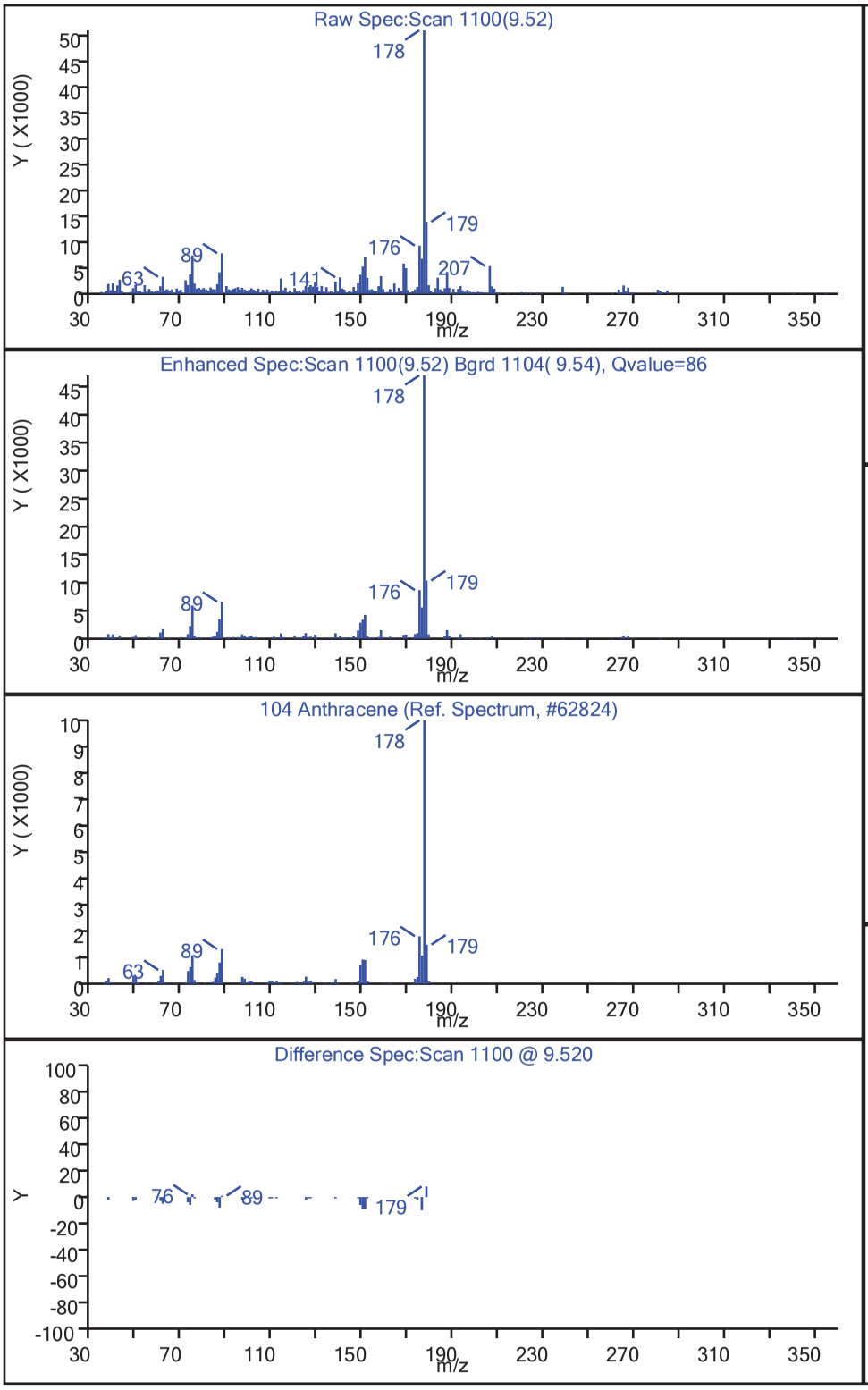
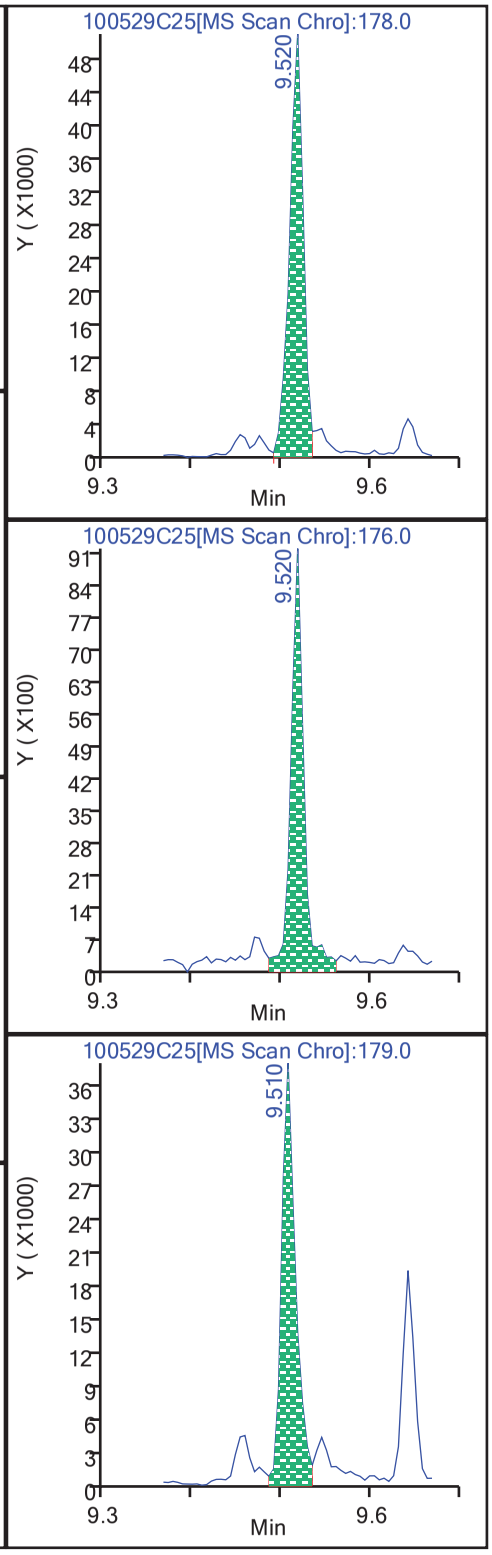
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

104 Anthracene





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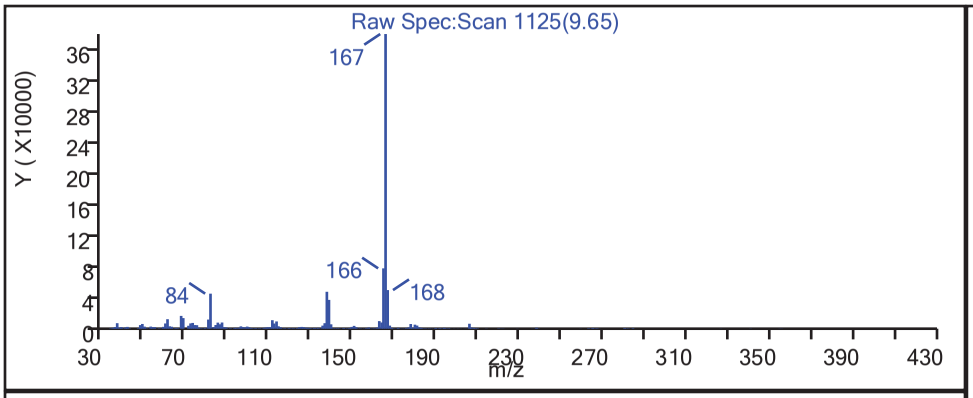
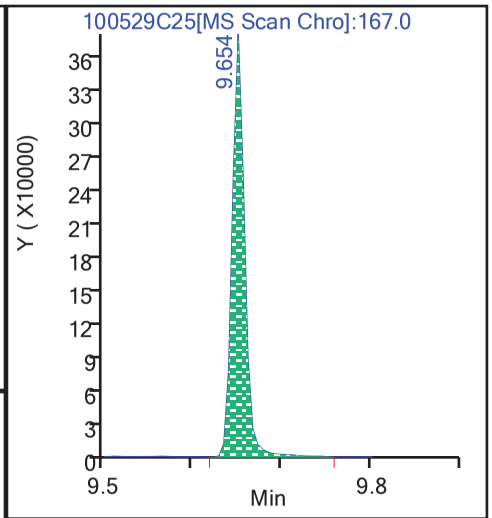
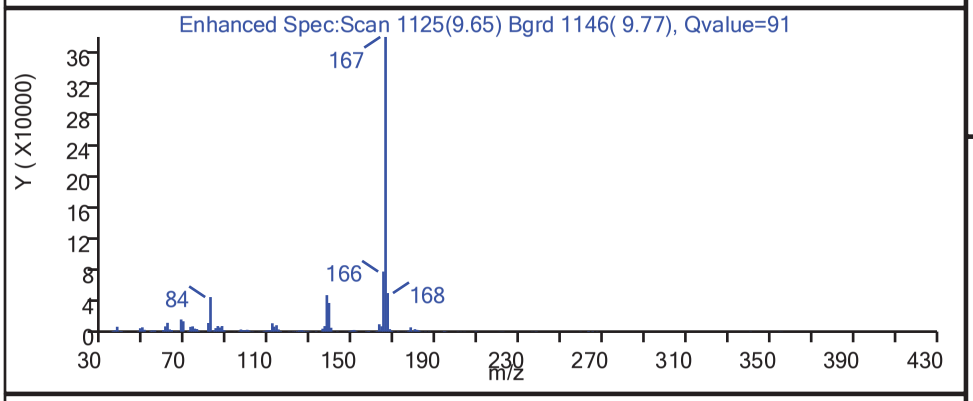
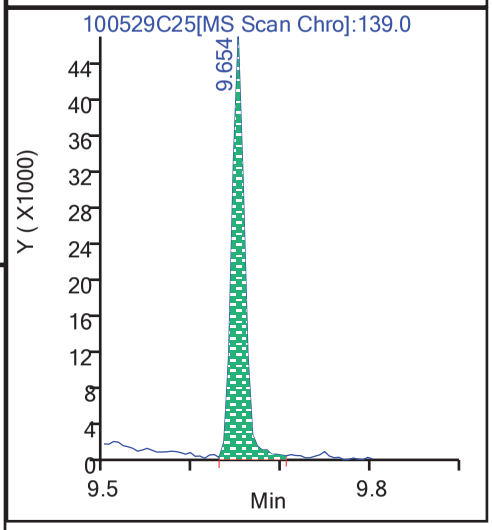
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

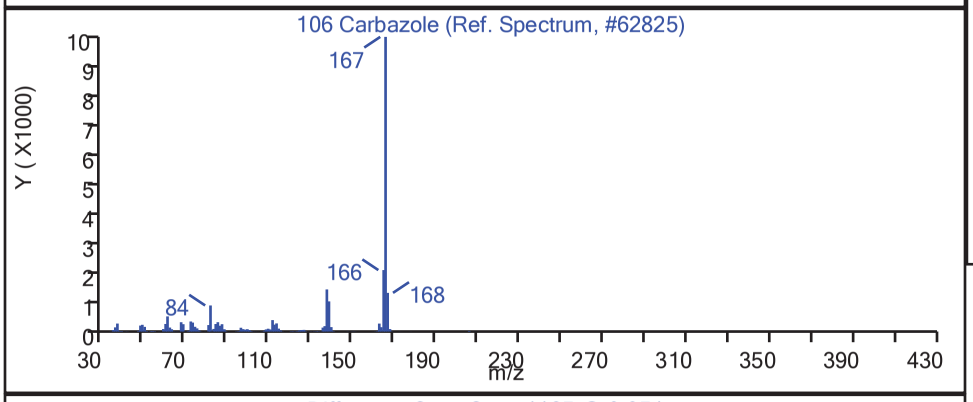
106 Carbazole

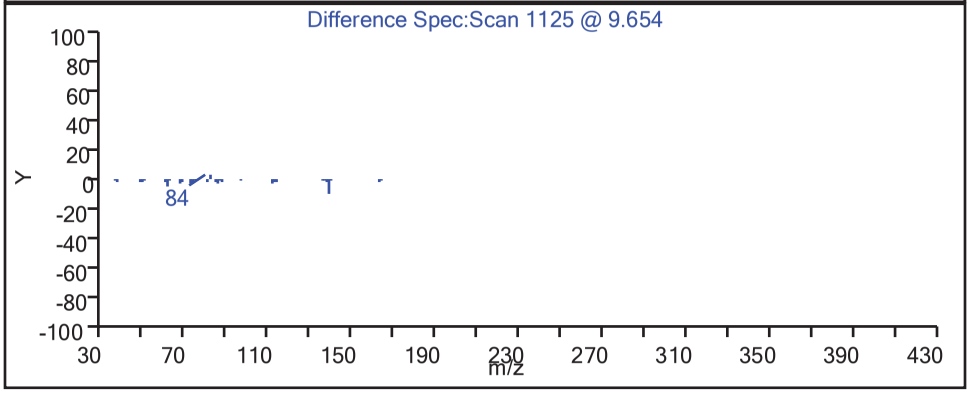












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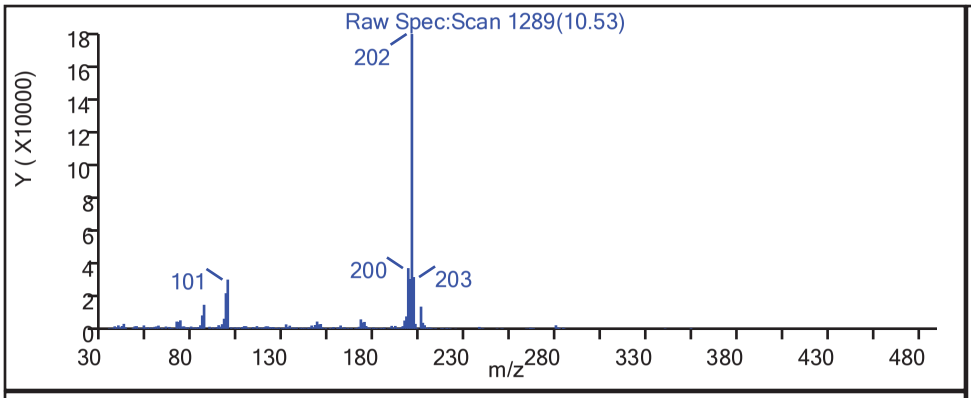
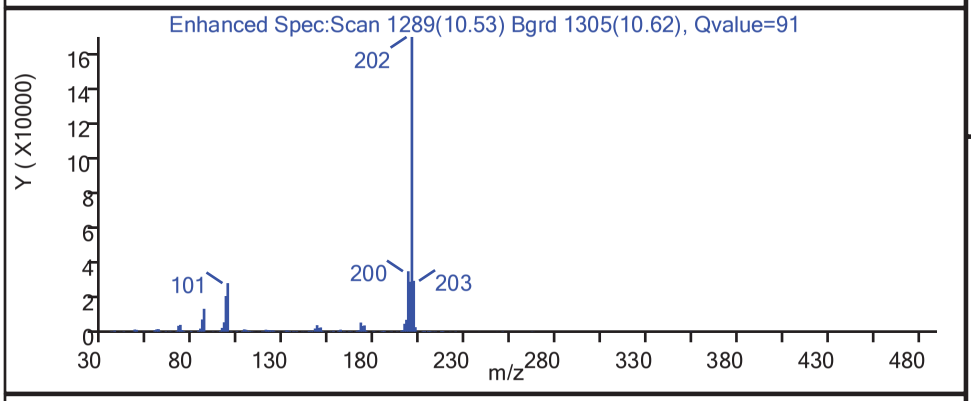
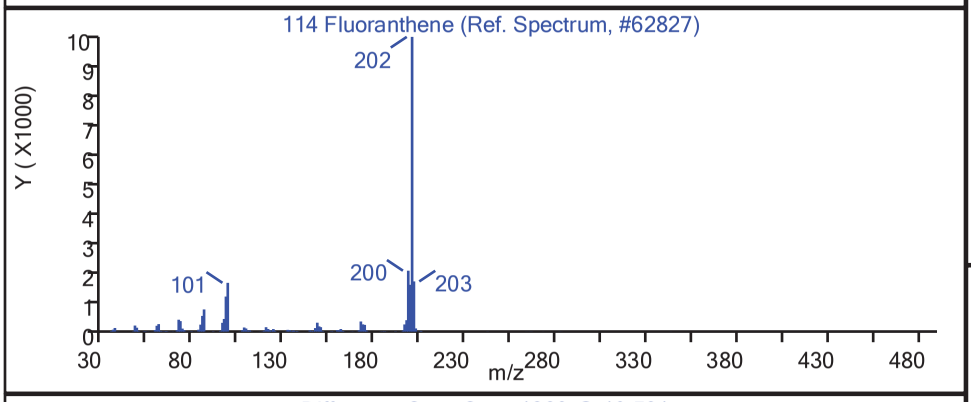
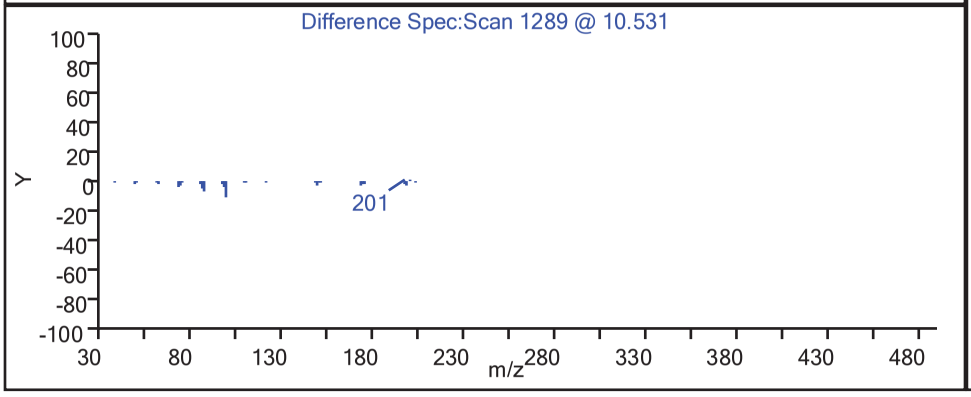
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

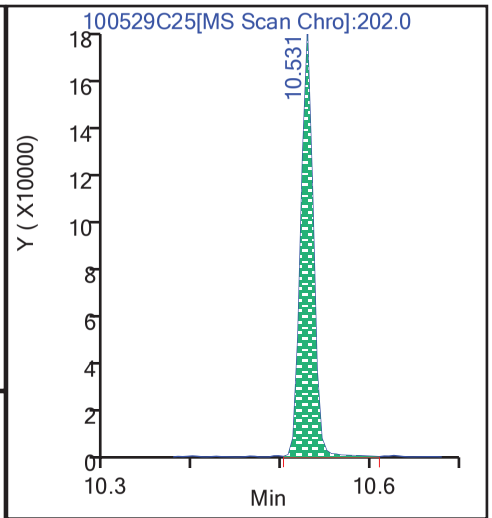
114 Fluoranthene

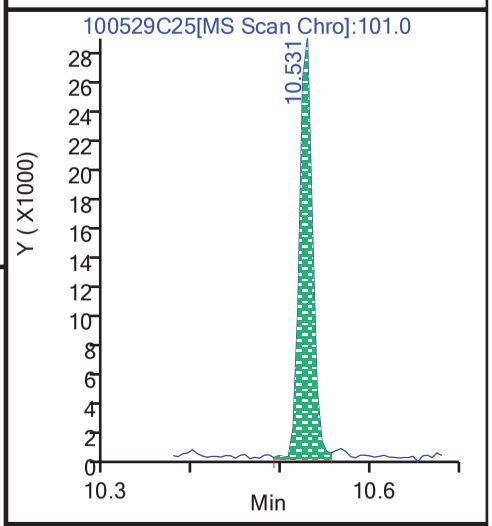


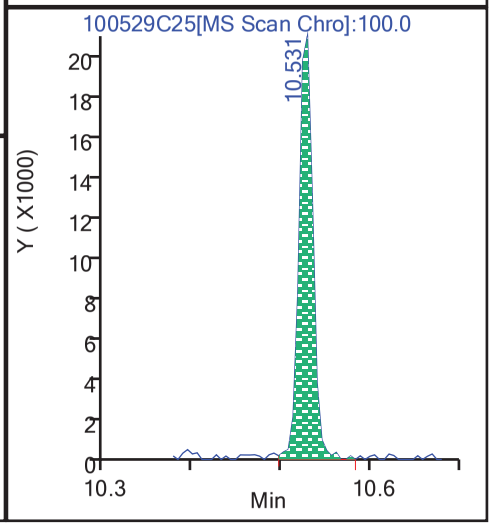












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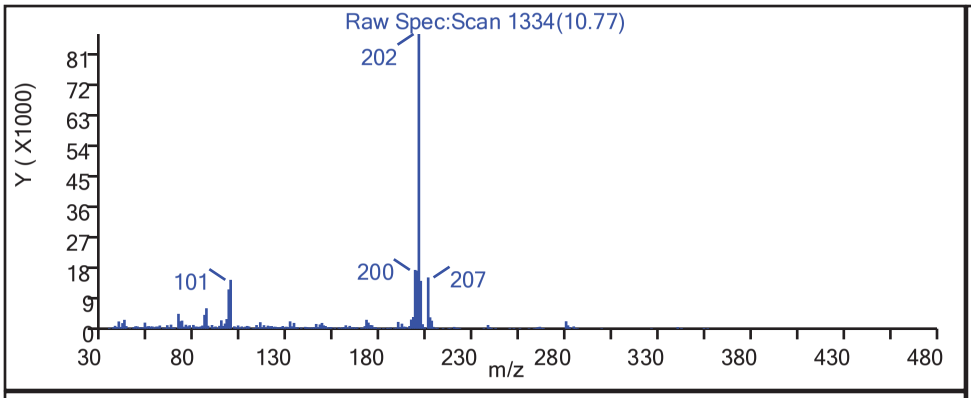
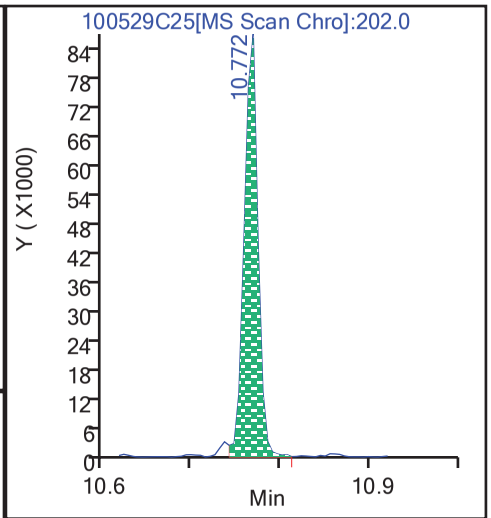
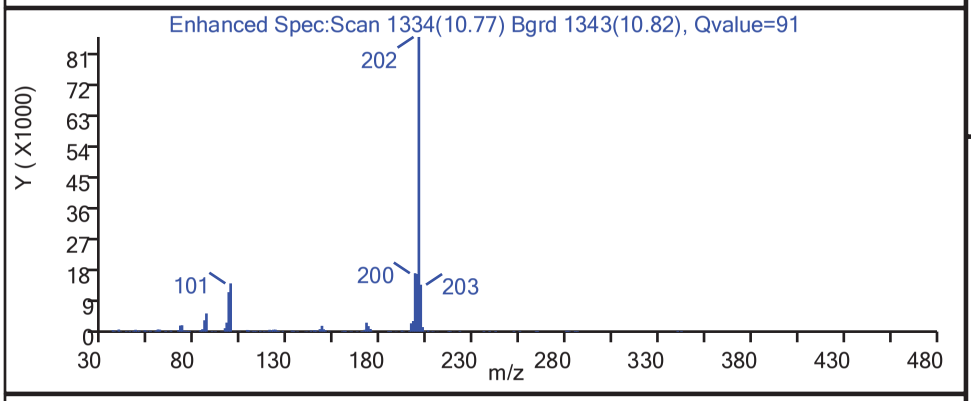
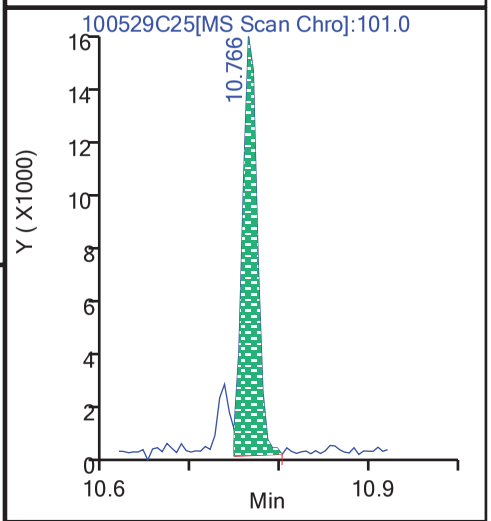
Injection Date:	29-May-2018 20:26:30	Inst. ID:	msd10.i
Client ID:	BW16GW65	Lab ID:	TE22045-001
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

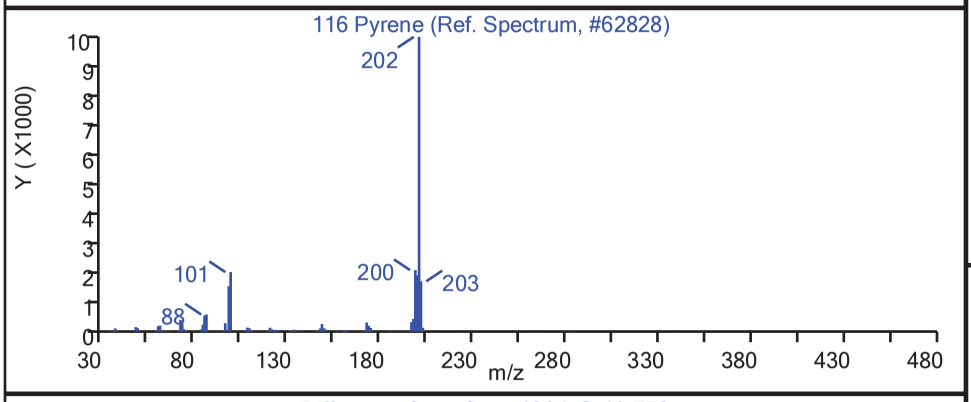
116 Pyrene

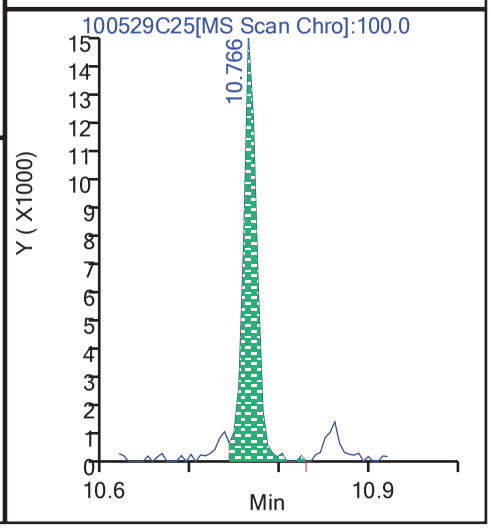


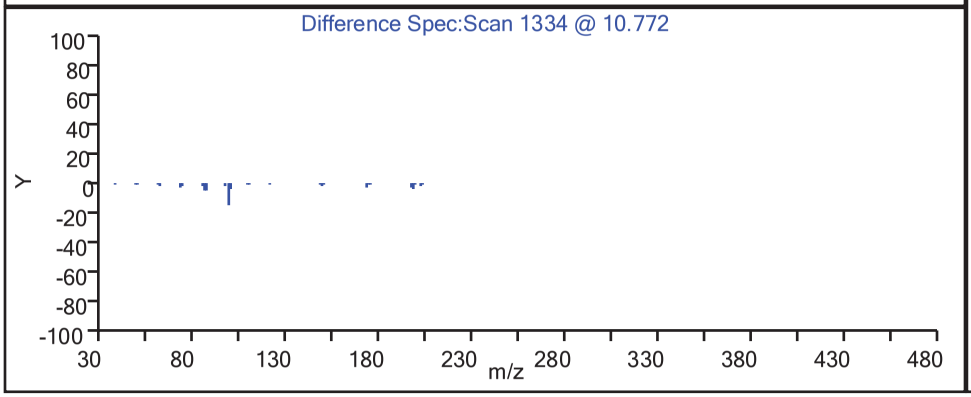










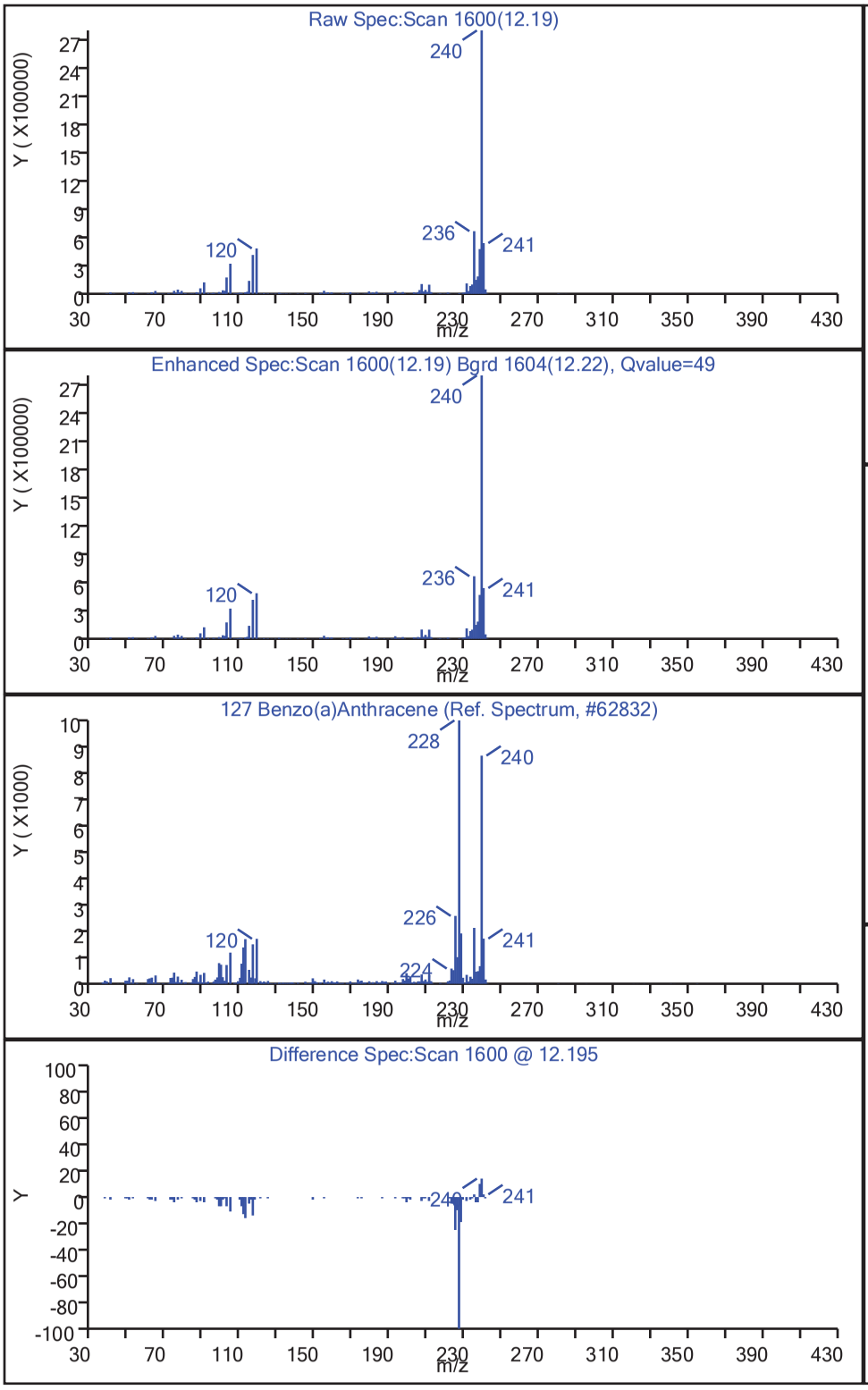


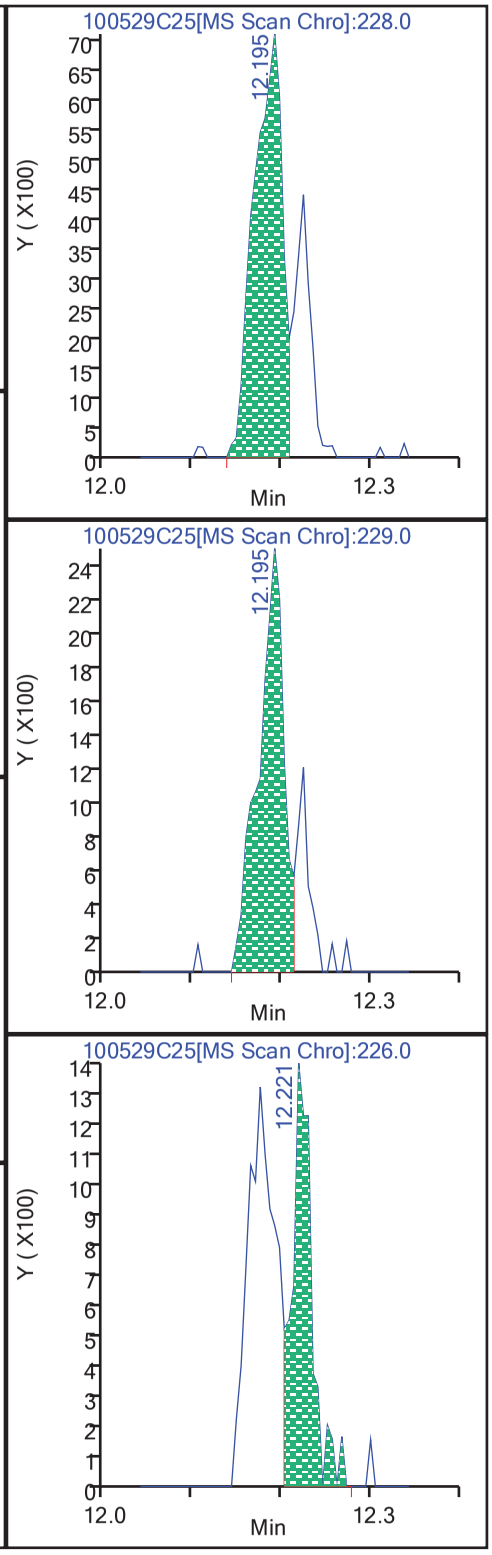
Report Date: 30-May-2018 08:28:50 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C25.D		
Injection Date:	29-May-2018 20:26:30	Inst. ID:	msd10.i
Client ID:	BW16GW65	Lab ID:	TE22045-001
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

127 Benzo(a)Anthracene



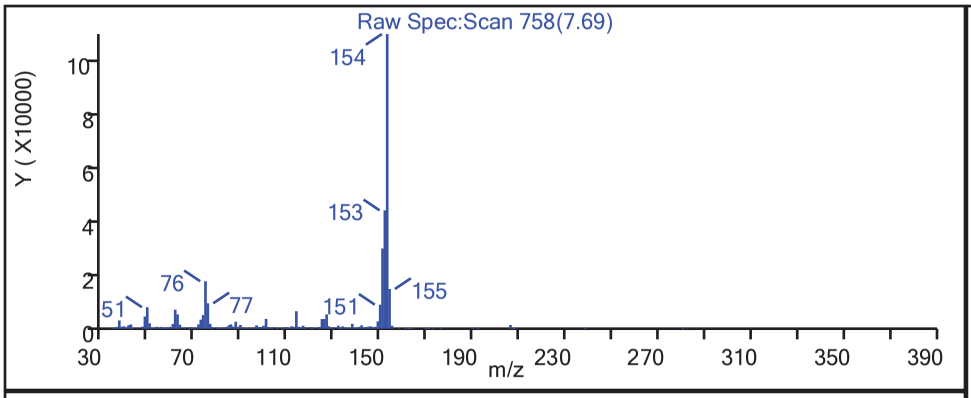


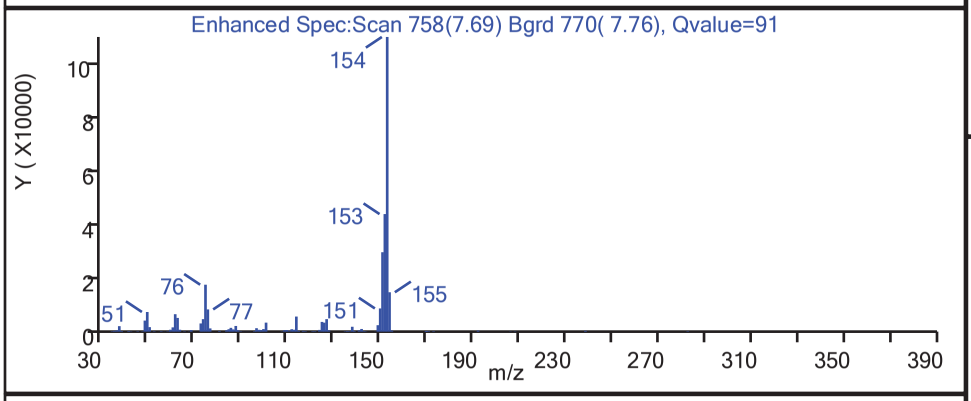
Report Date: 30-May-2018 08:28:50 AIM Revision: 1.0 20-Sep-2017 14:04:40

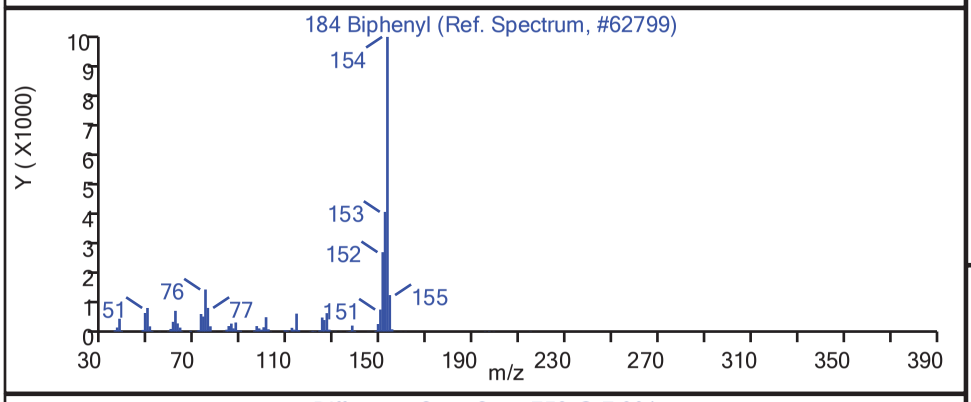
Shealy Environmental Services

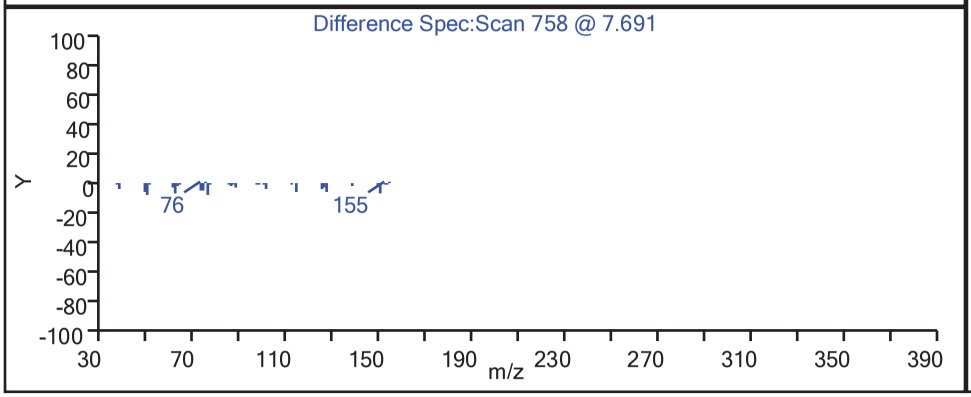
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C25.D		
Injection Date:	29-May-2018 20:26:30	Inst. ID:	msd10.i
Client ID:	BW16GW65	Lab ID:	TE22045-001
Sample Info:	10052918C.b, TE22045-001		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

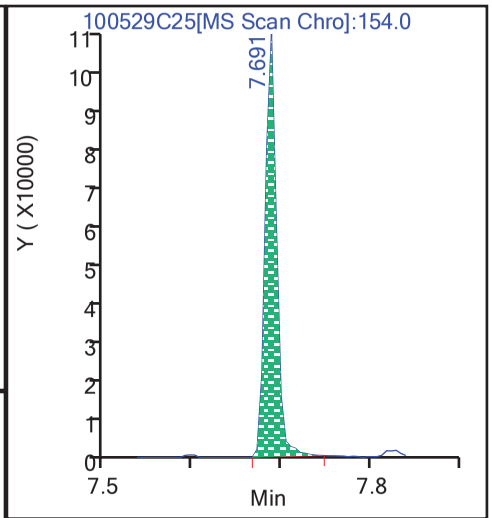
184 Biphenyl

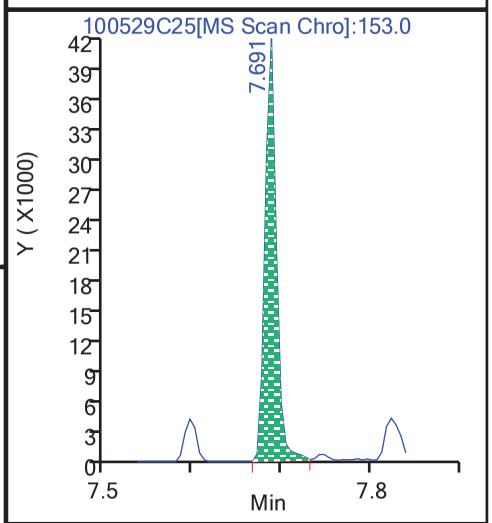


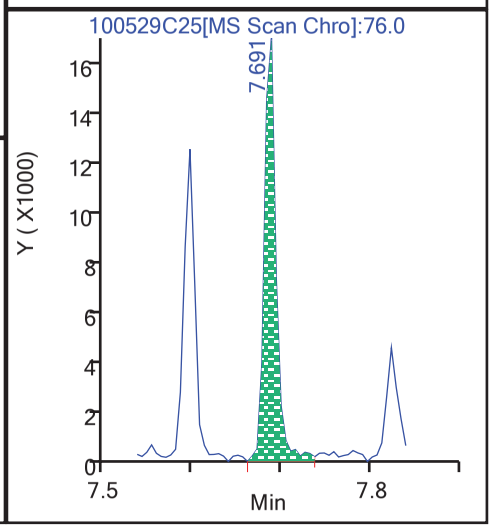












Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW916GW65
Date Sampled: 05/18/2018 1130
Date Received: 05/22/2018

Laboratory ID: TE22045-002
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2050	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	9.4	J	20	2.5	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	20	U	20	2.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	20	U	20	2.5	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	40	U	40	5.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	33		20	5.0	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	100	U	100	5.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	40	U	40	2.5	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	40	U	40	2.5	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	20	U	20	2.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	20	U	20	2.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	4.0	U	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	20	U	20	5.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	40	U	40	2.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	20	U	20	5.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	20	U	20	8.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	20	U	20	7.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	40	U	40	5.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	100	U	100	5.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	20	U	20	2.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	20	U	20	2.5	ug/L	1
4-Chloroaniline	106-47-8	8270D	40	U	40	2.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	20	U	20	2.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	40	U	40	7.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	100	U	100	10	ug/L	1
Acenaphthene	83-32-9	8270D	40		4.0	1.0	ug/L	1
Acenaphthylene	208-96-8	8270D	4.0	U	4.0	1.0	ug/L	1
Acetophenone	98-86-2	8270D	20	U	20	2.5	ug/L	1
Anthracene	120-12-7	8270D	2.8	J	4.0	1.0	ug/L	1
Atrazine	1912-24-9	8270D	20	U	20	2.5	ug/L	1
Benzaldehyde	100-52-7	8270D	40	U	40	2.5	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	4.0	U	4.0	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	20	U	20	2.5	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	20	U	20	2.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	20	U	20	2.5	ug/L	1
Caprolactam	105-60-2	8270D	40	U	40	5.0	ug/L	1
Carbazole	86-74-8	8270D	20	U	20	2.5	ug/L	1
Chrysene	218-01-9	8270D	4.0	U	4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	4.0	U	4.0	1.0	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW916GW65
Date Sampled: 05/18/2018 1130
Date Received: 05/22/2018

Laboratory ID: TE22045-002
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2050	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	132-64-9	8270D	16	J	20	2.5	ug/L	1
Diethylphthalate	84-66-2	8270D	20	U	20	2.5	ug/L	1
Dimethyl phthalate	131-11-3	8270D	20	U	20	2.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	20	U	20	2.5	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	20	U	20	2.5	ug/L	1
Fluoranthene	206-44-0	8270D	18		4.0	1.0	ug/L	1
Fluorene	86-73-7	8270D	22		4.0	1.0	ug/L	1
Hexachlorobenzene	118-74-1	8270D	20	U	20	2.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	20	U	20	2.5	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	100	U	100	10	ug/L	1
Hexachloroethane	67-72-1	8270D	20	U	20	5.0	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	4.0	U	4.0	1.0	ug/L	1
Isophorone	78-59-1	8270D	20	U	20	2.5	ug/L	1
Naphthalene	91-20-3	8270D	4.0	U	4.0	1.0	ug/L	1
Nitrobenzene	98-95-3	8270D	20	U	20	7.5	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	20	U	20	2.5	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	20	U	20	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	200		100	10	ug/L	1
Phenanthrene	85-01-8	8270D	4.0	U	4.0	1.0	ug/L	1
Phenol	108-95-2	8270D	20	U	20	2.5	ug/L	1
Pyrene	129-00-0	8270D	9.1		4.0	1.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		70	37-129
2-Fluorophenol		70	24-127
Nitrobenzene-d5		82	38-127
Phenol-d5		81	28-128
Terphenyl-d14		53	10-148
2,4,6-Tribromophenol		55	35-144

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

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Report Date: 30-May-2018 08:28:50 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D
Lab Sample ID: TE22045-002 Client Sample ID: BW916GW65
Injection Date: 29-May-2018 20:50:30 Dil. Factor: 5.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, TE22045-002
Misc. Info: 5X 72993
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Client ALS Bottle: 23
Cpnd Sublist: sample.sb
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	5.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 30-May-2018 08:20:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.712	5.717	-0.005	1071911	20.000	400.00	
* 41 Naphthalene-d8	136.0	6.734	6.734	0.000	4276961	20.000	400.00	
* 67 Acenaphthene-d10	164.0	8.194	8.199	-0.005	2156200	20.000	400.00	
* 102 Phenanthrene-d10	188.0	9.456	9.462	-0.006	3405964	20.000	400.00	
* 128 Chrysene-d12	240.0	12.195	12.195	0.000	3309180	20.000	400.00	
* 136 Perylene-d12	264.0	14.345	14.345	0.000	3412954	20.000	400.00	
$ 6 2-Fluorophenol	112.0	4.765	4.776	-0.011	113187	1.4075	28.150	e
199 Benzaldehyde	77.0		5.397		ND			
$ 9 Phenol-d5	99.0	5.413	5.413	0.000	167442	1.6227	32.455	e
10 Phenol	94.0		5.423		ND			
12 bis(2-Chloroethyl)ether	63.0		5.482		ND			
13 2-Chlorophenol	128.0		5.568		ND			
20 o-Cresol	108.0		5.883		ND			
21 bis(2Chloro1methylethyl)ether	45.0		5.883		ND			
26 n-Nitroso-di-n-propylamine	70.0		5.990		ND			
23 m+p-Cresol	107.0		5.996		ND			
24 Acetophenone	105.0		6.017		ND			
28 Hexachloroethane	117.0		6.119		ND			
$ 29 Nitrobenzene-d5	82.0	6.145	6.151	-0.006	124472	1.6363	32.727	e
30 Nitrobenzene	77.0		6.167		ND			
32 Isophorone	82.0		6.333		ND			
33 2-Nitrophenol	139.0		6.418		ND			
34 2,4-Dimethylphenol	107.0	6.456	6.423	0.033	88357	1.6520	33.040	Qe

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
35 bis(2-Chloroethoxy)methane	93.0		6.482		ND			
38 2,4-Dichlorophenol	162.0		6.616		ND			
43 Naphthalene	128.0		6.755		ND			
44 4-Chloroaniline	127.0		6.787		ND			
47 Hexachlorobutadiene	224.6		6.825		ND			
196 Caprolactam	113.0		7.071		ND			
49 4-Chloro-3-methylphenol	107.0		7.172		ND			
51 2-Methylnaphthalene	142.0		7.317		ND			
53 Hexachlorocyclopentadiene	237.0		7.434		ND			
54 2,4,6-Trichlorophenol	196.0		7.547		ND			
55 2,4,5-Trichlorophenol	196.0		7.589		ND			
$ 56 2-Fluorobiphenyl	172.0	7.600	7.606	-0.006	224661	1.3991	27.982	e
184 Biphenyl	154.0	7.691	7.691	0.000	84093	0.47093	9.4186	e
58 2-Chloronaphthalene	162.0		7.729		ND			
60 2-Nitroaniline	138.0		7.819		ND			
62 Dimethylphthalate	163.0		7.926		ND			
65 2,6-Dinitrotoluene	165.0		7.996		ND			
64 Acenaphthylene	152.0		8.087		ND			
66 3-Nitroaniline	138.0		8.167		ND			
68 Acenaphthene	153.0	8.221	8.226	-0.005	275694	2.0039	40.077	e
69 2,4-Dinitrophenol	184.0		8.237		ND			
70 4-Nitrophenol	109.0		8.301		ND			
73 2,4-Dinitrotoluene	165.0		8.338		ND			
71 Dibenzofuran	168.0	8.365	8.370	-0.005	144879	0.80226	16.045	e
78 Diethylphthalate	149.0		8.504		ND			
80 4-Chlorophenylphenylether	204.0		8.627		ND			
79 Fluorene	166.0	8.654	8.659	-0.005	172926	1.1049	22.098	e
84 4,6-Dinitro-2-methylphenol	198.0		8.681		ND			
83 4-Nitroaniline	138.0		8.686		ND			
86 n-Nitrosodiphenylamine	169.0		8.729		ND			
$ 88 2,4,6-Tribromophenol	330.0	8.863	8.868	-0.006	16716	1.0960	21.919	e
94 4-Bromophenylphenylether	248.0		9.044		ND			
96 Hexachlorobenzene	284.0		9.125		ND			
200 Atrazine	200.0		9.146		ND			
99 Pentachlorophenol	266.0	9.301	9.296	0.005	206262	10.029	200.58	eM
103 Phenanthrene	178.0		9.483		ND			
104 Anthracene	178.0	9.520	9.526	-0.006	24892	0.14000	2.8000	Qe
106 Carbazole	167.0		9.654		ND			
109 Di-n-butylphthalate	149.0		9.857		ND			
114 Fluoranthene	202.0	10.531	10.537	-0.006	167385	0.91045	18.209	e
116 Pyrene	202.0	10.767	10.772	-0.005	91696	0.45410	9.0820	e
$ 117 Terphenyl-d14	244.0	10.863	10.863	0.000	151920	1.0567	21.134	e
122 Butylbenzylphthalate	149.0		11.360		ND			
130 bis(2-Ethylhexyl)phthalate	149.0		12.029		ND			
125 3,3'-Dichlorobenzidine	252.0		12.114		ND			
127 Benzo(a)Anthracene	228.0		12.179		ND			
129 Chrysene	228.0		12.232		ND			
131 Di-n-octylphthalate	149.0		12.949		ND			
132 Benzo(b)fluoranthene	252.0		13.740		ND			
134 Benzo(k)fluoranthene	252.0		13.783		ND			
135 Benzo(a)pyrene	252.0		14.254		ND			

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
138 Indeno(1,2,3-c,d)pyrene	276.0		16.217		ND			
139 Dibenzo(a,h)anthracene	278.0		16.228		ND			
140 Benzo(g,h,i)perylene	276.0		16.784		ND			

Compound Type Legend

* - ISTD

$ - Surrogate

QC Flag Legend

Processing Flags

e - Compound Concentration Below Quantitation Limit

Q - Qualifier Signal(s) Fails Ratio Test

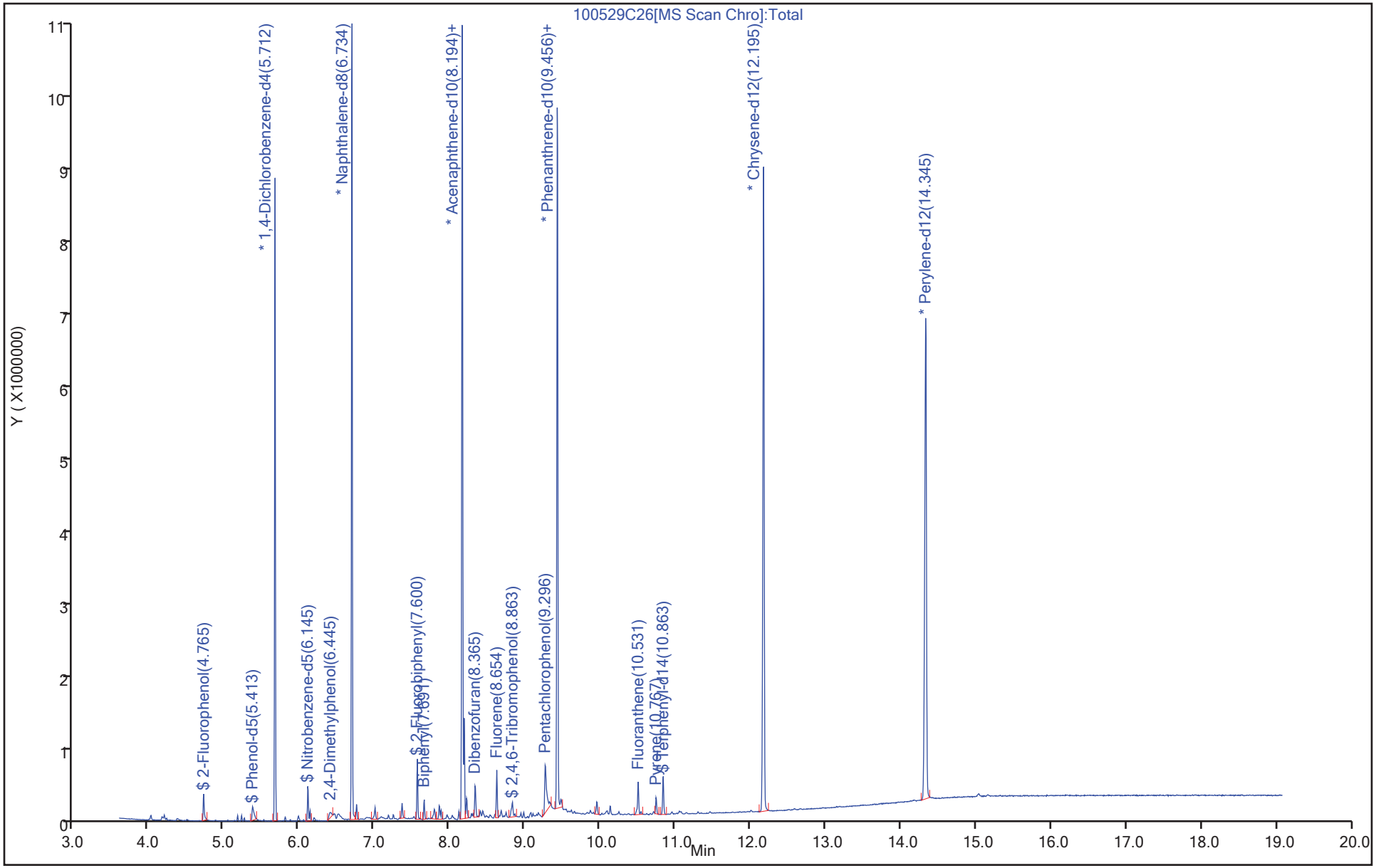
Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 30-May-2018 08:28:50 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D				
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	BW916GW65	Lab ID:	TE22045-002		
Sample Info:	10052918C.b, TE22045-002				
Injection Vol.	5.00 uL	Dil. Factor:	5.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
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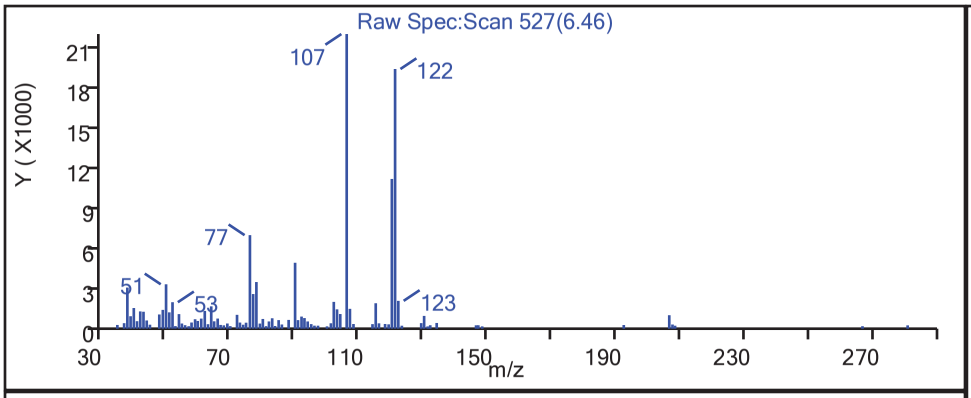
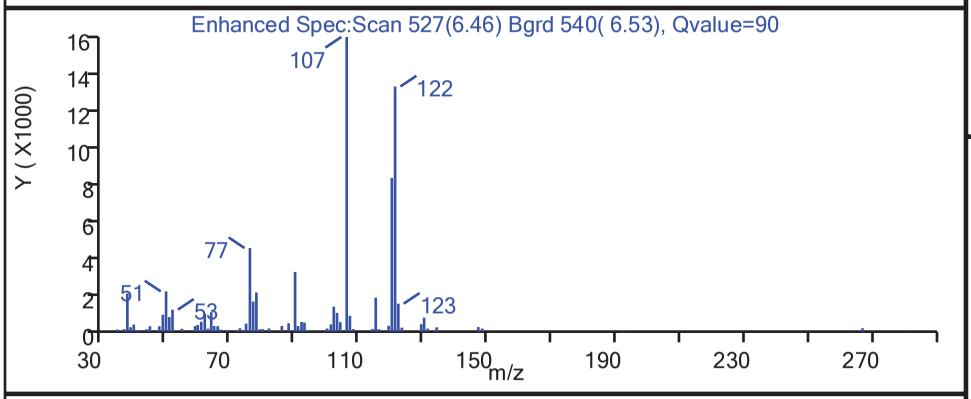
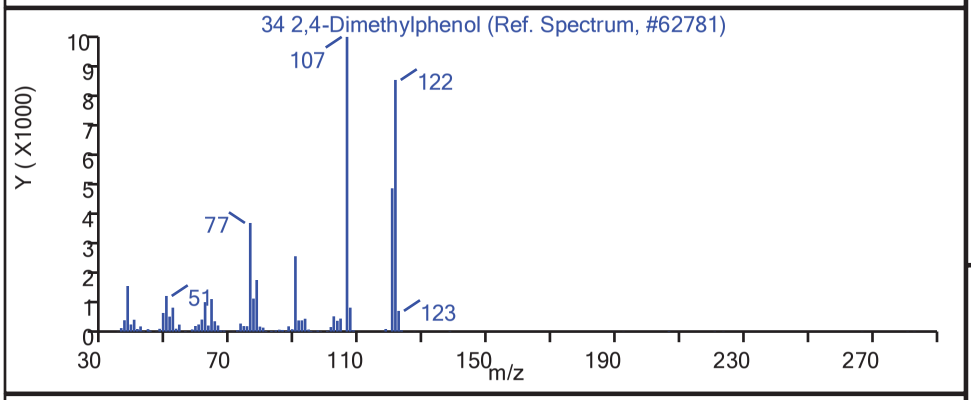
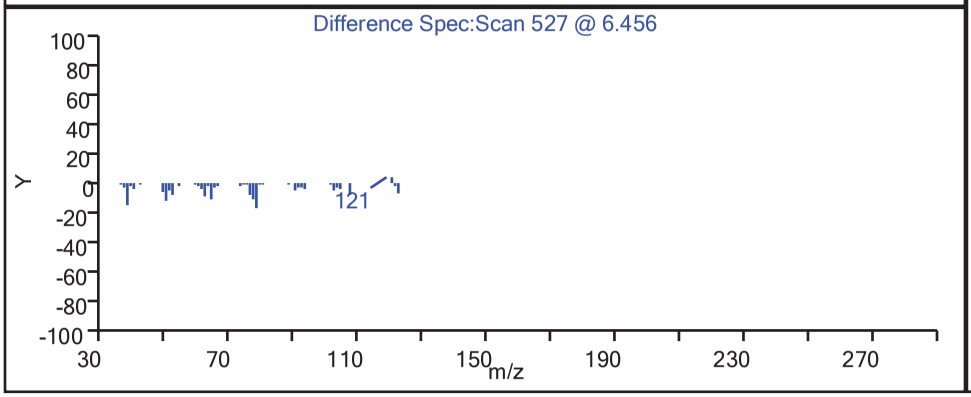
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

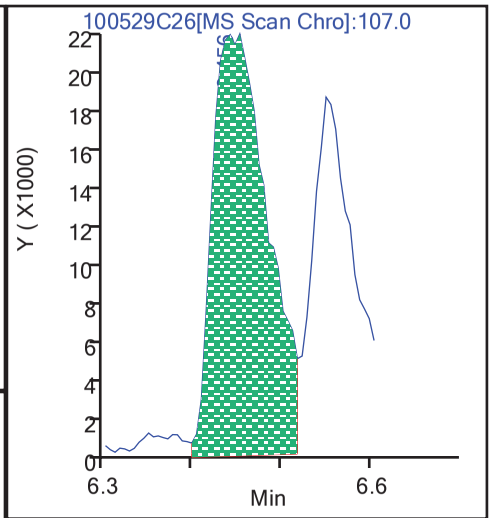
34 2,4-Dimethylphenol

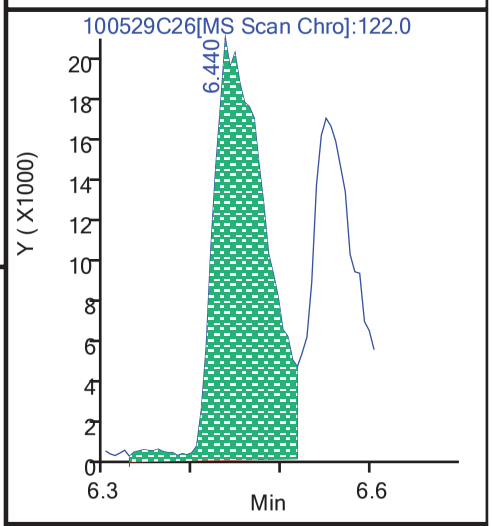


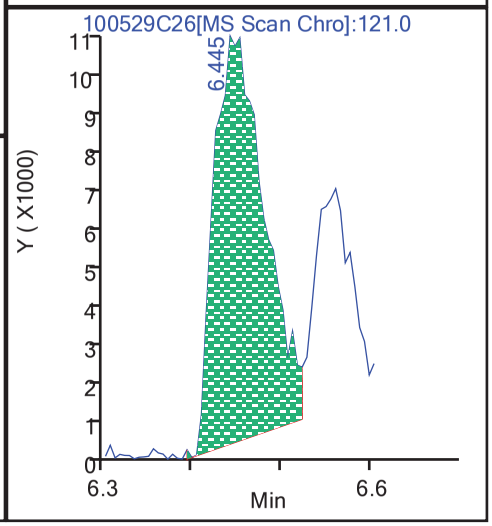










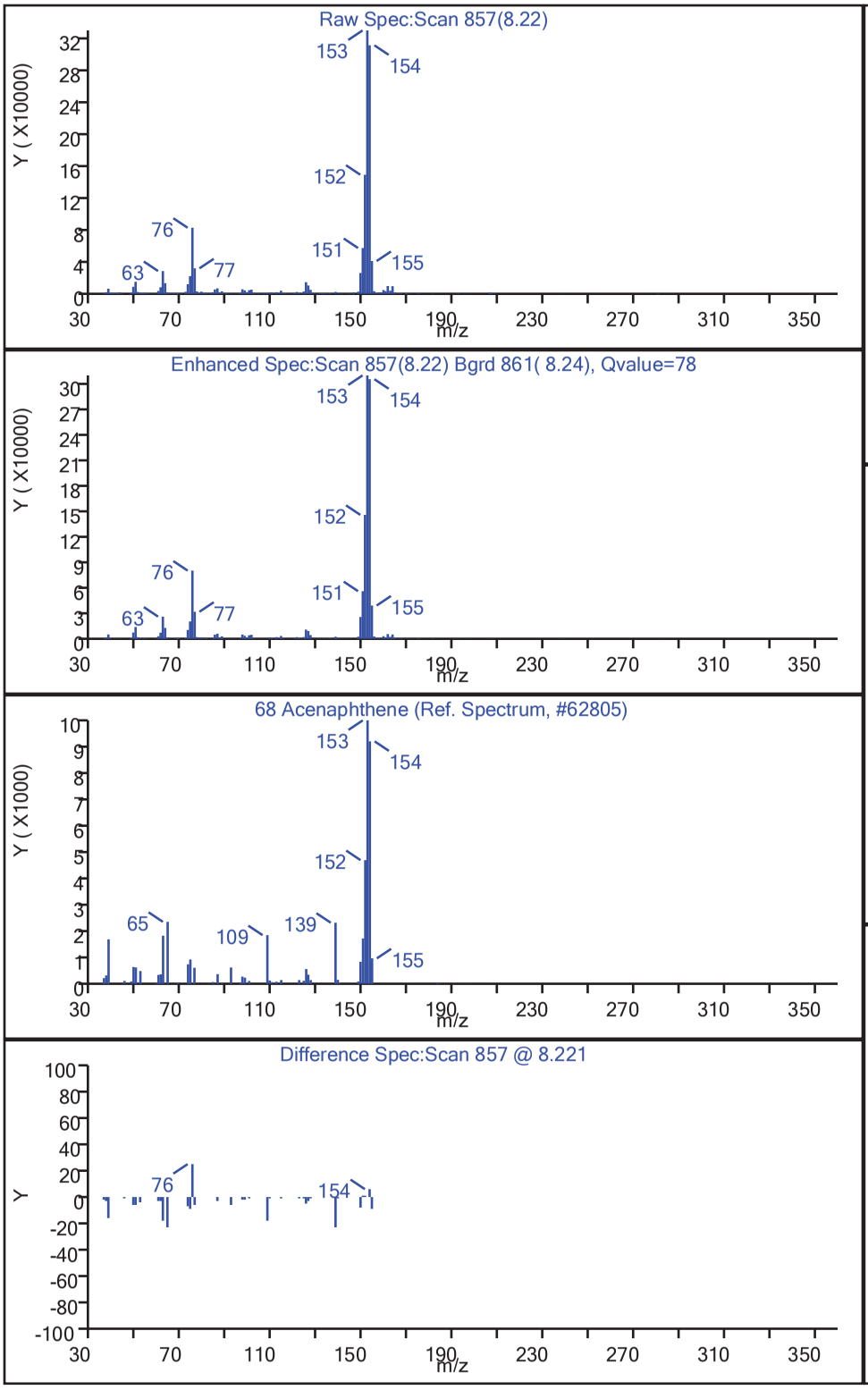


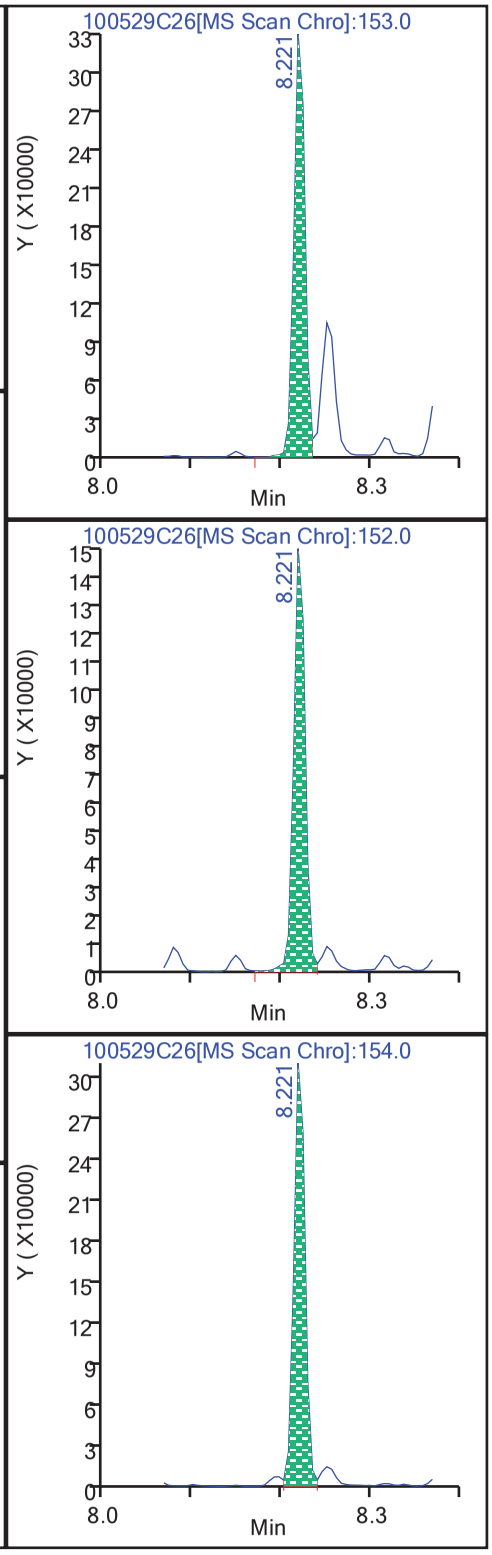
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

68 Acenaphthene



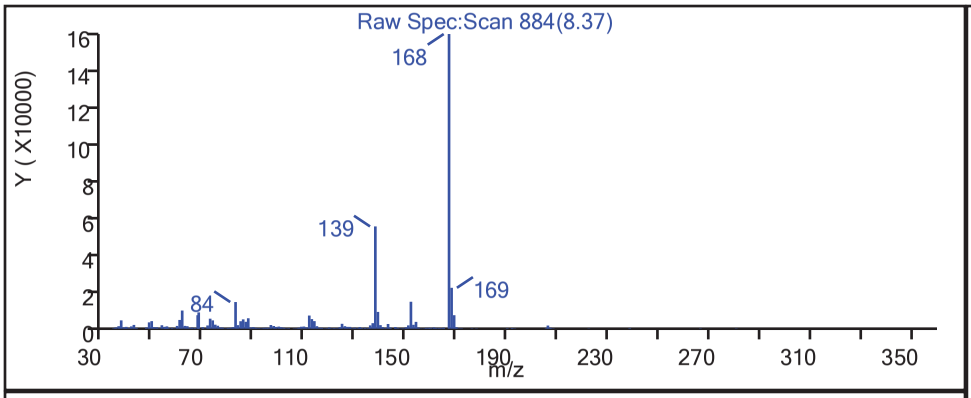


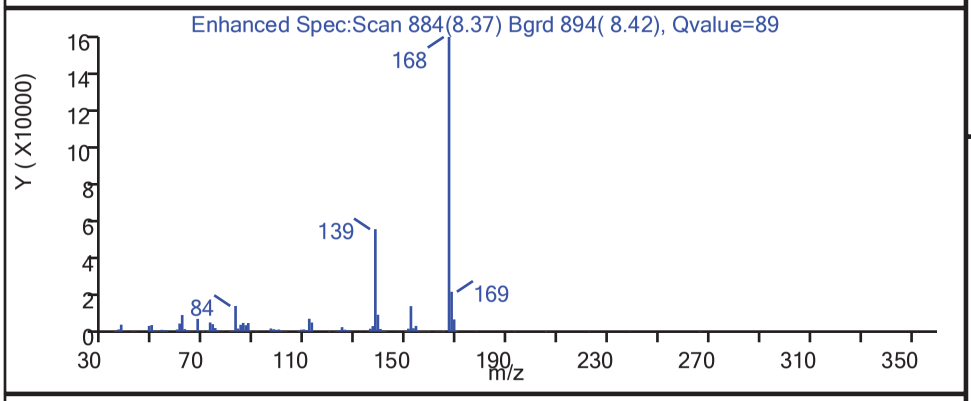
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

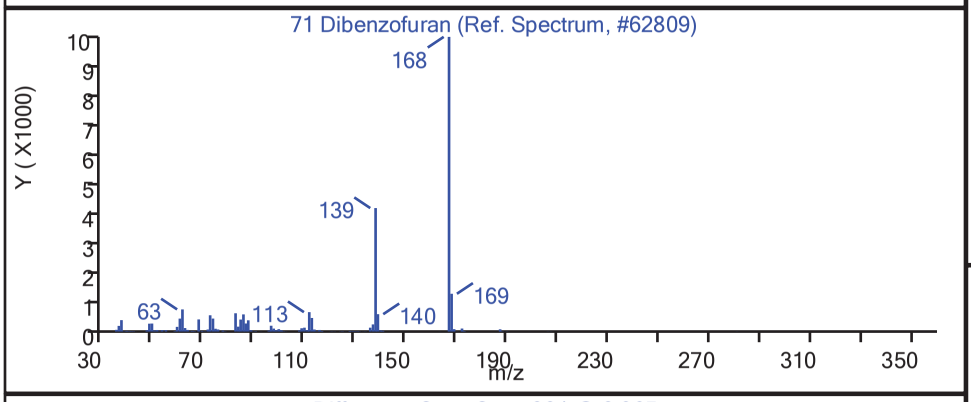
Shealy Environmental Services

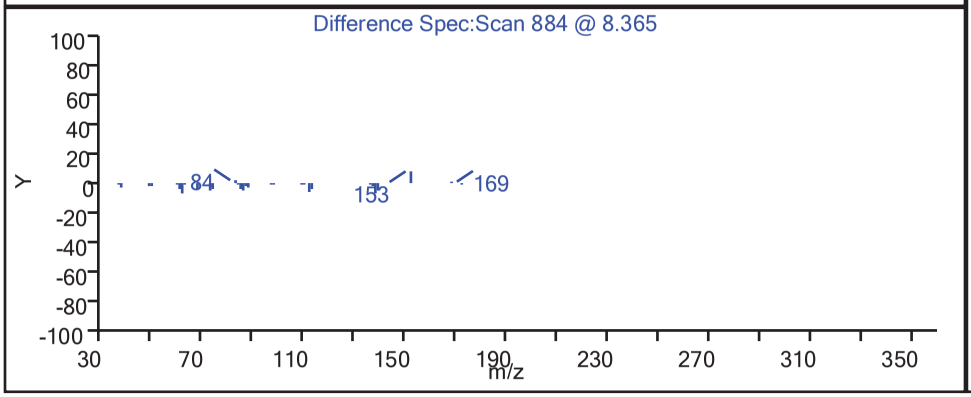
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

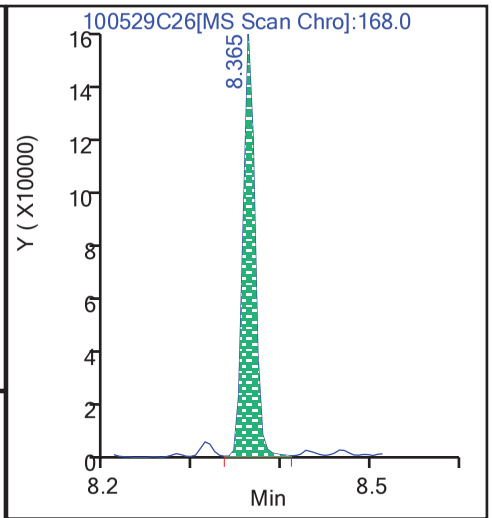
71 Dibenzofuran

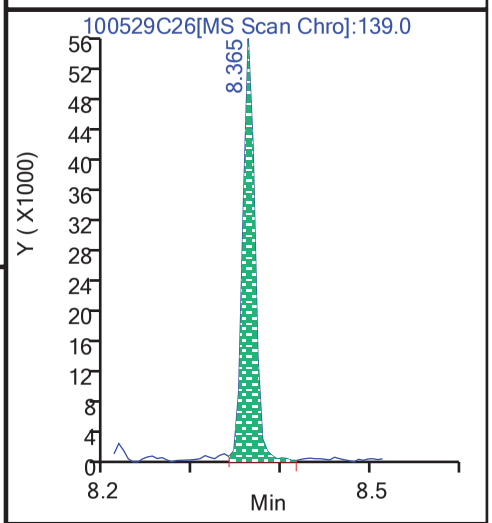


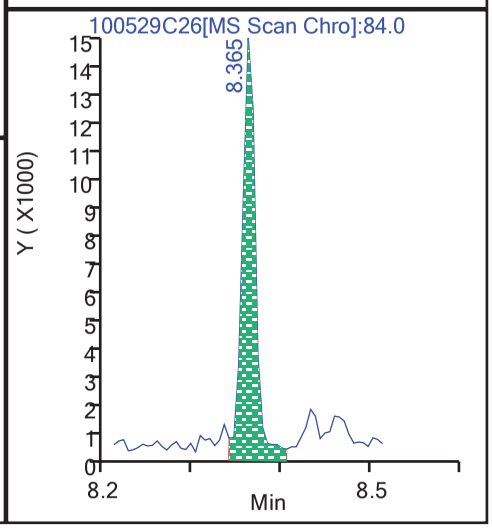










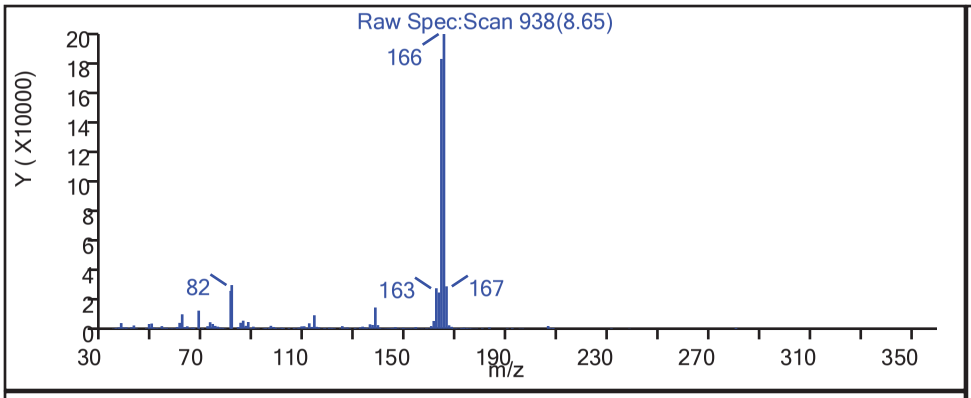


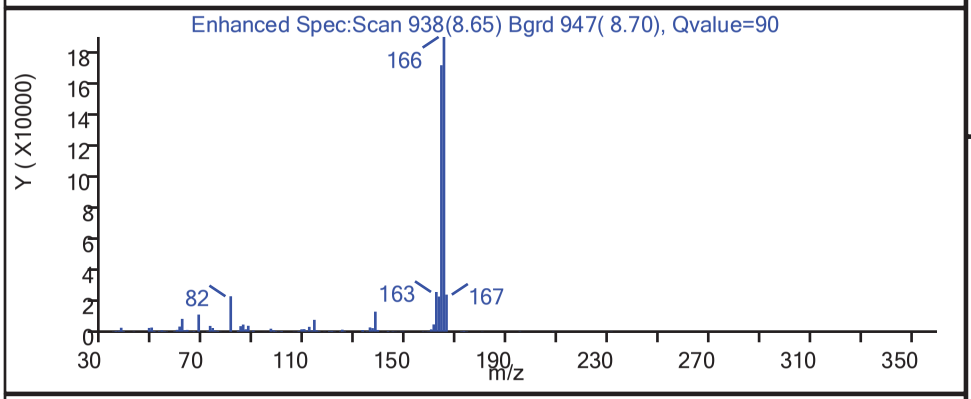
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

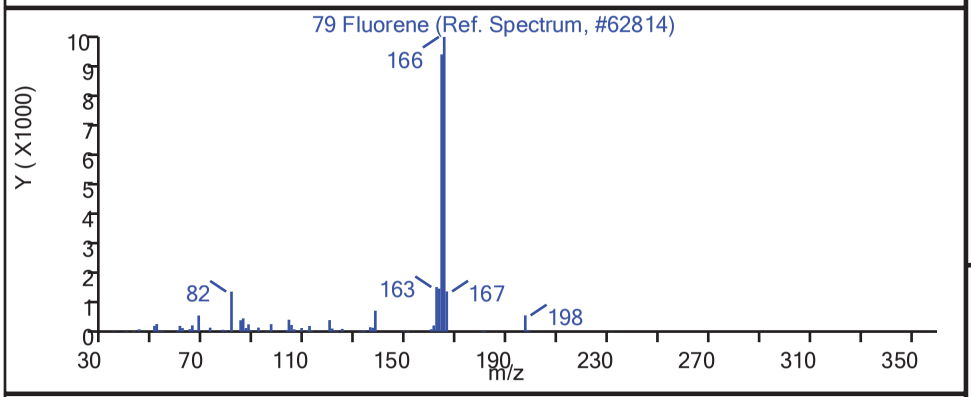
Shealy Environmental Services

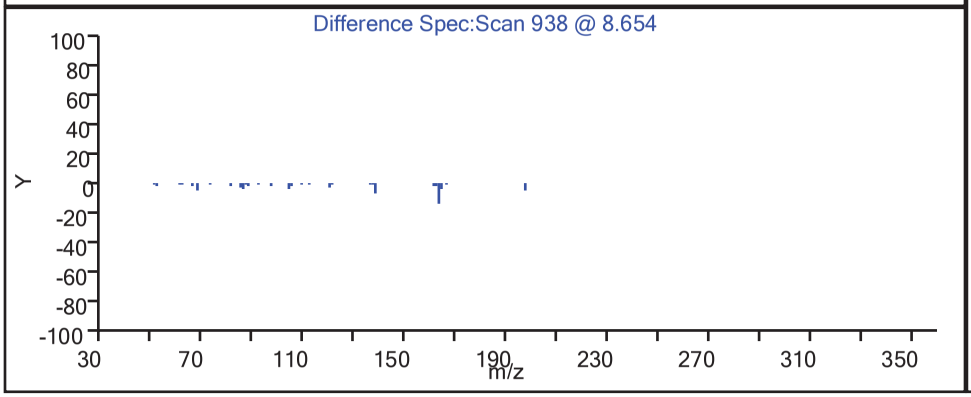
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

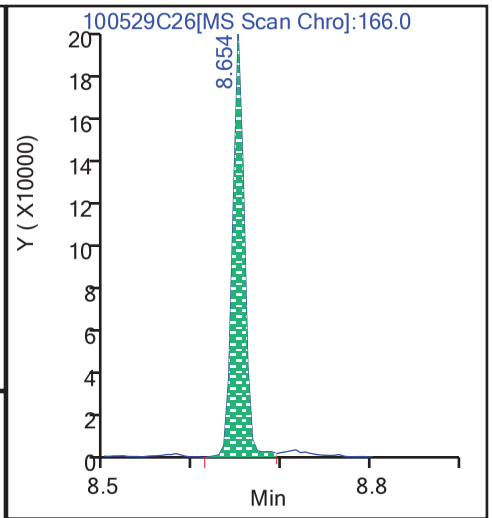
79 Fluorene

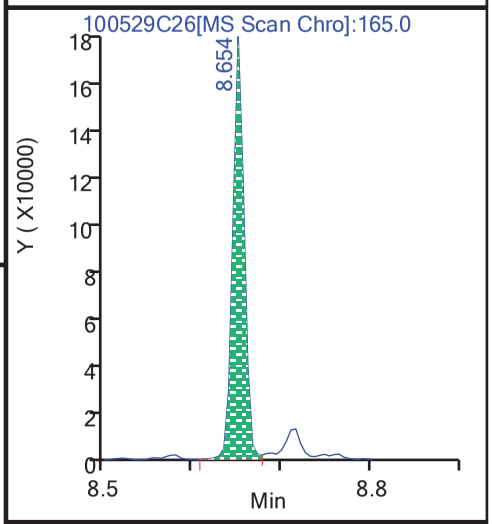


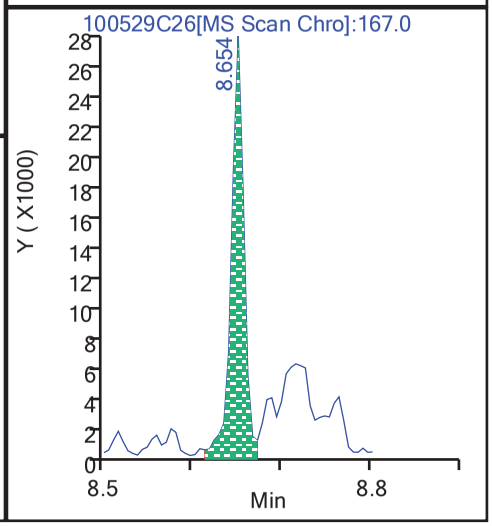










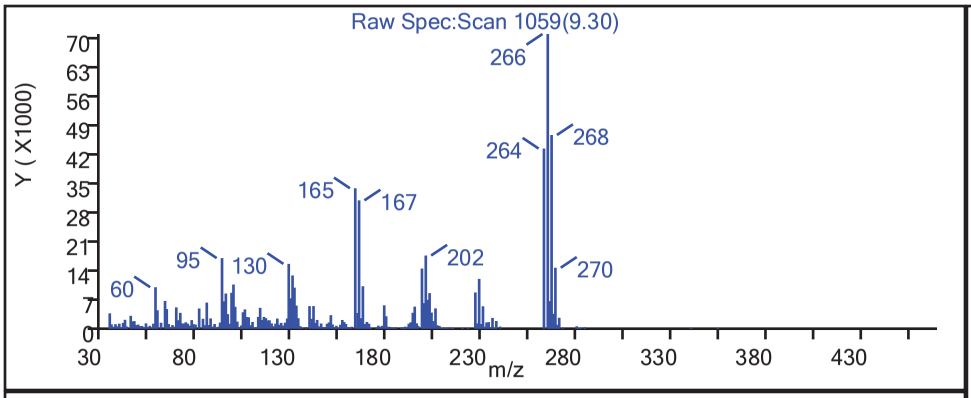


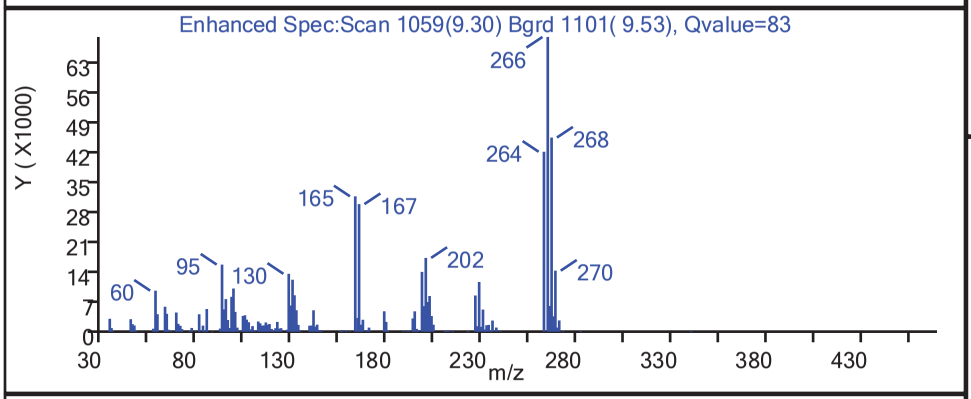
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

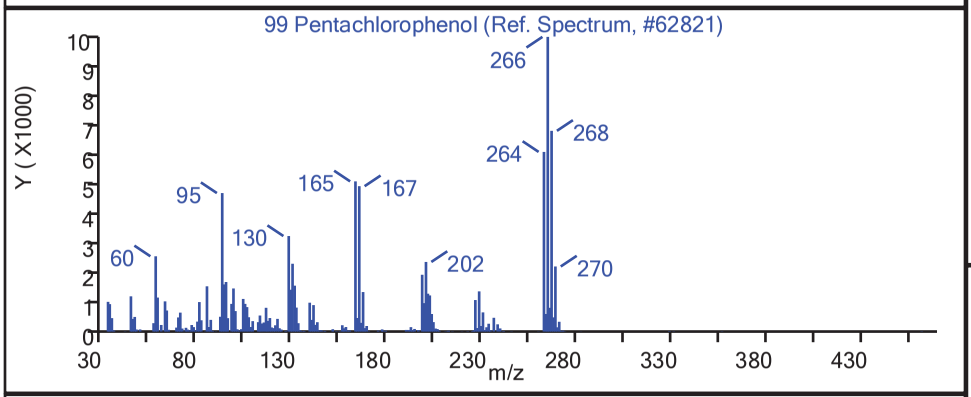
Shealy Environmental Services

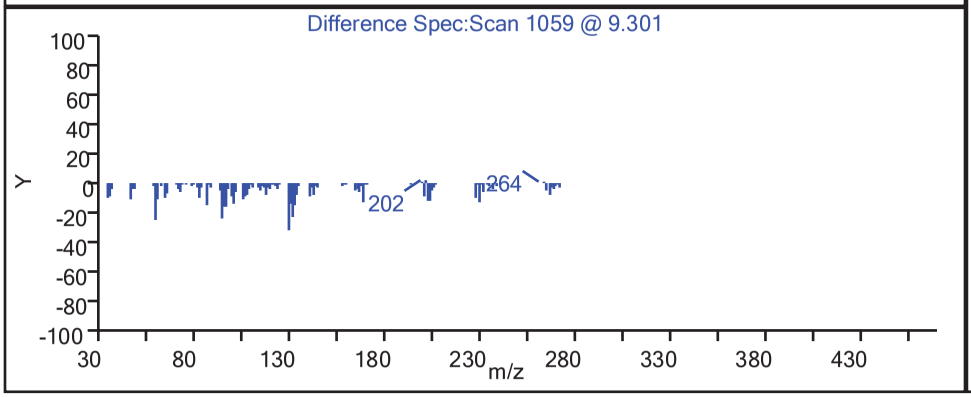
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

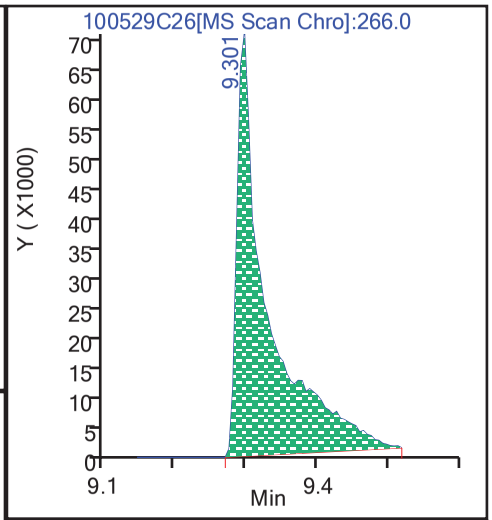
99 Pentachlorophenol

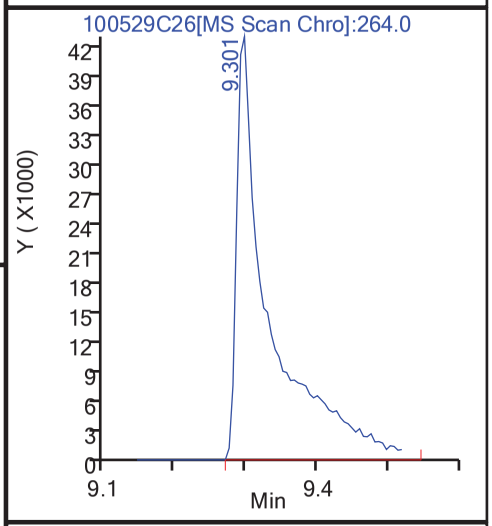


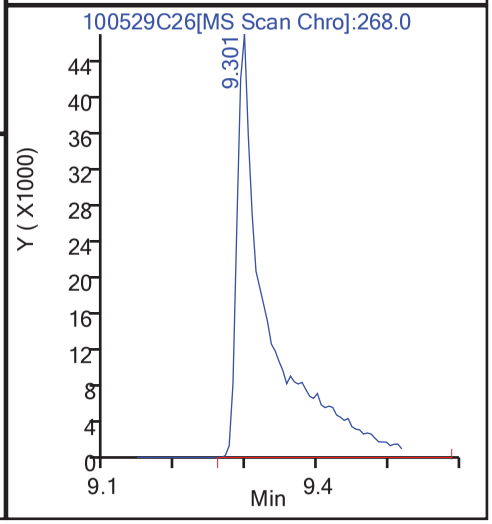










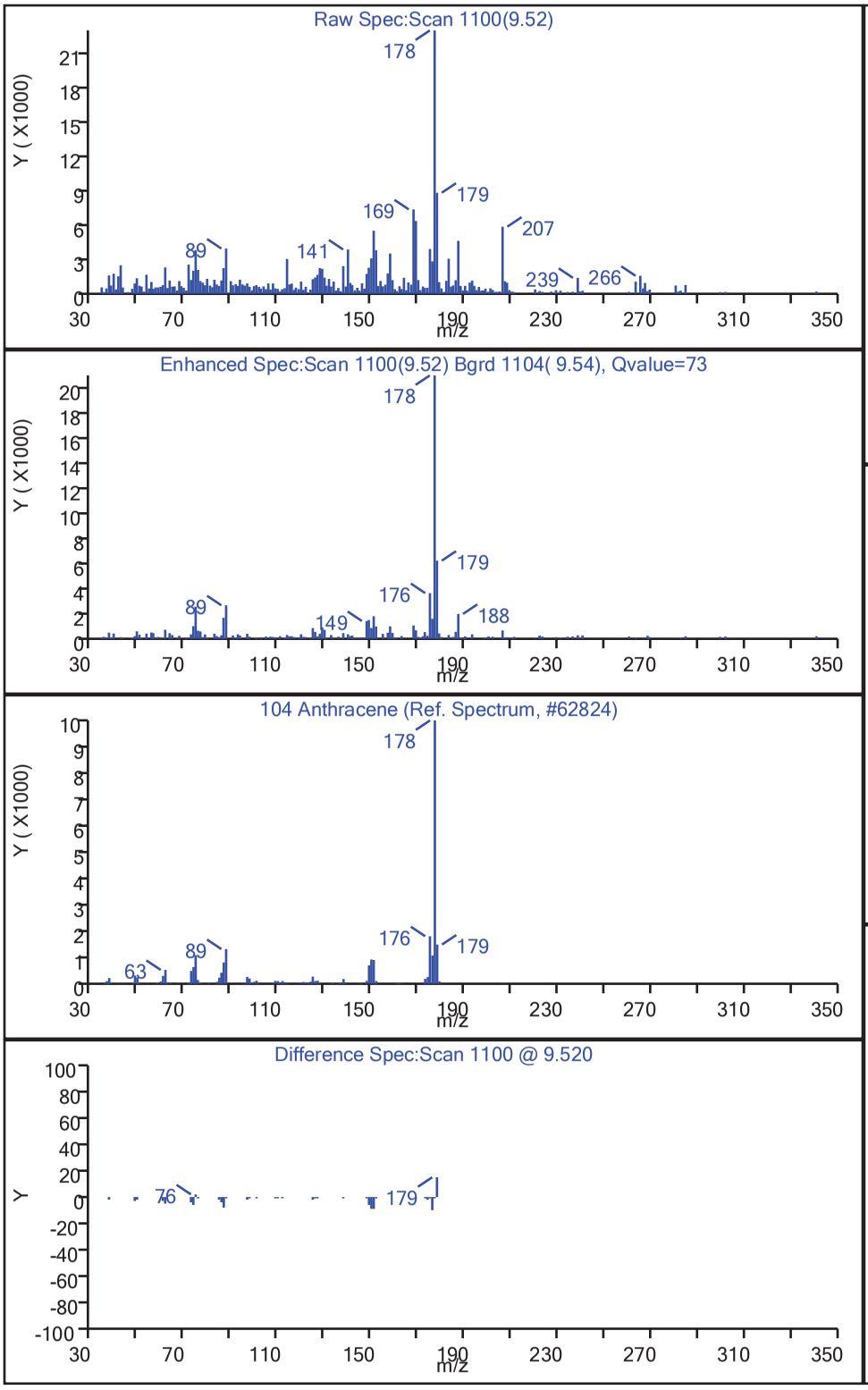


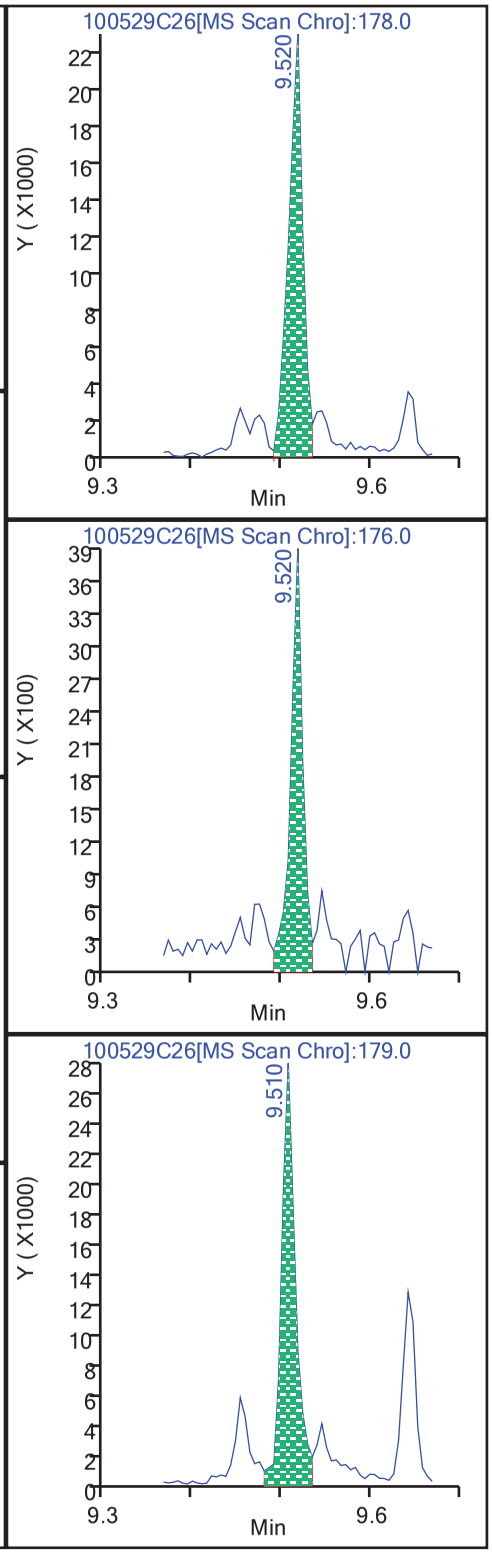
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

104 Anthracene



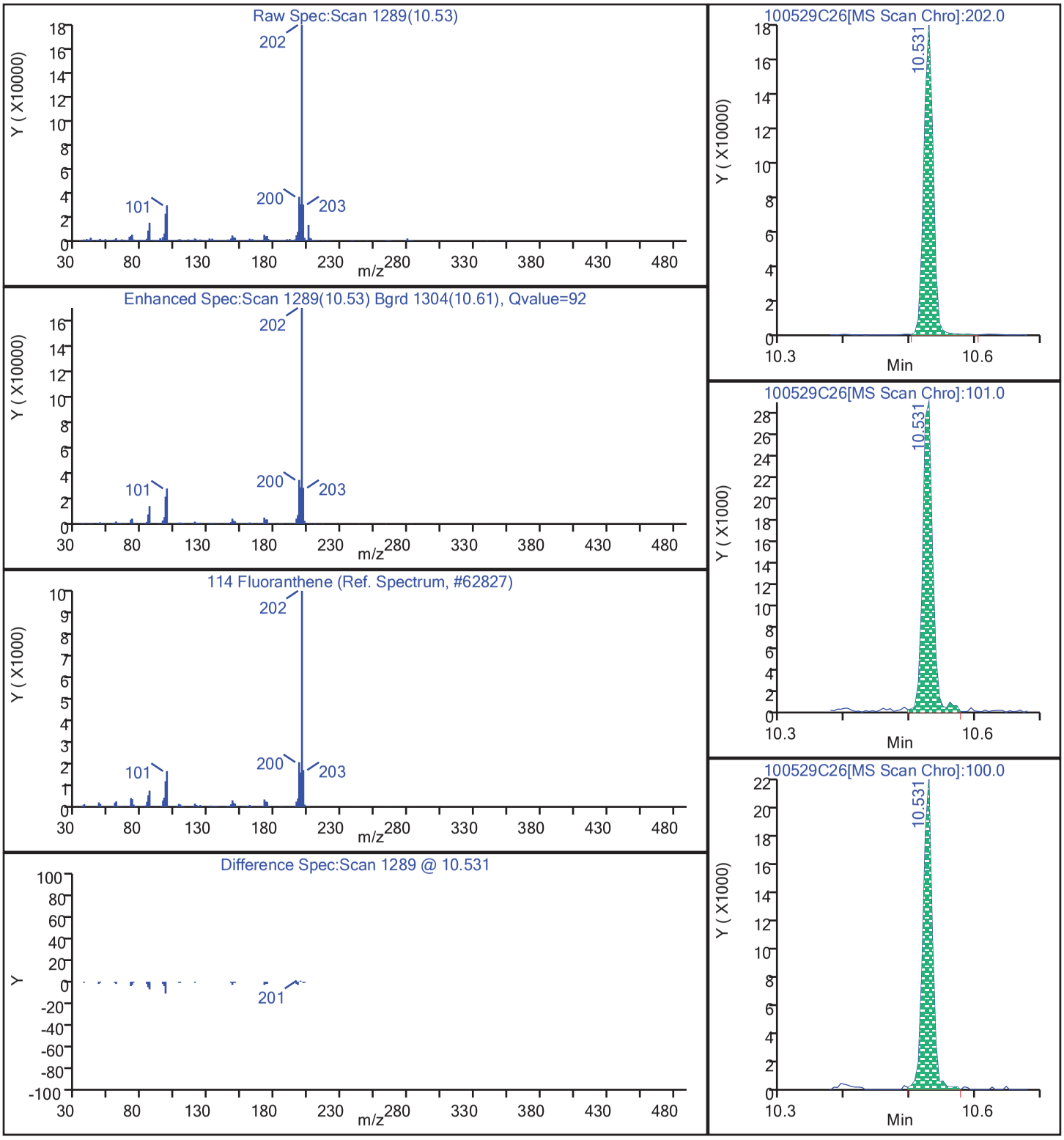


Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

114 Fluoranthene

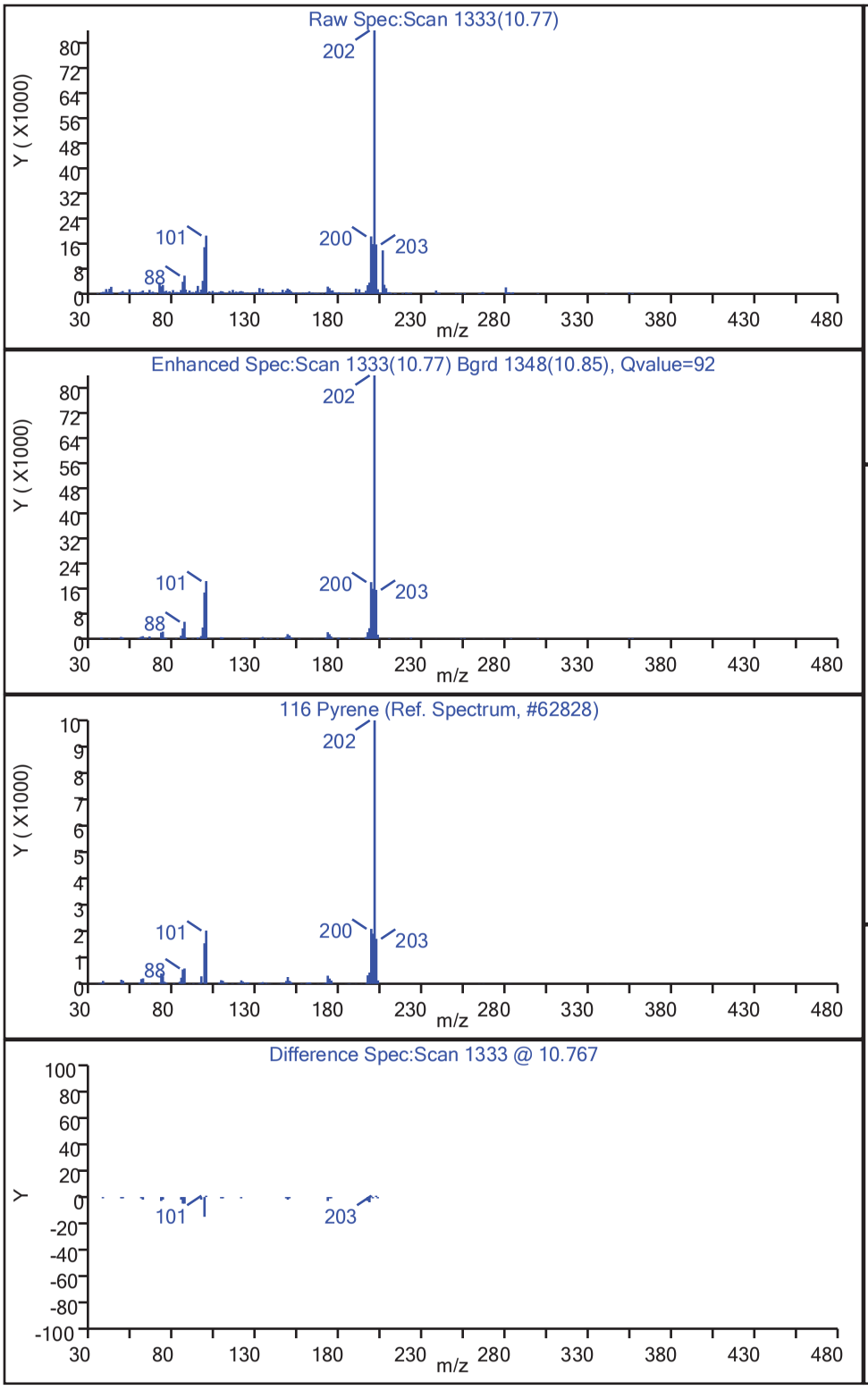


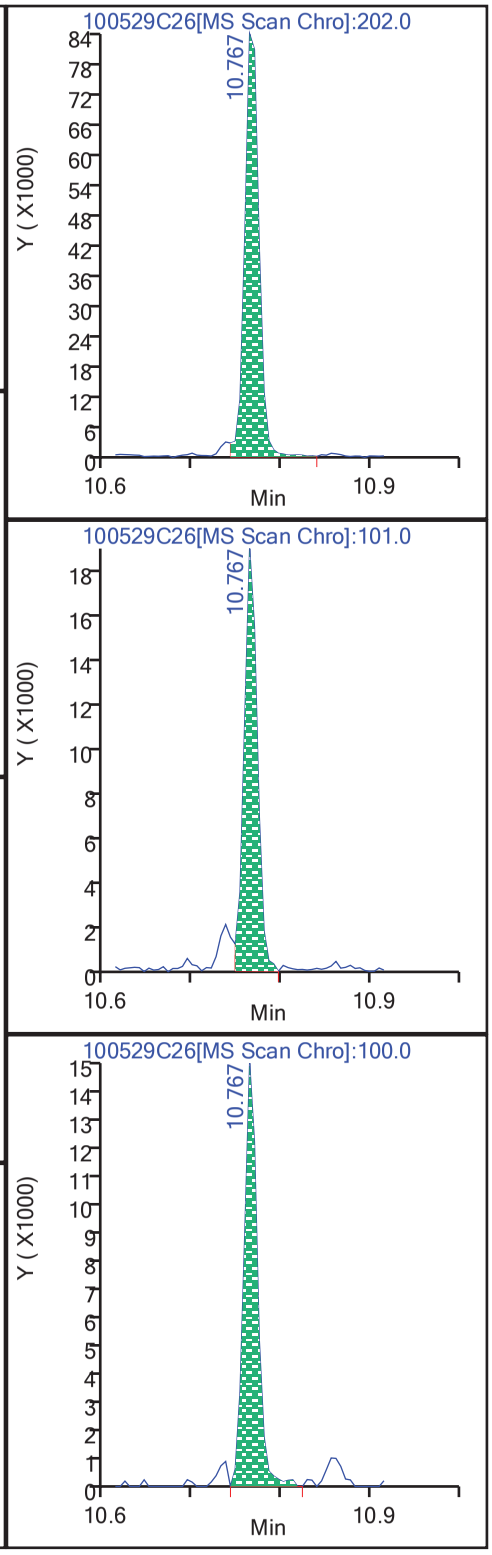
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

116 Pyrene



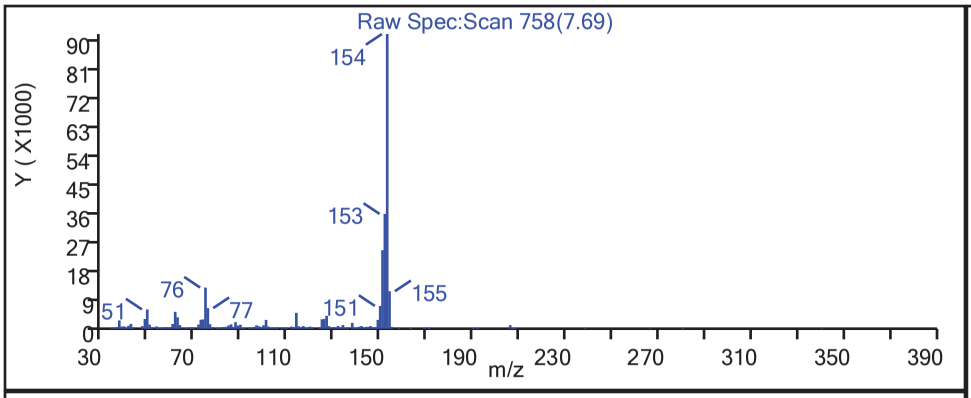


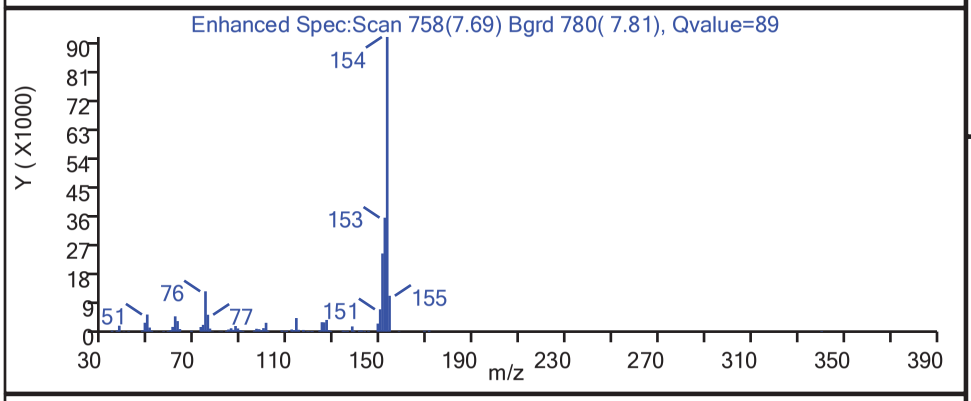
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

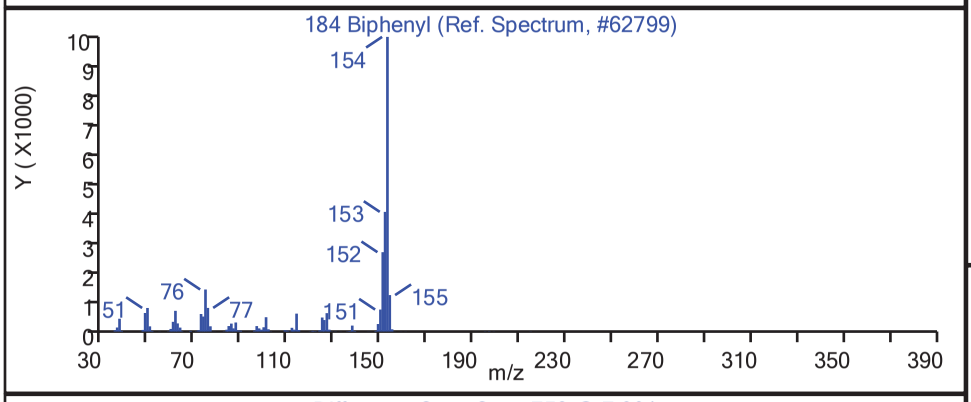
Shealy Environmental Services

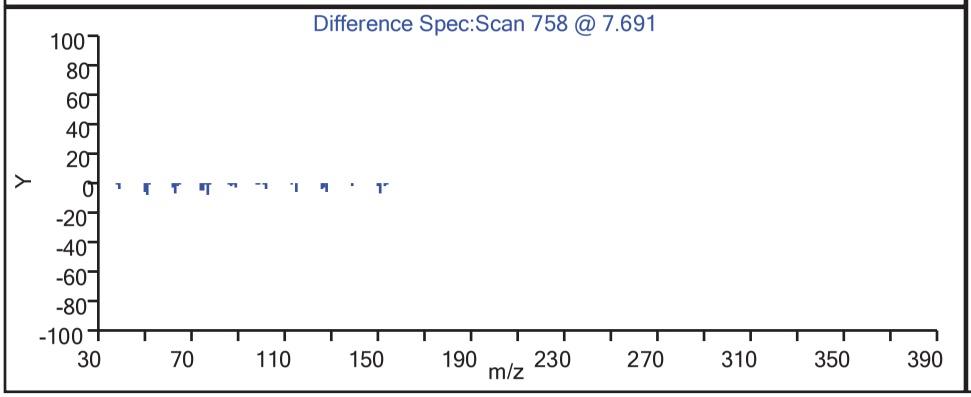
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

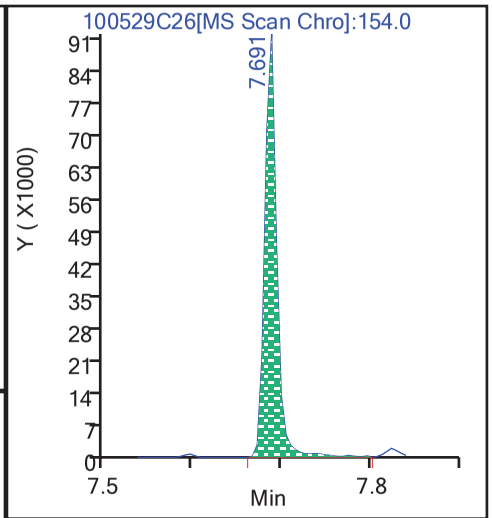
184 Biphenyl

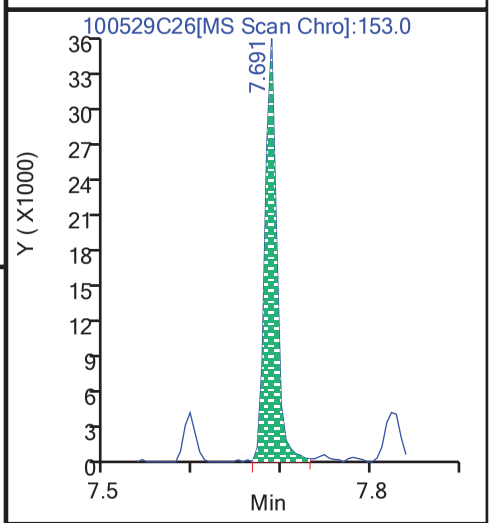


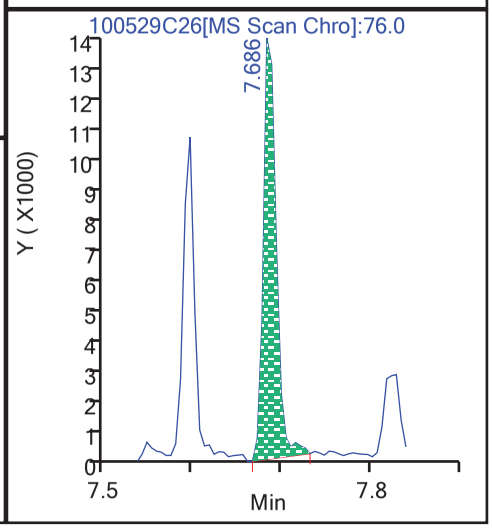












Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

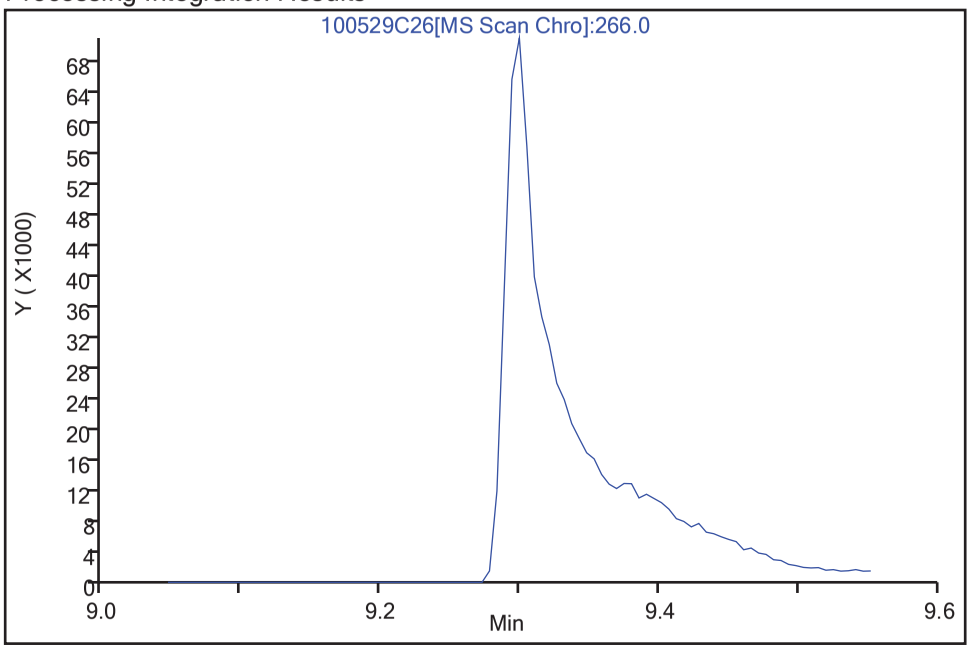
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C26.D		
Injection Date:	29-May-2018 20:50:30	Inst. ID:	msd10.i
Client ID:	BW916GW65	Lab ID:	TE22045-002
Sample Info:	10052918C.b, TE22045-002		
Injection Vol.	5.00 uL	Dil. Factor:	5.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

99 Pentachlorophenol, CAS: 87-86-5

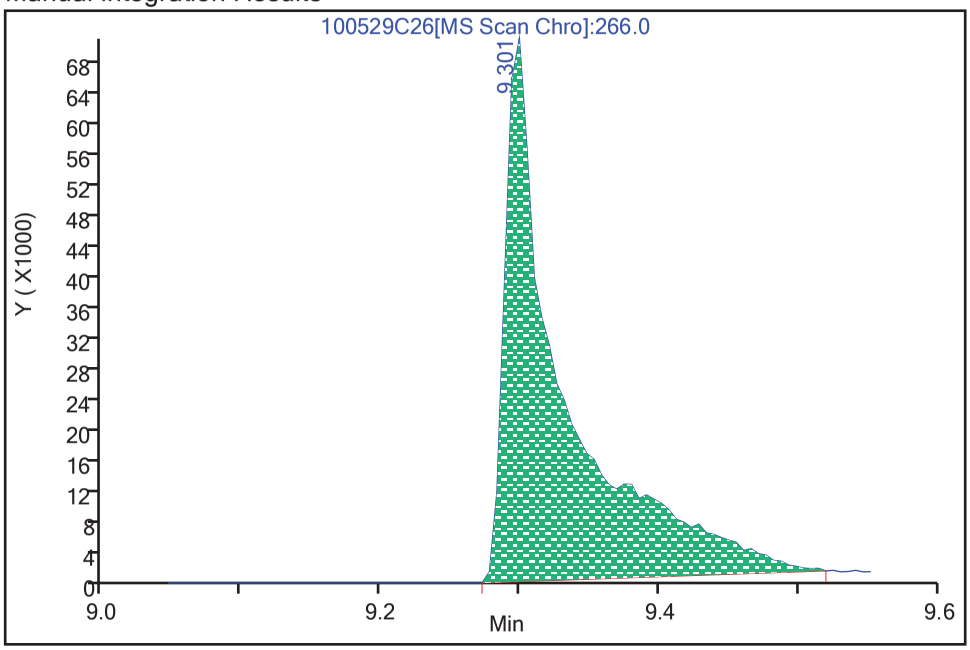
Not Detected
Expected RT: 9.296
RT Window: 8.724-9.867

Processing Integration Results



Manual Integration Results

RT: 9.301
Area: 206262
Conc: 200.58
Conc Units: ug/L



Data Editor: cmp2, 30-May-2018 08:20:30
Audit Action: Mint
Audit Reason: Incorrect Auto Integration

Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW16GW12
Date Sampled: 05/18/2018 0855
Date Received: 05/22/2018

Laboratory ID: TE22045-003
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	100	05/29/2018 2115	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	160	J	400	50	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	400	U	400	50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	400	U	400	50	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	800	U	800	100	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	3800		400	100	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	2000	U	2000	100	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	800	U	800	50	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	800	U	800	50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	400	U	400	50	ug/L	1
2-Chlorophenol	95-57-8	8270D	400	U	400	50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	850		80	20	ug/L	1
2-Methylphenol	95-48-7	8270D	2000		400	100	ug/L	1
2-Nitroaniline	88-74-4	8270D	800	U	800	50	ug/L	1
2-Nitrophenol	88-75-5	8270D	400	U	400	100	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	400	U	400	180	ug/L	1
3+4-Methylphenol	106-44-5	8270D	4900		400	150	ug/L	1
3-Nitroaniline	99-09-2	8270D	800	U	800	100	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	2000	U	2000	100	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	400	U	400	50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	400	U	400	50	ug/L	1
4-Chloroaniline	106-47-8	8270D	800	U	800	50	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	400	U	400	50	ug/L	1
4-Nitroaniline	100-01-6	8270D	800	U	800	150	ug/L	1
4-Nitrophenol	100-02-7	8270D	2000	U	2000	200	ug/L	1
Acenaphthene	83-32-9	8270D	670		80	20	ug/L	1
Acenaphthylene	208-96-8	8270D	23	J	80	20	ug/L	1
Acetophenone	98-86-2	8270D	650		400	50	ug/L	1
Anthracene	120-12-7	8270D	100		80	20	ug/L	1
Atrazine	1912-24-9	8270D	400	U	400	50	ug/L	1
Benzaldehyde	100-52-7	8270D	800	U	800	50	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	80	U	80	20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	80	U	80	20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	80	U	80	20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	80	U	80	20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	80	U	80	20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	400	U	400	50	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	400	U	400	50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	400	U	400	50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	400	U	400	50	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	400	U	400	50	ug/L	1
Caprolactam	105-60-2	8270D	800	U	800	100	ug/L	1
Carbazole	86-74-8	8270D	1000		400	50	ug/L	1
Chrysene	218-01-9	8270D	80	U	80	20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	80	U	80	20	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW16GW12
Date Sampled: 05/18/2018 0855
Date Received: 05/22/2018

Laboratory ID: TE22045-003
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	100	05/29/2018 2115	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	132-64-9	8270D	520		400	50	ug/L	1
Diethylphthalate	84-66-2	8270D	400	U	400	50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	400	U	400	50	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	400	U	400	50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	400	U	400	50	ug/L	1
Fluoranthene	206-44-0	8270D	90		80	20	ug/L	1
Fluorene	86-73-7	8270D	400		80	20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	400	U	400	50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	400	U	400	50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	2000	U	2000	200	ug/L	1
Hexachloroethane	67-72-1	8270D	400	U	400	100	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	80	U	80	20	ug/L	1
Isophorone	78-59-1	8270D	400	U	400	50	ug/L	1
Naphthalene	91-20-3	8270D	8100		80	20	ug/L	1
Nitrobenzene	98-95-3	8270D	400	U	400	150	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	400	U	400	50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	400	U	400	50	ug/L	1
Pentachlorophenol	87-86-5	8270D	2400		2000	200	ug/L	1
Phenanthrene	85-01-8	8270D	580		80	20	ug/L	1
Phenol	108-95-2	8270D	2300		400	50	ug/L	1
Pyrene	129-00-0	8270D	50	J	80	20	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		64	24-127
Nitrobenzene-d5		92	38-127
Phenol-d5		93	28-128
Terphenyl-d14		12	10-148
2,4,6-Tribromophenol	N	18	35-144

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

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Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D
Lab Sample ID: TE22045-003 Client Sample ID: BW16GW12
Injection Date: 29-May-2018 21:15:30 Dil. Factor: 100.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, TE22045-003
Misc. Info: 100X 72993
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Client ALS Bottle: 24
Cpnd Sublist: sample.sb
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	100.00	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 30-May-2018 08:22:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.712	5.717	-0.005	1057932	20.000	8000.00	
* 41 Naphthalene-d8	136.0	6.734	6.734	0.000	4282022	20.000	8000.00	
* 67 Acenaphthene-d10	164.0	8.194	8.199	-0.005	2178583	20.000	8000.00	
* 102 Phenanthrene-d10	188.0	9.456	9.462	-0.006	3512017	20.000	8000.00	
* 128 Chrysene-d12	240.0	12.195	12.195	0.000	3204680	20.000	8000.00	
* 136 Perylene-d12	264.0	14.345	14.345	0.000	3211011	20.000	8000.00	
$ 6 2-Fluorophenol	112.0	4.771	4.776	-0.005	5052	0.06365	25.461	Qe
199 Benzaldehyde	77.0		5.397		ND			
$ 9 Phenol-d5	99.0	5.418	5.413	0.005	9499	0.09327	37.310	e
10 Phenol	94.0	5.423	5.423	0.000	610740	5.6497	2259.90	e
12 bis(2-Chloroethyl)ether	63.0		5.482		ND			
13 2-Chlorophenol	128.0		5.568		ND			
20 o-Cresol	108.0	5.878	5.883	-0.005	388399	5.0171	2006.85	Qe
21 bis(2Chloro1methylethyl)ether	45.0		5.883		ND			
26 n-Nitroso-di-n-propylamine	70.0		5.990		ND			
23 m+p-Cresol	107.0	6.001	5.996	0.005	1058831	12.365	4945.90	Qe
24 Acetophenone	105.0	6.012	6.017	-0.005	180075	1.6370	654.79	Qe
28 Hexachloroethane	117.0		6.119		ND			
$ 29 Nitrobenzene-d5	82.0	6.145	6.151	-0.006	7023	0.09222	36.887	e
30 Nitrobenzene	77.0		6.167		ND			
32 Isophorone	82.0		6.333		ND			
33 2-Nitrophenol	139.0		6.418		ND			
34 2,4-Dimethylphenol	107.0	6.434	6.423	0.011	508048	9.4878	3795.12	Qe

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
35 bis(2-Chloroethoxy)methane	93.0		6.482		ND			
38 2,4-Dichlorophenol	162.0		6.616		ND			
43 Naphthalene	128.0	6.750	6.755	-0.005	4552515	20.156	8062.31	
44 4-Chloroaniline	127.0		6.787		ND			
47 Hexachlorobutadiene	224.6		6.825		ND			
196 Caprolactam	113.0		7.071		ND			
49 4-Chloro-3-methylphenol	107.0		7.172		ND			
51 2-Methylnaphthalene	142.0	7.311	7.317	-0.006	324178	2.1299	851.95	e
53 Hexachlorocyclopentadiene	237.0		7.434		ND			
54 2,4,6-Trichlorophenol	196.0		7.547		ND			
55 2,4,5-Trichlorophenol	196.0		7.589		ND			
$ 56 2-Fluorobiphenyl	172.0	7.600	7.606	-0.006	8151	0.05024	20.096	e
184 Biphenyl	154.0	7.691	7.691	0.000	71213	0.39470	157.88	e
58 2-Chloronaphthalene	162.0		7.729		ND			
60 2-Nitroaniline	138.0		7.819		ND			
62 Dimethylphthalate	163.0		7.926		ND			
65 2,6-Dinitrotoluene	165.0		7.996		ND			
64 Acenaphthylene	152.0	8.081	8.087	-0.006	11026	0.05819	23.275	Qe
66 3-Nitroaniline	138.0		8.167		ND			
68 Acenaphthene	153.0	8.226	8.226	0.000	233523	1.6799	671.96	e
69 2,4-Dinitrophenol	184.0		8.237		ND			
70 4-Nitrophenol	109.0		8.301		ND			
73 2,4-Dinitrotoluene	165.0		8.338		ND			
71 Dibenzofuran	168.0	8.365	8.370	-0.005	238654	1.3080	523.18	e
78 Diethylphthalate	149.0		8.504		ND			
80 4-Chlorophenylphenylether	204.0		8.627		ND			
79 Fluorene	166.0	8.654	8.659	-0.005	159470	1.0084	403.37	e
84 4,6-Dinitro-2-methylphenol	198.0		8.681		ND			
83 4-Nitroaniline	138.0		8.686		ND			
86 n-Nitrosodiphenylamine	169.0		8.729		ND			
$ 88 2,4,6-Tribromophenol	330.0	8.868	8.868	0.000	284	0.01806	7.2231	QeR
94 4-Bromophenylphenylether	248.0		9.044		ND			
96 Hexachlorobenzene	284.0		9.125		ND			
200 Atrazine	200.0		9.146		ND			
99 Pentachlorophenol	266.0	9.328	9.296	0.032	100179	6.0053	2402.12	eM
103 Phenanthrene	178.0	9.477	9.483	-0.006	291161	1.4496	579.83	e
104 Anthracene	178.0	9.520	9.526	-0.006	46009	0.25096	100.38	Qe
106 Carbazole	167.0	9.654	9.654	0.000	438869	2.5586	1023.45	e
109 Di-n-butylphthalate	149.0		9.857		ND			
114 Fluoranthene	202.0	10.531	10.537	-0.006	42449	0.22392	89.568	e
116 Pyrene	202.0	10.772	10.772	0.000	24531	0.12544	50.178	e
$ 117 Terphenyl-d14	244.0	10.857	10.863	-0.006	1652	0.01187	4.7461	Qe
122 Butylbenzylphthalate	149.0		11.360		ND			
130 bis(2-Ethylhexyl)phthalate	149.0		12.029		ND			
125 3,3'-Dichlorobenzidine	252.0		12.114		ND			
127 Benzo(a)Anthracene	228.0		12.179		ND			
129 Chrysene	228.0		12.232		ND			
131 Di-n-octylphthalate	149.0		12.949		ND			
132 Benzo(b)fluoranthene	252.0		13.740		ND			
134 Benzo(k)fluoranthene	252.0		13.783		ND			
135 Benzo(a)pyrene	252.0		14.254		ND			

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
138 Indeno(1,2,3-c,d)pyrene	276.0		16.217		ND			
139 Dibenzo(a,h)anthracene	278.0		16.228		ND			
140 Benzo(g,h,i)perylene	276.0		16.784		ND			

Compound Type Legend

* - ISTD

$ - Surrogate

QC Flag Legend

Processing Flags

e - Compound Concentration Below Quantitation Limit

Q - Qualifier Signal(s) Fails Ratio Test

R - Spike/Surrogte Fails %Recovery Test

Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

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Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D				
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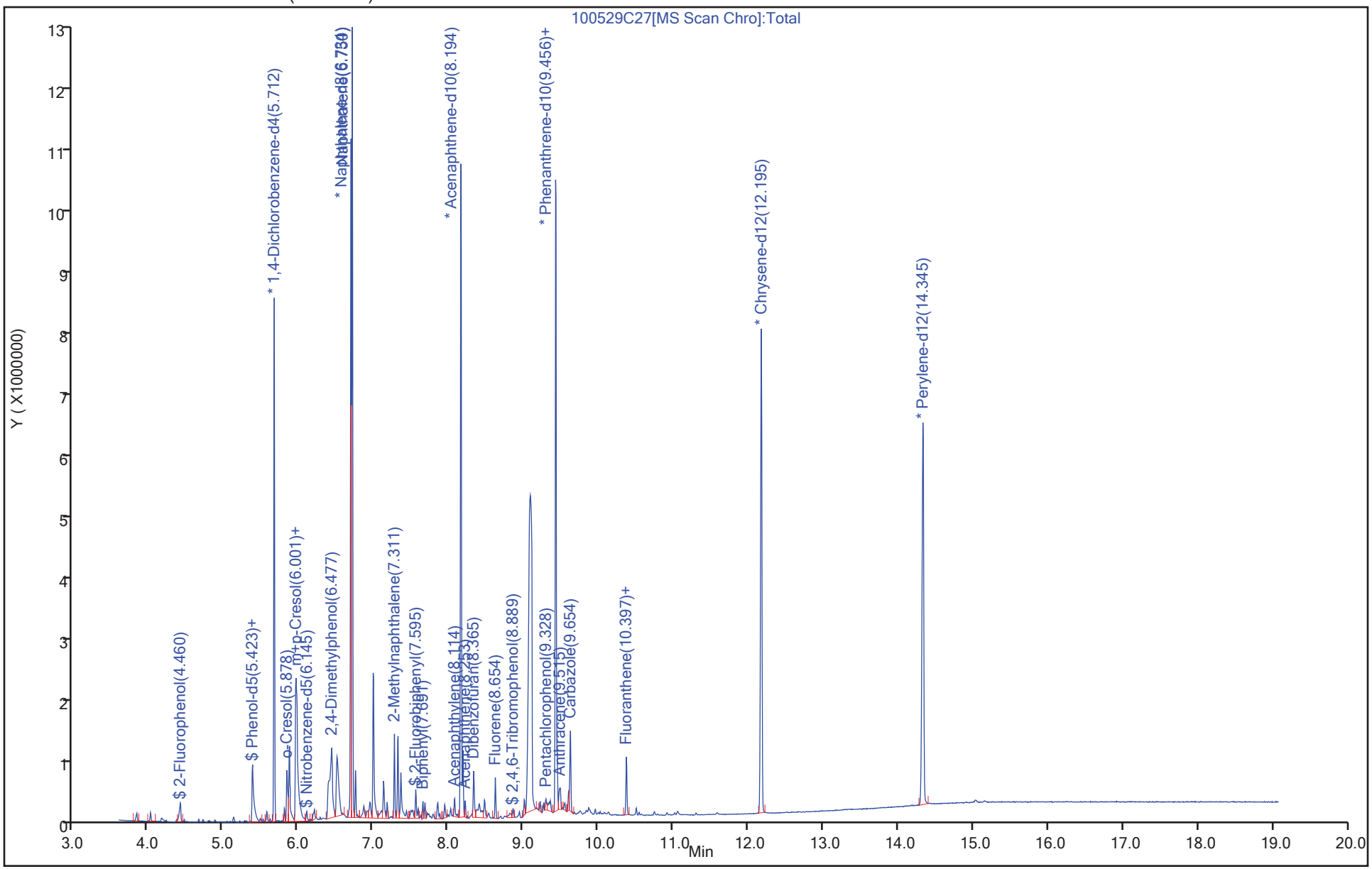
Client ID:	BW16GW12	Lab ID:	TE22045-003		
Sample Info:	10052918C.b, TE22045-003				
Injection Vol.	5.00 uL	Dil. Factor:	100.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

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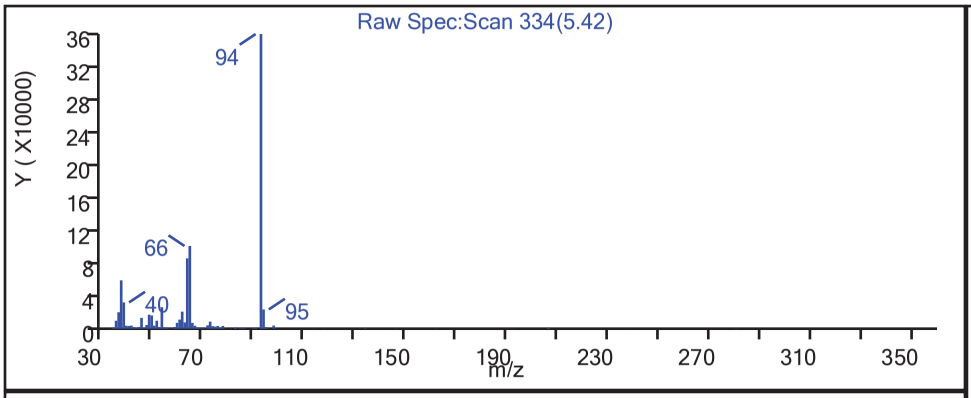
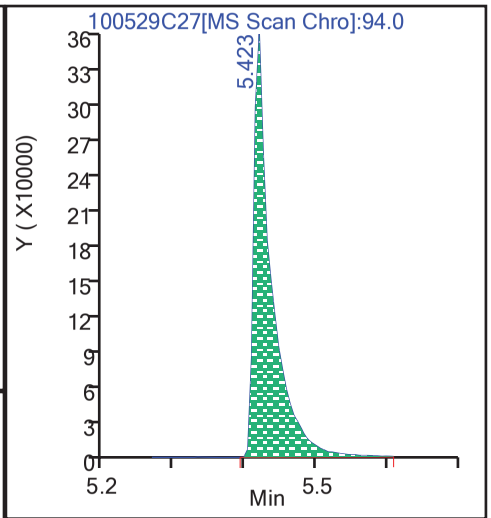
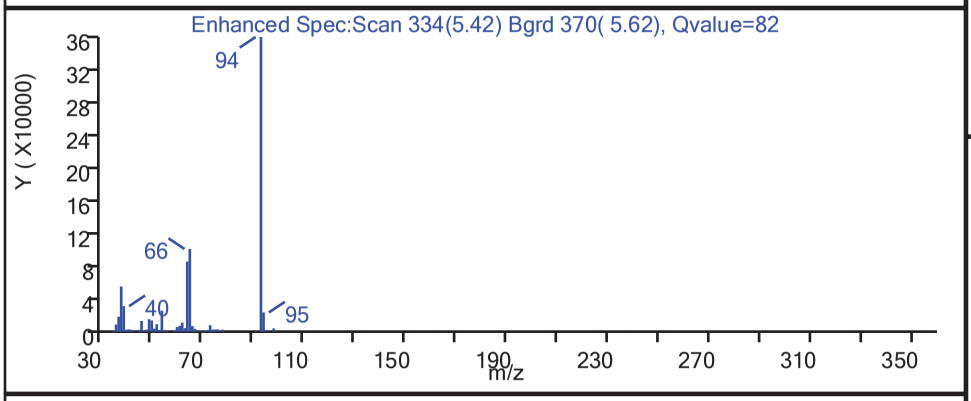
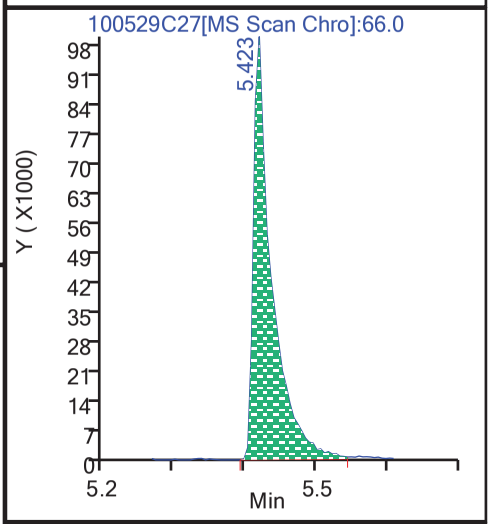
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

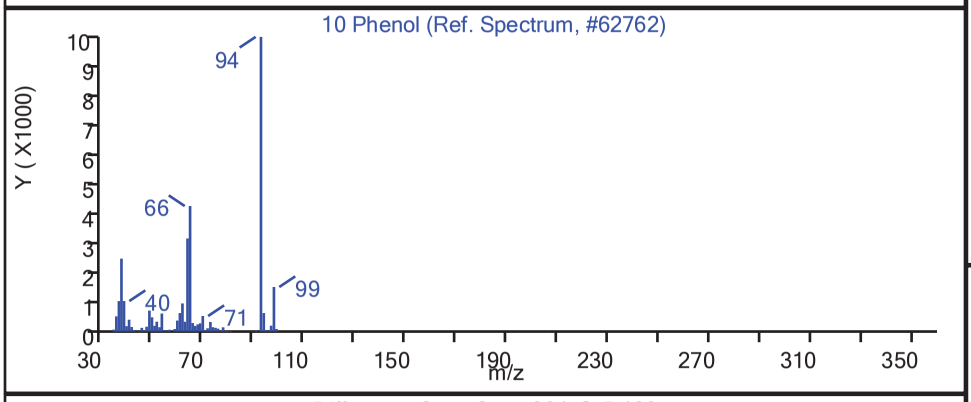
10 Phenol

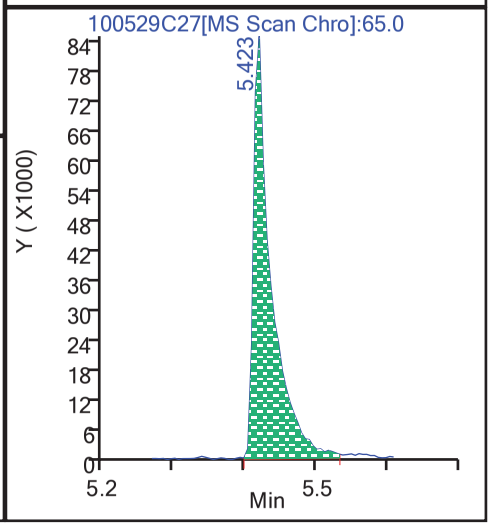


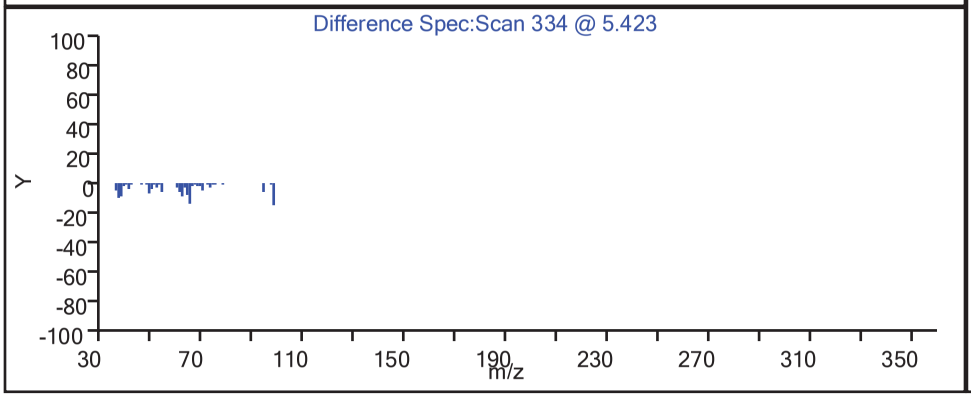










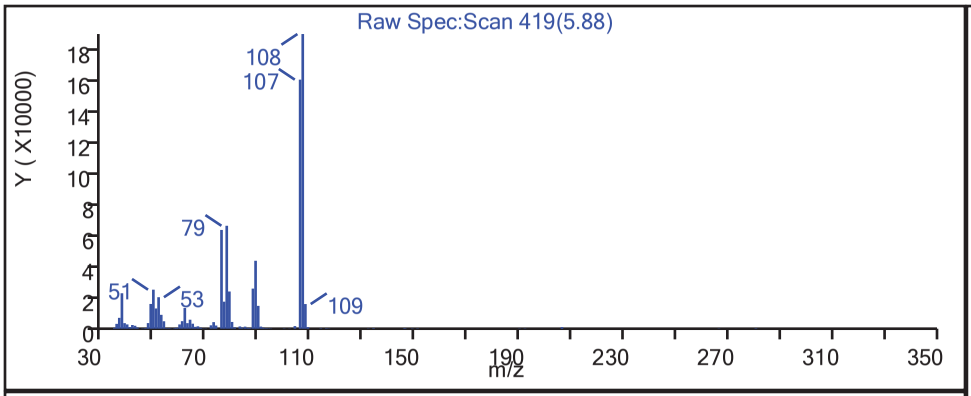


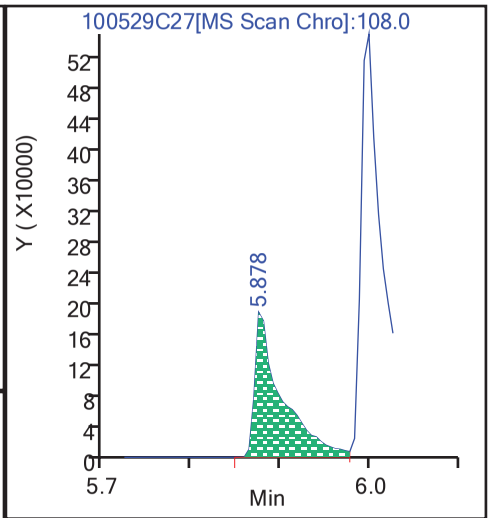
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

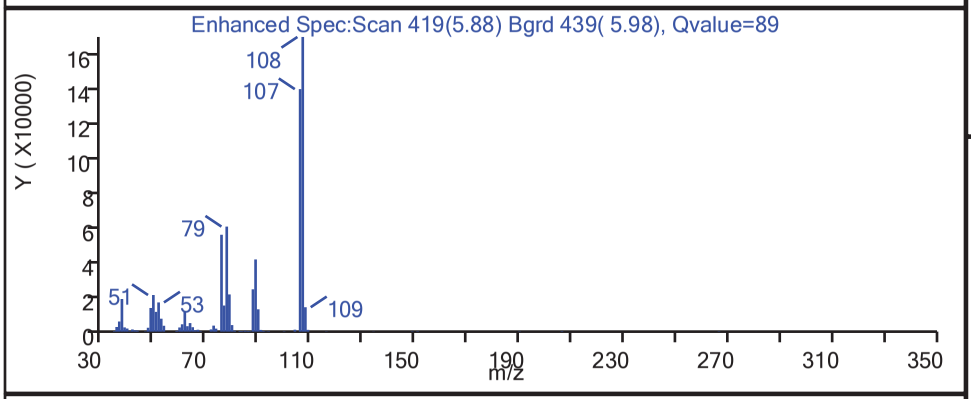
Shealy Environmental Services

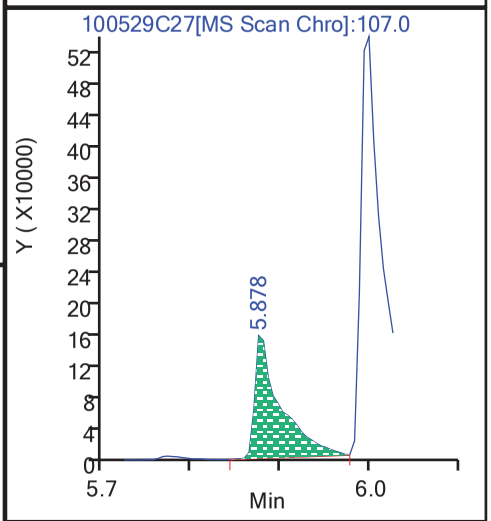
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

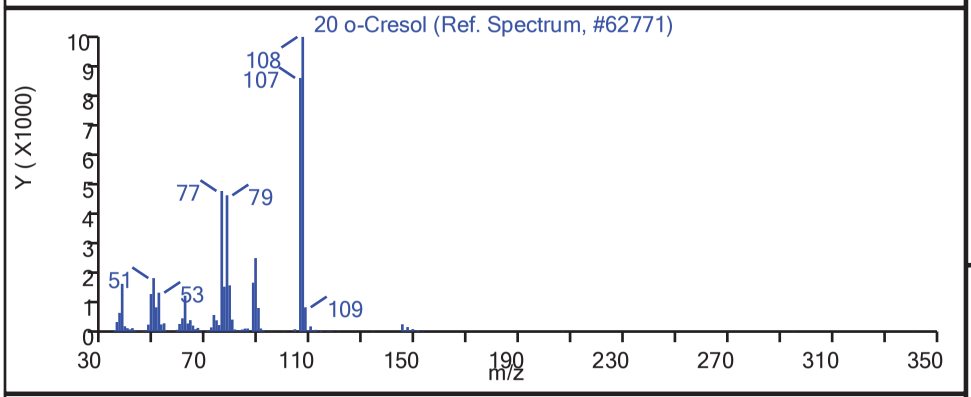
20 o-Cresol

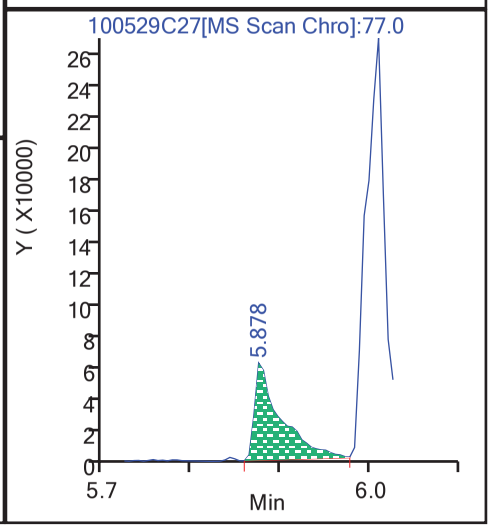


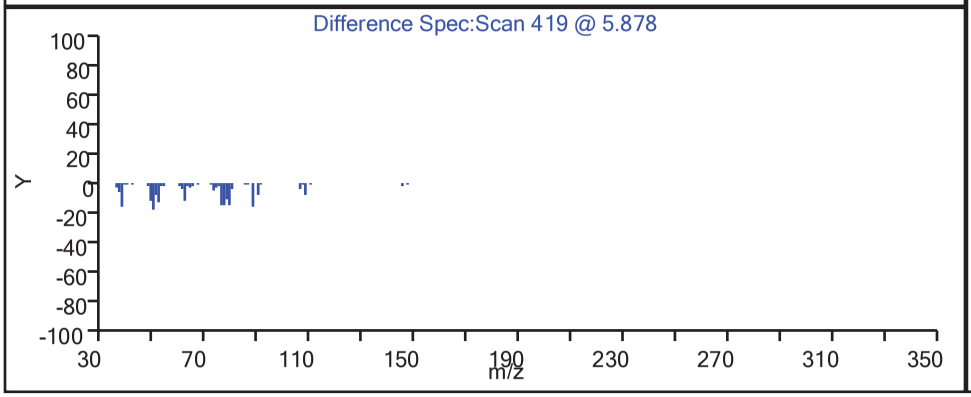












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Shealy Environmental Services

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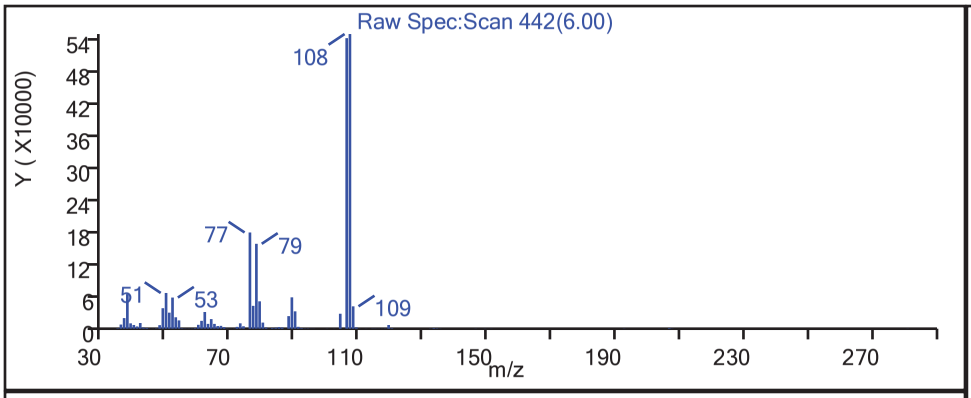
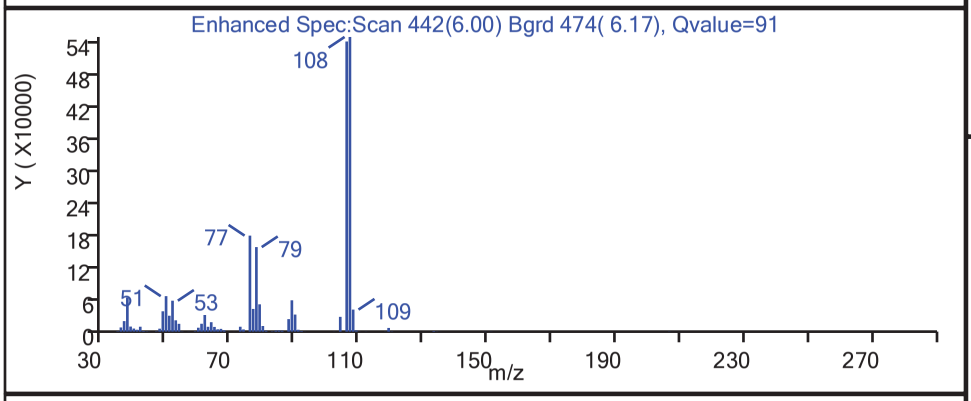
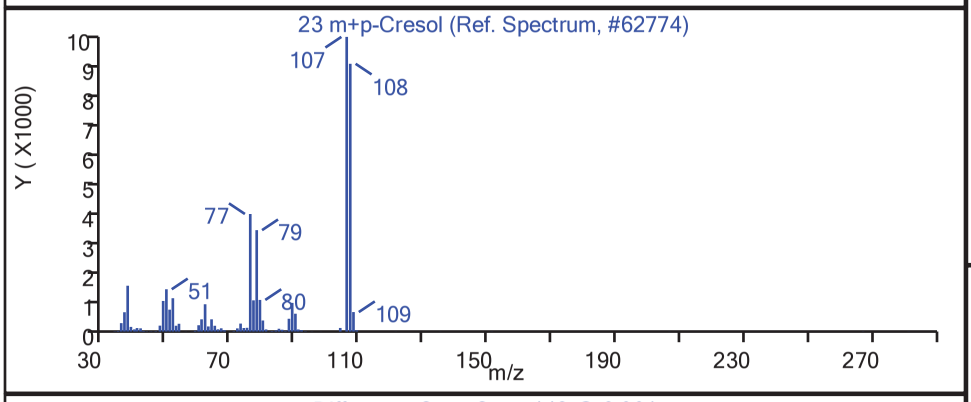
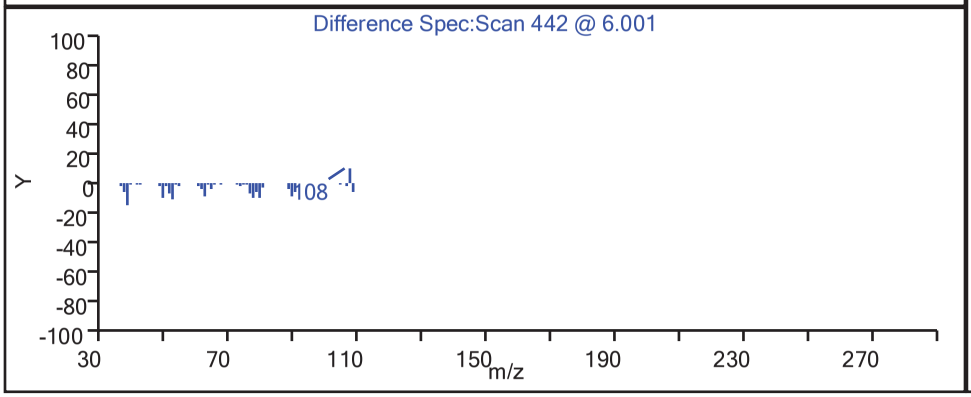
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

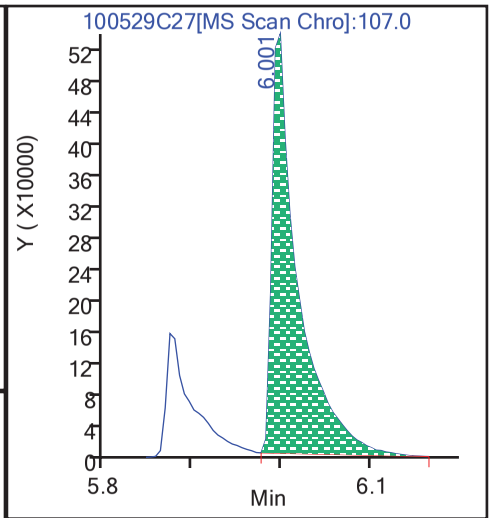
23 m+p-Cresol

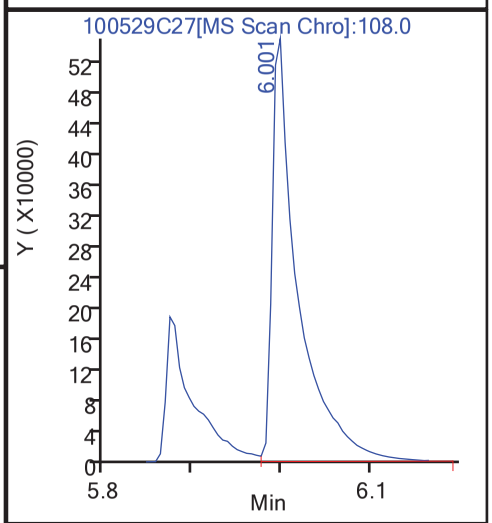


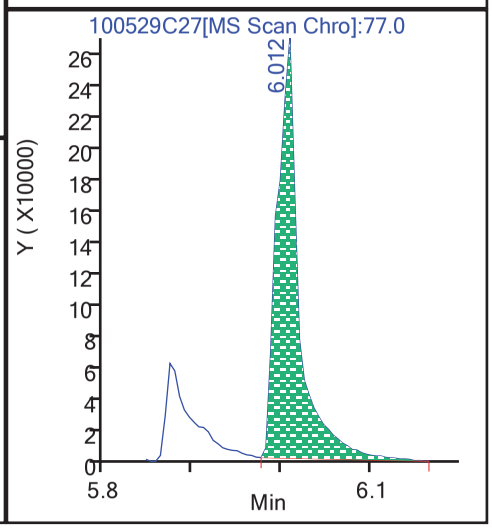












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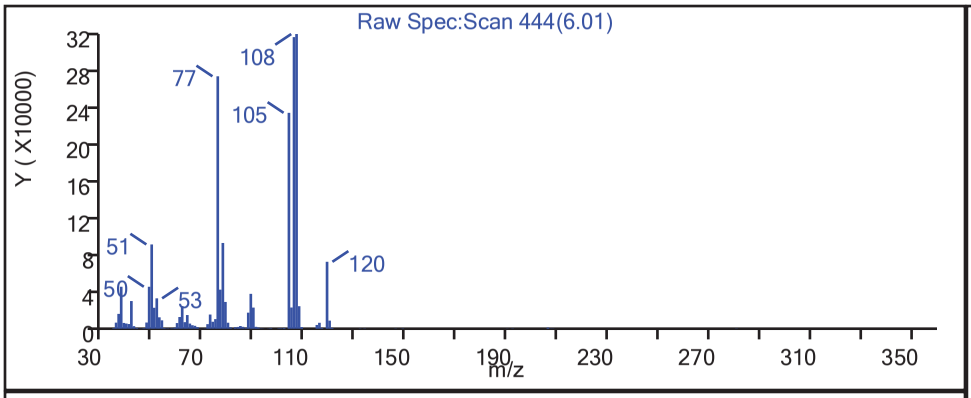
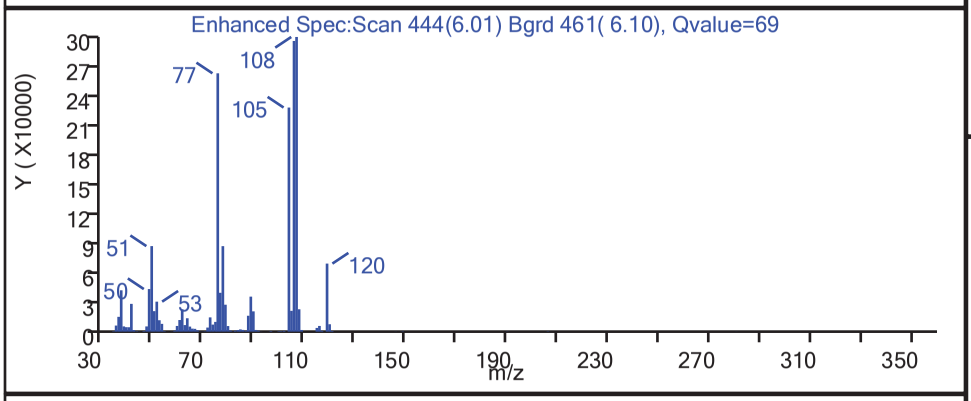
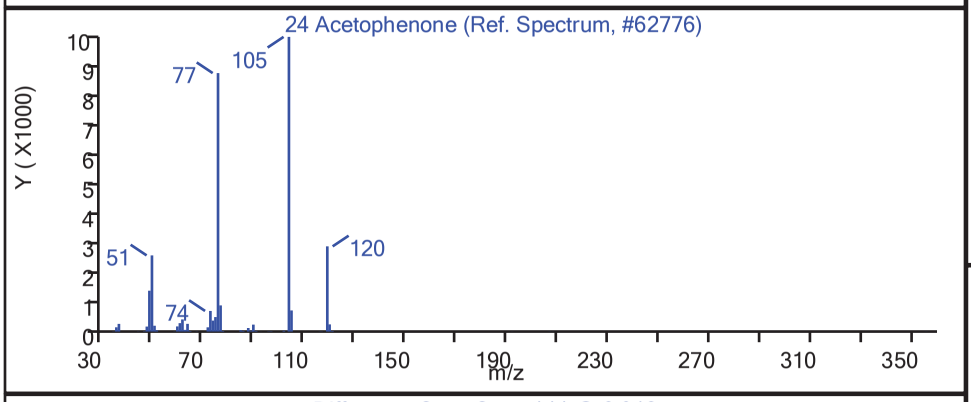
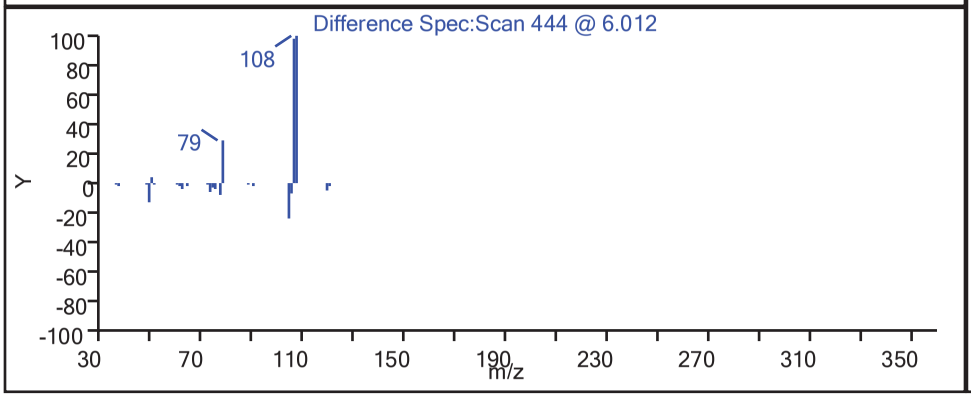
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

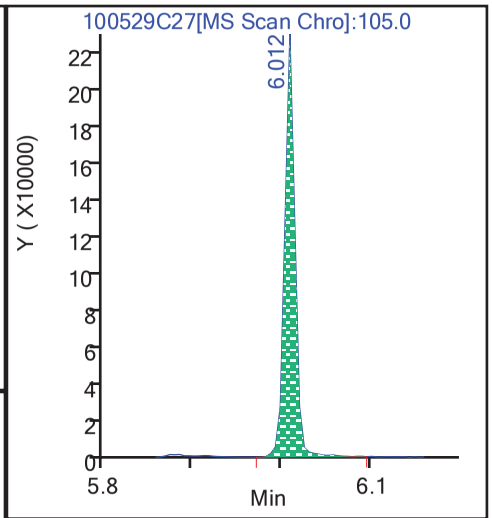
24 Acetophenone

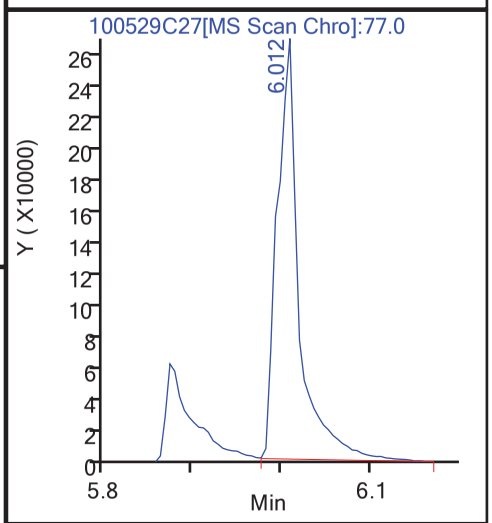


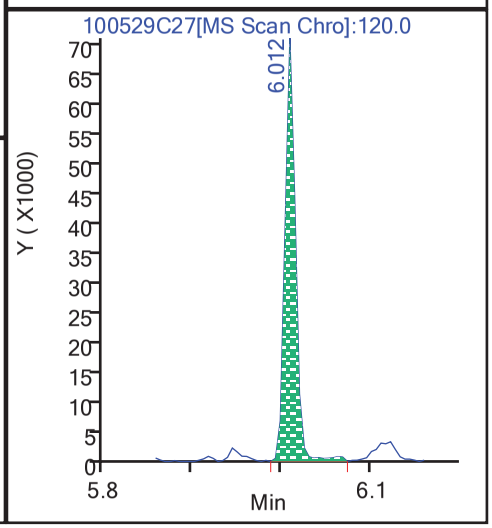












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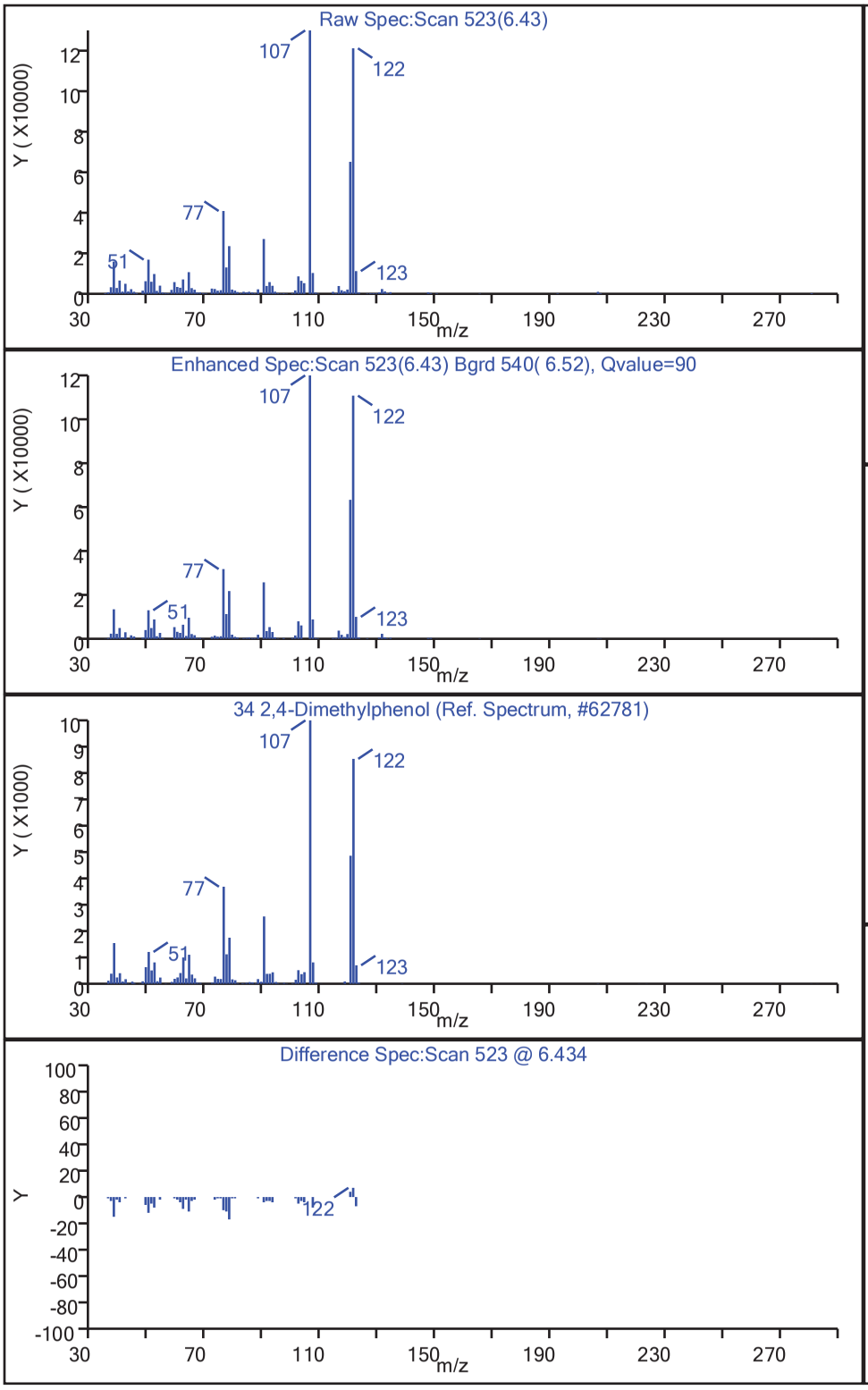
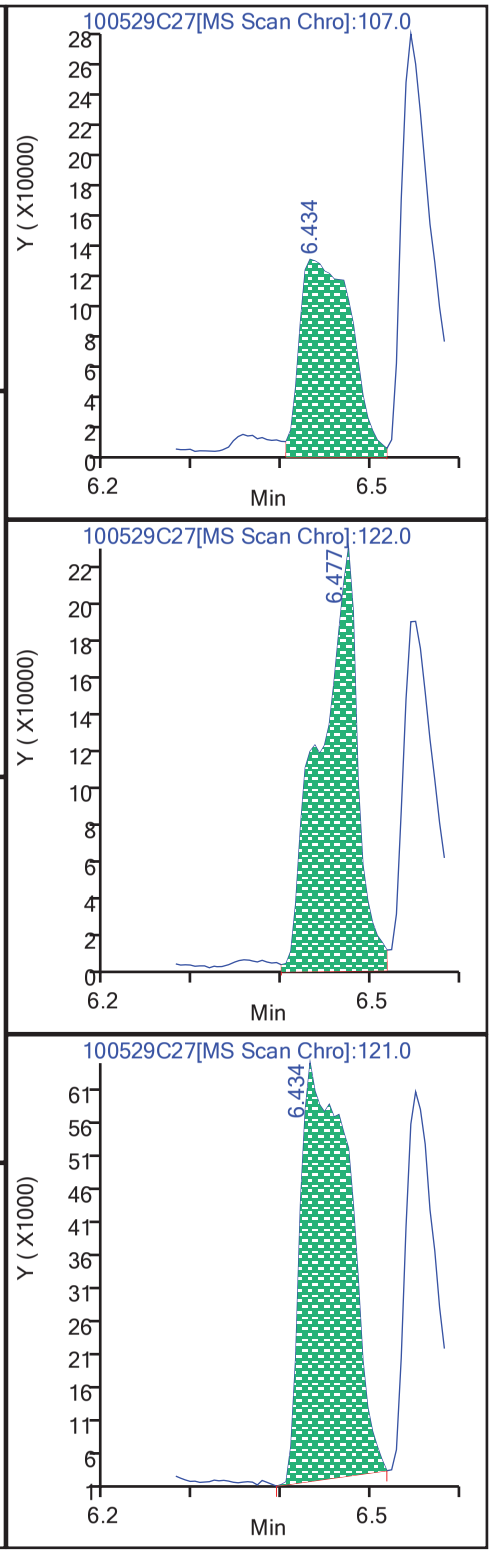
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

34 2,4-Dimethylphenol





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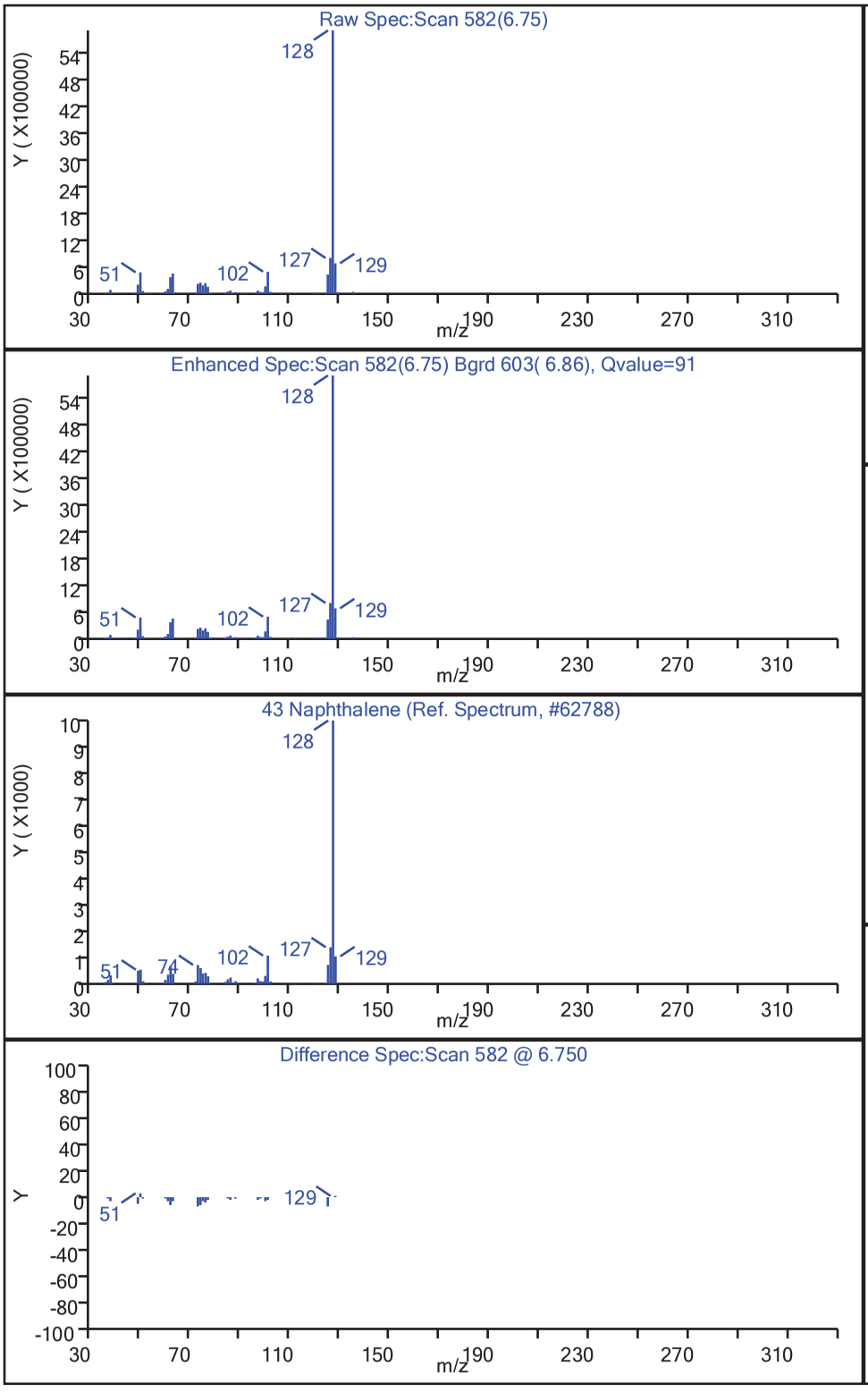
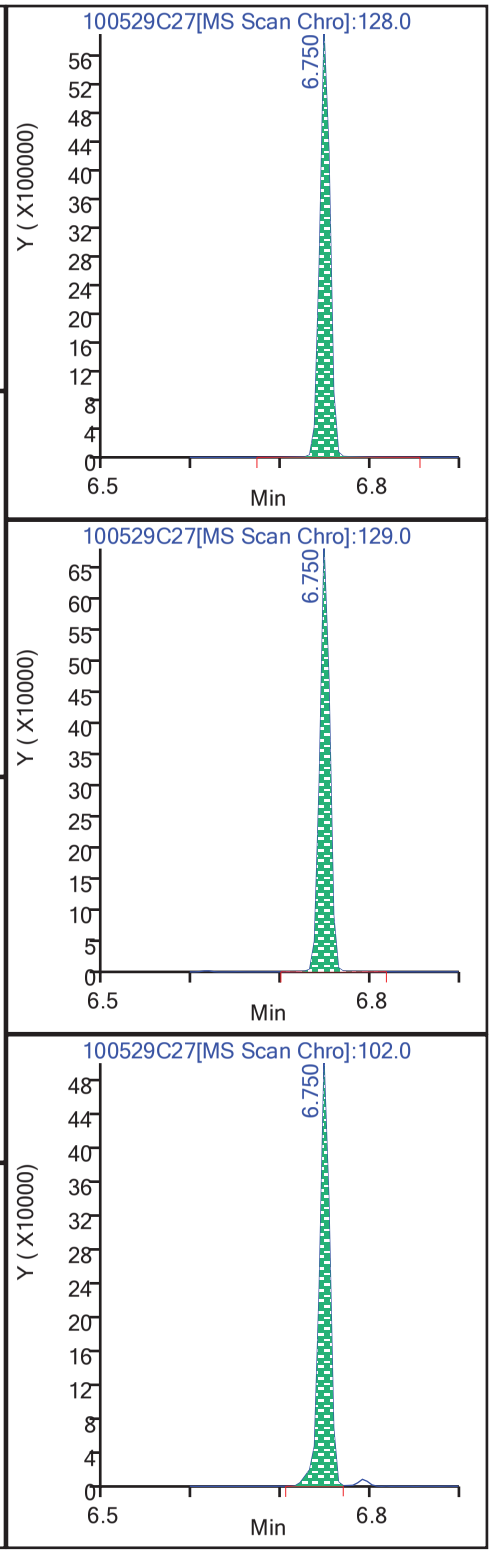
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

43 Naphthalene





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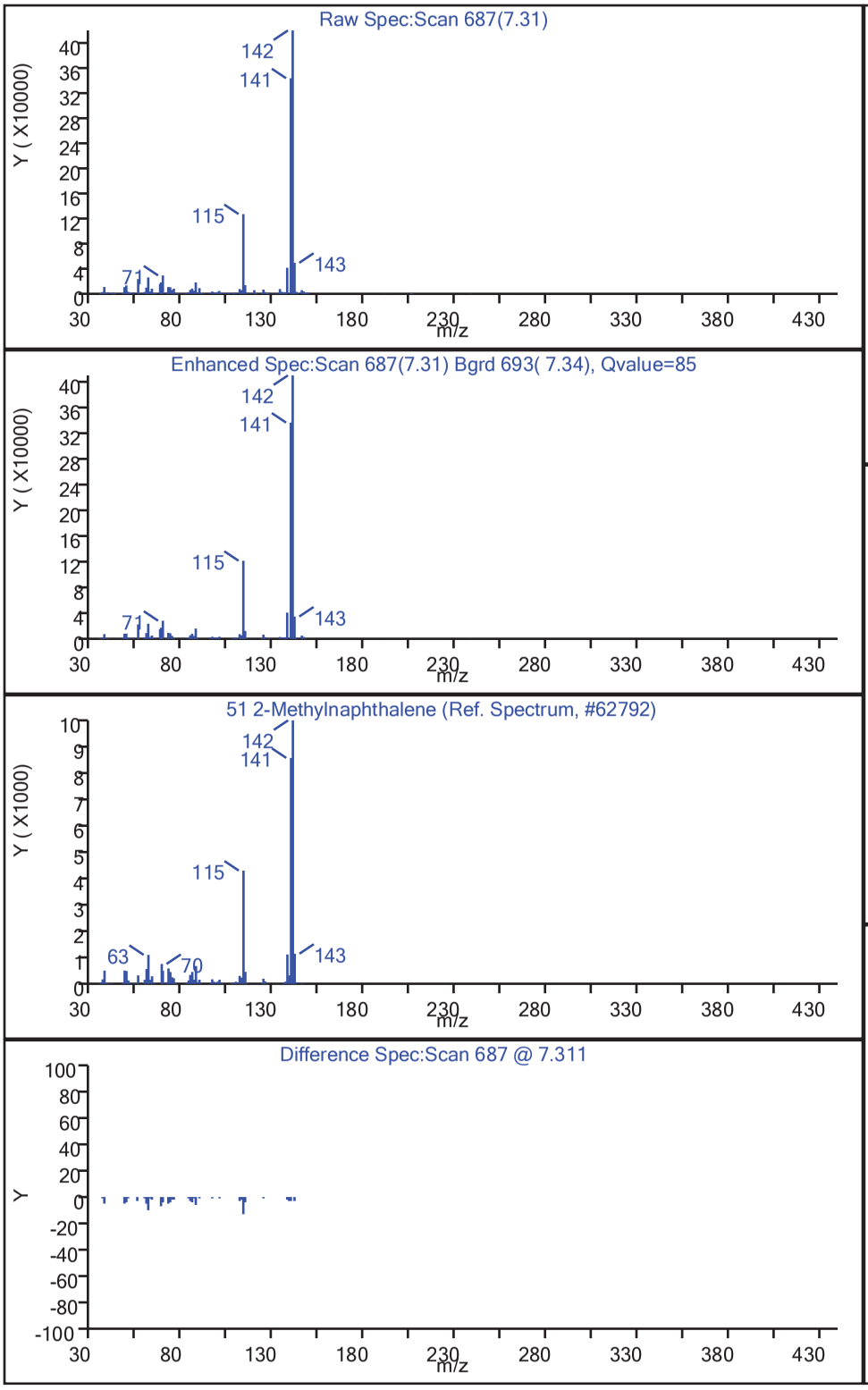
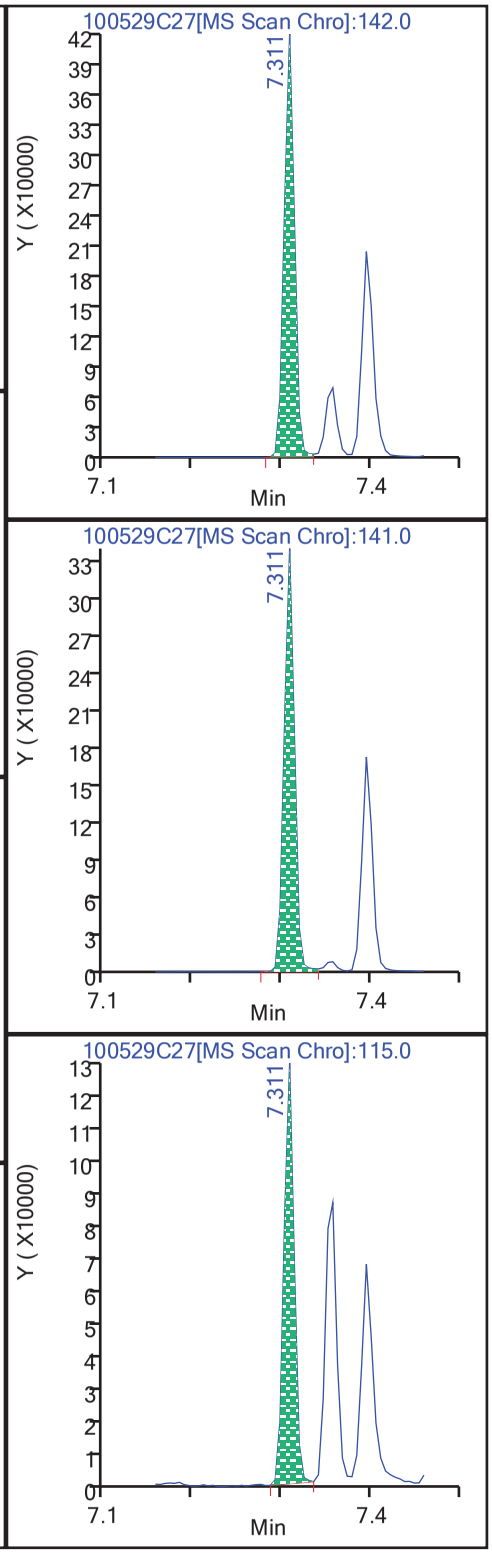
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

51 2-Methylnaphthalene





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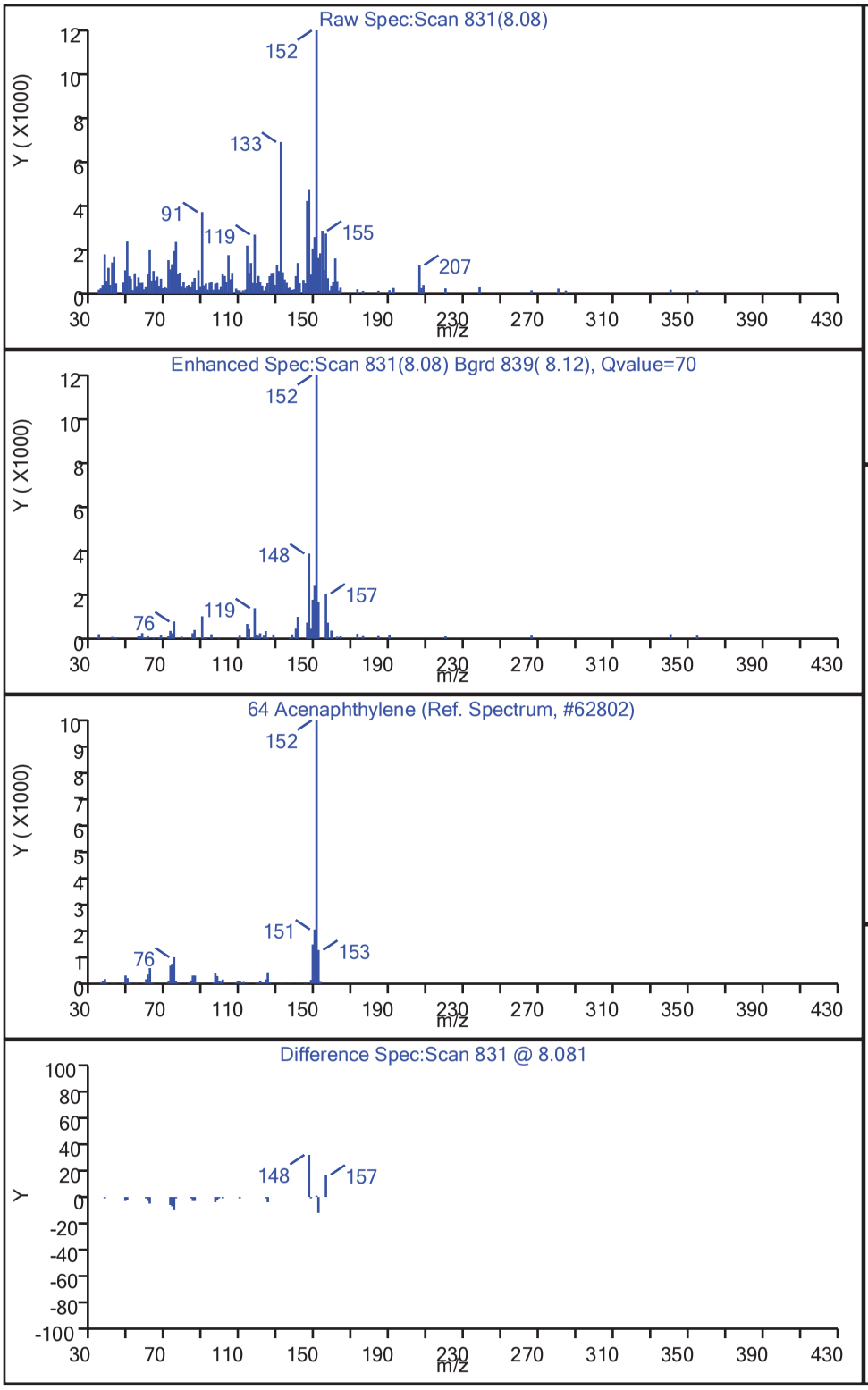
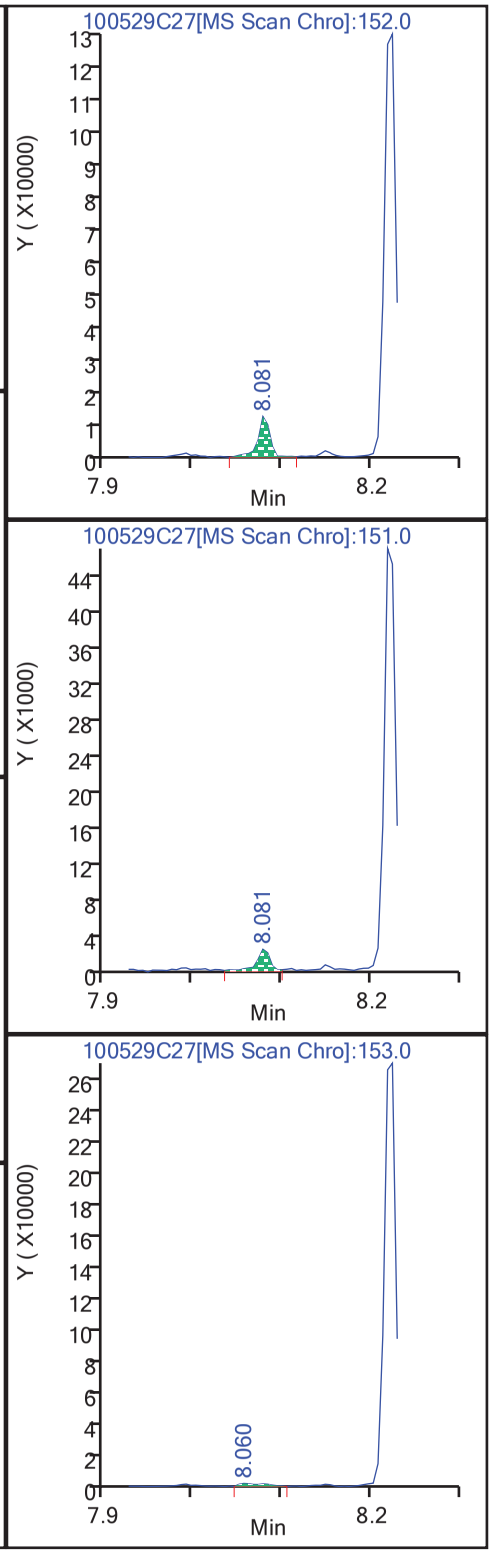
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

64 Acenaphthylene





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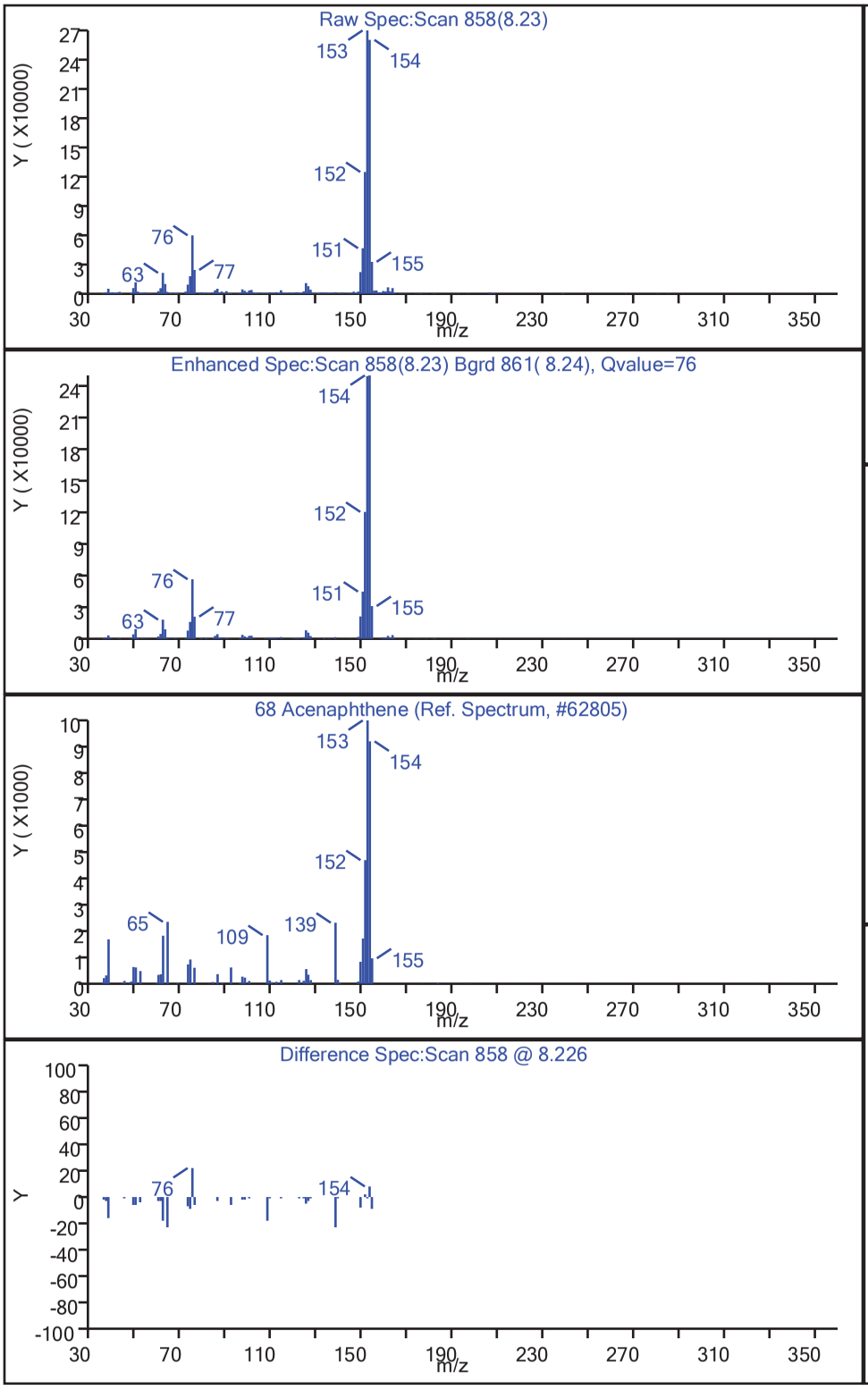
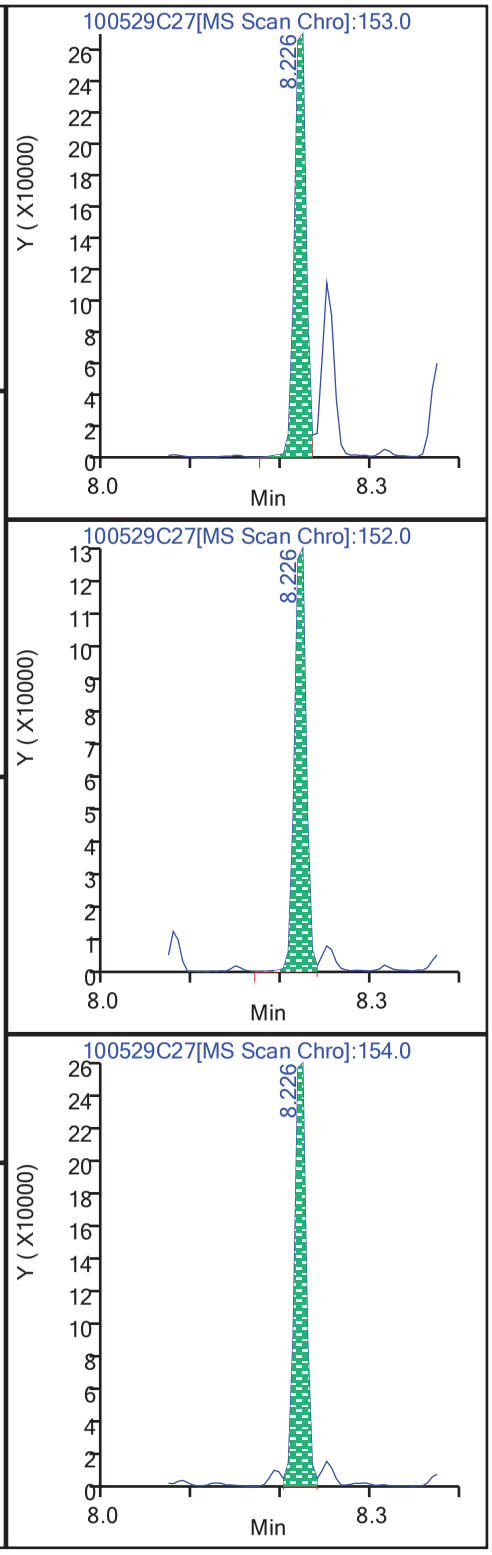
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

68 Acenaphthene





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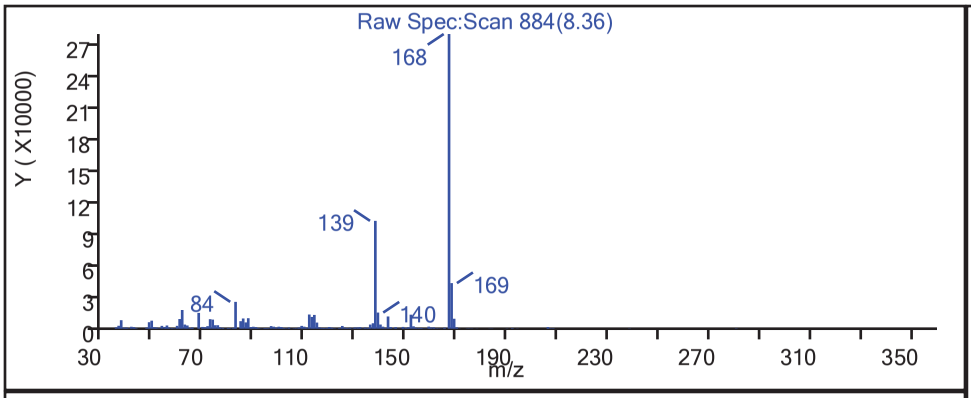
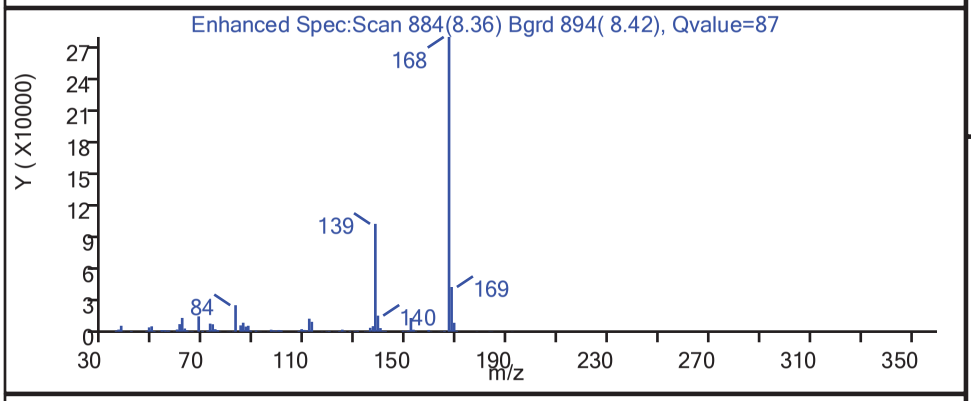
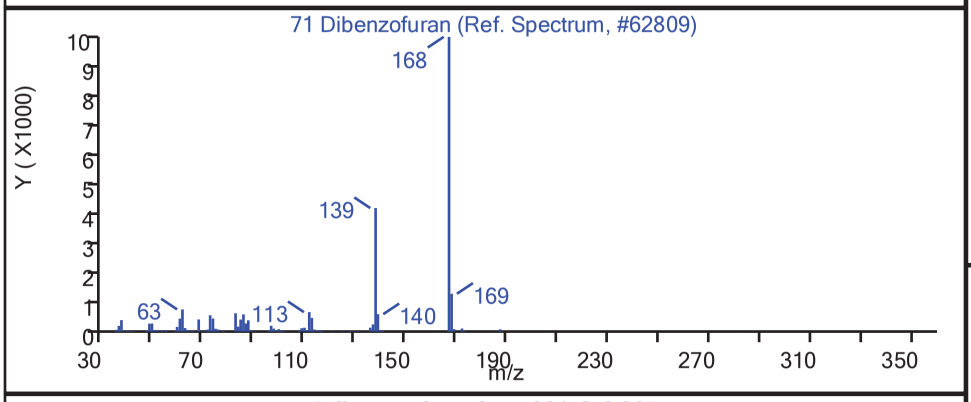
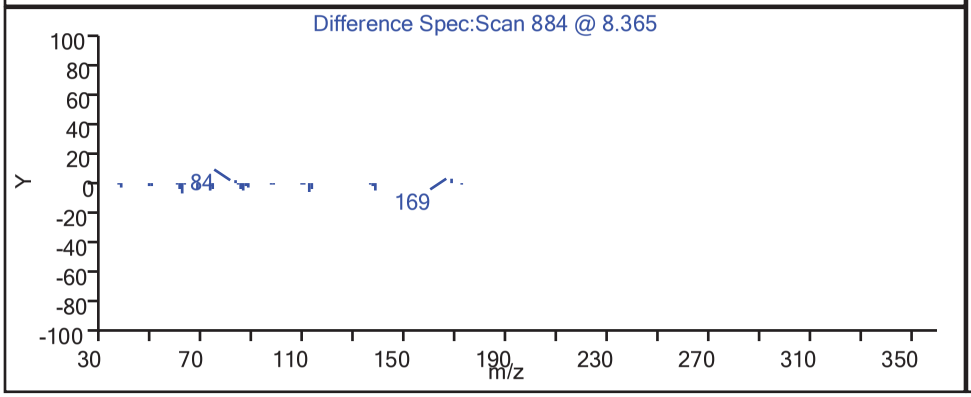
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

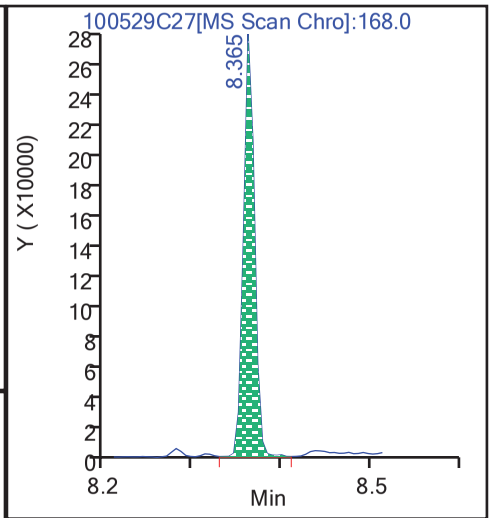
71 Dibenzofuran

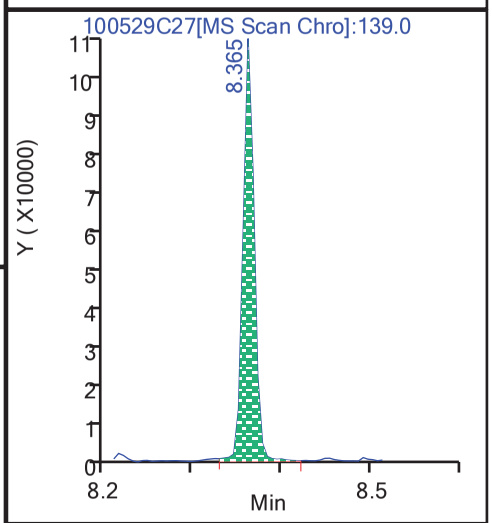


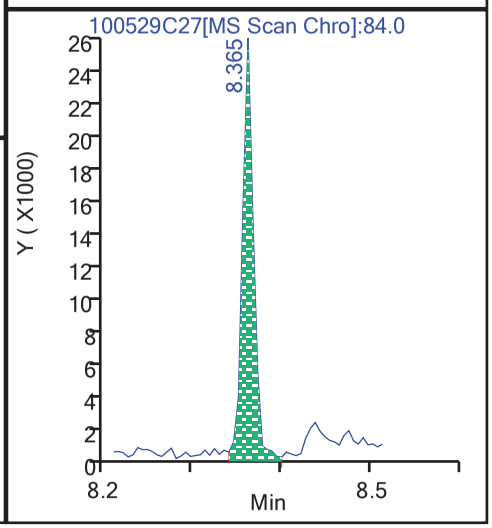












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Sample Info:	10052918C.b, TE22045-003		
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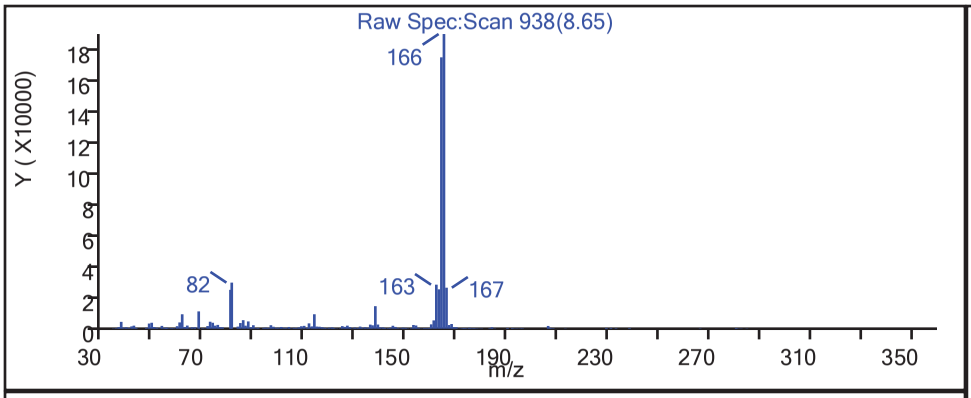
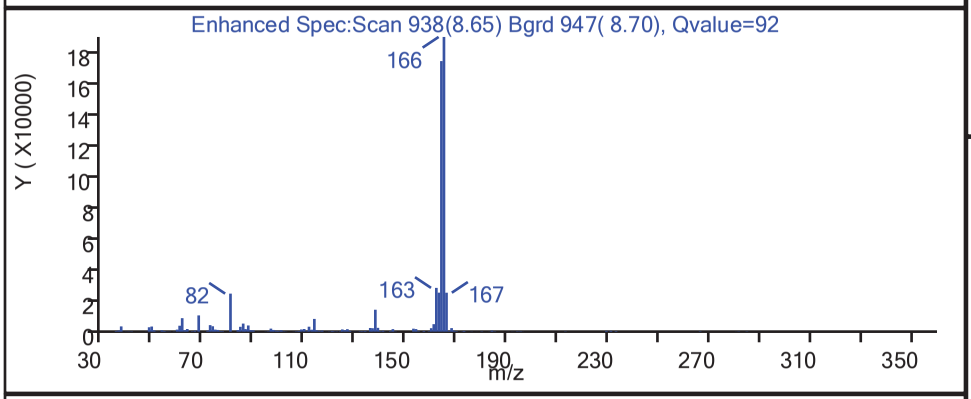
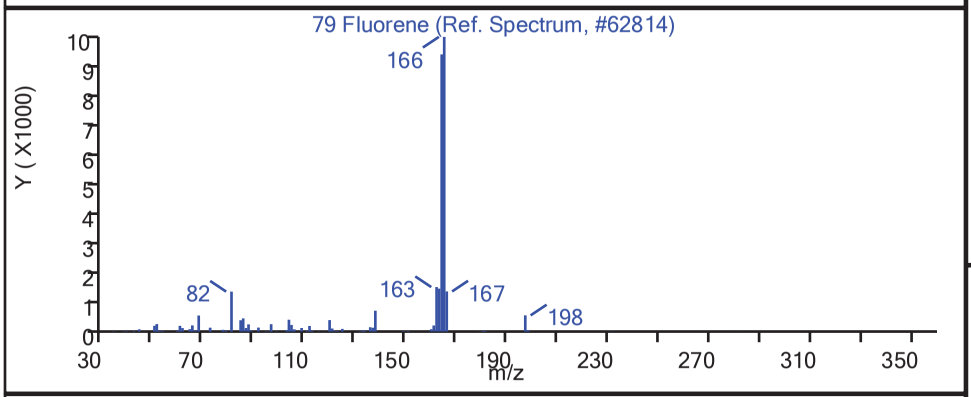
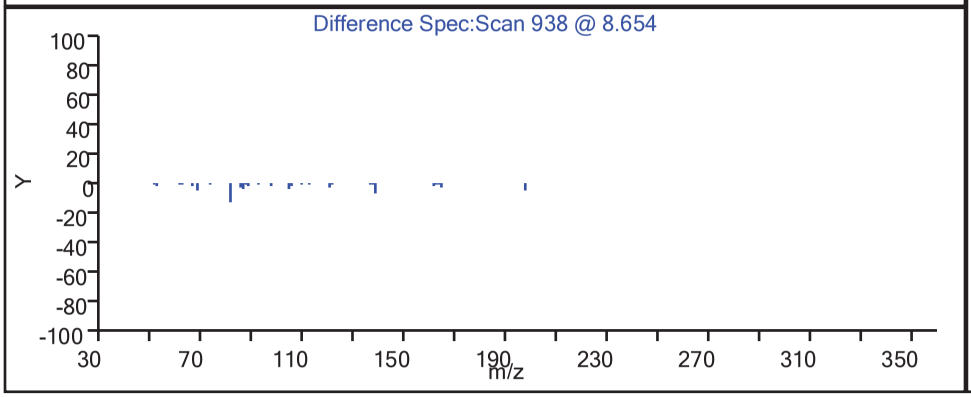
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

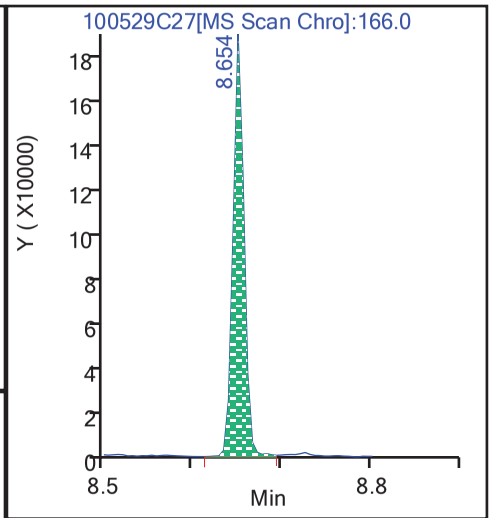
79 Fluorene

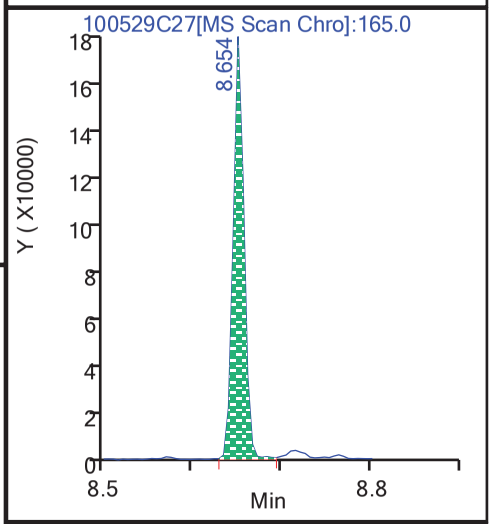


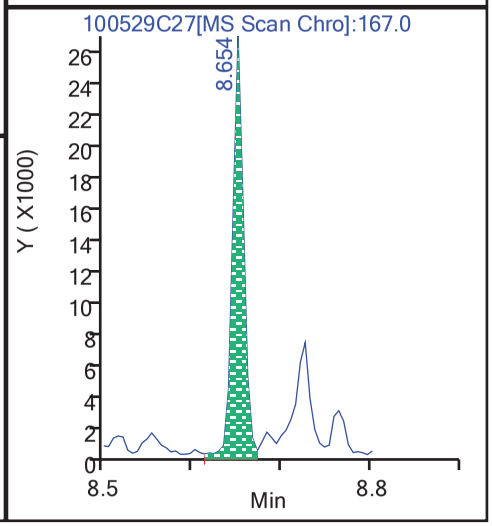












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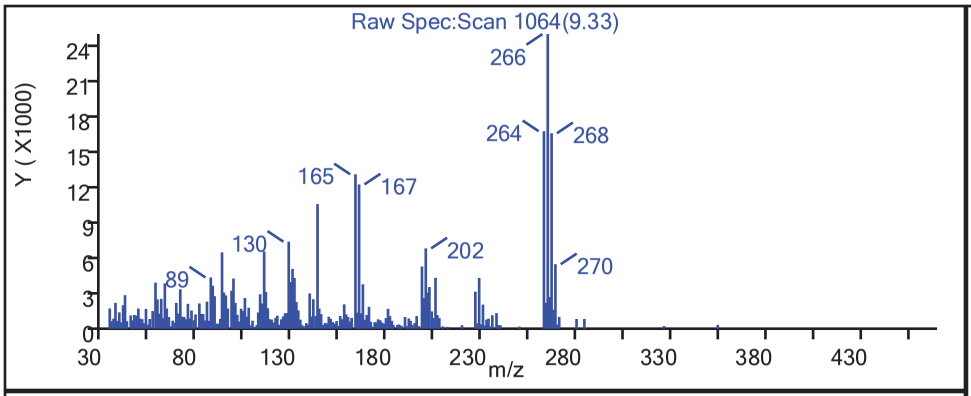
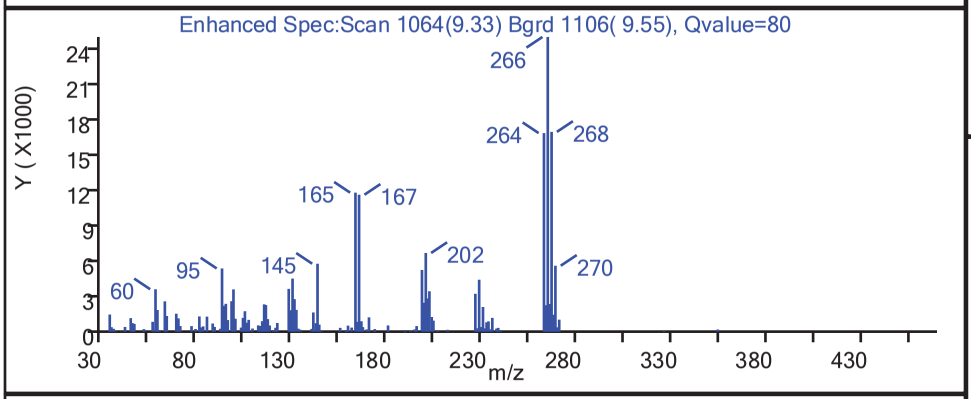
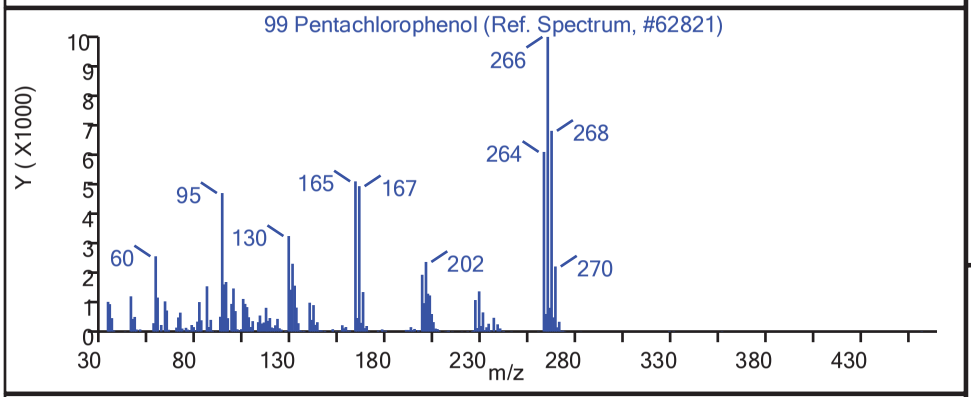
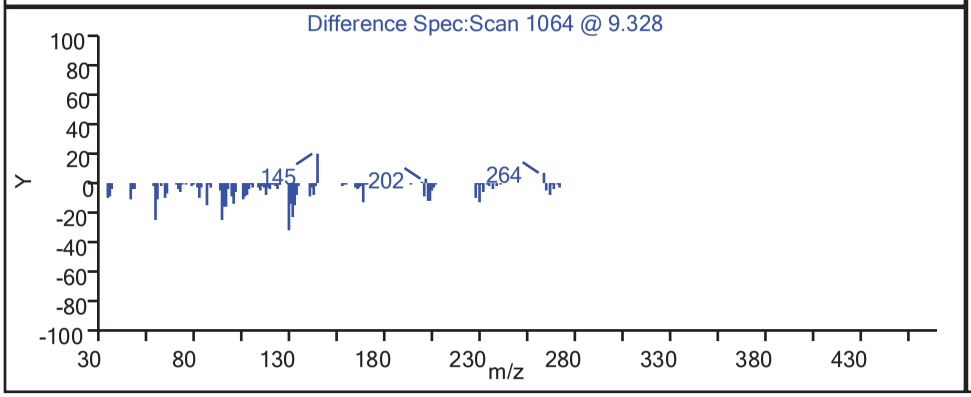
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

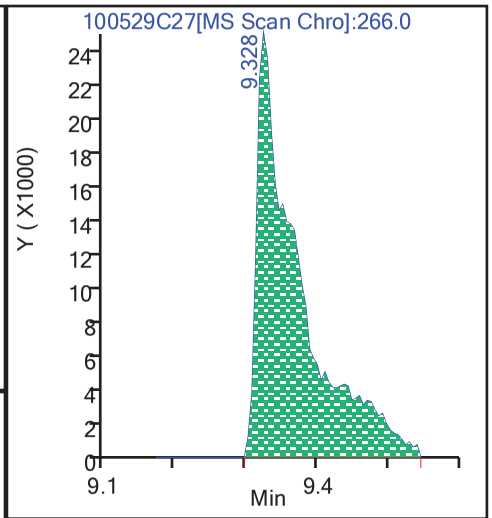
99 Pentachlorophenol

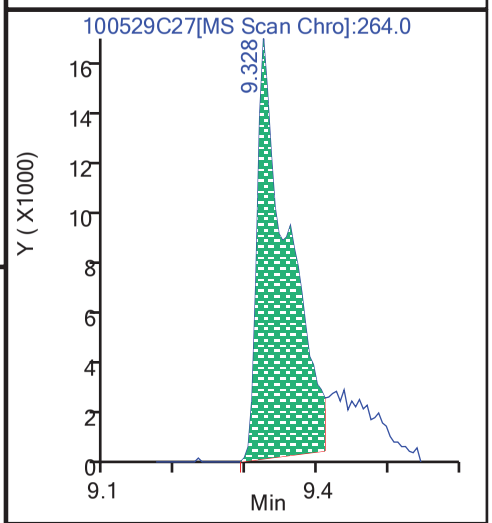


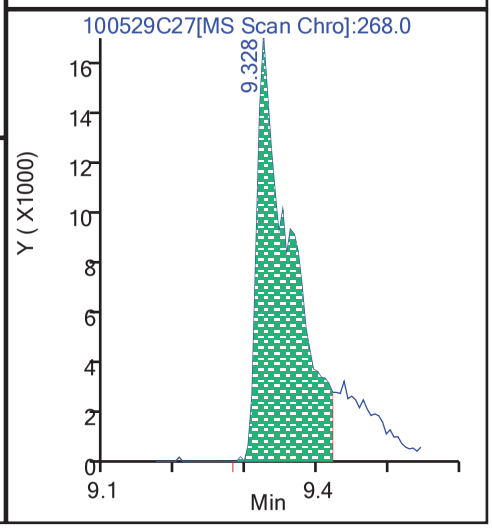










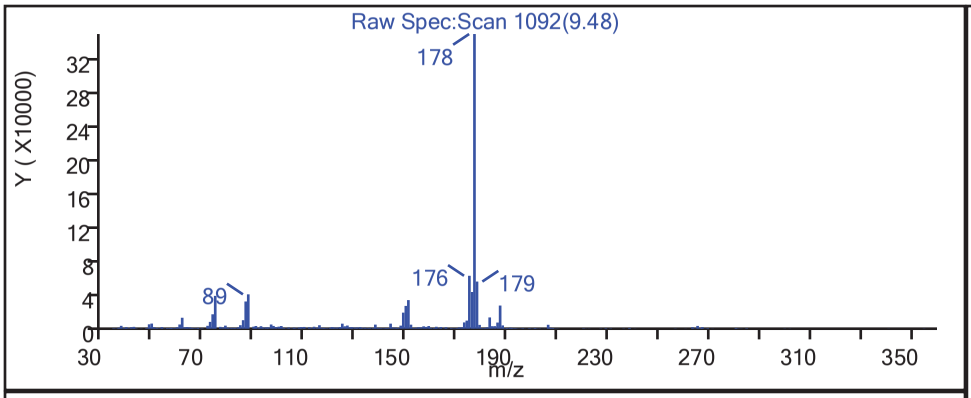


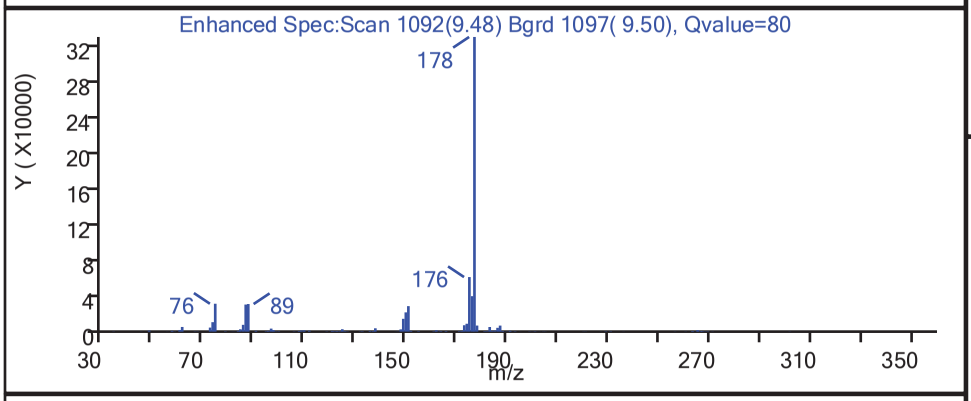
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

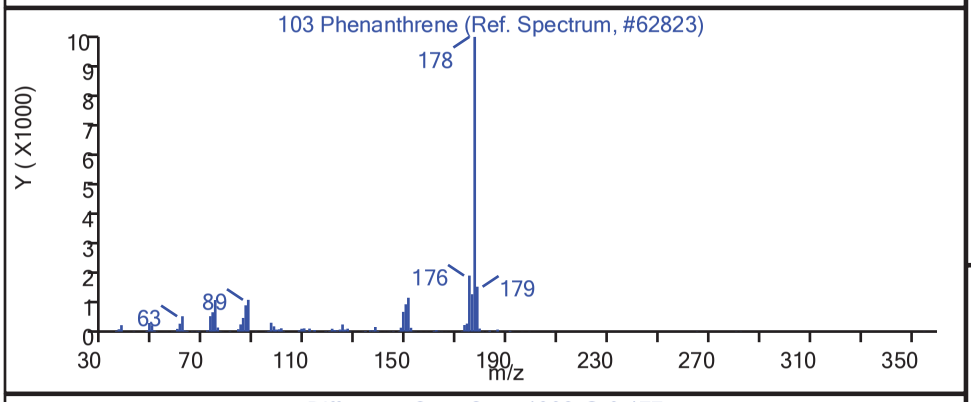
Shealy Environmental Services

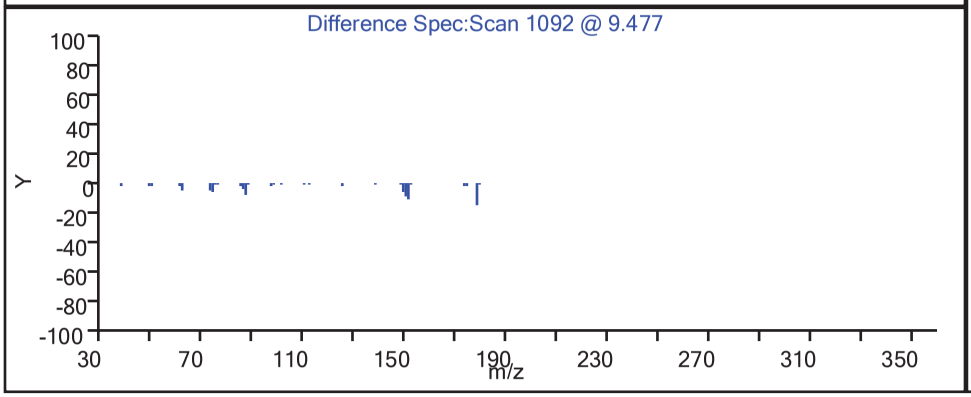
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

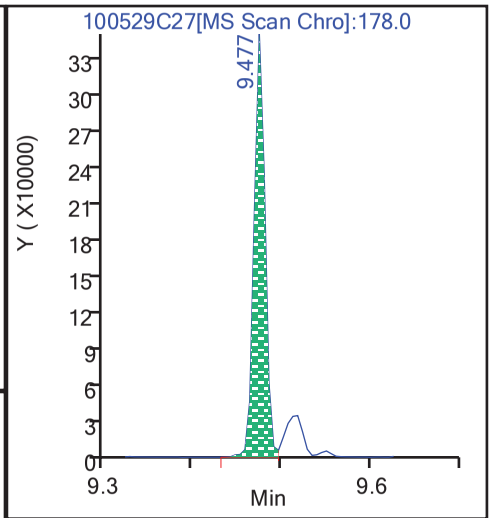
103 Phenanthrene

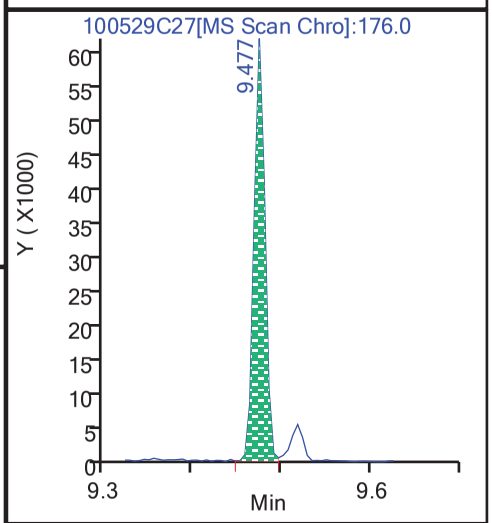


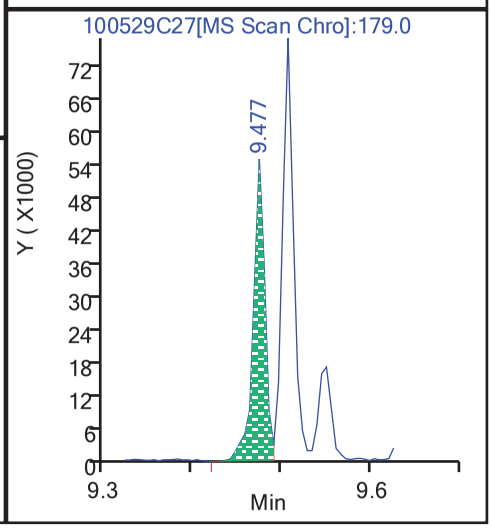










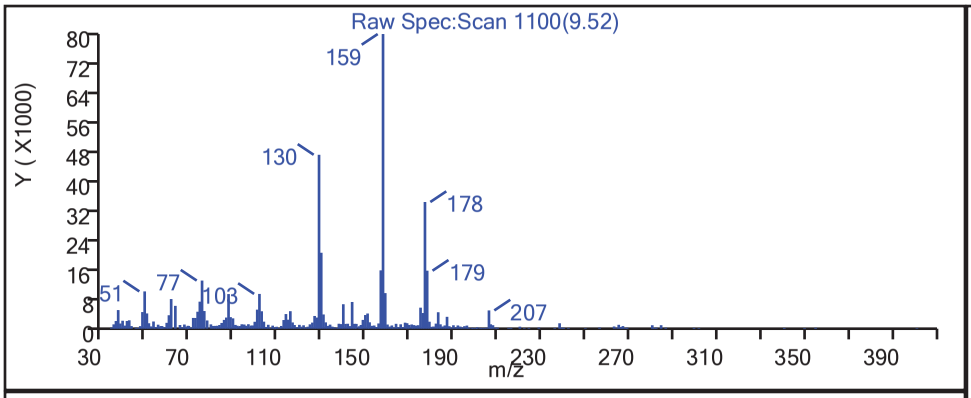


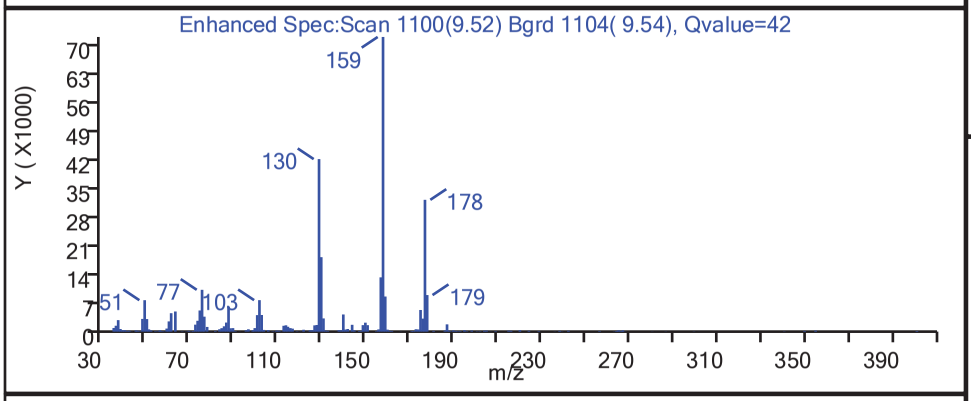
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

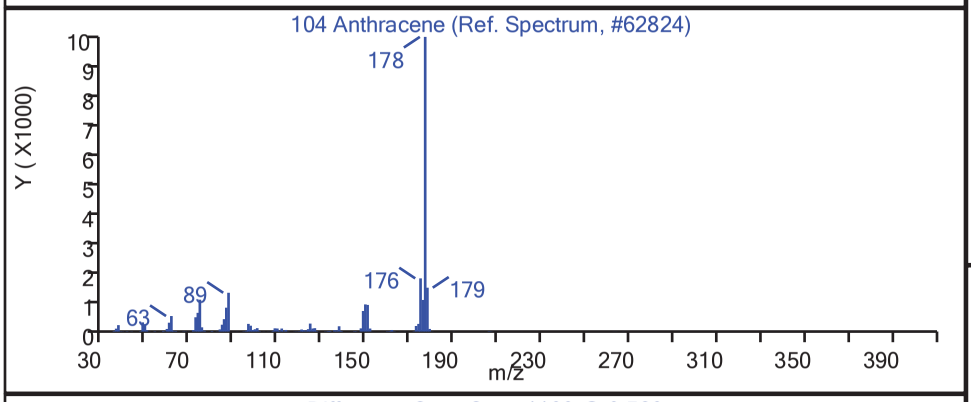
Shealy Environmental Services

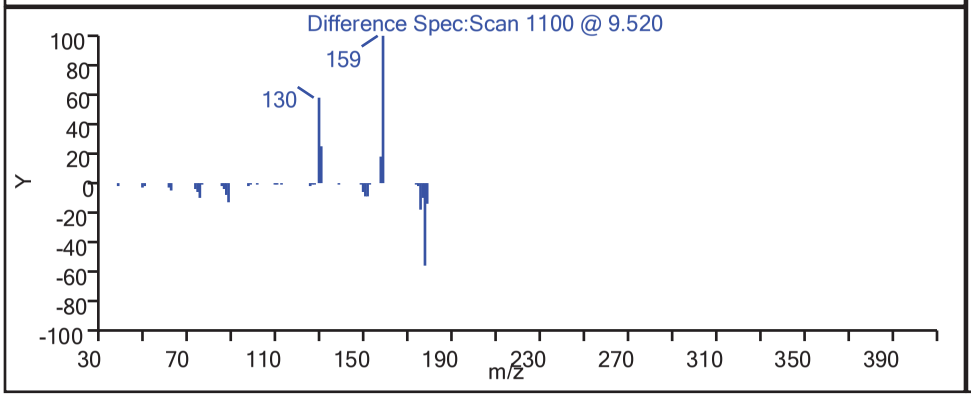
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

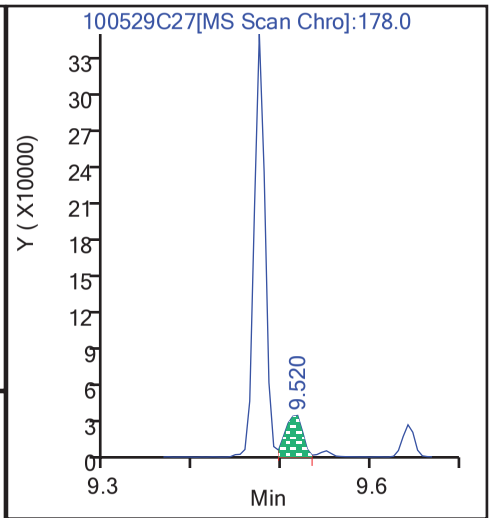
104 Anthracene

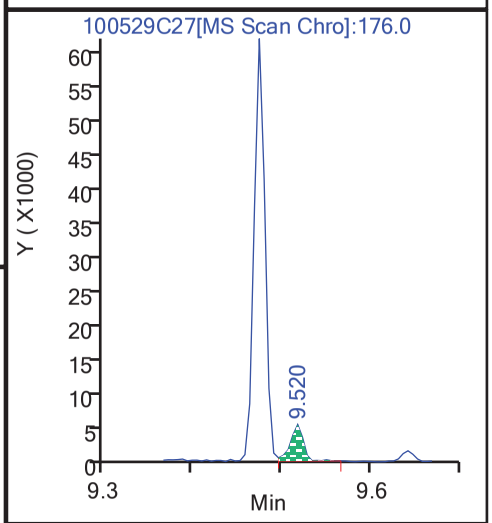


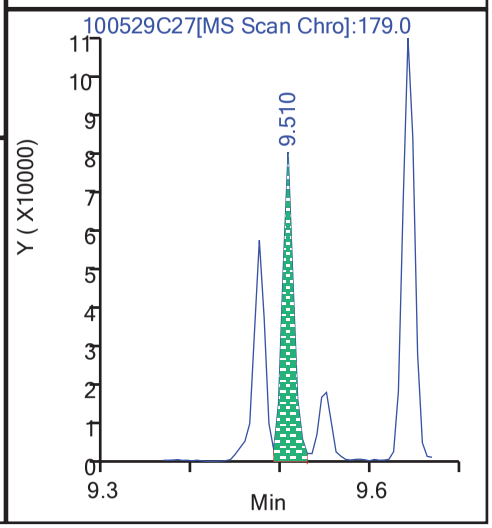










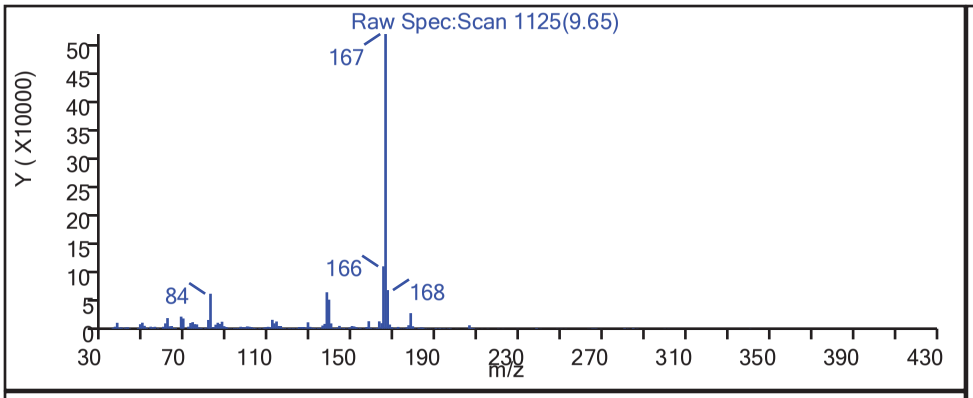


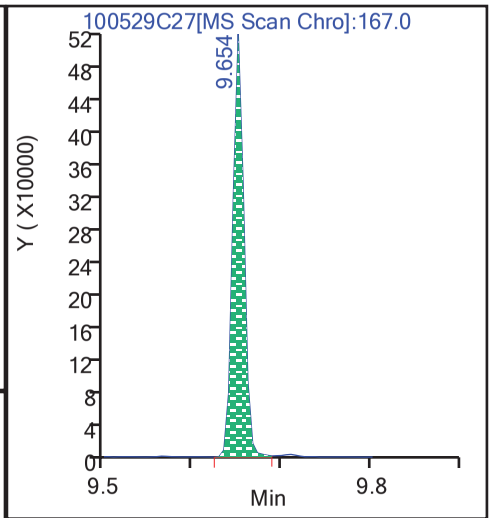
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

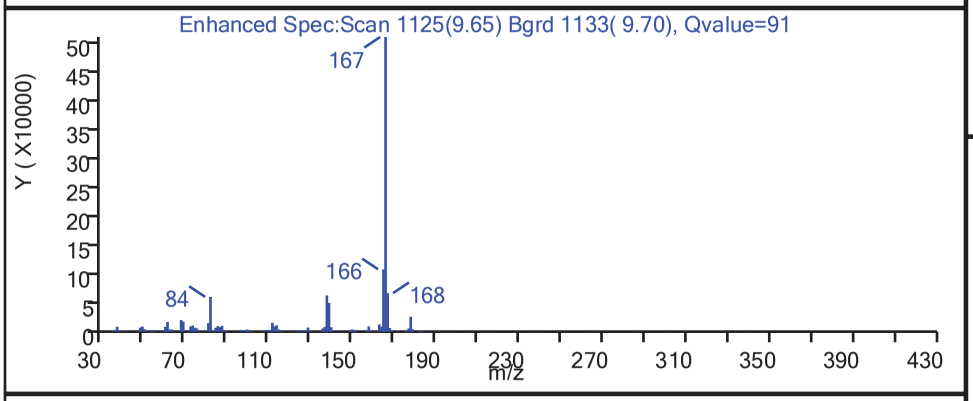
Shealy Environmental Services

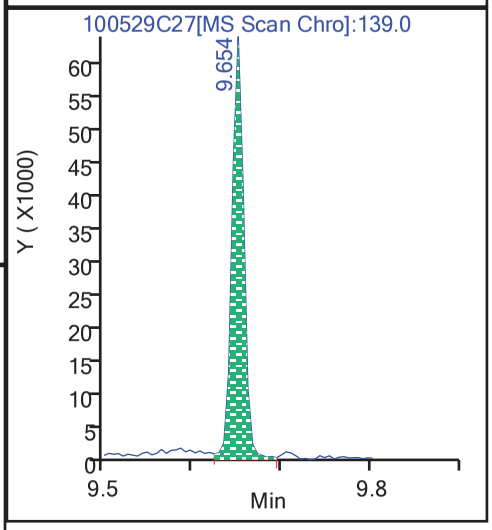
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

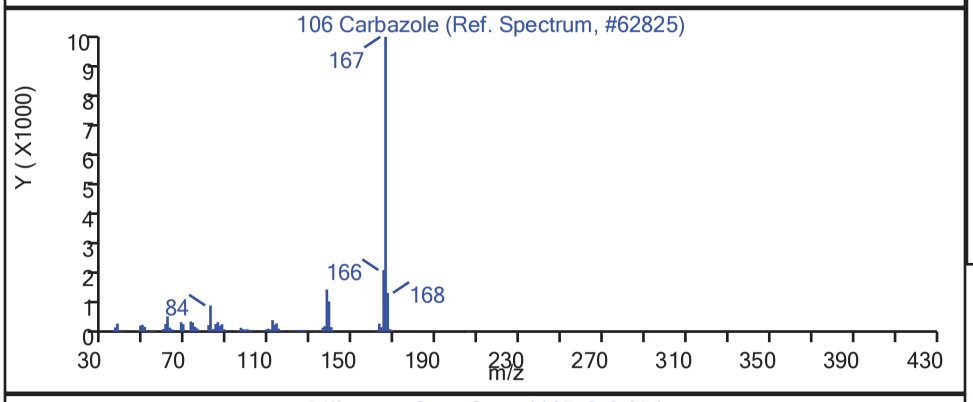
106 Carbazole

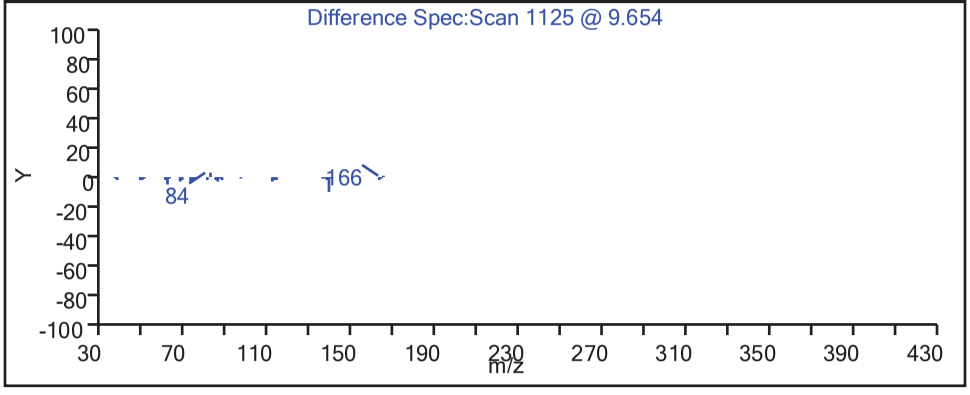










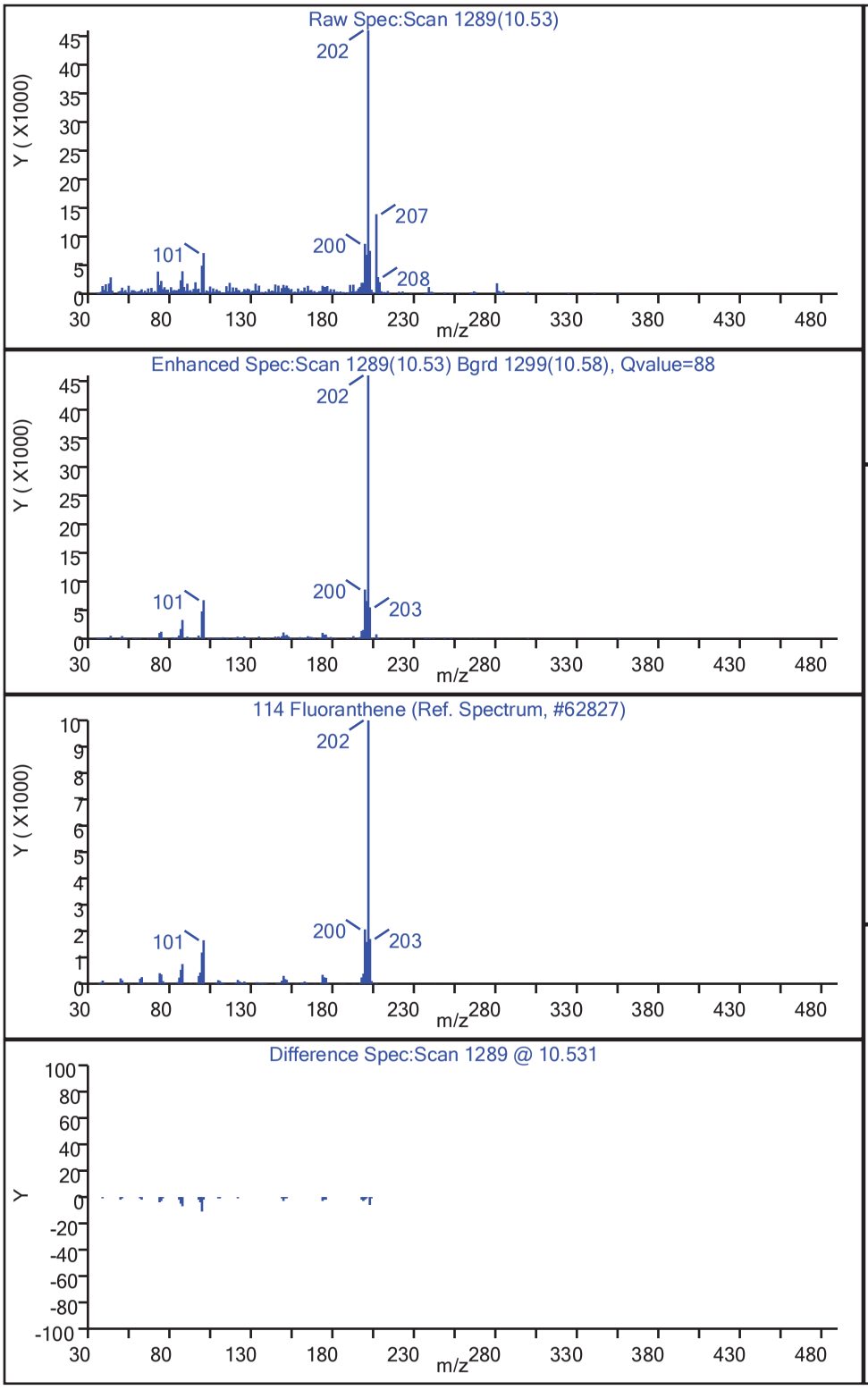


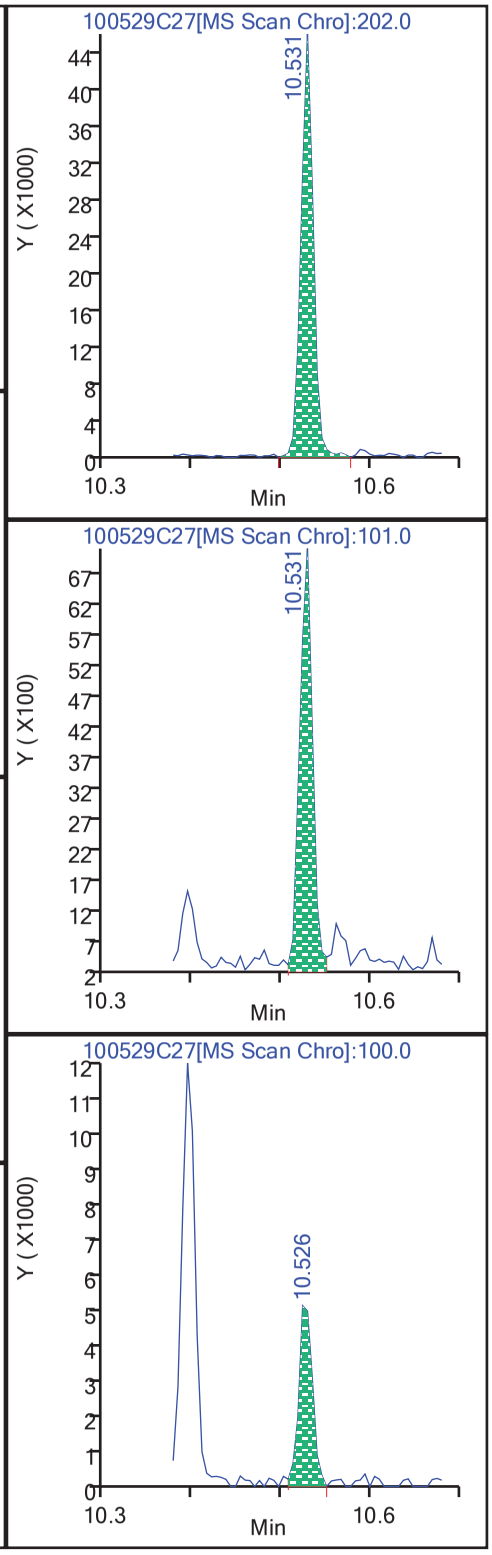
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

114 Fluoranthene



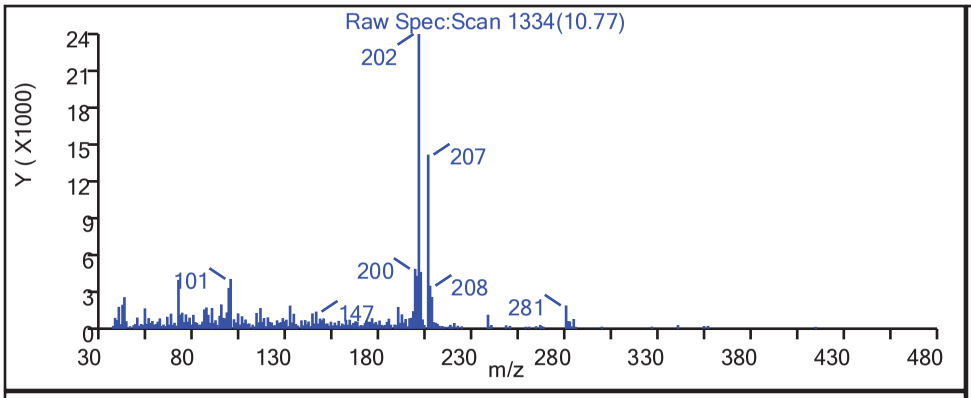


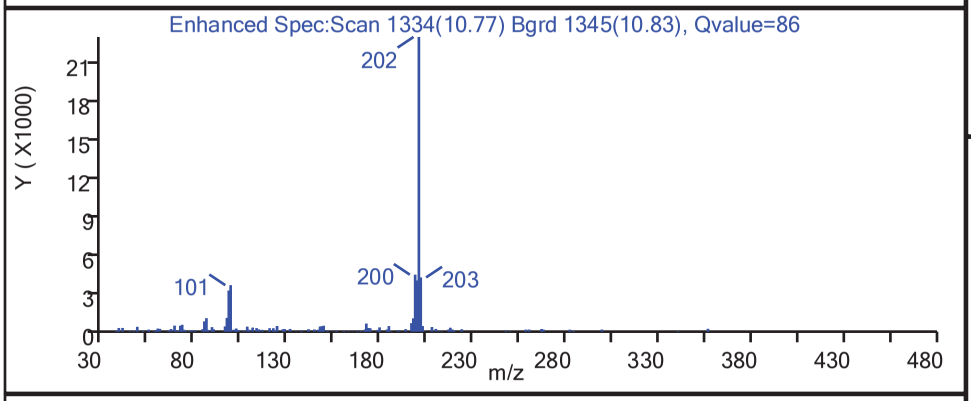
Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

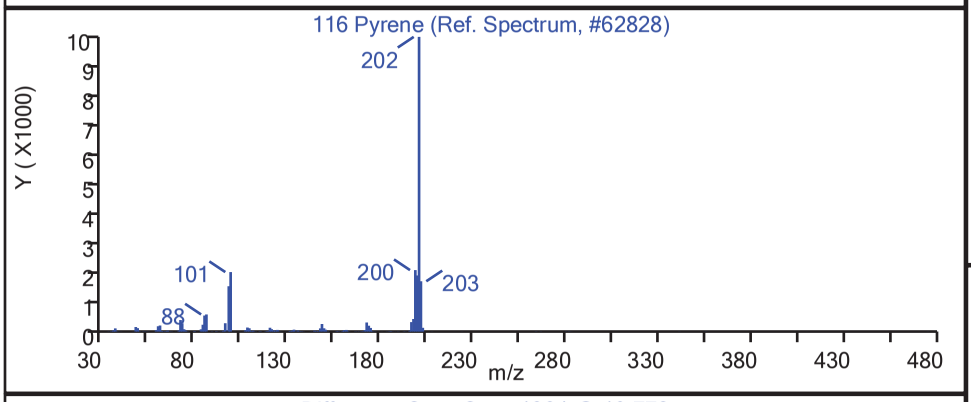
Shealy Environmental Services

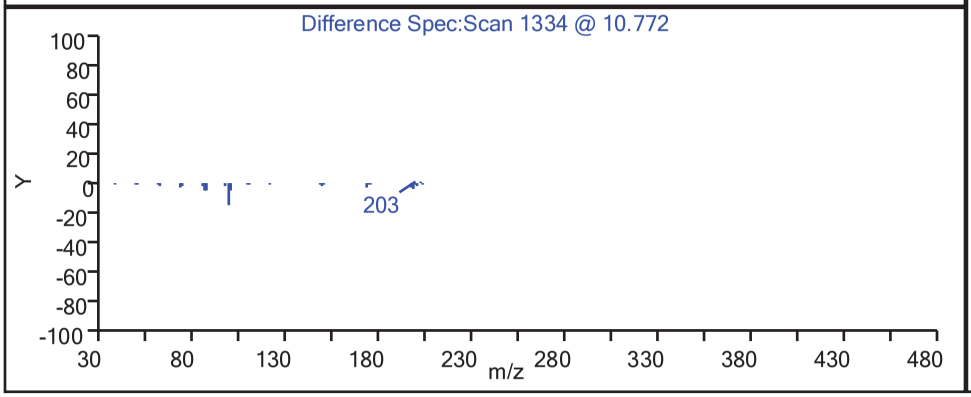
Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

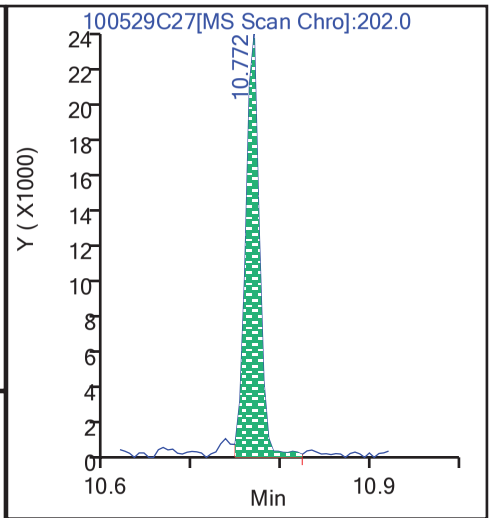
116 Pyrene

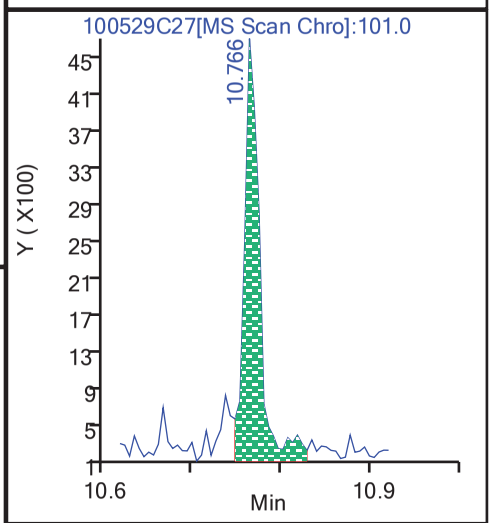


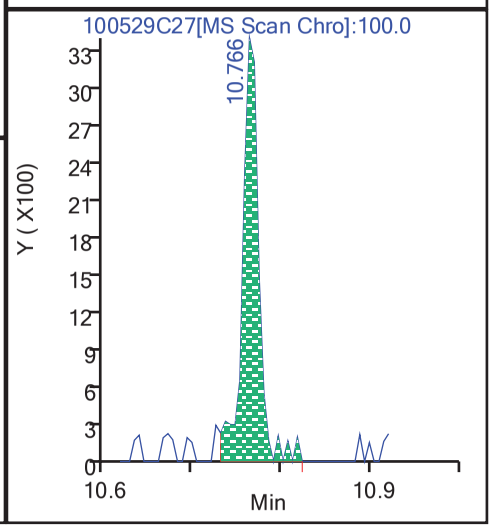












Report Date: 30-May-2018 08:28:52 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
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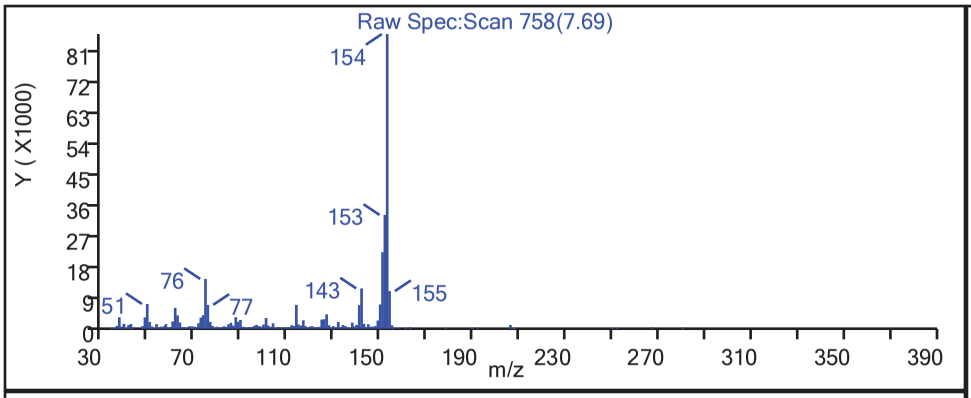
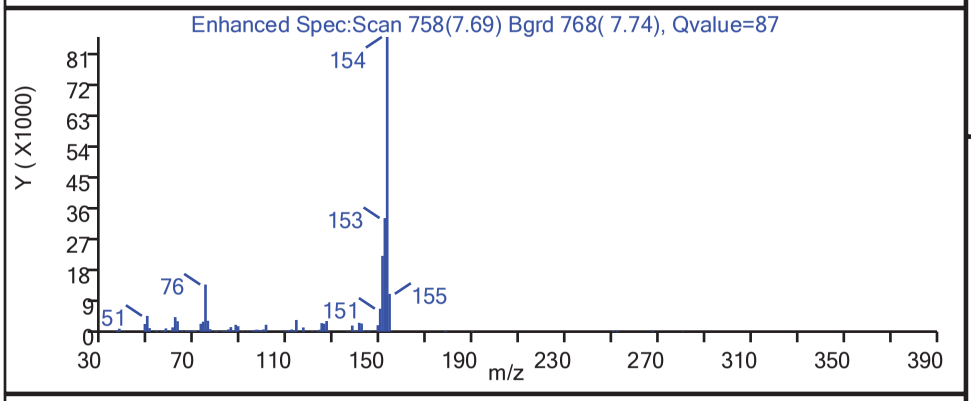
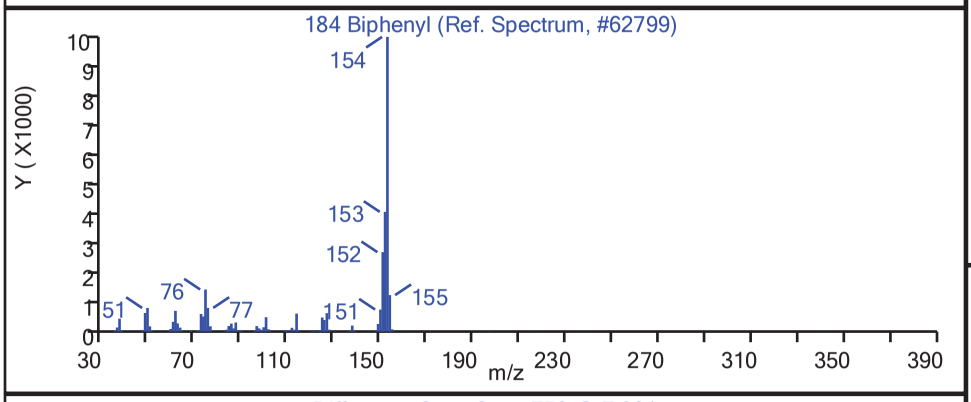
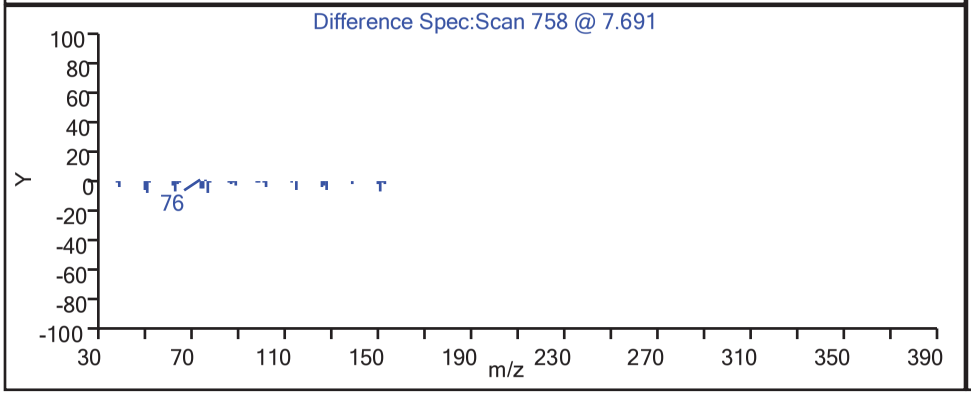
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

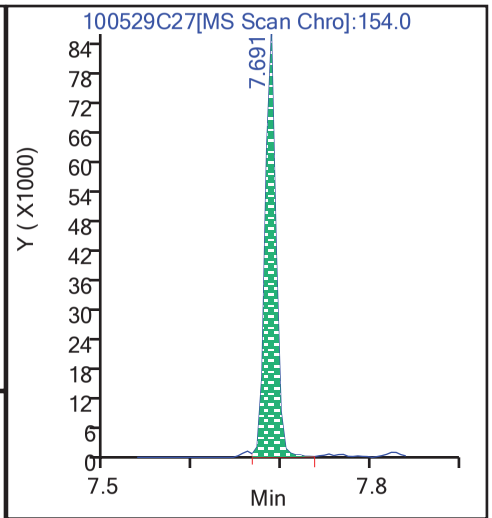
184 Biphenyl

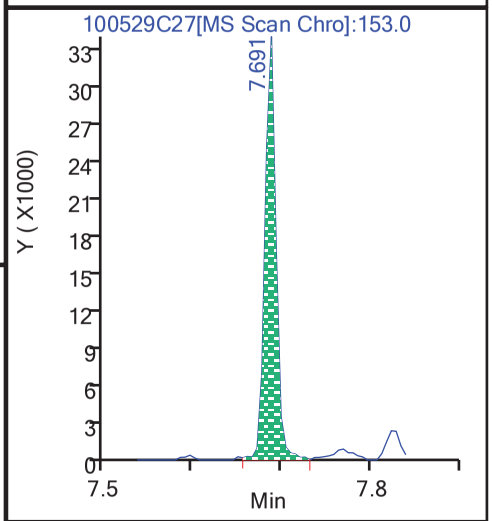


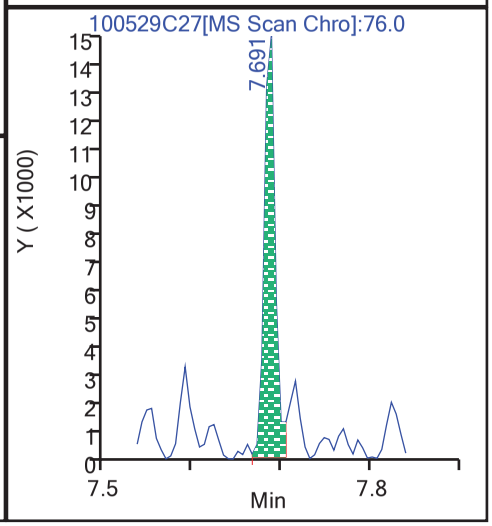












Report Date: 30-May-2018 08:28:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

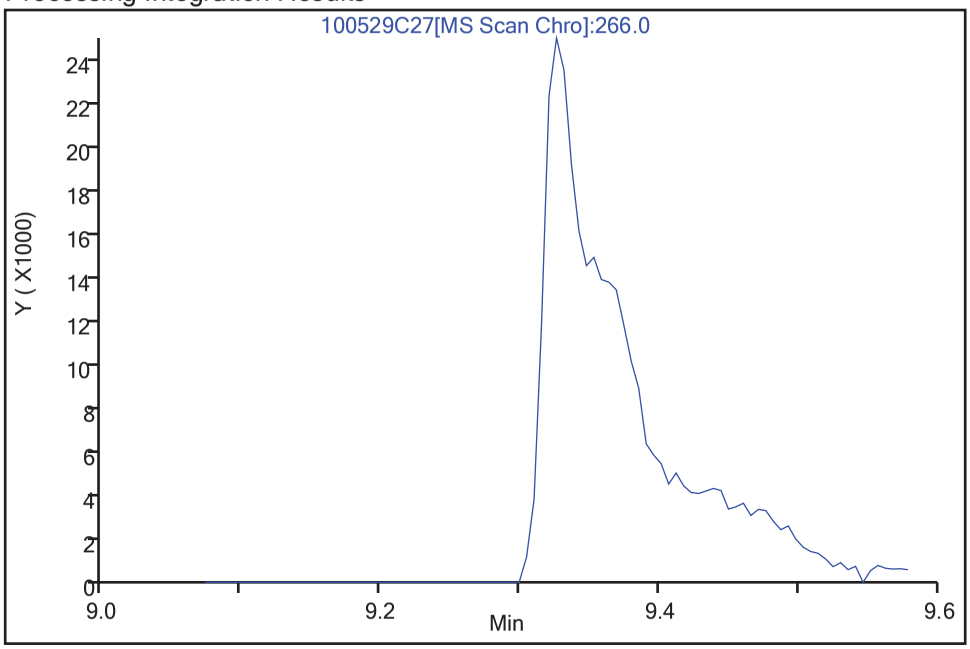
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C27.D		
Injection Date:	29-May-2018 21:15:30	Inst. ID:	msd10.i
Client ID:	BW16GW12	Lab ID:	TE22045-003
Sample Info:	10052918C.b, TE22045-003		
Injection Vol.	5.00 uL	Dil. Factor:	100.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

99 Pentachlorophenol, CAS: 87-86-5

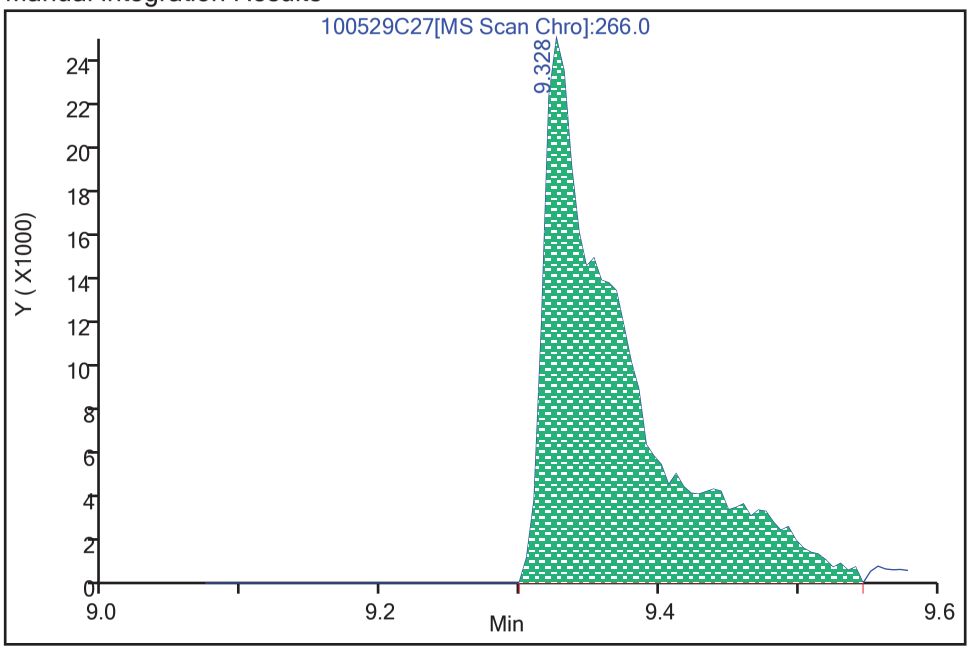
Not Detected
Expected RT: 9.296
RT Window: 8.724-9.867

Processing Integration Results



Manual Integration Results

RT: 9.328
Area: 100179
Conc: 2402.12
Conc Units: ug/L



Data Editor: cmp2, 30-May-2018 08:22:30
Audit Action: Mint
Audit Reason: Incorrect Auto Integration

CALIBRATION DATA

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Form 6

Batch: \\Organics\hh\chem\msd10.i\10052218D.b
Method: 8270DLVI-10.M Instrument: msd10
Cal Start Date: 22-May-2018 18:42:30 Cal End Date: 23-May-2018 04:25:30
Last Modified: 23-May-2018 08:37:30
No.Compounds: 175 Integrator: falcon

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 / %Drift	Level 2 / %Drift	Level 3 / %Drift	Level 4 / %Drift	Level 5 / %Drift	Level 6 / %Drift	Level 7 / %Drift	Level 8 / %Drift	Level 9 / %Drift	B	M1	Curve	RSD/RSE	R^2	Flags
S 214 Total PAHs	67.7556										67.7556	Avg	0.0		
193 1,4-Dioxane		0.212329	0.194551	0.235391	0.222929	0.240962	0.247393	0.272422	0.230960		0.232117	Avg	10.1		
		-8.5	-16.2	1.4	-4	3.8	6.6	17.4	-0.5						
2 N-Nitrosodimethylamine		0.546405	0.510559	0.547125	0.555323	0.533139	0.537000	0.548512	0.506733		0.535600	Avg	3.4		
		2	-4.7	2.2	3.7	-0.5	0.3	2.4	-5.4						
1 pyridine		0.614183	0.618422	0.647636	0.735573	0.794996	0.838072				0.708147	Avg	13.5		
		-13.3	-12.7	-8.5	3.9	12.3	18.3								
$ 6 2-Fluorophenol	1.327907	1.292593	1.339756	1.575006	1.584257	1.783610	1.496701	1.590650	1.513283		1.500418	Avg	10.5		
	-11.5	-13.9	-10.7	5	5.6	18.9	-0.2	6	0.9						
199 Benzaldehyde		0.841631	0.854266	0.902391	0.992905	0.953270	0.942159	0.981205	0.973146		0.930122	Avg	6.2		
		-9.5	-8.2	-3	6.7	2.5	1.3	5.5	4.6						
$ 9 Phenol-d5	1.666941	1.628609	1.648641	2.133491	2.045654	2.386252	1.895622	2.037455	1.884703		1.925263	Avg	13.2		
	-13.4	-15.4	-14.4	10.8	6.3	23.9	-1.5	5.8	-2.1						
10 Phenol		1.667183	1.681912	2.216871	2.163180	2.507267	2.008541	2.130146	1.973854		2.043619	Avg	13.7		
		-18.4	-17.7	8.5	5.9	22.7	-1.7	4.2	-3.4						
12 bis(2-Chloroethyl)ethe		1.067485	1.027914	1.181851	1.107494	1.288840	1.047038	1.097216	1.004623		1.102808	Avg	8.4		
		-3.2	-6.8	7.2	0.4	16.9	-5.1	-0.5	-8.9						
11 Aniline		0.109669	0.189807	0.355945	0.205991	0.320608	0.151993	0.142073	0.113429		0.198689	Avg	*46.7		C
		*-44.8	-4.5	*79.1	3.7	*61.4	-23.5	-28.5	*-42.9						
201 n-Decane		1.555598	1.499915	1.638403	1.594322	1.541103	1.594682	1.671110	1.473260		1.571049	Avg	4.3		
		-1	-4.5	4.3	1.5	-1.9	1.5	6.4	-6.2						
13 2-Chlorophenol		1.370651	1.345394	1.625511	1.556336	1.858404	1.521201	1.615732	1.508776		1.550251	Avg	10.4		
		-11.6	-13.2	4.9	0.4	19.9	-1.9	4.2	-2.7						
14 1,3-Dichlorobenzene		1.586765	1.530469	1.577633	1.670764	1.598800	1.599593	1.653582	1.553217		1.596353	Avg	2.9		
		-0.6	-4.1	-1.2	4.7	0.2	0.2	3.6	-2.7						
17 1,4-Dichlorobenzene		1.671785	1.622868	1.632236	1.740249	1.685787	1.669685	1.713302	1.618861		1.669347	Avg	2.6		
		0.1	-2.8	-2.2	4.2	1	0	2.6	-3						
18 Benzyl alcohol			0.258738	0.700749	0.891204	1.094731	0.896236	0.963751		0.076120	1.054133	WLn	8.2	0.992	
			0.7	-3.1	-0.2	14	-7.4	-2.5							
19 1,2-Dichlorobenzene		1.553238	1.501460	1.497124	1.561125	1.635912	1.546612	1.598071	1.508478		1.550253	Avg	3.2		
		0.2	-3.1	-3.4	0.7	5.5	-0.2	3.1	-2.7						

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 / %Drift	Level 2 / %Drift	Level 3 / %Drift	Level 4 / %Drift	Level 5 / %Drift	Level 6 / %Drift	Level 7 / %Drift	Level 8 / %Drift	Level 9 / %Drift	B	M1	Curve	RSD/RSE	R^2	Flags
21 bis(2Chloro1methylethy		1.989741	1.891118	2.273183	2.061872	2.337318	1.826532	1.938324	1.741132		2.007403	Avg	10.4		
		-0.9	-5.8	13.2	2.7	16.4	-9	-3.4	-13.3						
20 o-Cresol		1.203017	1.258343	1.539778	1.482157	1.729427	1.468086	1.579463	1.447811		1.463510	Avg	11.6		
		-17.8	-14	5.2	1.3	18.2	0.3	7.9	-1.1						
26 n-Nitroso-di-n-propyla		0.881347	0.912277	1.213929	1.096763	1.271414	0.993068	1.068672	0.986508		1.052997	Avg	13.1		
		-16.3	-13.4	15.3	4.2	20.7	-5.7	1.5	-6.3						
23 m+p-Cresol		1.331027	1.352444	1.855416	1.763178	1.933576	1.536589	1.634643	1.544140		1.618877	Avg	13.7		
		-17.8	-16.5	14.6	8.9	19.4	-5.1	1	-4.6						
24 Acetophenone		1.837737	1.813894	2.366243	2.157778	2.503648	1.957795	2.077245	1.922576		2.079614	Avg	12.0		
		-11.6	-12.8	13.8	3.8	20.4	-5.9	-0.1	-7.6						
28 Hexachloroethane		0.547504	0.543588	0.537292	0.589276	0.581566	0.582456	0.597263	0.563784		0.567841	Avg	4.0		
		-3.6	-4.3	-5.4	3.8	2.4	2.6	5.2	-0.7						
$ 29 Nitrobenzene-d5	0.317523	0.321829	0.319280	0.345878	0.389852	0.380225	0.376688	0.384927	0.365171		0.355708	Avg	8.4		
	-10.7	-9.5	-10.2	-2.8	9.6	6.9	5.9	8.2	2.7						
30 Nitrobenzene		0.350127	0.346240	0.364078	0.392851	0.376994	0.377231	0.381189	0.361214		0.368740	Avg	4.4		
		-5	-6.1	-1.3	6.5	2.2	2.3	3.4	-2						
32 Isophorone		0.528954	0.544867	0.586120	0.660509	0.652061	0.663834	0.684435	0.650837		0.621452	Avg	9.6		
		-14.9	-12.3	-5.7	6.3	4.9	6.8	10.1	4.7						
33 2-Nitrophenol		0.132994	0.145975	0.163932	0.192645	0.198949	0.199709	0.206161	0.200274	0.023202	0.204065	Ln	6.8	0.998	
		11.6	-5.3	-10.4	-1	0.6	0.2	2.9	-0.3						
34 2,4-Dimethylphenol		0.228297	0.216448	0.240944	0.273980	0.257573	0.256523	0.268992	0.258073		0.250104	Avg	8.0		
		-8.7	-13.5	-3.7	9.5	3	2.6	7.6	3.2						
35 bis(2-Chloroethoxy)met		0.383510	0.376231	0.385572	0.410362	0.403082	0.406706	0.417793	0.403778		0.398379	Avg	3.7		
		-3.7	-5.6	-3.2	3	1.2	2.1	4.9	1.4						
36 Benzoic acid		0.096763	0.108773	0.150409	0.209987	0.218034	0.230330	0.241674	0.237587	0.084747	0.239383	WLn	14.4	0.992	
		25.2	-12.2	-20.2	-3.8	-3.3	0.5	4.3	2.1						
38 2,4-Dichlorophenol		0.237775	0.244153	0.262247	0.291807	0.292194	0.297472	0.307714	0.303626		0.279623	Avg	9.8		
		-15	-12.7	-6.2	4.4	4.5	6.4	10	8.6						
40 1,2,4-Trichlorobenzene		0.291122	0.272216	0.276225	0.307335	0.313791	0.314259	0.321550	0.307853		0.300544	Avg	6.1		
		-3.1	-9.4	-8.1	2.3	4.4	4.6	7	2.4						
43 Naphthalene	1.232062	1.069373	1.014388	1.017484	1.079513	1.042046	1.031267	1.036956	0.971490		1.054953	Avg	7.0		
	16.8	1.4	-3.8	-3.6	2.3	-1.2	-2.2	-1.7	-7.9						
44 4-Chloroaniline		0.309568	0.340962	0.373274	0.408149	0.409751	0.410864	0.425939	0.419971		0.387310	Avg	10.9		
		-20.1	-12	-3.6	5.4	5.8	6.1	10	8.4						
45 2,6-Dichlorophenol		0.254096	0.254380	0.266830	0.292990	0.295154	0.303170	0.311723	0.305499		0.285480	Avg	8.2		
		-11	-10.9	-6.5	2.6	3.4	6.2	9.2	7						
47 Hexachlorobutadiene		0.153323	0.144655	0.149934	0.170325	0.172448	0.173068	0.176414	0.170544		0.163839	Avg	7.6		
		-6.4	-11.7	-8.5	4	5.3	5.6	7.7	4.1						
196 Caprolactam		0.067242	0.069425	0.086665	0.100928	0.104415	0.107410	0.113492	0.111495	0.029318	0.111754	WLn	9.9	0.997	
		18.8	-8.6	-10.7	-3.8	-2.7	-1	3.9	1.7						
49 4-Chloro-3-methylpheno		0.263301	0.259844	0.278830	0.317529	0.308827	0.317314	0.324830	0.311768		0.297780	Avg	8.8		
		-11.6	-12.7	-6.4	6.6	3.7	6.6	9.1	4.7						

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 / %Drift	Level 2 / %Drift	Level 3 / %Drift	Level 4 / %Drift	Level 5 / %Drift	Level 6 / %Drift	Level 7 / %Drift	Level 8 / %Drift	Level 9 / %Drift	B	M1	Curve	RSD/RSE	R^2	Flags
51 2-Methylnaphthalene	0.810510	0.679881	0.660199	0.660174	0.707847	0.710298	0.716808	0.742188	0.710254		0.710906	Avg	6.5		
	14	-4.4	-7.1	-7.1	-0.4	-0.1	0.8	4.4	-0.1						
204 1-Methylnaphthalene	0.813214	0.674171	0.652810	0.644999	0.696085	0.692709	0.698124	0.722433	0.684744		0.697699	Avg	7.1		
	16.6	-3.4	-6.4	-7.6	-0.2	-0.7	0.1	3.5	-1.9						
53 Hexachlorocyclopentadi		0.266206	0.268526	0.299916	0.334735	0.335489	0.321547	0.326143	0.294096		0.305832	Avg	9.2		
		-13	-12.2	-1.9	9.5	9.7	5.1	6.6	-3.8						
52 1,2,4,5-Tetrachloroben		0.523931	0.478827	0.502540	0.543113	0.577743	0.582756	0.608315	0.595200		0.551553	Avg	8.5		
		-5	-13.2	-8.9	-1.5	4.7	5.7	10.3	7.9						
54 2,4,6-Trichlorophenol		0.272479	0.281885	0.307591	0.357773	0.372172	0.375908	0.394842	0.384860		0.343439	Avg	14.2		
		-20.7	-17.9	-10.4	4.2	8.4	9.5	15	12.1						
55 2,4,5-Trichlorophenol		0.292105	0.299965	0.339937	0.390605	0.399512	0.408532	0.423151	0.409651		0.370432	Avg	14.1		
		-21.1	-19	-8.2	5.4	7.9	10.3	14.2	10.6						
$ 56 2-Fluorobiphenyl	1.648234	1.429673	1.345285	1.396033	1.497081	1.505630	1.518304	1.563774	1.500612		1.489403	Avg	6.1		
	10.7	-4	-9.7	-6.3	0.5	1.1	1.9	5	0.8						
184 Biphenyl		1.624936	1.572951	1.566639	1.702809	1.699098	1.701244	1.742382	1.640484		1.656318	Avg	3.9		
		-1.9	-5	-5.4	2.8	2.6	2.7	5.2	-1						
58 2-Chloronaphthalene		1.195270	1.124465	1.138254	1.235644	1.250689	1.261924	1.299030	1.251924		1.219650	Avg	5.1		
		-2	-7.8	-6.7	1.3	2.5	3.5	6.5	2.6						
183 Diphenyl ether		0.857531	0.821059	0.846691	0.862385	0.886199	0.882585				0.859408	Avg	2.8		
		-0.2	-4.5	-1.5	0.3	3.1	2.7								
60 2-Nitroaniline		0.242907	0.256000	0.325520	0.382238	0.389325	0.401211	0.403045	0.404284	0.028054	0.408335	WLn	8.3	0.998	
		15.6	-9.3	-9.1	-0.8	-0.9	1.1	0.9	0.9						
62 Dimethylphthalate		1.223208	1.199963	1.234125	1.342398	1.355177	1.361755	1.400818	1.356437		1.309235	Avg	5.9		
		-6.6	-8.3	-5.7	2.5	3.5	4	7	3.6						
65 2,6-Dinitrotoluene		0.232779	0.260509	0.290336	0.326320	0.334291	0.340275	0.354473	0.348026		0.310876	Avg	14.4		
		-25.1	-16.2	-6.6	5	7.5	9.5	14	12						
64 Acenaphthylene	1.597001	1.627345	1.628903	1.718473	1.855681	1.813863	1.808132	1.851827	1.755282		1.739612	Avg	5.8		
	-8.2	-6.5	-6.4	-1.2	6.7	4.3	3.9	6.5	0.9						
66 3-Nitroaniline		0.180378	0.187681	0.253938	0.297869	0.305607	0.322500	0.329712	0.334864	0.032840	0.332148	WLn	10.5	0.997	
		20	-10.7	-10.4	-3.8	-3.6	0.4	1.9	3						
68 Acenaphthene	1.420140	1.265888	1.208649	1.224003	1.293967	1.270938	1.269217	1.297969	1.234508		1.276142	Avg	4.9		
	11.3	-0.8	-5.3	-4.1	1.4	-0.4	-0.5	1.7	-3.3						
69 2,4-Dinitrophenol			0.070416	0.109960	0.159922	0.173891	0.187871	0.198120	0.200139	0.154871	0.204210	WLn	9.5	0.994	
			11.9	-15.2	-6.2	-4.5	-0.3	3.2	3.2						
70 4-Nitrophenol			0.098063	0.129712	0.162085	0.152691	0.158135	0.162257	0.153564	0.081247	0.163718	WLn	4.3	0.998	
			0.5	-4.5	7.1	-1.3	0.7	2.4	-3.5						
73 2,4-Dinitrotoluene		0.259731	0.303697	0.352752	0.417690	0.425715	0.428984	0.442994	0.430792	0.025878	0.440788	WLn	6.3	0.999	
		10.7	-5.2	-9.6	-0.1	0	-0.1	2.6	-0.5						
71 Dibenzofuran	1.893159	1.684934	1.598625	1.604197	1.663312	1.643498	1.658367	1.704463	1.625013		1.675063	Avg	5.3		
	13	0.6	-4.6	-4.2	-0.7	-1.9	-1	1.8	-3						
76 2,3,4,6-Tetrachlorophe		0.188194	0.201647	0.213572	0.258504	0.268975	0.280099	0.292243	0.291255	0.026875	0.288817	WLn	10.5	0.996	
		18.9	-3.3	-15.3	-5.1	-3.3	-0.3	3.3	2.6						

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 / %Drift	Level 2 / %Drift	Level 3 / %Drift	Level 4 / %Drift	Level 5 / %Drift	Level 6 / %Drift	Level 7 / %Drift	Level 8 / %Drift	Level 9 / %Drift	B	M1	Curve	RSD/RSE	R^2	Flags
78 Diethylphthalate		1.141915	1.123021	1.186412	1.291375	1.264152	1.270058	1.311680	1.247785		1.229550	Avg	5.7		
		-7.1	-8.7	-3.5	5	2.8	3.3	6.7	1.5						
80 4-Chlorophenylphenylet		0.623652	0.588441	0.597504	0.639065	0.649123	0.668941	0.702920	0.686302		0.644493	Avg	6.3		
		-3.2	-8.7	-7.3	-0.8	0.7	3.8	9.1	6.5						
79 Fluorene	1.608868	1.413273	1.353665	1.365344	1.454157	1.448193	1.459835	1.507482	1.454798		1.451735	Avg	5.2		
	10.8	-2.6	-6.8	-6	0.2	-0.2	0.6	3.8	0.2						
84 4,6-Dinitro-2-methylph				0.089699	0.120488	0.125728	0.127784	0.137610	0.135122	0.094848	0.145278	WLn	2	0.999	
				-0.3	1.9	-0.8	-2.6	2.3	-0.7						
83 4-Nitroaniline		0.148582	0.165629	0.232611	0.293094	0.304022	0.318641	0.331087	0.331523	0.038283	0.331023	WLn	11.9	0.996	
		21.5	-11.7	-14.4	-3.8	-3.1	0.1	3.1	2.7						
86 n-Nitrosodiphenylamine		0.545287	0.541556	0.545712	0.591586	0.574055	0.582078	0.604208	0.584103		0.571073	Avg	4.2		
		-4.5	-5.2	-4.4	3.6	0.5	1.9	5.8	2.3						
87 Azobenzene		0.816319	0.836937	0.872521	0.885303	0.841571	0.824764	0.858554	0.808975		0.843118	Avg	3.2		
		-3.2	-0.7	3.5	5	-0.2	-2.2	1.8	-4						
$ 88 2,4,6-Tribromophenol				0.069396	0.085222	0.089576	0.092832	0.098943	0.101412		0.089563	Avg	12.9		
				-22.5	-4.8	0	3.6	10.5	13.2						
94 4-Bromophenylphenyleth		0.176894	0.179270	0.183380	0.202531	0.207078	0.208892	0.221223	0.219406		0.199834	Avg	8.9		
		-11.5	-10.3	-8.2	1.3	3.6	4.5	10.7	9.8						
96 Hexachlorobenzene		0.179658	0.175096	0.181842	0.203466	0.210988	0.210654	0.227600	0.225107		0.201801	Avg	10.2		
		-11	-13.2	-9.9	0.8	4.6	4.4	12.8	11.5						
200 Atrazine		0.157075	0.159011	0.192361	0.215826	0.215029	0.223336	0.223232	0.222259		0.201016	Avg	14.1		
		-21.9	-20.9	-4.3	7.4	7	11.1	11.1	10.6						
202 Octadecane		0.536134	0.521498	0.532894	0.548044	0.519473	0.503540	0.516085	0.485384		0.520381	Avg	3.8		
		3	0.2	2.4	5.3	-0.2	-3.2	-0.8	-6.7						
99 Pentachlorophenol			0.082780	0.100082	0.133572	0.141352	0.147465	0.155129	0.157686	0.121131	0.159237	WLn	8.6	0.996	
			12.6	-12.9	-4	-3.2	-1.3	2.3	3.1						
103 Phenanthrene	1.371129	1.123969	1.068895	1.086682	1.157724	1.135550	1.103393	1.151948	1.095238		1.143836	Avg	7.9		
	19.9	-1.7	-6.6	-5	1.2	-0.7	-3.5	0.7	-4.2						
104 Anthracene	1.064425	0.960794	0.958472	1.024771	1.095342	1.081711	1.064619	1.103473	1.042750		1.044040	Avg	5.1		
	2	-8	-8.2	-1.8	4.9	3.6	2	5.7	-0.1						
106 Carbazole		0.963489	0.946264	0.959703	1.022902	0.985608	0.970959	1.003626	0.961799		0.976794	Avg	2.6		
		-1.4	-3.1	-1.7	4.7	0.9	-0.6	2.7	-1.5						
109 Di-n-butylphthalate		0.939184	1.008965	1.127484	1.270927	1.220572	1.194138	1.221546	1.150748		1.141696	Avg	10.0		
		-17.7	-11.6	-1.2	11.3	6.9	4.6	7	0.8						
114 Fluoranthene	1.061478	1.006668	1.004643	1.057067	1.151253	1.116648	1.094503	1.136219	1.087621		1.079567	Avg	4.8		
	-1.7	-6.8	-6.9	-2.1	6.6	3.4	1.4	5.2	0.7						
115 Benzidine		0.353811	0.462073	0.649427	0.792615	0.793765	0.802074	0.743301	0.741875	0.155780	0.788731	WLn	7.1	0.997	
		7.2	-10.3	-5.2	6.7	4.8	4.8	-3.3	-3.9						
116 Pyrene	1.243883	1.141288	1.136311	1.194740	1.300191	1.251178	1.224385	1.274026	1.217753		1.220417	Avg	4.6		
	1.9	-6.5	-6.9	-2.1	6.5	2.5	0.3	4.4	-0.2						
$ 117 Terphenyl-d14	0.925351	0.814370	0.787491	0.812920	0.892692	0.880527	0.882741	0.930166	0.893945		0.868911	Avg	5.9		
	6.5	-6.3	-9.4	-6.4	2.7	1.3	1.6	7	2.9						

Report Date: 23-May-2018 09:12:03 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 / %Drift	Level 2 / %Drift	Level 3 / %Drift	Level 4 / %Drift	Level 5 / %Drift	Level 6 / %Drift	Level 7 / %Drift	Level 8 / %Drift	Level 9 / %Drift	B	M1	Curve	RSD/RSE	R^2	Flags
122 Butylbenzylphthalate		0.333857	0.376465	0.460436	0.584524	0.576881	0.582394	0.597682	0.580621	0.028816	0.598398	WLn	8.2	0.998	
		13.4	-8.3	-11.5	3.4	0.2	0.2	2.2	-1						
130 bis(2-Ethylhexyl)phtha		0.405471	0.476531	0.616250	0.807892	0.794553	0.808857	0.837862	0.809953	0.033224	0.835897	WLn	9.2	0.997	
		15	-9.8	-13	3.3	-0.5	0.1	2.9	-0.9						
125 3,3'-Dichlorobenzidine		0.242533	0.256342	0.276575	0.354880	0.385432	0.415407	0.426575	0.464877	0.083215	0.468785	Ln	51	0.992	
		*118.2	*37.9	-7.7	-7.7	-6.7	-3.1	-2.3	4.7						
127 Benzo(a)Anthracene	1.259771	0.997348	0.977822	1.034505	1.160461	1.130132	1.126179	1.178233	1.139258		1.111523	Avg	8.2		
	13.3	-10.3	-12	-6.9	4.4	1.7	1.3	6	2.5						
129 Chrysene	1.333166	1.102340	1.045817	1.065692	1.152563	1.137243	1.135488	1.192383	1.138213		1.144767	Avg	7.3		
	16.5	-3.7	-8.6	-6.9	0.7	-0.7	-0.8	4.2	-0.6						
131 Di-n-octylphthalate		0.583141	0.724476	0.979386	1.292972	1.331210	1.376808	1.454195	1.412717	0.039171	1.437373	WLn	11.2	0.995	
		18.9	-10.4	-16.2	-2.2	-2.2	-0.3	4.3	0.9						
132 Benzo(b)fluoranthene	1.009735	0.900040	0.889015	0.996158	1.122527	1.101765	1.166904	1.216630	1.168704		1.063498	Avg	11.3		
	-5.1	-15.4	-16.4	-6.3	5.6	3.6	9.7	14.4	9.9						
134 Benzo(k)fluoranthene	1.076465	0.938698	0.994647	1.046817	1.166793	1.213587	1.192915	1.305783	1.310448		1.138462	Avg	11.6		
	-5.4	-17.5	-12.6	-8	2.5	6.6	4.8	14.7	15.1						
135 Benzo(a)pyrene	0.777994	0.741613	0.773169	0.854716	0.963791	0.985825	0.996492	1.051953	1.035681		0.909026	Avg	13.5		
	-14.4	-18.4	-14.9	-6	6	8.4	9.6	15.7	13.9						
138 Indeno(1,2,3-c,d)pyren	1.100605	1.056873	1.081209	1.139396	1.233813	1.186496	1.196754	1.244891	1.191854		1.159099	Avg	5.8		
	-5	-8.8	-6.7	-1.7	6.4	2.4	3.2	7.4	2.8						
139 Dibenzo(a,h)anthracene	1.030705	0.935187	0.951657	0.992647	1.099852	1.069058	1.100800	1.160854	1.103289		1.049339	Avg	7.3		
	-1.8	-10.9	-9.3	-5.4	4.8	1.9	4.9	10.6	5.1						
140 Benzo(g,h,i)perylene	1.038115	0.922327	0.924345	0.950942	0.987564	0.917134	0.916881	0.941723	0.877920		0.941884	Avg	5.0		
	10.2	-2.1	-1.9	1	4.8	-2.6	-2.7	0	-6.8						

QC Flag Legend

C - Fails Curve Fit Error Test

Shealy Environmental Services
Initial Calibration RT Report

Batch: \\Organics\hh\chem\msd10.i\10052218D.b
Method: 8270DLVI-10.M Instrument: msd10
Cal Start Date: 22-May-2018 18:42:30 Cal End Date: 23-May-2018 04:25:30
Last Modified: 23-May-2018 08:37:30
No.Compounds: 175 Integrator: falcon

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Avg. RRT	%Rsd RT	Flags
S 214 Total PAHs										1.000	0.000	
193 1,4-Dioxane		3.840	3.835	3.829	3.829	3.829	3.829	3.824	3.824	3.830	0.137	
2 N-Nitrosodimethylamine		4.038	4.022	4.022	4.017	4.017	4.017	4.011	4.011	4.019	0.212	
1 pyridine		4.161	4.118	4.097	4.081	4.081	4.075			4.102	0.800	
$ 6 2-Fluorophenol	4.856	4.851	4.851	4.851	4.851	4.851	4.851	4.851	4.851	4.852	0.036	
199 Benzaldehyde		5.466	5.466	5.466	5.466	5.466	5.466	5.466	5.466	5.466	0.002	
$ 9 Phenol-d5	5.482	5.482	5.477	5.477	5.482	5.482	5.482	5.482	5.488	5.481	0.060	
10 Phenol		5.493	5.487	5.487	5.493	5.493	5.493	5.493	5.498	5.492	0.064	
11 Aniline		5.546	5.546	5.541	5.546	5.546	5.546	5.546	5.546	5.546	0.035	
12 bis(2-Chloroethyl)ethe		5.546	5.546	5.546	5.546	5.546	5.552	5.552	5.552	5.548	0.051	
201 n-Decane		5.578	5.578	5.578	5.578	5.578	5.584	5.584	5.584	5.580	0.051	
13 2-Chlorophenol		5.637	5.637	5.637	5.637	5.637	5.637	5.637	5.637	5.637	0.002	
14 1,3-Dichlorobenzene		5.739	5.739	5.739	5.739	5.739	5.744	5.744	5.744	5.741	0.050	
17 1,4-Dichlorobenzene		5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	0.001	
18 Benzyl alcohol			5.894	5.878	5.878	5.878	5.878	5.878		5.881	0.111	
19 1,2-Dichlorobenzene		5.921	5.921	5.921	5.921	5.921	5.921	5.921	5.921	5.921	0.001	
21 bis(2Chloro1methylethy		5.942	5.942	5.942	5.942	5.942	5.942	5.942	5.942	5.942	0.001	
20 o-Cresol		5.942	5.942	5.942	5.947	5.947	5.947	5.948	5.948	5.945	0.047	
26 n-Nitroso-di-n-propyla		6.049	6.049	6.049	6.054	6.054	6.060	6.060	6.060	6.054	0.083	
23 m+p-Cresol		6.060	6.060	6.060	6.060	6.060	6.065	6.065	6.065	6.062	0.047	
24 Acetophenone		6.081	6.081	6.081	6.081	6.081	6.087	6.081	6.087	6.082	0.042	
28 Hexachloroethane		6.183	6.183	6.183	6.183	6.183	6.188	6.183	6.183	6.183	0.031	
$ 29 Nitrobenzene-d5	6.215	6.215	6.215	6.215	6.215	6.215	6.220	6.220	6.220	6.217	0.044	
30 Nitrobenzene		6.231	6.231	6.231	6.231	6.231	6.236	6.236	6.236	6.233	0.046	
32 Isophorone		6.397	6.397	6.397	6.402	6.402	6.402	6.402	6.408	6.401	0.060	
34 2,4-Dimethylphenol		6.482	6.482	6.482	6.482	6.482	6.482	6.482	6.488	6.483	0.030	
33 2-Nitrophenol		6.482	6.482	6.482	6.482	6.482	6.482	6.482	6.482	6.482	0.001	
35 bis(2-Chloroethoxy)met		6.546	6.541	6.541	6.546	6.546	6.546	6.547	6.547	6.545	0.039	
36 Benzoic acid		6.525	6.536	6.546	6.573	6.573	6.595	6.600	6.611	6.570	0.480	
38 2,4-Dichlorophenol		6.675	6.675	6.675	6.675	6.675	6.680	6.680	6.680	6.677	0.043	
40 1,2,4-Trichlorobenzene		6.734	6.734	6.734	6.734	6.734	6.739	6.739	6.739	6.736	0.042	
43 Naphthalene	6.814	6.814	6.814	6.814	6.819	6.819	6.819	6.819	6.819	6.817	0.042	
44 4-Chloroaniline		6.857	6.857	6.851	6.851	6.851	6.851	6.851	6.851	6.853	0.035	
45 2,6-Dichlorophenol		6.857	6.857	6.857	6.857	6.857	6.862	6.862	6.862	6.859	0.041	
47 Hexachlorobutadiene		6.889	6.889	6.889	6.889	6.889	6.889	6.889	6.889	6.889	0.001	
196 Caprolactam		7.156	7.145	7.140	7.140	7.140	7.146	7.146	7.145	7.145	0.074	
49 4-Chloro-3-methylpheno		7.236	7.236	7.236	7.236	7.236	7.236	7.237	7.237	7.236	0.001	
51 2-Methylnaphthalene	7.375	7.375	7.375	7.375	7.381	7.381	7.381	7.381	7.381	7.378	0.039	
204 1-Methylnaphthalene	7.466	7.466	7.466	7.466	7.466	7.466	7.466	7.467	7.467	7.466	0.001	
53 Hexachlorocyclopentadi		7.499	7.498	7.498	7.498	7.498	7.504	7.504	7.504	7.501	0.038	
52 1,2,4,5-Tetrachloroben		7.509	7.509	7.514	7.515	7.515	7.515	7.515	7.520	7.514	0.046	
54 2,4,6-Trichlorophenol		7.611	7.611	7.611	7.611	7.611	7.611	7.611	7.611	7.611	0.001	
55 2,4,5-Trichlorophenol		7.654	7.654	7.654	7.654	7.654	7.654	7.654	7.654	7.654	0.001	
$ 56 2-Fluorobiphenyl	7.664	7.664	7.664	7.670	7.670	7.670	7.670	7.670	7.670	7.668	0.035	
184 Biphenyl		7.755	7.755	7.761	7.761	7.761	7.761	7.761	7.761	7.759	0.032	
58 2-Chloronaphthalene		7.793	7.793	7.793	7.798	7.798	7.798	7.798	7.798	7.796	0.036	
183 Diphenyl ether		7.835	7.835	7.836	7.836	7.835	7.835			7.835	0.001	
60 2-Nitroaniline		7.889	7.889	7.884	7.889	7.889	7.889	7.889	7.889	7.888	0.024	

Report Date: 23-May-2018 09:12:04 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Avg. RRT	%Rsd RT	Flags
62 Dimethylphthalate		7.991	7.991	7.991	7.996	7.996	7.996	8.001	8.001	7.995	0.057	
65 2,6-Dinitrotoluene		8.060	8.060	8.060	8.065	8.065	8.065	8.066	8.071	8.064	0.048	
64 Acenaphthylene	8.151	8.151	8.151	8.151	8.151	8.151	8.156	8.157	8.157	8.153	0.034	
66 3-Nitroaniline		8.237	8.237	8.237	8.237	8.237	8.237	8.237	8.237	8.237	0.001	
68 Acenaphthene	8.290	8.290	8.290	8.290	8.295	8.295	8.295	8.296	8.296	8.293	0.035	
69 2,4-Dinitrophenol			8.301	8.301	8.306	8.306	8.306	8.312	8.312	8.306	0.054	
70 4-Nitrophenol			8.370	8.370	8.370	8.370	8.376	8.376	8.381	8.373	0.051	
73 2,4-Dinitrotoluene		8.402	8.402	8.402	8.408	8.408	8.408	8.413	8.413	8.407	0.054	
71 Dibenzofuran	8.434	8.435	8.434	8.434	8.440	8.440	8.440	8.440	8.440	8.437	0.034	
76 2,3,4,6-Tetrachlorophe		8.536	8.536	8.536	8.536	8.536	8.542	8.542	8.542	8.538	0.033	
78 Diethylphthalate		8.568	8.568	8.568	8.568	8.568	8.574	8.574	8.579	8.571	0.048	
80 4-Chlorophenylphenylet		8.697	8.697	8.697	8.697	8.697	8.697	8.697	8.697	8.697	0.001	
79 Fluorene	8.723	8.723	8.723	8.723	8.729	8.729	8.729	8.729	8.729	8.726	0.033	
84 4,6-Dinitro-2-methylph				8.750	8.750	8.750	8.755	8.756	8.756	8.753	0.035	
83 4-Nitroaniline		8.766	8.766	8.761	8.761	8.761	8.761	8.766	8.766	8.763	0.032	
86 n-Nitrosodiphenylamine		8.798	8.798	8.798	8.798	8.798	8.804	8.804	8.804	8.800	0.032	
87 Azobenzene		8.830	8.830	8.830	8.830	8.830	8.836	8.836	8.836	8.832	0.032	
$ 88 2,4,6-Tribromophenol				8.932	8.937	8.937	8.937	8.937	8.937	8.936	0.025	
94 4-Bromophenylphenyleth		9.114	9.114	9.114	9.114	9.114	9.114	9.114	9.114	9.114	0.001	
96 Hexachlorobenzene		9.189	9.189	9.189	9.189	9.189	9.194	9.194	9.194	9.191	0.031	
200 Atrazine		9.215	9.215	9.215	9.215	9.215	9.215	9.216	9.221	9.216	0.020	
202 Octadecane		9.290	9.290	9.290	9.290	9.290	9.290	9.290	9.290	9.290	0.001	
99 Pentachlorophenol			9.360	9.360	9.365	9.365	9.365	9.365	9.365	9.364	0.028	
103 Phenanthrene	9.547	9.547	9.547	9.552	9.552	9.552	9.552	9.553	9.558	9.551	0.038	
104 Anthracene	9.590	9.590	9.590	9.595	9.595	9.595	9.595	9.595	9.595	9.593	0.028	
106 Carbazole		9.724	9.724	9.723	9.729	9.729	9.729	9.729	9.729	9.727	0.029	
109 Di-n-butylphthalate		9.921	9.921	9.921	9.927	9.927	9.927	9.927	9.927	9.925	0.028	
114 Fluoranthene	10.617	10.617	10.617	10.617	10.617	10.617	10.617	10.622	10.622	10.618	0.023	
115 Benzidine		10.729	10.729	10.729	10.734	10.734	10.740	10.745	10.750	10.736	0.075	
116 Pyrene	10.857	10.857	10.857	10.857	10.857	10.857	10.863	10.863	10.863	10.859	0.025	
$ 117 Terphenyl-d14	10.948	10.948	10.948	10.954	10.954	10.954	10.954	10.954	10.954	10.952	0.025	
122 Butylbenzylphthalate		11.456	11.451	11.456	11.456	11.456	11.457	11.457	11.457	11.456	0.017	
130 bis(2-Ethylhexyl)phtha		12.130	12.130	12.130	12.130	12.130	12.130	12.131	12.136	12.131	0.016	
125 3,3'-Dichlorobenzidine		12.227	12.221	12.221	12.221	12.227	12.227	12.227	12.227	12.225	0.023	
127 Benzo(a)Anthracene	12.285	12.286	12.286	12.285	12.285	12.285	12.291	12.291	12.291	12.287	0.022	
129 Chrysene	12.339	12.339	12.339	12.339	12.344	12.344	12.350	12.350	12.355	12.344	0.049	
131 Di-n-octylphthalate		13.066	13.066	13.066	13.066	13.066	13.066	13.067	13.072	13.067	0.015	
132 Benzo(b)fluoranthene	13.869	13.869	13.869	13.869	13.874	13.874	13.879	13.880	13.885	13.874	0.044	
134 Benzo(k)fluoranthene	13.906	13.906	13.906	13.911	13.917	13.917	13.922	13.922	13.928	13.915	0.058	
135 Benzo(a)pyrene	14.387	14.388	14.388	14.387	14.393	14.393	14.398	14.398	14.404	14.393	0.042	
138 Indeno(1,2,3-c,d)pyren	16.404	16.404	16.404	16.409	16.420	16.420	16.436	16.442	16.452	16.421	0.111	
139 Dibenzo(a,h)anthracene	16.415	16.415	16.409	16.420	16.431	16.431	16.441	16.447	16.452	16.429	0.094	
140 Benzo(g,h,i)perylene	16.992	16.992	16.987	16.998	17.008	17.008	17.019	17.025	17.030	17.007	0.091	

Shealy Environmental Services
Form 6 Response

Batch: \\Organics\hh\chem\msd10.i\10052218D.b
Method: 8270DLVI-10.M Instrument: msd10
Cal Start Date: 22-May-2018 18:42:30 Cal End Date: 23-May-2018 04:25:30
Last Modified: 23-May-2018 08:37:30
No.Compounds: 175 Integrator: falcon

Internal Standards

* 16 1,4-Dichlorobenzene-d4
* 41 Naphthalene-d8
* 67 Acenaphthene-d10
* 102 Phenanthrene-d10
* 128 Chrysene-d12
* 136 Perylene-d12

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 Conc/Rsp	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Istd #
S 214 Total PAHs	0.20000									#16
	530398									
193 1,4-Dioxane		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		9088	16116	38708	93471	141941	223909	264188	301270	
2 N-Nitrosodimethylamine		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		23387	42293	89970	232839	314051	486024	531934	660995	
1 pyridine		1.0000	2.0000	5.0000	10.000	15.000	20.000			#16
		26288	51228	106498	308415	468300	758516			
$ 6 2-Fluorophenol	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
	10395	55325	110981	258996	664256	1050653	1354624	1542575	1973963	
199 Benzaldehyde		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		31975	63127	179933	353486	498883	687741	1053248	1093081	
$ 9 Phenol-d5	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
	13049	69707	136568	350834	857713	1405645	1715676	1975875	2458452	
10 Phenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		71358	139324	364545	906990	1476930	1817876	2065765	2574743	
11 Aniline		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		4694	15723	58532	86369	188857	137565	137779	147960	
12 bis(2-Chloroethyl)ethe		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		45690	85149	194345	464356	759204	947646	1064054	1310455	
201 n-Decane		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		66582	124248	269421	668476	907802	1443304	1620603	1921756	
13 2-Chlorophenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		58666	111448	267301	652549	1094711	1376798	1566899	1968083	
14 1,3-Dichlorobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		67916	126779	259428	700527	941789	1447748	1603605	2026053	
17 1,4-Dichlorobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		71555	134433	268407	729661	993029	1511187	1661520	2111681	
18 Benzyl alcohol			2.0000	5.0000	10.000	15.000	20.000	25.000		#16
			21433	115232	373669	644862	811159	934623		
19 1,2-Dichlorobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		66481	124376	246189	654557	963650	1399797	1549771	1967695	
21 bis(2Chloro1methylethy		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		85164	156654	373805	864513	1376820	1653145	1879741	2271175	
20 o-Cresol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		51491	104237	253203	621447	1018736	1328725	1531726	1888559	
26 n-Nitroso-di-n-propyla		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		37723	75570	199620	459857	748939	898799	1036373	1286825	

Report Date: 23-May-2018 09:12:04 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 Conc/Rsp	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Istd #
23 m+p-Cresol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		56970	112032	305107	739275	1138992	1390725	1585238	2014213	
24 Acetophenone		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		78658	150257	389108	904725	1474798	1771947	2014463	2507854	
28 Hexachloroethane		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#16
		23434	45029	88353	247075	342577	527165	579211	735414	
$ 29 Nitrobenzene-d5	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
	10570	56533	107640	286798	699727	1138792	1366383	1568880	1939422	
30 Nitrobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		61504	116729	301889	705111	1129117	1368352	1553644	1918404	
32 Isophorone		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		92917	183693	486003	1185517	1952955	2407967	2789613	3456592	
34 2,4-Dimethylphenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		40103	72972	199788	491755	771445	930500	1096355	1370623	
33 2-Nitrophenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		23362	49213	135930	345769	595862	724417	840270	1063657	
35 bis(2-Chloroethoxy)met		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		67368	126840	319711	736541	1207251	1475270	1702837	2144463	
36 Benzoic acid		2.0000	4.0000	10.000	20.000	30.000	40.000	50.000	60.000	#41
		33995	73342	249435	753794	1306046	1670981	1970024	2523652	
38 2,4-Dichlorophenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		41768	82312	217452	523752	875135	1079038	1254175	1612556	
40 1,2,4-Trichlorobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		51139	91773	229042	551622	939821	1139932	1310569	1635005	
43 Naphthalene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
	41014	187848	341984	843685	1937569	3120982	3740779	4226412	5159580	
44 4-Chloroaniline		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		56640	121529	319704	762763	1102639	1437755	1908060	2185759	
45 2,6-Dichlorophenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		44635	85760	221252	525875	884002	1099709	1270517	1622503	
47 Hexachlorobutadiene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		26933	48768	124323	305708	516491	627782	719026	905759	
196 Caprolactam		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		12303	24745	74227	188617	280981	375865	508405	580283	
49 4-Chloro-3-methylpheno		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
		46252	87602	231202	569918	924952	1151014	1323939	1655796	
51 2-Methylnaphthalene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
	26981	119429	222575	547408	1270482	2127380	2600122	3025001	3772154	
204 1-Methylnaphthalene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#41
	27071	118426	220084	534825	1249372	2074700	2532349	2944482	3636672	
53 Hexachlorocyclopentadi		5.0000	10.000	25.000	50.000	75.000	100.00	125.00	150.00	#67
		118820	237109	644419	1595541	2600700	3057871	3466514	4074074	
52 1,2,4,5-Tetrachloroben		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		46771	84561	215958	517759	895730	1108388	1293133	1649047	
54 2,4,6-Trichlorophenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		24324	49781	132182	341071	577013	714968	839340	1066284	
55 2,4,5-Trichlorophenol		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		26076	52974	146082	372370	619401	777019	899519	1134971	
$ 56 2-Fluorobiphenyl	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
	28890	127626	237578	599921	1427192	2334319	2887778	3324213	4157563	
184 Biphenyl		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		145057	277784	673236	1623316	2634272	3235726	3703890	4545090	
58 2-Chloronaphthalene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		106701	198581	489145	1177960	1939061	2400150	2761430	3468552	
183 Diphenyl ether		1.0000	2.0000	5.0000	10.000	15.000	20.000			#67
		81434	158505	381723	836813	1243991	1699470			

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Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 Conc/Rsp	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Istd #
60 2-Nitroaniline		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		22873	46772	142342	360137	539062	716705	941748	1083482	
62 Dimethylphthalate		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		109195	211914	530344	1279730	2101058	2590025	2977806	3758114	
65 2,6-Dinitrotoluene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		20780	46006	124767	311086	518283	647195	753526	964234	
64 Acenaphthylene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
	27992	145272	287665	738484	1769051	2812202	3439024	3936545	4863146	
66 3-Nitroaniline		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		16985	34290	111041	280646	423145	576100	770400	897436	
68 Acenaphthene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
	24892	113005	213448	525994	1233560	1970454	2414021	2759173	3420302	
69 2,4-Dinitrophenol			4.0000	10.000	20.000	30.000	40.000	50.000	60.000	#67
			24871	94507	304912	539200	714652	842311	1109000	
70 4-Nitrophenol			4.0000	10.000	20.000	30.000	40.000	50.000	60.000	#67
			34636	111483	309037	473462	601539	689841	850920	
73 2,4-Dinitrotoluene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		23186	53633	151589	398191	660026	815918	941700	1193542	
71 Dibenzofuran	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
	33183	150413	282318	689376	1585663	2548069	3154175	3623283	4502225	
76 2,3,4,6-Tetrachlorophe		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		16800	35611	91779	246436	417017	532741	621239	806944	
78 Diethylphthalate		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		101938	198326	509840	1231089	1959933	2415620	2788320	3457085	
80 4-Chlorophenylphenylet		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		55673	103919	256767	609231	1006396	1272309	1494240	1901453	
79 Fluorene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
	28200	126162	239058	586733	1386272	2245270	2776572	3204549	4030631	
84 4,6-Dinitro-2-methylph				5.0000	10.000	15.000	20.000	25.000	30.000	#102
				63050	195793	339175	429629	509556	653609	
83 4-Nitroaniline		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#67
		13991	30261	101715	276147	420951	569205	773611	888483	
86 n-Nitrosodiphenylamine		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		78701	154649	383585	961327	1548623	1957029	2237325	2825400	
87 Azobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		117819	238999	613301	1438616	2270300	2772976	3179143	3913141	
$ 88 2,4,6-Tribromophenol				5.0000	10.000	15.000	20.000	25.000	30.000	#102
				48779	138485	241648	312115	366377	490544	
94 4-Bromophenylphenyleth		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		25531	51193	128899	329112	558633	702325	819166	1061301	
96 Hexachlorobenzene		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		25930	50001	127818	330632	569181	708249	842783	1088878	
200 Atrazine		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		23729	46520	133796	327210	477556	643980	851077	969410	
202 Octadecane		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		77380	148921	374575	890570	1401380	1692974	1911012	2347878	
99 Pentachlorophenol			4.0000	10.000	20.000	30.000	40.000	50.000	60.000	#102
			47278	140697	434108	762649	991598	1148856	1525501	
103 Phenanthrene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
	38612	162222	305238	763837	1881299	3063364	3709767	4265555	5297841	
104 Anthracene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
	29975	138671	273705	720319	1779929	2918123	3579401	4086057	5043946	
106 Carbazole		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		139060	270219	674582	1662214	2658868	3264504	3716332	4652376	
109 Di-n-butylphthalate		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
		135552	288124	792517	2065254	3292729	4014865	4523269	5566352	

Report Date: 23-May-2018 09:12:04 AIM Revision: 1.0 20-Sep-2017 14:04:40
Method Path: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

Compound	Level 1 Conc/Rsp	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Istd #
114 Fluoranthene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#102
	29892	145292	286890	743020	1870784	3012374	3679876	4207310	5260994	
115 Benzidine		5.0000	10.000	25.000	50.000	75.000	100.00	125.00	150.00	#128
		243075	615640	2017632	5337517	7873769	10291003	12922480	14431418	
116 Pyrene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
	31709	150824	298903	758486	1914556	3067375	3786029	4273670	5416495	
$ 117 Terphenyl-d14	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
	23589	107621	207147	516086	1314505	2158691	2729601	3120203	3976218	
122 Butylbenzylphthalate		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
		44120	99028	292310	860723	1414274	1800871	2004900	2582570	
130 bis(2-Ethylhexyl)phtha		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
		53584	125350	391229	1189636	1947917	2501138	2810573	3602624	
125 3,3'-Dichlorobenzidine		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
		33325	68307	171852	477956	764661	1065975	1483225	1808613	
127 Benzo(a)Anthracene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
	32114	131802	257213	656760	1708800	2770620	3482356	3952335	5067355	
129 Chrysene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#128
	33985	145677	275099	676559	1697170	2788053	3511143	3999801	5062704	
131 Di-n-octylphthalate		1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
		79042	188019	606650	1878938	3108244	3960022	4465761	5675407	
132 Benzo(b)fluoranthene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
	26435	121996	230721	617039	1631249	2572512	3356291	3736211	4695116	
134 Benzo(k)fluoranthene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
	28182	127236	258135	648418	1695576	2833605	3431105	4009997	5264556	
135 Benzo(a)pyrene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
	20368	100522	200656	529427	1400575	2301803	2866145	3230497	4160714	
138 Indeno(1,2,3-c,d)pyren	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
	28814	143254	280600	705763	1792969	2770351	3442145	3823000	4788118	
139 Dibenzo(a,h)anthracene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
	26984	126760	246978	614864	1598298	2496144	3166160	3564925	4432321	
140 Benzo(g,h,i)perylene	0.20000	1.0000	2.0000	5.0000	10.000	15.000	20.000	25.000	30.000	#136
	27178	125017	239890	589031	1435122	2141418	2637166	2891986	3526929	

Shealy Environmental Services
Calibration History Report

Batch: \\Organics\hh\chem\msd10.i\10052218D.b
Method: 8270DLVI-10.M Instrument: msd10
Cal Start Date: 22-May-2018 18:42:30 Cal End Date: 23-May-2018 04:25:30
Last Modified: 23-May-2018 08:37:30
No.Compounds: 175 Integrator: falcon

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan

No. Cal Levels: 9 No. Cal Levels: 23

No.	Ical Level	Lab Sample ID	Injection Date/Time	Batch Name	Data File	Sublist	Batch Number	Sample Number
1	1	SVMS 3451	22-May-2018 18:42:30	10052218D.b	100522D03.D	PAH+.sub	34213553	37233515
2	2	SVMS 3452	22-May-2018 19:07:30	10052218D.b	100522D04.D	1STD.sub	34213553	37233749
3	3	SVMS 3453	22-May-2018 19:31:30	10052218D.b	100522D05.D	1STD.sub	34213553	37234054
4	4	SVMS 3454	22-May-2018 19:56:30	10052218D.b	100522D06.D	1STD.sub	34213553	37234296
5	5	SVMS 3455	22-May-2018 20:20:30	10052218D.b	100522D07.D	1STD.sub	34213553	37234520
6	6	SVMS 3456	22-May-2018 20:45:30	10052218D.b	100522D08.D	1STD.sub	34213553	37234806
7	7	SVMS 3457	22-May-2018 21:09:30	10052218D.b	100522D09.D	1STD.sub	34213553	37235098
8	8	SVMS 3458	22-May-2018 21:34:30	10052218D.b	100522D10.D	1STD.sub	34213553	37235378
9	9	SVMS 3459	22-May-2018 21:58:30	10052218D.b	100522D11.D	1STD.sub	34213553	37235567
10	2	SVMS 3482	22-May-2018 22:47:30	10052218D.b	100522D13.D	3STD.sub	34213553	37236020
11	3	SVMS 3483	22-May-2018 23:11:30	10052218D.b	100522D14.D	3STD.sub	34213553	37236194
12	4	SVMS 3484	22-May-2018 23:36:30	10052218D.b	100522D15.D	3STD.sub	34213553	37236359
13	5	SVMS 3485	23-May-2018 00:00:30	10052218D.b	100522D16.D	3STD.sub	34213553	37236559
14	6	SVMS 3486	23-May-2018 00:24:30	10052218D.b	100522D17.D	3STD.sub	34213553	37236726
15	7	SVMS 3487	23-May-2018 00:48:30	10052218D.b	100522D18.D	3STD.sub	34213553	37236898
16	8	SVMS 3488	23-May-2018 01:12:30	10052218D.b	100522D19.D	3STD.sub	34213553	37237084
17	9	SVMS 3489	23-May-2018 01:37:30	10052218D.b	100522D20.D	3STD.sub	34213553	37237247
18	2	SVMS 3390	23-May-2018 02:25:30	10052218D.b	100522D22.D	Diphenyl.sub	34213553	37237513
19	3	SVMS 3391	23-May-2018 02:49:30	10052218D.b	100522D23.D	Diphenyl.sub	34213553	37237593
20	4	SVMS 3392	23-May-2018 03:13:30	10052218D.b	100522D24.D	Diphenyl.sub	34213553	37237642
21	5	SVMS 3393	23-May-2018 03:37:30	10052218D.b	100522D25.D	Diphenyl.sub	34213553	37237691
22	6	SVMS 3394	23-May-2018 04:01:30	10052218D.b	100522D26.D	Diphenyl.sub	34213553	37237748
23	7	SVMS 3395	23-May-2018 04:25:30	10052218D.b	100522D27.D	Diphenyl.sub	34213553	37237784

Report Date: 23-May-2018 09:11:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D03.D
Lab Sample ID: SVMS 3451 Client Sample ID: 1STD0.2CB
Injection Date: 22-May-2018 18:42:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3451
Misc. Info: 1STD0.2
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Ical, Level: 1 ALS Bottle: 1
Cpnd Sublist: PAH+.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
$ 6 2-Fluorophenol	112.0	4.856	4.856	0.000	10395	0.20000	0.20000	
$ 9 Phenol-d5	99.0	5.482	5.482	0.000	13049	0.20000	0.20000	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	782811	20.000	20.000	
$ 29 Nitrobenzene-d5	82.0	6.215	6.215	0.000	10570	0.20000	0.20000	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3328891	20.000	20.000	
43 Naphthalene	128.0	6.814	6.814	0.000	41014	0.20000	0.20000	
51 2-Methylnaphthalene	142.0	7.375	7.375	0.000	26981	0.20000	0.20000	
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	27071	0.20000	0.20000	
$ 56 2-Fluorobiphenyl	172.0	7.664	7.664	0.000	28890	0.20000	0.20000	
64 Acenaphthylene	152.0	8.151	8.151	0.000	27992	0.20000	0.20000	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1752785	20.000	20.000	
68 Acenaphthene	153.0	8.290	8.290	0.000	24892	0.20000	0.20000	
71 Dibenzofuran	168.0	8.434	8.434	0.000	33183	0.20000	0.20000	
79 Fluorene	166.0	8.723	8.723	0.000	28200	0.20000	0.20000	
$ 88 2,4,6-Tribromophenol	330.0	8.927	8.927	0.000	782	0.20000	0.20000	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2816074	20.000	20.000	
103 Phenanthrene	178.0	9.547	9.547	0.000	38612	0.20000	0.20000	
104 Anthracene	178.0	9.590	9.590	0.000	29975	0.20000	0.20000	
114 Fluoranthene	202.0	10.617	10.617	0.000	29892	0.20000	0.20000	
116 Pyrene	202.0	10.857	10.857	0.000	31709	0.20000	0.20000	
$ 117 Terphenyl-d14	244.0	10.948	10.948	0.000	23589	0.20000	0.20000	
127 Benzo(a)Anthracene	228.0	12.285	12.285	0.000	32114	0.20000	0.20000	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2549194	20.000	20.000	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
129 Chrysene	228.0	12.339	12.339	0.000	33985	0.20000	0.20000	
132 Benzo(b)fluoranthene	252.0	13.869	13.869	0.000	26435	0.20000	0.20000	
134 Benzo(k)fluoranthene	252.0	13.906	13.906	0.000	28182	0.20000	0.20000	
135 Benzo(a)pyrene	252.0	14.387	14.387	0.000	20368	0.20000	0.20000	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2618014	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.404	16.404	0.000	28814	0.20000	0.20000	
139 Dibenzo(a,h)anthracene	278.0	16.415	16.415	0.000	26984	0.20000	0.20000	
140 Benzo(g,h,i)perylene	276.0	16.992	16.992	0.000	27178	0.20000	0.20000	
S 214 Total PAHs	100.0	1.000		0.000		0.20000	3.6000	Q

Compound Type Legend

$ - Surrogate
* - ISTD
S - Summary

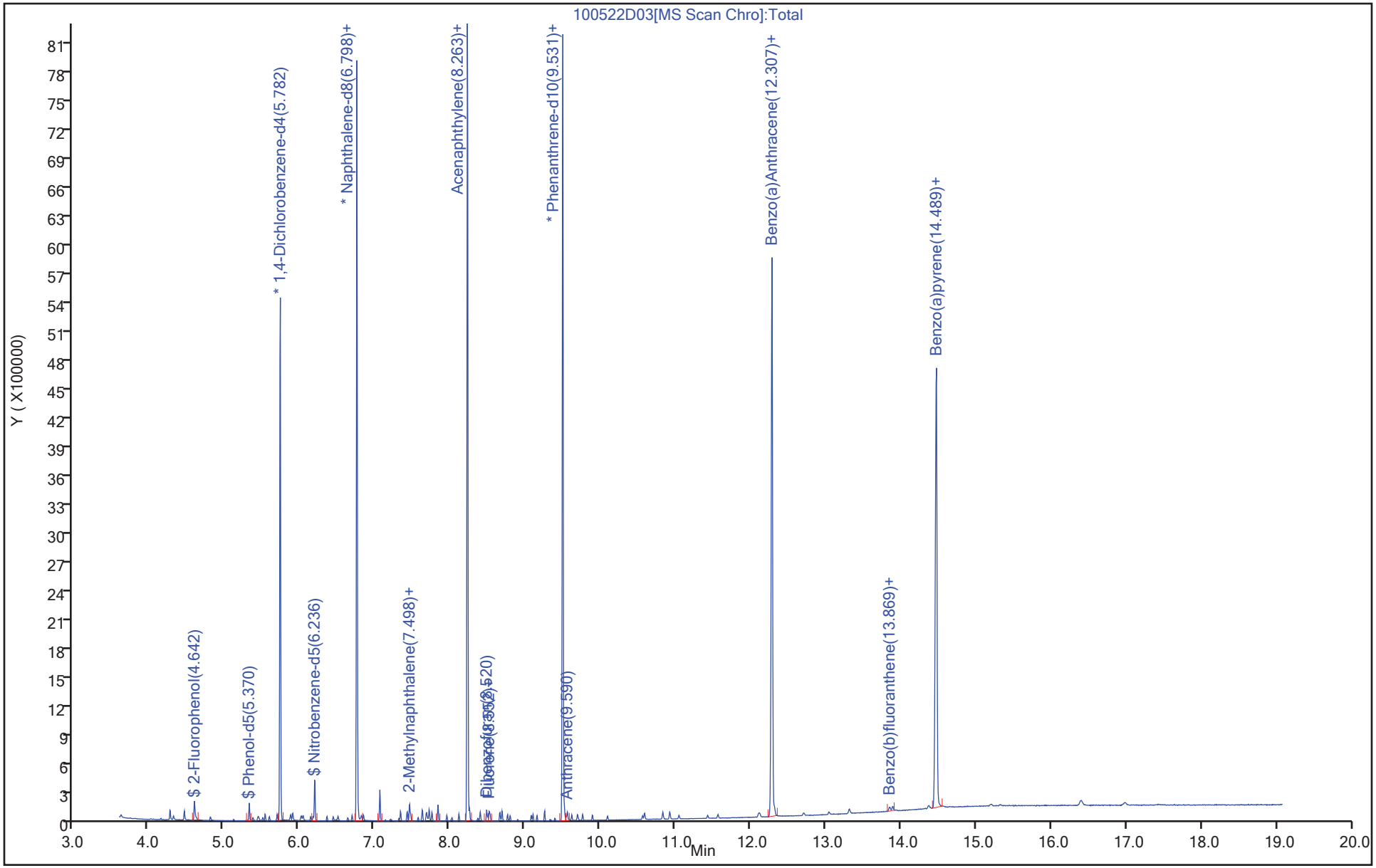
QC Flag Legend

Processing Flags
Q - Qualifier Signal(s) Fails Ratio Test
Review Flags

Report Date: 23-May-2018 09:11:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D03.D				
Injection Date:	22-May-2018 18:42:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD0.2CB	Lab ID:	SVMS 3451		
Sample Info:	10052218D.b, SVMS 3451				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D04.D
Lab Sample ID: SVMS 3452 Client Sample ID: 1STD001CB
Injection Date: 22-May-2018 19:07:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3452
Misc. Info: 1STD001
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Ical, Level: 2 ALS Bottle: 2
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 23-May-2018 08:12:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.840	3.840	0.000	9088	1.0000	1.0000	
2 N-Nitrosodimethylamine	42.0	4.038	4.038	0.000	23387	1.0000	1.0000	
1 pyridine	79.0	4.161	4.161	0.000	26288	1.0000	1.0000	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	55325	1.0000	0.98652	
$ 9 Phenol-d5	99.0	5.482	5.482	0.000	69707	1.0000	0.98837	
10 Phenol	94.0	5.493	5.493	0.000	71358	1.0000	1.0000	
11 Aniline	66.0	5.546	5.546	0.000	4694	1.0000	1.0000	
12 bis(2-Chloroethyl)ether	63.0	5.546	5.546	0.000	45690	1.0000	1.0000	
201 n-Decane	57.0	5.578	5.578	0.000	66582	1.0000	1.0000	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	58666	1.0000	1.0000	
14 1,3-Dichlorobenzene	146.0	5.739	5.739	0.000	67916	1.0000	1.0000	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	856031	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	71555	1.0000	1.0000	
18 Benzyl alcohol	79.0	5.905	5.905	0.000	3836	1.0000	1.0000	M
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	66481	1.0000	1.0000	
20 o-Cresol	108.0	5.942	5.942	0.000	51491	1.0000	1.0000	
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	85164	1.0000	1.0000	
23 m+p-Cresol	107.0	6.060	6.060	0.000	56970	1.0000	1.0000	
26 n-Nitroso-di-n-propylamine	70.0	6.049	6.049	0.000	37723	1.0000	1.0000	
24 Acetophenone	105.0	6.081	6.081	0.000	78658	1.0000	1.0000	
28 Hexachloroethane	117.0	6.183	6.183	0.000	23434	1.0000	1.0000	
$ 29 Nitrobenzene-d5	82.0	6.215	6.215	0.000	56533	1.0000	1.0067	
30 Nitrobenzene	77.0	6.231	6.231	0.000	61504	1.0000	1.0000	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.397	6.397	0.000	92917	1.0000	1.0000	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	40103	1.0000	1.0000	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	23362	1.0000	1.0000	
36 Benzoic acid	105.0	6.525	6.525	0.000	33995	2.0000	2.0000	
35 bis(2-Chloroethoxy)methane	93.0	6.546	6.546	0.000	67368	1.0000	1.0000	
38 2,4-Dichlorophenol	162.0	6.675	6.675	0.000	41768	1.0000	1.0000	
40 1,2,4-Trichlorobenzene	180.0	6.734	6.734	0.000	51139	1.0000	1.0000	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3513235	20.000	20.000	
43 Naphthalene	128.0	6.814	6.814	0.000	187848	1.0000	0.92931	
45 2,6-Dichlorophenol	162.0	6.857	6.857	0.000	44635	1.0000	1.0000	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	26933	1.0000	1.0000	
49 4-Chloro-3-methylphenol	107.0	7.236	7.236	0.000	46252	1.0000	1.0000	
51 2-Methylnaphthalene	142.0	7.375	7.375	0.000	119429	1.0000	0.91235	
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	118426	1.0000	0.90652	
53 Hexachlorocyclopentadiene	237.0	7.499	7.499	0.000	118820	5.0000	5.0000	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.509	7.509	0.000	46771	1.0000	1.0000	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	24324	1.0000	1.0000	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	26076	1.0000	1.0000	
$ 56 2-Fluorobiphenyl	172.0	7.664	7.664	0.000	127626	1.0000	0.92899	
184 Biphenyl	154.0	7.755	7.755	0.000	145057	1.0000	1.0000	
58 2-Chloronaphthalene	162.0	7.793	7.793	0.000	106701	1.0000	1.0000	
62 Dimethylphthalate	163.0	7.991	7.991	0.000	109195	1.0000	1.0000	
65 2,6-Dinitrotoluene	165.0	8.060	8.060	0.000	20780	1.0000	1.0000	
64 Acenaphthylene	152.0	8.151	8.151	0.000	145272	1.0000	1.0094	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1785387	20.000	20.000	
68 Acenaphthene	153.0	8.290	8.290	0.000	113005	1.0000	0.94257	
69 2,4-Dinitrophenol	184.0	8.306	8.306	0.000	9997	2.0000	2.0000	
70 4-Nitrophenol	109.0	8.376	8.376	0.000	17509	2.0000	2.0000	M
73 2,4-Dinitrotoluene	165.0	8.402	8.402	0.000	23186	1.0000	1.0000	
71 Dibenzofuran	168.0	8.435	8.435	0.000	150413	1.0000	0.94181	
76 2,3,4,6-Tetrachlorophenol	232.0	8.536	8.536	0.000	16800	1.0000	1.0000	
78 Diethylphthalate	149.0	8.568	8.568	0.000	101938	1.0000	1.0000	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	55673	1.0000	1.0000	
79 Fluorene	166.0	8.723	8.723	0.000	126162	1.0000	0.93528	
84 4,6-Dinitro-2-methylphenol	198.0	8.750	8.750	0.000	6777	1.0000	1.0000	
86 n-Nitrosodiphenylamine	169.0	8.798	8.798	0.000	78701	1.0000	1.0000	
87 Azobenzene	77.0	8.830	8.830	0.000	117819	1.0000	1.0000	
$ 88 2,4,6-Tribromophenol	330.0	8.932	8.932	0.000	7791	1.0000	1.3206	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	25531	1.0000	1.0000	
96 Hexachlorobenzene	284.0	9.189	9.189	0.000	25930	1.0000	1.0000	
202 Octadecane	57.0	9.290	9.290	0.000	77380	1.0000	1.0000	
99 Pentachlorophenol	266.0	9.365	9.365	0.000	21331	2.0000	2.0000	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2886592	20.000	20.000	
103 Phenanthrene	178.0	9.547	9.547	0.000	162222	1.0000	0.90094	
104 Anthracene	178.0	9.590	9.590	0.000	138671	1.0000	0.94883	
106 Carbazole	167.0	9.724	9.724	0.000	139060	1.0000	1.0000	
109 Di-n-butylphthalate	149.0	9.921	9.921	0.000	135552	1.0000	1.0000	
114 Fluoranthene	202.0	10.617	10.617	0.000	145292	1.0000	0.97350	
116 Pyrene	202.0	10.857	10.857	0.000	150824	1.0000	0.95699	
$ 117 Terphenyl-d14	244.0	10.948	10.948	0.000	107621	1.0000	0.93621	
122 Butylbenzylphthalate	149.0	11.456	11.456	0.000	44120	1.0000	1.0000	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.130	12.130	0.000	53584	1.0000	1.0000	
127 Benzo(a)Anthracene	228.0	12.286	12.286	0.000	131802	1.0000	0.88374	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2643050	20.000	20.000	
129 Chrysene	228.0	12.339	12.339	0.000	145677	1.0000	0.90522	
131 Di-n-octylphthalate	149.0	13.066	13.066	0.000	79042	1.0000	1.0000	
132 Benzo(b)fluoranthene	252.0	13.869	13.869	0.000	121996	1.0000	0.94256	
134 Benzo(k)fluoranthene	252.0	13.906	13.906	0.000	127236	1.0000	0.93164	
135 Benzo(a)pyrene	252.0	14.388	14.388	0.000	100522	1.0000	0.97606	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2710903	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.404	16.404	0.000	143254	1.0000	0.97973	
139 Dibenzo(a,h)anthracene	278.0	16.415	16.415	0.000	126760	1.0000	0.95141	
140 Benzo(g,h,i)perylene	276.0	16.992	16.992	0.000	125017	1.0000	0.94094	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

Processing Flags

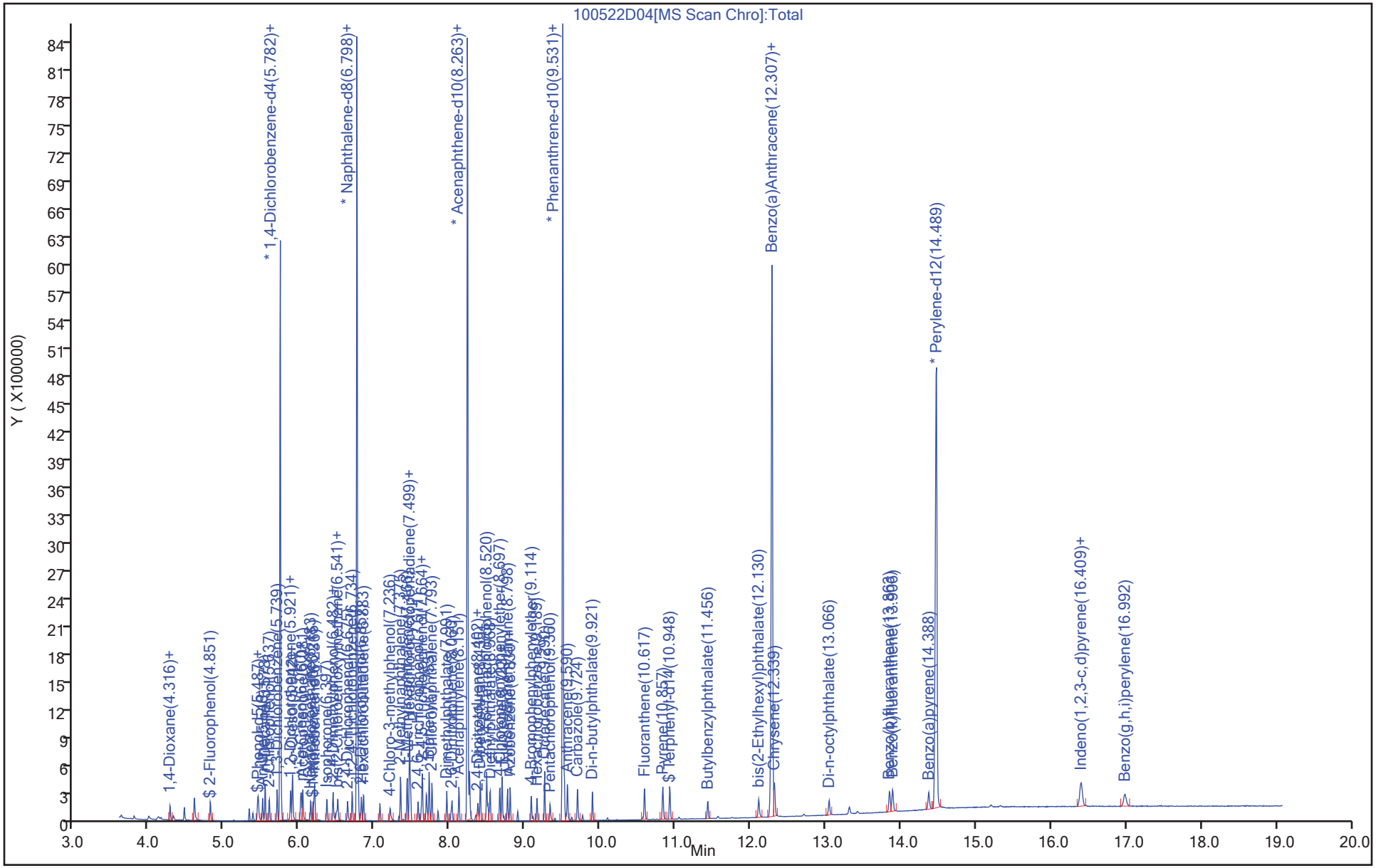
Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D04.D				
Injection Date:	22-May-2018 19:07:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD001CB	Lab ID:	SVMS 3452		
Sample Info:	10052218D.b, SVMS 3452				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

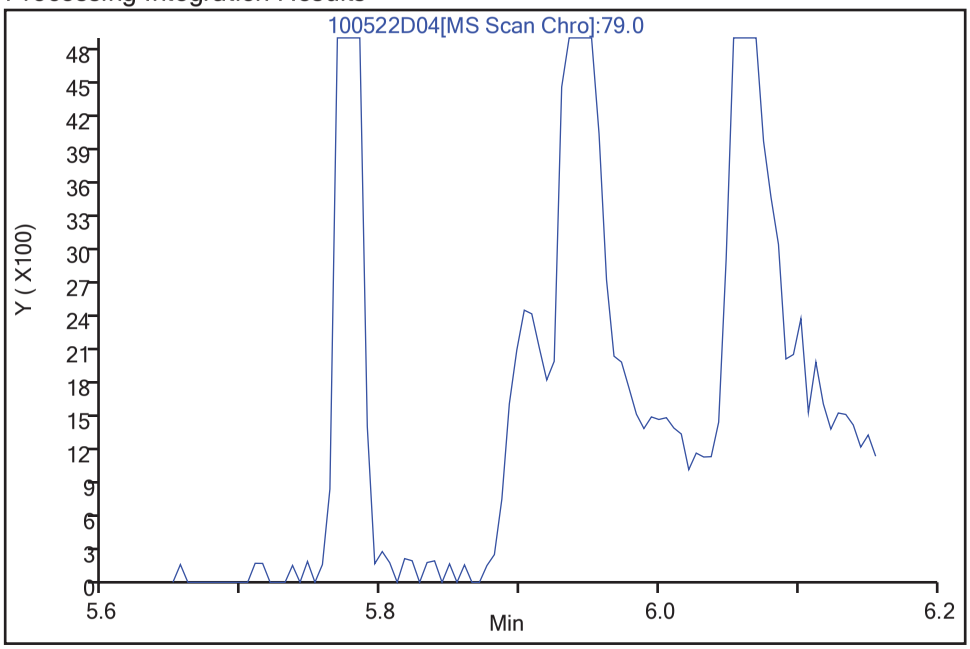
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D04.D		
Injection Date:	22-May-2018 19:07:30	Inst. ID:	msd10.i
Client ID:	1STD001CB	Lab ID:	SVMS 3452
Sample Info:	10052218D.b, SVMS 3452		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

18 Benzyl alcohol, CAS: 100-51-6

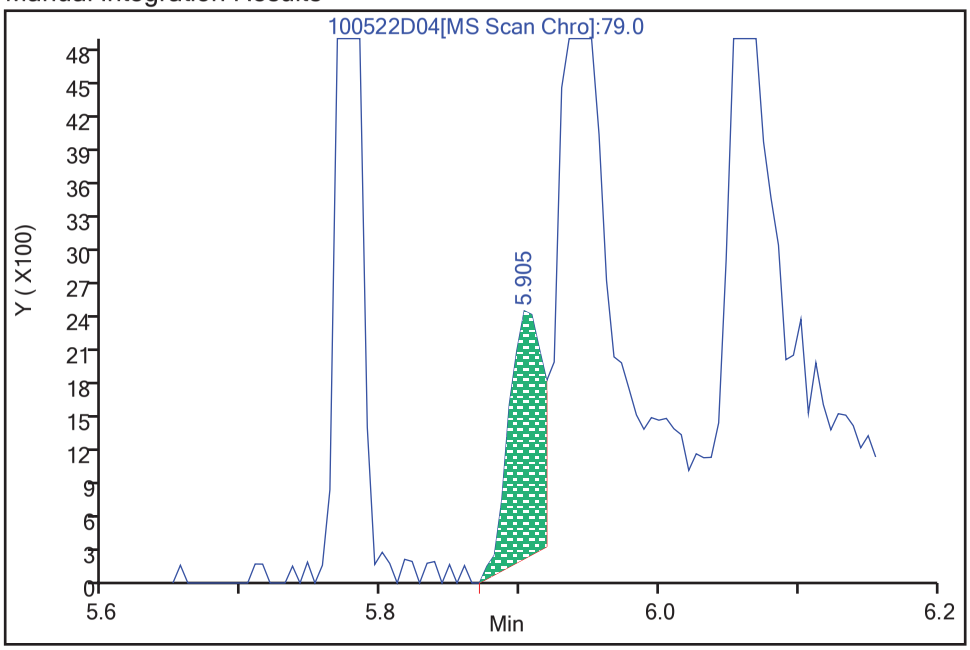
Not Detected
Expected RT: 5.905
RT Window: 5.558-6.251

Processing Integration Results



Manual Integration Results

RT: 5.905
Area: 3836
Amount: 1.0000
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:11:30
Audit Action: Mint
Audit Reason: Split Peak

Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

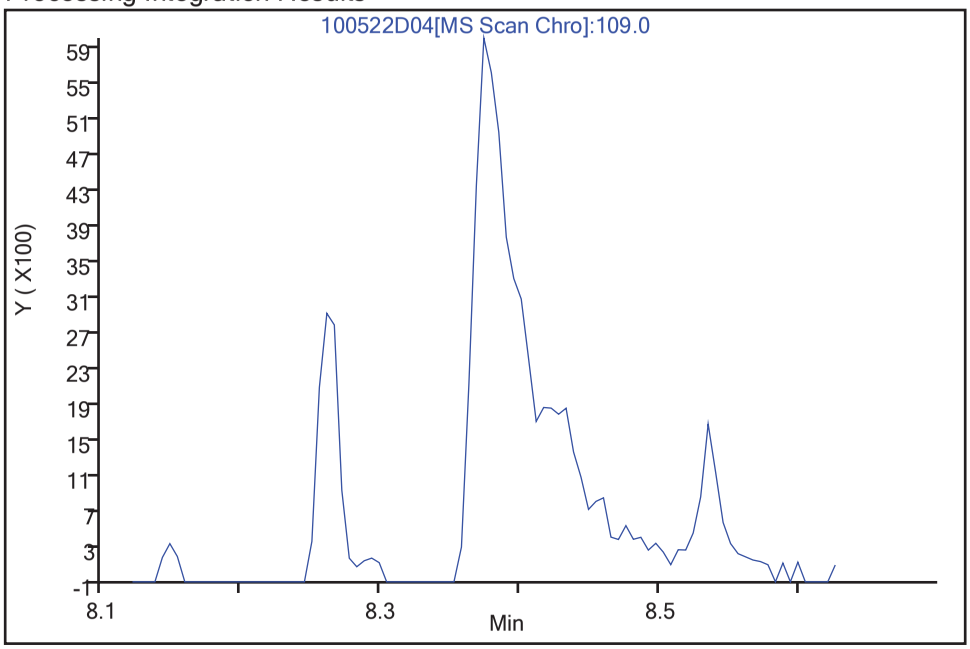
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D04.D		
Injection Date:	22-May-2018 19:07:30	Inst. ID:	msd10.i
Client ID:	1STD001CB	Lab ID:	SVMS 3452
Sample Info:	10052218D.b, SVMS 3452		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

70 4-Nitrophenol, CAS: 100-02-7

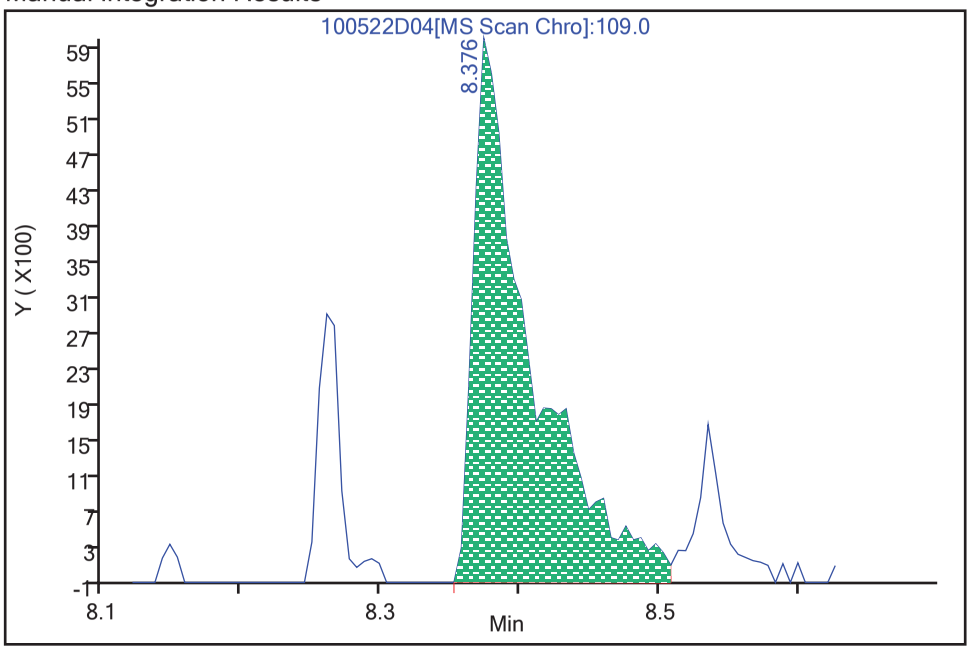
Not Detected
Expected RT: 8.376
RT Window: 7.880-8.871

Processing Integration Results



Manual Integration Results

RT: 8.376
Area: 17509
Amount: 2.0000
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:12:30
Audit Action: Mint
Audit Reason: Incorrect Auto Integration

Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D05.D
Lab Sample ID: SVMS 3453 Client Sample ID: 1STD002CB
Injection Date: 22-May-2018 19:31:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3453
Misc. Info: 1STD002
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Ical, Level: 3 ALS Bottle: 3
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 23-May-2018 08:13:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.835	3.835	0.000	16116	2.0000	1.9126	
2 N-Nitrosodimethylamine	42.0	4.022	4.022	0.000	42293	2.0000	1.9322	
1 pyridine	79.0	4.118	4.118	0.000	51228	2.0000	2.0069	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	110981	2.0000	2.0298	
$ 9 Phenol-d5	99.0	5.477	5.477	0.000	136568	2.0000	2.0007	
10 Phenol	94.0	5.487	5.487	0.000	139324	2.0000	2.0088	
11 Aniline	66.0	5.546	5.546	0.000	15723	2.0000	2.5352	
12 bis(2-Chloroethyl)ether	63.0	5.546	5.546	0.000	85149	2.0000	1.9622	
201 n-Decane	57.0	5.578	5.578	0.000	124248	2.0000	1.9636	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	111448	2.0000	1.9814	
14 1,3-Dichlorobenzene	146.0	5.739	5.739	0.000	126779	2.0000	1.9639	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	828367	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	134433	2.0000	1.9703	
18 Benzyl alcohol	79.0	5.894	5.894	0.000	21433	2.0000	2.9709	M
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	124376	2.0000	1.9661	
20 o-Cresol	108.0	5.942	5.942	0.000	104237	2.0000	2.0450	
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	156654	2.0000	1.9492	
23 m+p-Cresol	107.0	6.060	6.060	0.000	112032	2.0000	2.0160	
26 n-Nitroso-di-n-propylamine	70.0	6.049	6.049	0.000	75570	2.0000	2.0345	
24 Acetophenone	105.0	6.081	6.081	0.000	150257	2.0000	1.9869	
28 Hexachloroethane	117.0	6.183	6.183	0.000	45029	2.0000	1.9928	
$ 29 Nitrobenzene-d5	82.0	6.215	6.215	0.000	107640	2.0000	1.9983	
30 Nitrobenzene	77.0	6.231	6.231	0.000	116729	2.0000	1.9888	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.397	6.397	0.000	183693	2.0000	2.0296	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	72972	2.0000	1.9467	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	49213	2.0000	2.0931	
36 Benzoic acid	105.0	6.536	6.536	0.000	73342	4.0000	4.2337	
35 bis(2-Chloroethoxy)methane	93.0	6.541	6.541	0.000	126840	2.0000	1.9808	
38 2,4-Dichlorophenol	162.0	6.675	6.675	0.000	82312	2.0000	2.0265	
40 1,2,4-Trichlorobenzene	180.0	6.734	6.734	0.000	91773	2.0000	1.9329	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3371334	20.000	20.000	
43 Naphthalene	128.0	6.814	6.814	0.000	341984	2.0000	1.8355	
45 2,6-Dichlorophenol	162.0	6.857	6.857	0.000	85760	2.0000	2.0011	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	48768	2.0000	1.9418	
49 4-Chloro-3-methylphenol	107.0	7.236	7.236	0.000	87602	2.0000	1.9868	
51 2-Methylnaphthalene	142.0	7.375	7.375	0.000	222575	2.0000	1.8419	
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	220084	2.0000	1.8301	
53 Hexachlorocyclopentadiene	237.0	7.498	7.498	0.000	237109	10.000	10.043	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.509	7.509	0.000	84561	2.0000	1.9100	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	49781	2.0000	2.0339	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	52974	2.0000	2.0266	
$ 56 2-Fluorobiphenyl	172.0	7.664	7.664	0.000	237578	2.0000	1.8249	
184 Biphenyl	154.0	7.755	7.755	0.000	277784	2.0000	1.9675	
58 2-Chloronaphthalene	162.0	7.793	7.793	0.000	198581	2.0000	1.9390	
62 Dimethylphthalate	163.0	7.991	7.991	0.000	211914	2.0000	1.9808	
65 2,6-Dinitrotoluene	165.0	8.060	8.060	0.000	46006	2.0000	2.1124	
64 Acenaphthylene	152.0	8.151	8.151	0.000	287665	2.0000	2.0138	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1766005	20.000	20.000	
68 Acenaphthene	153.0	8.290	8.290	0.000	213448	2.0000	1.8620	
69 2,4-Dinitrophenol	184.0	8.301	8.301	0.000	24871	4.0000	4.4564	
70 4-Nitrophenol	109.0	8.370	8.370	0.000	34636	4.0000	3.9999	
73 2,4-Dinitrotoluene	165.0	8.402	8.402	0.000	53633	2.0000	2.1561	
71 Dibenzofuran	168.0	8.434	8.434	0.000	282318	2.0000	1.8529	
76 2,3,4,6-Tetrachlorophenol	232.0	8.536	8.536	0.000	35611	2.0000	2.0690	
78 Diethylphthalate	149.0	8.568	8.568	0.000	198326	2.0000	1.9833	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	103919	2.0000	1.9419	
79 Fluorene	166.0	8.723	8.723	0.000	239058	2.0000	1.8561	
84 4,6-Dinitro-2-methylphenol	198.0	8.750	8.750	0.000	17000	2.0000	2.2362	
86 n-Nitrosodiphenylamine	169.0	8.798	8.798	0.000	154649	2.0000	1.9931	
87 Azobenzene	77.0	8.830	8.830	0.000	238999	2.0000	2.0249	
$ 88 2,4,6-Tribromophenol	330.0	8.932	8.932	0.000	17498	2.0000	2.5705	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	51193	2.0000	2.0133	
96 Hexachlorobenzene	284.0	9.189	9.189	0.000	50001	2.0000	1.9743	
202 Octadecane	57.0	9.290	9.290	0.000	148921	2.0000	1.9723	
99 Pentachlorophenol	266.0	9.360	9.360	0.000	47278	4.0000	4.2268	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2855640	20.000	20.000	
103 Phenanthrene	178.0	9.547	9.547	0.000	305238	2.0000	1.7995	
104 Anthracene	178.0	9.590	9.590	0.000	273705	2.0000	1.9274	
106 Carbazole	167.0	9.724	9.724	0.000	270219	2.0000	1.9820	
109 Di-n-butylphthalate	149.0	9.921	9.921	0.000	288124	2.0000	2.0716	
114 Fluoranthene	202.0	10.617	10.617	0.000	286890	2.0000	1.9617	
116 Pyrene	202.0	10.857	10.857	0.000	298903	2.0000	1.9361	
$ 117 Terphenyl-d14	244.0	10.948	10.948	0.000	207147	2.0000	1.8696	
122 Butylbenzylphthalate	149.0	11.451	11.451	0.000	99028	2.0000	2.1200	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.130	12.130	0.000	125350	2.0000	2.1611	
127 Benzo(a)Anthracene	228.0	12.286	12.286	0.000	257213	2.0000	1.8136	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2630469	20.000	20.000	
129 Chrysene	228.0	12.339	12.339	0.000	275099	2.0000	1.8024	
131 Di-n-octylphthalate	149.0	13.066	13.066	0.000	188019	2.0000	2.2162	
132 Benzo(b)fluoranthene	252.0	13.869	13.869	0.000	230721	2.0000	1.9059	
134 Benzo(k)fluoranthene	252.0	13.906	13.906	0.000	258135	2.0000	1.9828	
135 Benzo(a)pyrene	252.0	14.388	14.388	0.000	200656	2.0000	2.0233	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2595242	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.404	16.404	0.000	280600	2.0000	2.0031	
139 Dibenzo(a,h)anthracene	278.0	16.409	16.409	0.000	246978	2.0000	1.9571	
140 Benzo(g,h,i)perylene	276.0	16.987	16.987	0.000	239890	2.0000	1.9225	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

Processing Flags

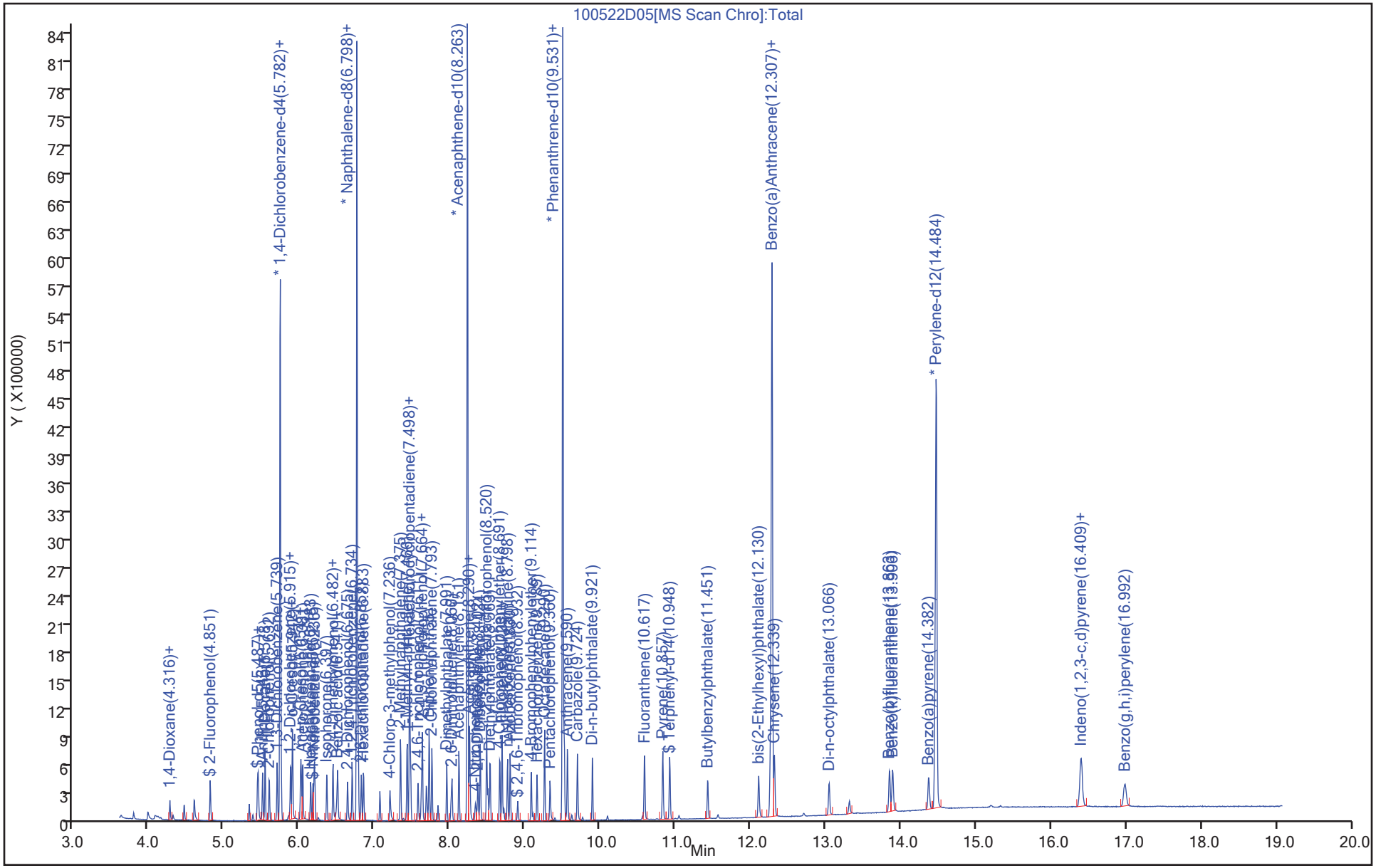
Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D05.D				
Injection Date:	22-May-2018 19:31:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD002CB	Lab ID:	SVMS 3453		
Sample Info:	10052218D.b, SVMS 3453				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

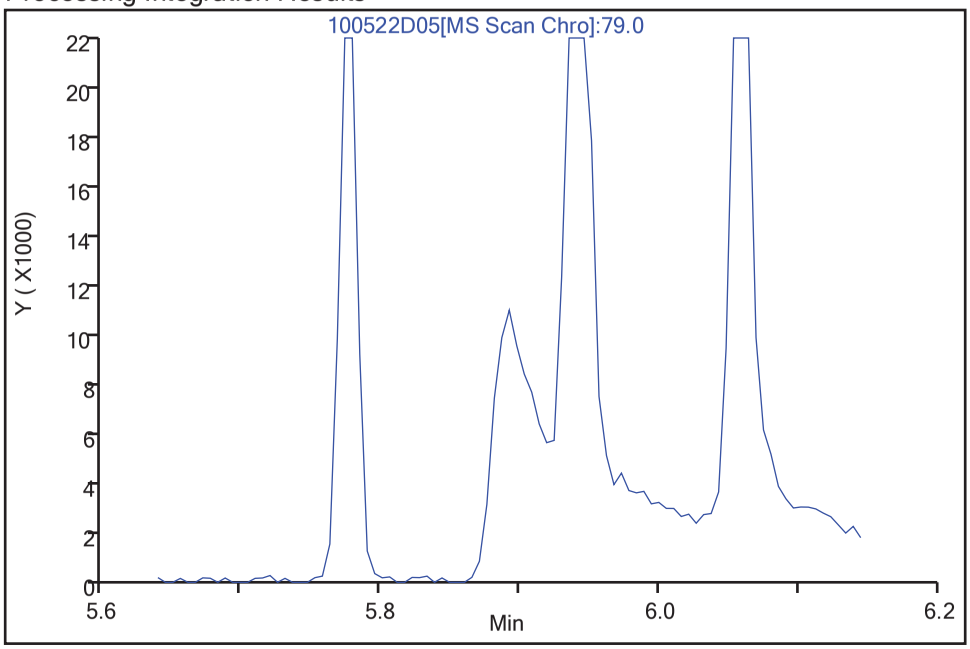
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D05.D		
Injection Date:	22-May-2018 19:31:30	Inst. ID:	msd10.i
Client ID:	1STD002CB	Lab ID:	SVMS 3453
Sample Info:	10052218D.b, SVMS 3453		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

18 Benzyl alcohol, CAS: 100-51-6

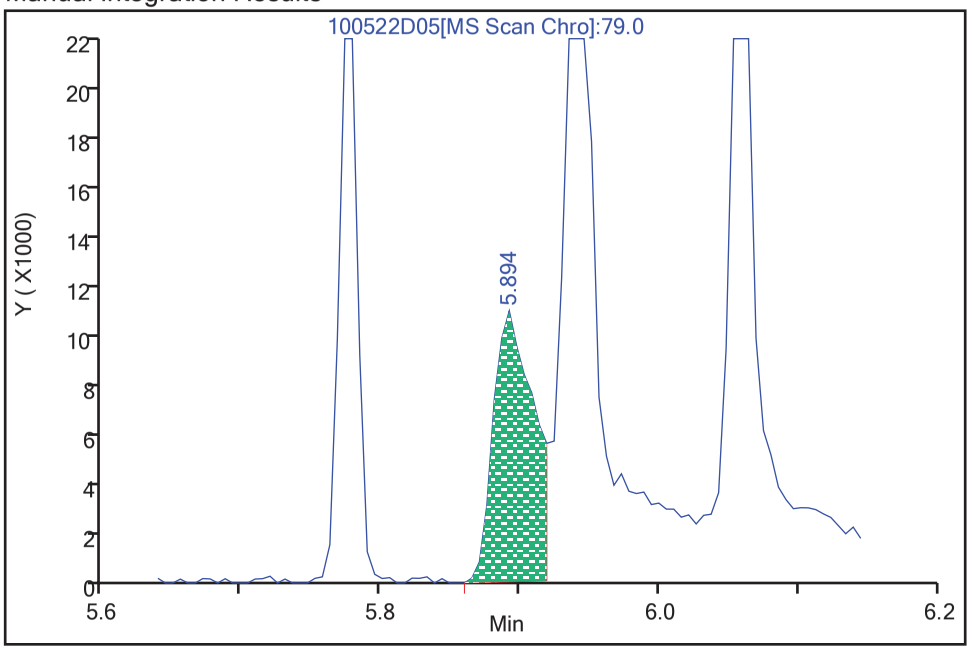
Not Detected
Expected RT: 5.894
RT Window: 5.547-6.241

Processing Integration Results



Manual Integration Results

RT: 5.894
Area: 21433
Amount: 2.9709
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:13:30
Audit Action: Mint
Audit Reason: Split Peak

Report Date: 23-May-2018 09:11:42 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D06.D		
Lab Sample ID:	SVMS 3454	Client Sample ID:	1STD005CB
Injection Date:	22-May-2018 19:56:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3454		
Misc. Info:	1STD005		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 4	ALS Bottle:	4
Cpnd Sublist:	1STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 08:31:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.829	3.829	0.000	38708	5.0000	5.0705	
2 N-Nitrosodimethylamine	42.0	4.022	4.022	0.000	89970	5.0000	5.1076	
1 pyridine	79.0	4.097	4.097	0.000	106498	5.0000	4.3702	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	258996	5.0000	5.2486	
$ 9 Phenol-d5	99.0	5.477	5.477	0.000	350834	5.0000	5.5408	
10 Phenol	94.0	5.487	5.487	0.000	364545	5.0000	5.4239	
11 Aniline	66.0	5.541	5.541	0.000	58532	5.0000	8.9573	
12 bis(2-Chloroethyl)ether	63.0	5.546	5.546	0.000	194345	5.0000	5.3584	
201 n-Decane	57.0	5.578	5.578	0.000	269421	5.0000	5.2144	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	267301	5.0000	5.2427	
14 1,3-Dichlorobenzene	146.0	5.739	5.739	0.000	259428	5.0000	4.9414	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	657765	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	268407	5.0000	4.8888	
18 Benzyl alcohol	79.0	5.878	5.878	0.000	115232	5.0000	4.8462	M
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	246189	5.0000	4.8286	
20 o-Cresol	108.0	5.942	5.942	0.000	253203	5.0000	5.0459	M
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	373805	5.0000	5.6620	
23 m+p-Cresol	107.0	6.060	6.060	0.000	305107	5.0000	5.7306	
26 n-Nitroso-di-n-propylamine	70.0	6.049	6.049	0.000	199620	5.0000	5.7642	
24 Acetophenone	105.0	6.081	6.081	0.000	389108	5.0000	5.6891	
28 Hexachloroethane	117.0	6.183	6.183	0.000	88353	5.0000	4.7310	
$ 29 Nitrobenzene-d5	82.0	6.215	6.215	0.000	286798	5.0000	4.8618	
30 Nitrobenzene	77.0	6.231	6.231	0.000	301889	5.0000	4.9368	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.397	6.397	0.000	486003	5.0000	4.7157	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	199788	5.0000	4.8169	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	135930	5.0000	4.4807	
36 Benzoic acid	105.0	6.546	6.546	0.000	249435	10.000	7.9782	
35 bis(2-Chloroethoxy)methane	93.0	6.541	6.541	0.000	319711	5.0000	4.8393	
38 2,4-Dichlorophenol	162.0	6.675	6.675	0.000	217452	5.0000	4.6893	
40 1,2,4-Trichlorobenzene	180.0	6.734	6.734	0.000	229042	5.0000	4.5954	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3316749	20.000	20.000	
43 Naphthalene	128.0	6.814	6.814	0.000	843685	5.0000	4.8224	
45 2,6-Dichlorophenol	162.0	6.857	6.857	0.000	221252	5.0000	4.6734	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	124323	5.0000	4.5756	
49 4-Chloro-3-methylphenol	107.0	7.236	7.236	0.000	231202	5.0000	4.6818	
51 2-Methylnaphthalene	142.0	7.375	7.375	0.000	547408	5.0000	4.6432	
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	534825	5.0000	4.6223	
53 Hexachlorocyclopentadiene	237.0	7.498	7.498	0.000	644419	25.000	24.516	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.514	7.514	0.000	215958	5.0000	4.5557	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	132182	5.0000	4.4781	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	146082	5.0000	4.5884	
$ 56 2-Fluorobiphenyl	172.0	7.670	7.670	0.000	599921	5.0000	4.6866	
184 Biphenyl	154.0	7.761	7.761	0.000	673236	5.0000	4.7293	
58 2-Chloronaphthalene	162.0	7.793	7.793	0.000	489145	5.0000	4.6663	
62 Dimethylphthalate	163.0	7.991	7.991	0.000	530344	5.0000	4.7132	
65 2,6-Dinitrotoluene	165.0	8.060	8.060	0.000	124767	5.0000	4.6696	
64 Acenaphthylene	152.0	8.151	8.151	0.000	738484	5.0000	4.9392	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1718931	20.000	20.000	
68 Acenaphthene	153.0	8.290	8.290	0.000	525994	5.0000	4.7957	
69 2,4-Dinitrophenol	184.0	8.301	8.301	0.000	94507	10.000	8.4821	
70 4-Nitrophenol	109.0	8.370	8.370	0.000	111483	10.000	9.5478	
73 2,4-Dinitrotoluene	165.0	8.402	8.402	0.000	151589	5.0000	4.5189	
71 Dibenzofuran	168.0	8.434	8.434	0.000	689376	5.0000	4.7885	
76 2,3,4,6-Tetrachlorophenol	232.0	8.536	8.536	0.000	91779	5.0000	4.2349	
78 Diethylphthalate	149.0	8.568	8.568	0.000	509840	5.0000	4.8246	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	256767	5.0000	4.6355	
79 Fluorene	166.0	8.723	8.723	0.000	586733	5.0000	4.7025	
84 4,6-Dinitro-2-methylphenol	198.0	8.750	8.750	0.000	63050	5.0000	3.6541	
86 n-Nitrosodiphenylamine	169.0	8.798	8.798	0.000	383585	5.0000	4.7780	
87 Azobenzene	77.0	8.830	8.830	0.000	613301	5.0000	5.1744	
$ 88 2,4,6-Tribromophenol	330.0	8.932	8.932	0.000	48779	5.0000	3.8741	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	128899	5.0000	4.5883	
96 Hexachlorobenzene	284.0	9.189	9.189	0.000	127818	5.0000	4.5055	
202 Octadecane	57.0	9.290	9.290	0.000	374575	5.0000	5.1202	
99 Pentachlorophenol	266.0	9.360	9.360	0.000	140697	10.000	8.7077	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2811629	20.000	20.000	
103 Phenanthrene	178.0	9.552	9.552	0.000	763837	5.0000	4.7502	
104 Anthracene	178.0	9.595	9.595	0.000	720319	5.0000	4.9077	
106 Carbazole	167.0	9.723	9.723	0.000	674582	5.0000	4.9125	
109 Di-n-butylphthalate	149.0	9.921	9.921	0.000	792517	5.0000	4.9378	
114 Fluoranthene	202.0	10.617	10.617	0.000	743020	5.0000	4.8958	
116 Pyrene	202.0	10.857	10.857	0.000	758486	5.0000	4.8948	
$ 117 Terphenyl-d14	244.0	10.954	10.954	0.000	516086	5.0000	4.6778	
122 Butylbenzylphthalate	149.0	11.456	11.456	0.000	292310	5.0000	4.4236	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.130	12.130	0.000	391229	5.0000	4.3506	
127 Benzo(a)Anthracene	228.0	12.285	12.285	0.000	656760	5.0000	4.6535	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2539417	20.000	20.000	
129 Chrysene	228.0	12.339	12.339	0.000	676559	5.0000	4.6546	
131 Di-n-octylphthalate	149.0	13.066	13.066	0.000	606650	5.0000	4.1903	
132 Benzo(b)fluoranthene	252.0	13.869	13.869	0.000	617039	5.0000	4.6834	
134 Benzo(k)fluoranthene	252.0	13.911	13.911	0.000	648418	5.0000	4.5975	
135 Benzo(a)pyrene	252.0	14.387	14.387	0.000	529427	5.0000	4.7013	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2477674	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.409	16.409	0.000	705763	5.0000	4.9150	
139 Dibenzo(a,h)anthracene	278.0	16.420	16.420	0.000	614864	5.0000	4.7299	
140 Benzo(g,h,i)perylene	276.0	16.998	16.998	0.000	589031	5.0000	5.0481	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

Processing Flags

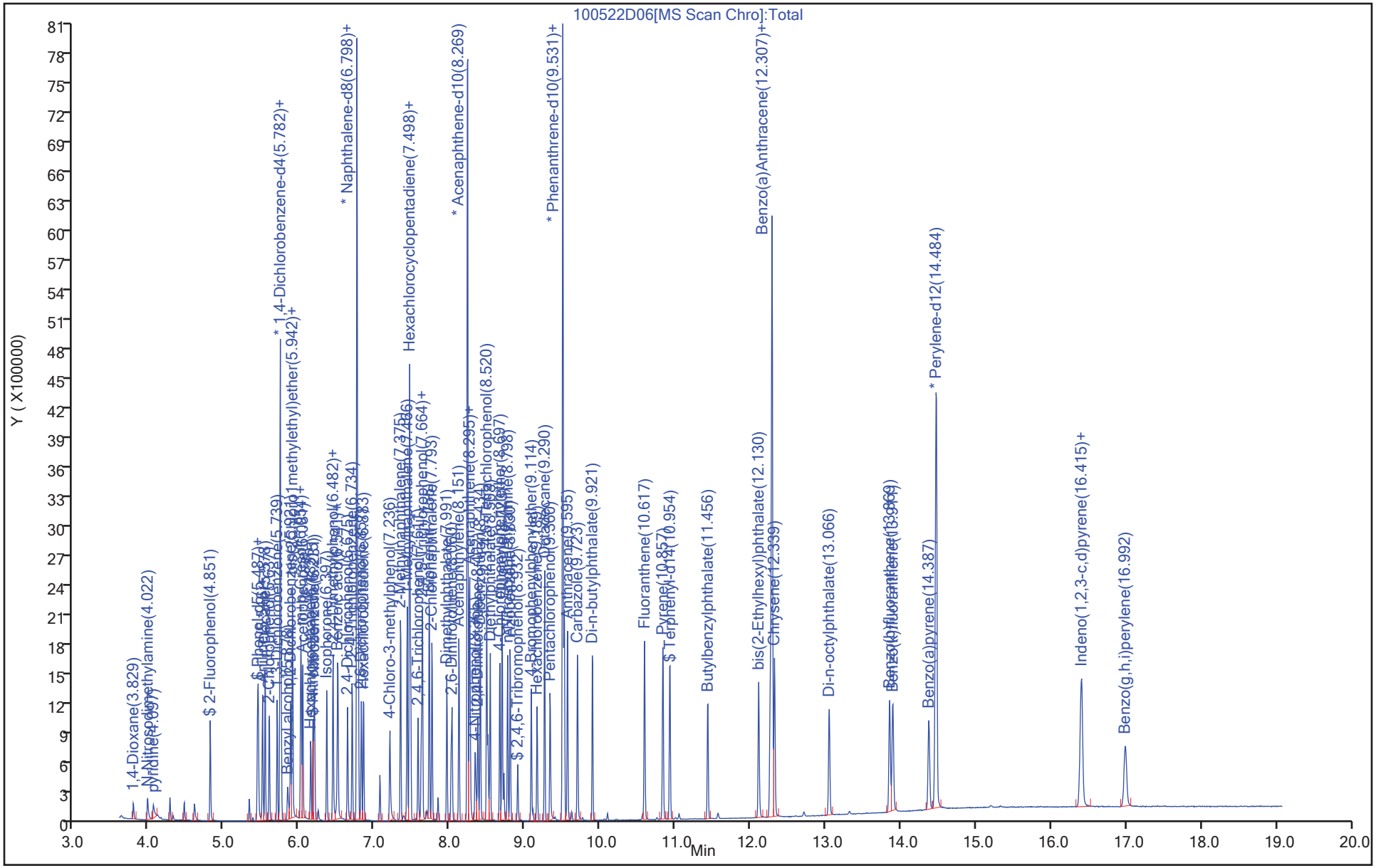
Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 23-May-2018 09:11:42 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D06.D				
Injection Date:	22-May-2018 19:56:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD005CB	Lab ID:	SVMS 3454		
Sample Info:	10052218D.b, SVMS 3454				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:42 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

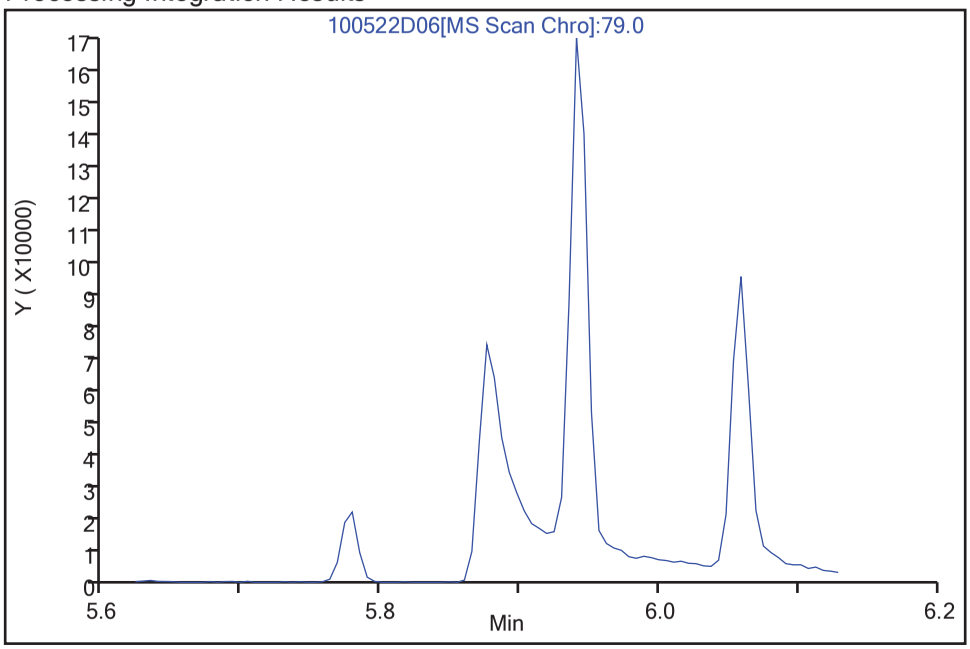
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D06.D		
Injection Date:	22-May-2018 19:56:30	Inst. ID:	msd10.i
Client ID:	1STD005CB	Lab ID:	SVMS 3454
Sample Info:	10052218D.b, SVMS 3454		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

18 Benzyl alcohol, CAS: 100-51-6

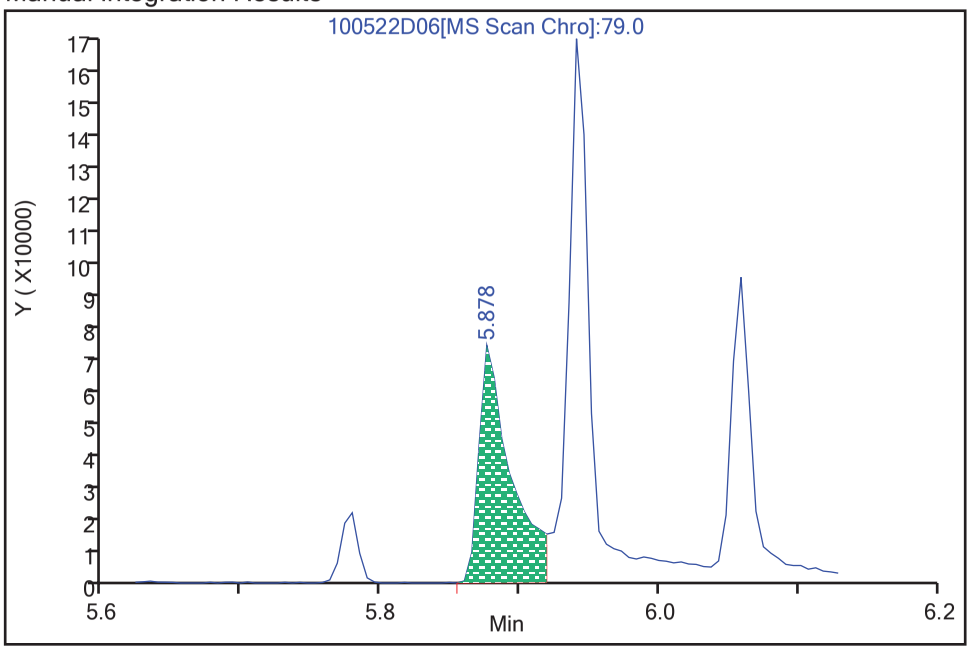
Not Detected
Expected RT: 5.878
RT Window: 5.531-6.225

Processing Integration Results



Manual Integration Results

RT: 5.878
Area: 115232
Amount: 4.8462
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:13:30
Audit Action: Mint
Audit Reason: Split Peak

Report Date: 23-May-2018 09:11:42 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

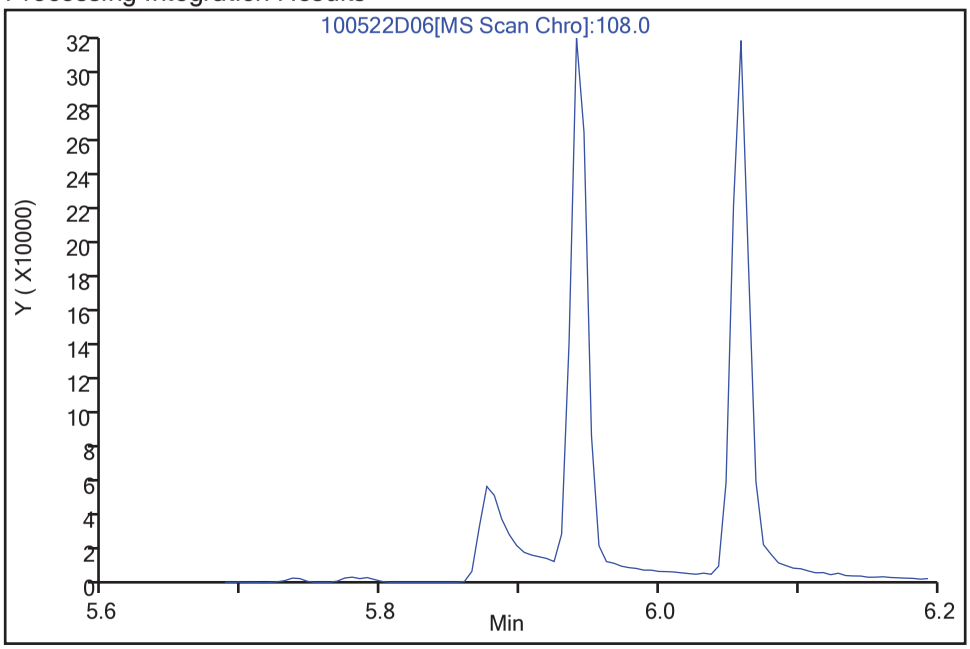
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D06.D		
Injection Date:	22-May-2018 19:56:30	Inst. ID:	msd10.i
Client ID:	1STD005CB	Lab ID:	SVMS 3454
Sample Info:	10052218D.b, SVMS 3454		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

20 o-Cresol, CAS: 95-48-7

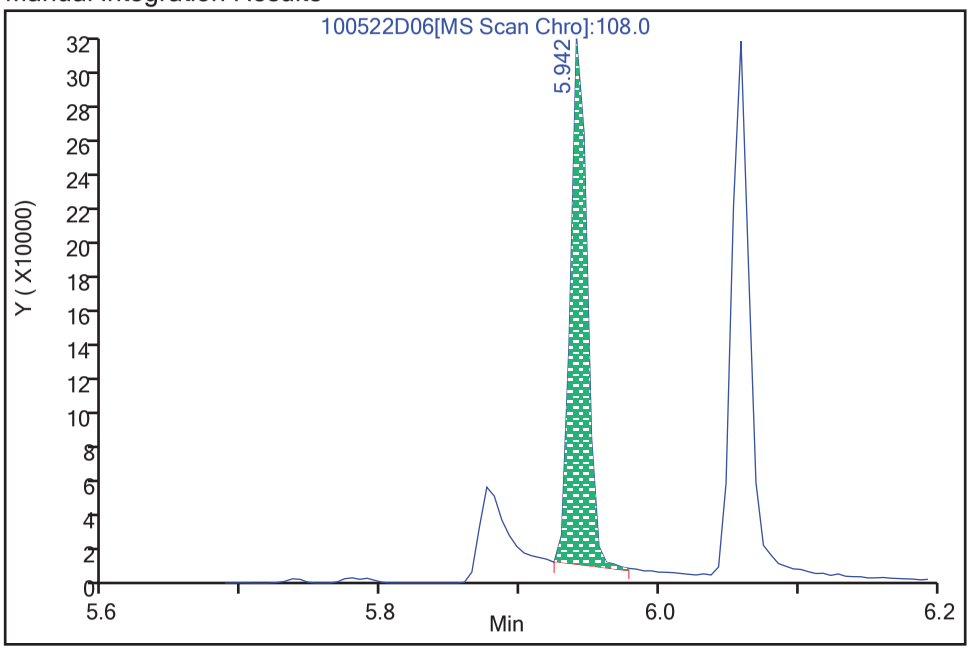
Not Detected
Expected RT: 5.942
RT Window: 5.595-6.289

Processing Integration Results



Manual Integration Results

RT: 5.942
Area: 253203
Amount: 5.0459
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:31:30
Audit Action: Mint
Audit Reason: Incorrect Auto Integration

Report Date: 23-May-2018 09:11:43 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D07.D		
Lab Sample ID:	SVMS 3455	Client Sample ID:	1STD010CB
Injection Date:	22-May-2018 20:20:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3455		
Misc. Info:	1STD010		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 5	ALS Bottle:	5
Cpnd Sublist:	1STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 08:31:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.829	3.829	0.000	93471	10.000	9.6042	
2 N-Nitrosodimethylamine	42.0	4.017	4.017	0.000	232839	10.000	10.368	
1 pyridine	79.0	4.081	4.081	0.000	308415	10.000	9.9272	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	664256	10.000	10.559	
$ 9 Phenol-d5	99.0	5.482	5.482	0.000	857713	10.000	10.625	
10 Phenol	94.0	5.493	5.493	0.000	906990	10.000	10.585	
11 Aniline	66.0	5.546	5.546	0.000	86369	10.000	10.367	
12 bis(2-Chloroethyl)ether	63.0	5.546	5.546	0.000	464356	10.000	10.042	
201 n-Decane	57.0	5.578	5.578	0.000	668476	10.000	10.148	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	652549	10.000	10.039	
14 1,3-Dichlorobenzene	146.0	5.739	5.739	0.000	700527	10.000	10.466	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	838571	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	729661	10.000	10.425	
18 Benzyl alcohol	79.0	5.878	5.878	0.000	373669	10.000	9.9768	M
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	654557	10.000	10.070	
20 o-Cresol	108.0	5.947	5.947	0.000	621447	10.000	10.127	M
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	864513	10.000	10.271	
23 m+p-Cresol	107.0	6.060	6.060	0.000	739275	10.000	10.891	
26 n-Nitroso-di-n-propylamine	70.0	6.054	6.054	0.000	459857	10.000	10.416	
24 Acetophenone	105.0	6.081	6.081	0.000	904725	10.000	10.376	
28 Hexachloroethane	117.0	6.183	6.183	0.000	247075	10.000	10.377	
$ 29 Nitrobenzene-d5	82.0	6.215	6.215	0.000	699727	10.000	10.960	
30 Nitrobenzene	77.0	6.231	6.231	0.000	705111	10.000	10.654	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.402	6.402	0.000	1185517	10.000	10.628	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	491755	10.000	10.955	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	345769	10.000	9.9044	
36 Benzoic acid	105.0	6.573	6.573	0.000	753794	20.000	19.239	
35 bis(2-Chloroethoxy)methane	93.0	6.546	6.546	0.000	736541	10.000	10.301	
38 2,4-Dichlorophenol	162.0	6.675	6.675	0.000	523752	10.000	10.436	
40 1,2,4-Trichlorobenzene	180.0	6.734	6.734	0.000	551622	10.000	10.226	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3589710	20.000	20.000	
43 Naphthalene	128.0	6.819	6.819	0.000	1937569	10.000	10.233	
45 2,6-Dichlorophenol	162.0	6.857	6.857	0.000	525875	10.000	10.263	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	305708	10.000	10.396	
49 4-Chloro-3-methylphenol	107.0	7.236	7.236	0.000	569918	10.000	10.663	
51 2-Methylnaphthalene	142.0	7.381	7.381	0.000	1270482	10.000	9.9570	
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	1249372	10.000	9.9769	
53 Hexachlorocyclopentadiene	237.0	7.498	7.498	0.000	1595541	50.000	54.725	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.515	7.515	0.000	517759	10.000	9.8470	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	341071	10.000	10.417	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	372370	10.000	10.545	
$ 56 2-Fluorobiphenyl	172.0	7.670	7.670	0.000	1427192	10.000	10.052	
184 Biphenyl	154.0	7.761	7.761	0.000	1623316	10.000	10.281	
58 2-Chloronaphthalene	162.0	7.798	7.798	0.000	1177960	10.000	10.131	
62 Dimethylphthalate	163.0	7.996	7.996	0.000	1279730	10.000	10.253	
65 2,6-Dinitrotoluene	165.0	8.065	8.065	0.000	311086	10.000	10.497	
64 Acenaphthylene	152.0	8.151	8.151	0.000	1769051	10.000	10.667	
* 67 Acenaphthene-d10	164.0	8.269	8.269	0.000	1906633	20.000	20.000	
68 Acenaphthene	153.0	8.295	8.295	0.000	1233560	10.000	10.140	
69 2,4-Dinitrophenol	184.0	8.306	8.306	0.000	304912	20.000	18.760	
70 4-Nitrophenol	109.0	8.370	8.370	0.000	309037	20.000	21.425	
73 2,4-Dinitrotoluene	165.0	8.408	8.408	0.000	398191	10.000	9.994	
71 Dibenzofuran	168.0	8.440	8.440	0.000	1585663	10.000	9.9298	
76 2,3,4,6-Tetrachlorophenol	232.0	8.536	8.536	0.000	246436	10.000	9.4879	
78 Diethylphthalate	149.0	8.568	8.568	0.000	1231089	10.000	10.503	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	609231	10.000	9.9158	
79 Fluorene	166.0	8.729	8.729	0.000	1386272	10.000	10.017	
84 4,6-Dinitro-2-methylphenol	198.0	8.750	8.750	0.000	195793	10.000	9.8166	
86 n-Nitrosodiphenylamine	169.0	8.798	8.798	0.000	961327	10.000	10.359	
87 Azobenzene	77.0	8.830	8.830	0.000	1438616	10.000	10.500	
$ 88 2,4,6-Tribromophenol	330.0	8.937	8.937	0.000	138485	10.000	9.5152	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	329112	10.000	10.135	
96 Hexachlorobenzene	284.0	9.189	9.189	0.000	330632	10.000	10.082	
202 Octadecane	57.0	9.290	9.290	0.000	890570	10.000	10.532	
99 Pentachlorophenol	266.0	9.365	9.365	0.000	434108	20.000	19.199	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3249997	20.000	20.000	
103 Phenanthrene	178.0	9.552	9.552	0.000	1881299	10.000	10.121	
104 Anthracene	178.0	9.595	9.595	0.000	1779929	10.000	10.491	
106 Carbazole	167.0	9.729	9.729	0.000	1662214	10.000	10.472	
109 Di-n-butylphthalate	149.0	9.927	9.927	0.000	2065254	10.000	11.132	
114 Fluoranthene	202.0	10.617	10.617	0.000	1870784	10.000	10.664	
116 Pyrene	202.0	10.857	10.857	0.000	1914556	10.000	10.654	
$ 117 Terphenyl-d14	244.0	10.954	10.954	0.000	1314505	10.000	10.274	
122 Butylbenzylphthalate	149.0	11.456	11.456	0.000	860723	10.000	10.344	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.130	12.130	0.000	1189636	10.000	10.329	
127 Benzo(a)Anthracene	228.0	12.285	12.285	0.000	1708800	10.000	10.440	
* 128 Chrysene-d12	240.0	12.312	12.312	0.000	2945037	20.000	20.000	
129 Chrysene	228.0	12.344	12.344	0.000	1697170	10.000	10.068	
131 Di-n-octylphthalate	149.0	13.066	13.066	0.000	1878938	10.000	9.7788	
132 Benzo(b)fluoranthene	252.0	13.874	13.874	0.000	1631249	10.000	10.555	
134 Benzo(k)fluoranthene	252.0	13.917	13.917	0.000	1695576	10.000	10.249	
135 Benzo(a)pyrene	252.0	14.393	14.393	0.000	1400575	10.000	10.602	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2906387	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.420	16.420	0.000	1792969	10.000	10.645	
139 Dibenzo(a,h)anthracene	278.0	16.431	16.431	0.000	1598298	10.000	10.481	
140 Benzo(g,h,i)perylene	276.0	17.008	17.008	0.000	1435122	10.000	10.485	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

Processing Flags

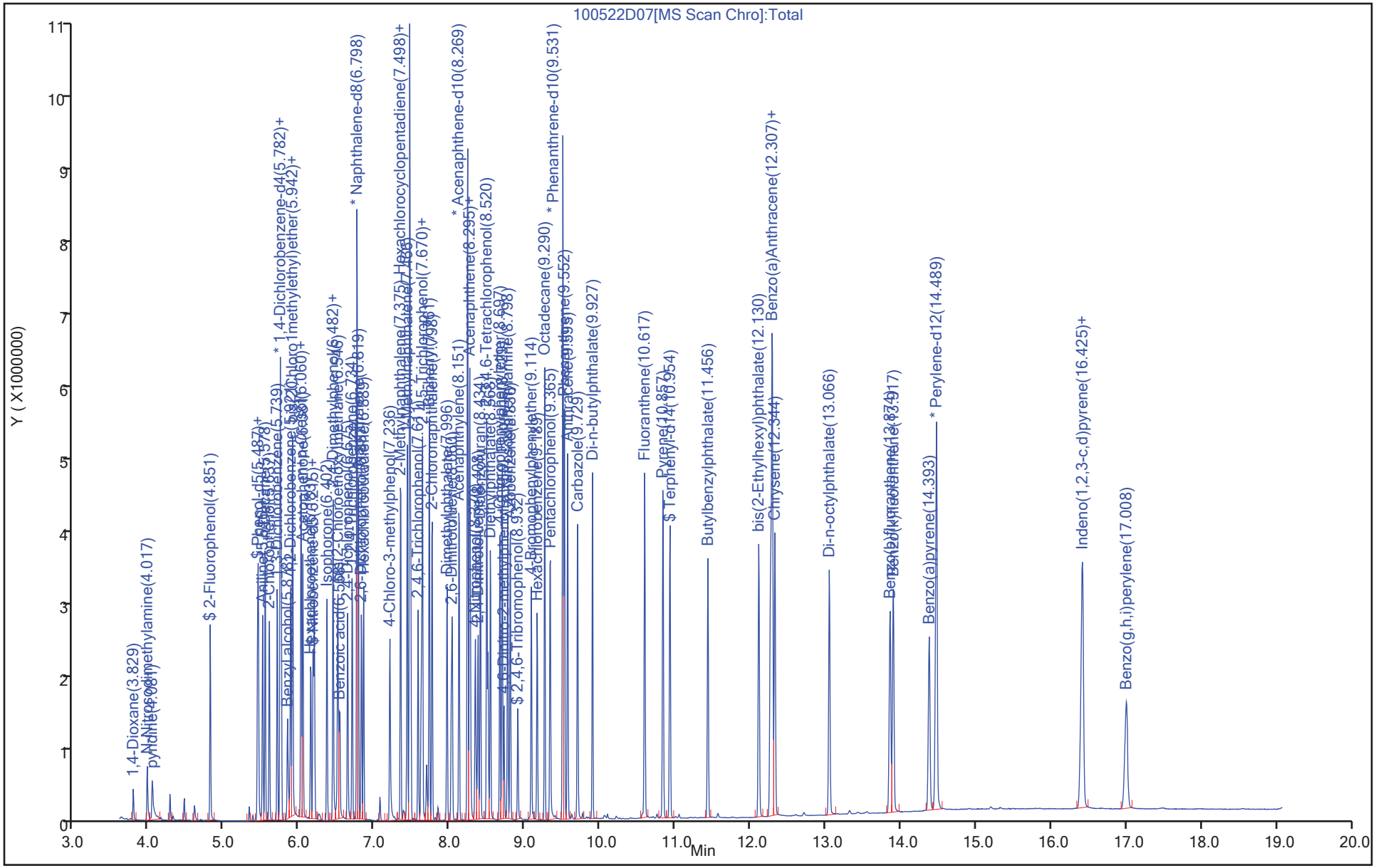
Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 23-May-2018 09:11:43 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D07.D				
Injection Date:	22-May-2018 20:20:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD010CB	Lab ID:	SVMS 3455		
Sample Info:	10052218D.b, SVMS 3455				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:43 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

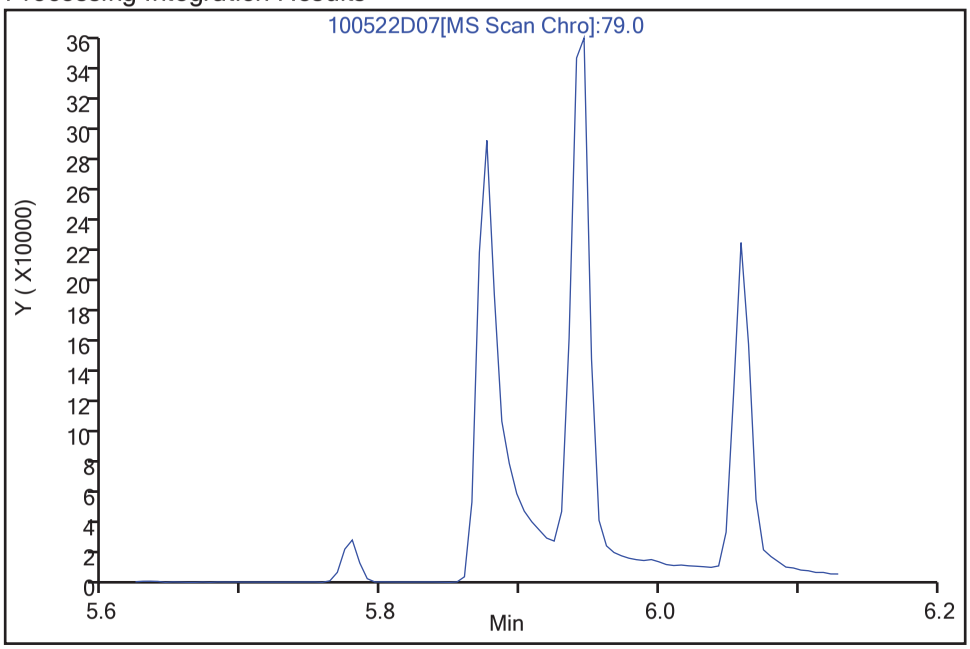
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D07.D		
Injection Date:	22-May-2018 20:20:30	Inst. ID:	msd10.i
Client ID:	1STD010CB	Lab ID:	SVMS 3455
Sample Info:	10052218D.b, SVMS 3455		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

18 Benzyl alcohol, CAS: 100-51-6

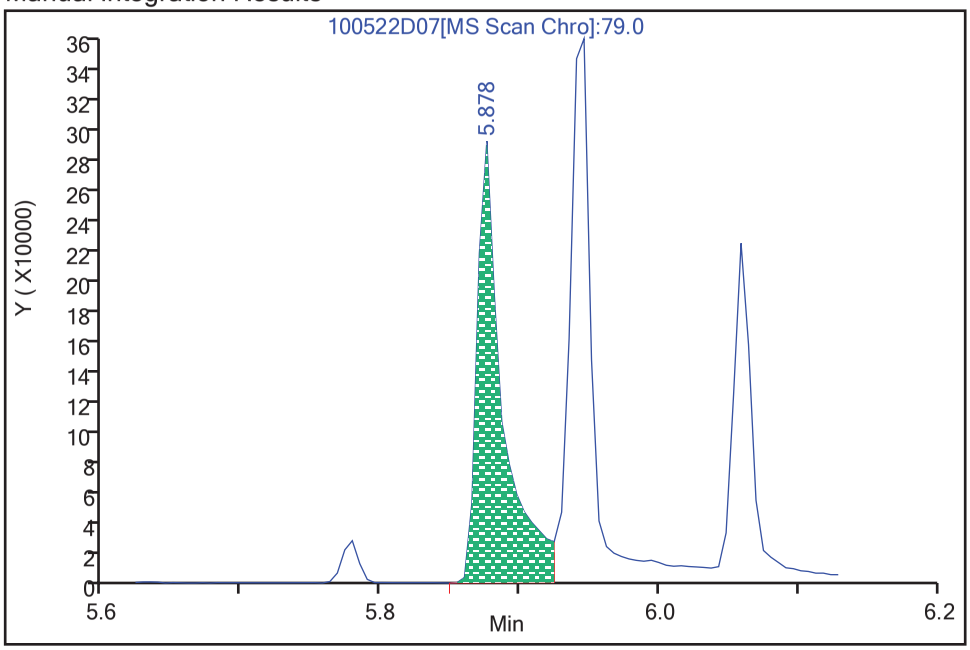
Not Detected
Expected RT: 5.878
RT Window: 5.531-6.225

Processing Integration Results



Manual Integration Results

RT: 5.878
Area: 373669
Amount: 9.9768
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:14:30
Audit Action: Mint
Audit Reason: Split Peak

Report Date: 23-May-2018 09:11:43 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

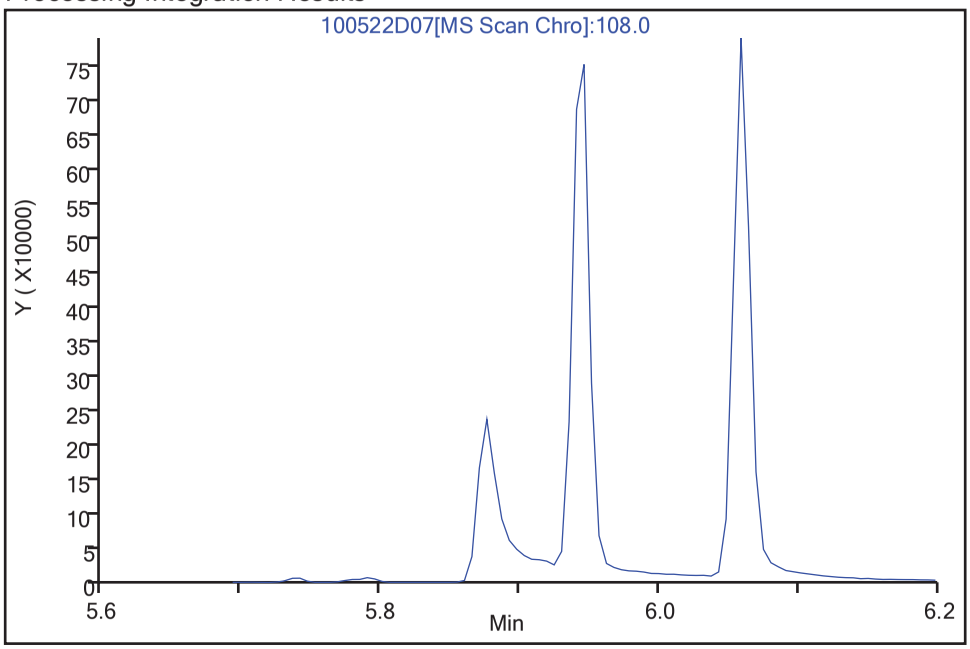
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D07.D		
Injection Date:	22-May-2018 20:20:30	Inst. ID:	msd10.i
Client ID:	1STD010CB	Lab ID:	SVMS 3455
Sample Info:	10052218D.b, SVMS 3455		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

20 o-Cresol, CAS: 95-48-7

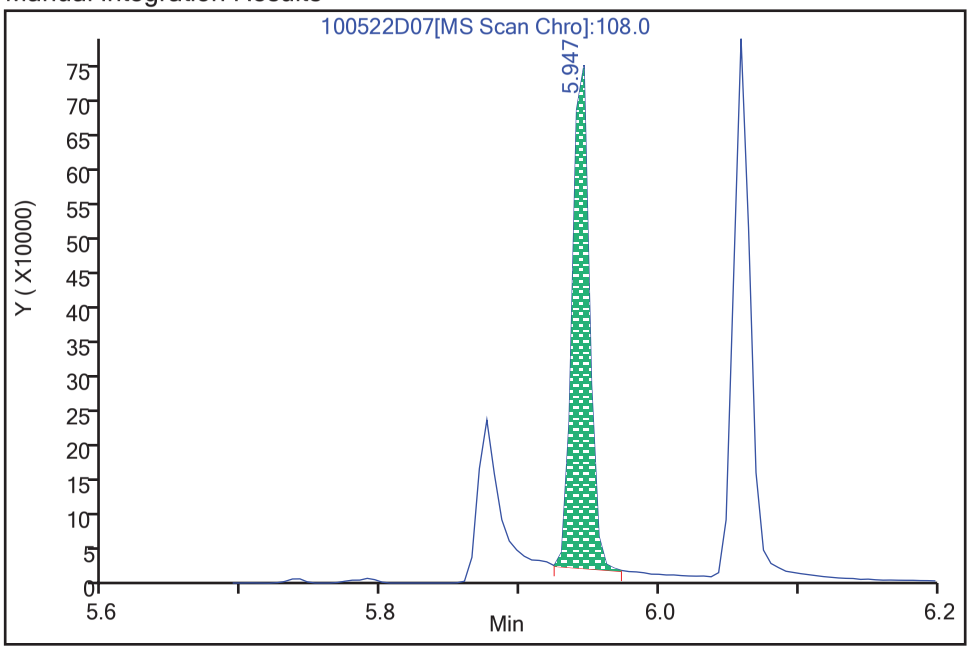
Not Detected
Expected RT: 5.947
RT Window: 5.600-6.294

Processing Integration Results



Manual Integration Results

RT: 5.947
Area: 621447
Amount: 10.127
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:31:30
Audit Action: Mint
Audit Reason: Incorrect Auto Integration

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D08.D		
Lab Sample ID:	SVMS 3456	Client Sample ID:	1STD015CB
Injection Date:	22-May-2018 20:45:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3456		
Misc. Info:	1STD015		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 6	ALS Bottle:	6
Cpnd Sublist:	1STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 08:31:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.835	3.835	0.000	141941	15.000	15.572	
2 N-Nitrosodimethylamine	42.0	4.017	4.017	0.000	314051	15.000	14.931	
1 pyridine	79.0	4.081	4.081	0.000	468300	15.000	16.094	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	1050653	15.000	17.831	
$ 9 Phenol-d5	99.0	5.482	5.482	0.000	1405645	15.000	18.592	
10 Phenol	94.0	5.493	5.493	0.000	1476930	15.000	18.403	
11 Aniline	66.0	5.546	5.546	0.000	188857	15.000	24.204	
12 bis(2-Chloroethyl)ether	63.0	5.552	5.552	0.000	759204	15.000	17.530	
201 n-Decane	57.0	5.584	5.584	0.000	907802	15.000	14.714	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	1094711	15.000	17.982	
14 1,3-Dichlorobenzene	146.0	5.744	5.744	0.000	941789	15.000	15.023	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	785413	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	993029	15.000	15.148	
18 Benzyl alcohol	79.0	5.878	5.878	0.000	644862	15.000	17.100	
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	963650	15.000	15.829	
20 o-Cresol	108.0	5.948	5.948	0.000	1018736	15.000	17.725	M
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	1376820	15.000	17.465	
23 m+p-Cresol	107.0	6.060	6.060	0.000	1138992	15.000	17.916	
26 n-Nitroso-di-n-propylamine	70.0	6.054	6.054	0.000	748939	15.000	18.111	
24 Acetophenone	105.0	6.081	6.081	0.000	1474798	15.000	18.058	
28 Hexachloroethane	117.0	6.183	6.183	0.000	342577	15.000	15.363	
$ 29 Nitrobenzene-d5	82.0	6.220	6.220	0.000	1138792	15.000	16.034	
30 Nitrobenzene	77.0	6.236	6.236	0.000	1129117	15.000	15.336	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.402	6.402	0.000	1952955	15.000	15.739	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	771445	15.000	15.448	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	595862	15.000	15.088	
36 Benzoic acid	105.0	6.584	6.584	0.000	1306046	30.000	29.019	
35 bis(2-Chloroethoxy)methane	93.0	6.547	6.547	0.000	1207251	15.000	15.177	
38 2,4-Dichlorophenol	162.0	6.675	6.675	0.000	875135	15.000	15.674	
40 1,2,4-Trichlorobenzene	180.0	6.739	6.739	0.000	939821	15.000	15.661	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3993401	20.000	20.000	
43 Naphthalene	128.0	6.819	6.819	0.000	3120982	15.000	14.816	
45 2,6-Dichlorophenol	162.0	6.857	6.857	0.000	884002	15.000	15.508	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	516491	15.000	15.788	
49 4-Chloro-3-methylphenol	107.0	7.237	7.237	0.000	924952	15.000	15.556	
51 2-Methylnaphthalene	142.0	7.381	7.381	0.000	2127380	15.000	14.987	
204 1-Methylnaphthalene	142.0	7.467	7.467	0.000	2074700	15.000	14.893	
53 Hexachlorocyclopentadiene	237.0	7.504	7.504	0.000	2600700	75.000	82.273	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.515	7.515	0.000	895730	15.000	15.712	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	577013	15.000	16.255	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	619401	15.000	16.178	
$ 56 2-Fluorobiphenyl	172.0	7.670	7.670	0.000	2334319	15.000	15.163	
184 Biphenyl	154.0	7.761	7.761	0.000	2634272	15.000	15.387	
58 2-Chloronaphthalene	162.0	7.798	7.798	0.000	1939061	15.000	15.382	
62 Dimethylphthalate	163.0	7.996	7.996	0.000	2101058	15.000	15.526	
65 2,6-Dinitrotoluene	165.0	8.066	8.066	0.000	518283	15.000	16.130	
64 Acenaphthylene	152.0	8.156	8.156	0.000	2812202	15.000	15.640	
* 67 Acenaphthene-d10	164.0	8.269	8.269	0.000	2067192	20.000	20.000	
68 Acenaphthene	153.0	8.296	8.296	0.000	1970454	15.000	14.939	
69 2,4-Dinitrophenol	184.0	8.306	8.306	0.000	539200	30.000	28.643	
70 4-Nitrophenol	109.0	8.376	8.376	0.000	473462	30.000	29.604	
73 2,4-Dinitrotoluene	165.0	8.408	8.408	0.000	660026	15.000	15.005	
71 Dibenzofuran	168.0	8.440	8.440	0.000	2548069	15.000	14.717	
76 2,3,4,6-Tetrachlorophenol	232.0	8.536	8.536	0.000	417017	15.000	14.507	
78 Diethylphthalate	149.0	8.574	8.574	0.000	1959933	15.000	15.422	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	1006396	15.000	15.108	
79 Fluorene	166.0	8.729	8.729	0.000	2245270	15.000	14.963	
84 4,6-Dinitro-2-methylphenol	198.0	8.756	8.756	0.000	339175	15.000	15.365	
86 n-Nitrosodiphenylamine	169.0	8.798	8.798	0.000	1548623	15.000	15.078	
87 Azobenzene	77.0	8.836	8.836	0.000	2270300	15.000	14.972	
$ 88 2,4,6-Tribromophenol	330.0	8.937	8.937	0.000	241648	15.000	15.002	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	558633	15.000	15.544	
96 Hexachlorobenzene	284.0	9.194	9.194	0.000	569181	15.000	15.683	
202 Octadecane	57.0	9.290	9.290	0.000	1401380	15.000	14.974	
99 Pentachlorophenol	266.0	9.365	9.365	0.000	762649	30.000	29.053	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3596924	20.000	20.000	
103 Phenanthrene	178.0	9.552	9.552	0.000	3063364	15.000	14.891	
104 Anthracene	178.0	9.595	9.595	0.000	2918123	15.000	15.541	
106 Carbazole	167.0	9.729	9.729	0.000	2658868	15.000	15.135	
109 Di-n-butylphthalate	149.0	9.927	9.927	0.000	3292729	15.000	16.036	
114 Fluoranthene	202.0	10.617	10.617	0.000	3012374	15.000	15.515	
116 Pyrene	202.0	10.863	10.863	0.000	3067375	15.000	15.378	
$ 117 Terphenyl-d14	244.0	10.954	10.954	0.000	2158691	15.000	15.201	
122 Butylbenzylphthalate	149.0	11.457	11.457	0.000	1414274	15.000	15.037	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.131	12.131	0.000	1947917	15.000	14.923	
127 Benzo(a)Anthracene	228.0	12.291	12.291	0.000	2770620	15.000	15.251	
* 128 Chrysene-d12	240.0	12.312	12.312	0.000	3268785	20.000	20.000	
129 Chrysene	228.0	12.350	12.350	0.000	2788053	15.000	14.901	
131 Di-n-octylphthalate	149.0	13.067	13.067	0.000	3108244	15.000	14.676	
132 Benzo(b)fluoranthene	252.0	13.880	13.880	0.000	2572512	15.000	15.540	
134 Benzo(k)fluoranthene	252.0	13.922	13.922	0.000	2833605	15.000	15.990	
135 Benzo(a)pyrene	252.0	14.398	14.398	0.000	2301803	15.000	16.267	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	3113201	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.431	16.431	0.000	2770351	15.000	15.355	
139 Dibenzo(a,h)anthracene	278.0	16.436	16.436	0.000	2496144	15.000	15.282	
140 Benzo(g,h,i)perylene	276.0	17.019	17.019	0.000	2141418	15.000	14.606	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

Processing Flags

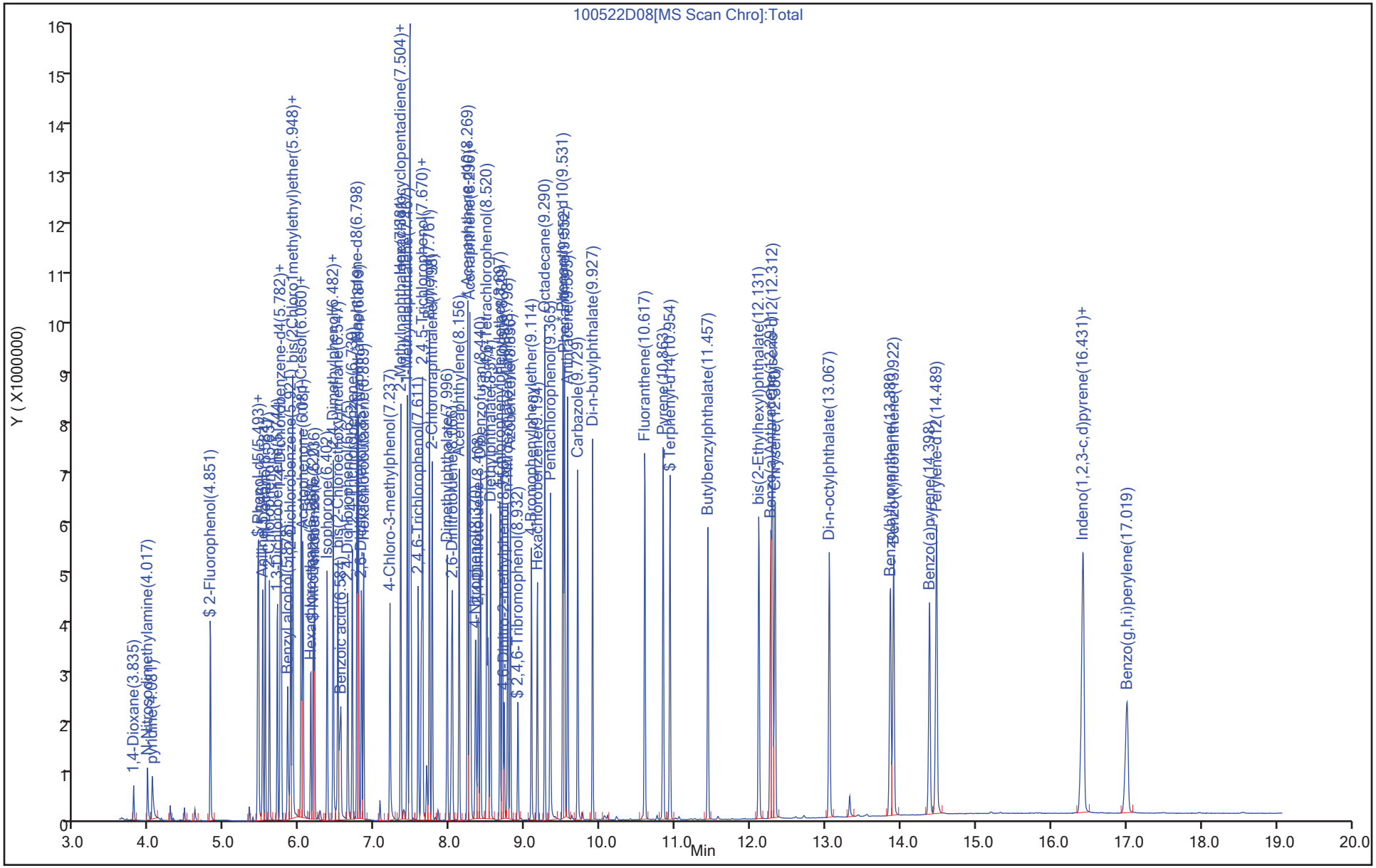
Review Flags

M - Compound Hit/Peak Manually Integrated

Report Date: 23-May-2018 09:11:43 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D08.D				
Injection Date:	22-May-2018 20:45:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD015CB	Lab ID:	SVMS 3456		
Sample Info:	10052218D.b, SVMS 3456				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:43 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

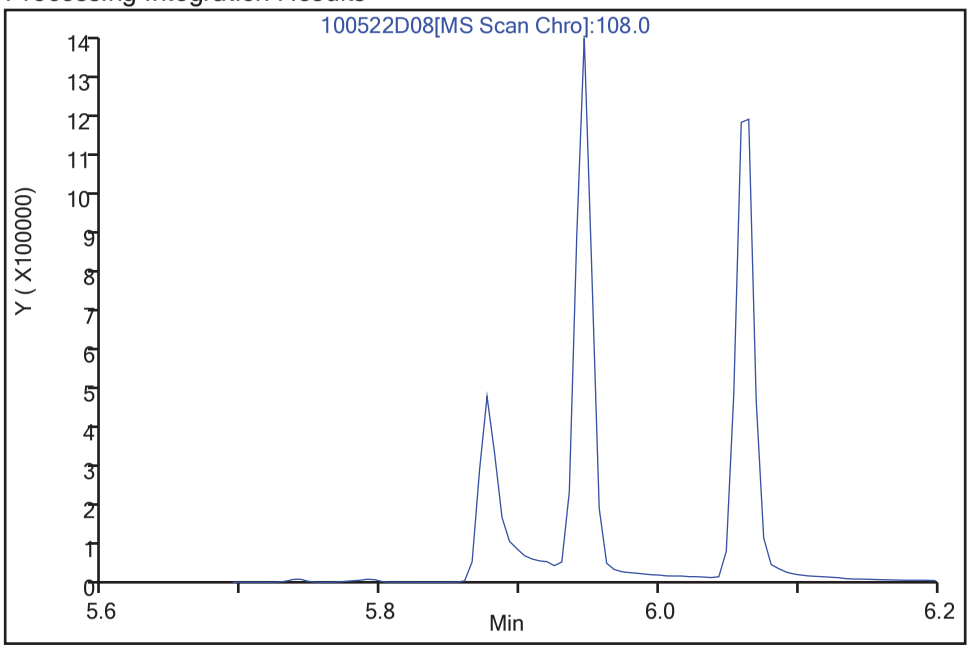
Manual Integration Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D08.D		
Injection Date:	22-May-2018 20:45:30	Inst. ID:	msd10.i
Client ID:	1STD015CB	Lab ID:	SVMS 3456
Sample Info:	10052218D.b, SVMS 3456		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

20 o-Cresol, CAS: 95-48-7

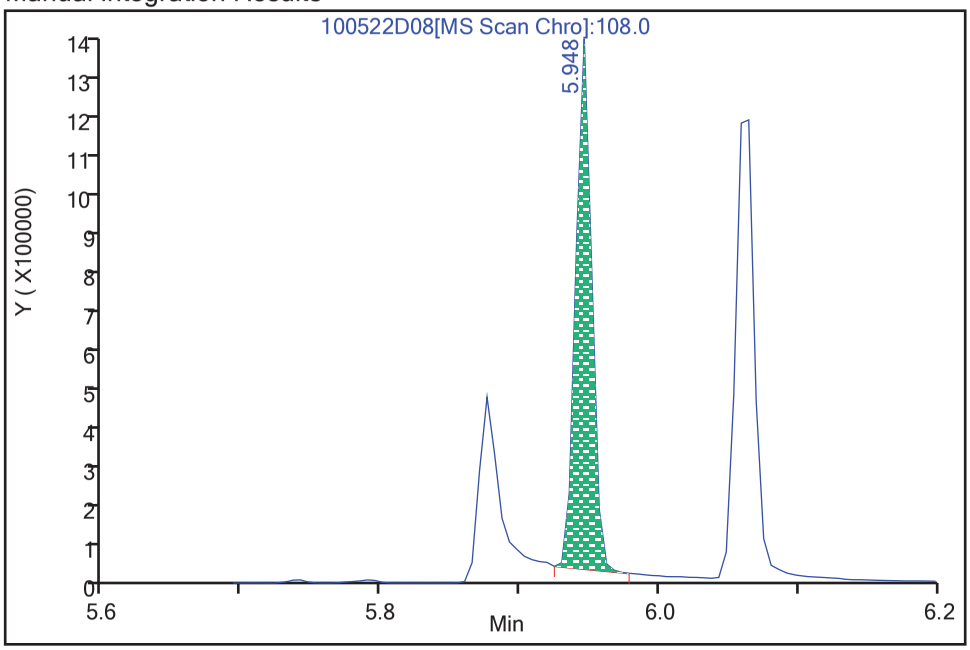
Not Detected
Expected RT: 5.948
RT Window: 5.601-6.294

Processing Integration Results



Manual Integration Results

RT: 5.948
Area: 1018736
Amount: 17.725
Amount Units: ng



Data Editor: cmp2, 23-May-2018 08:31:30
Audit Action: Mint
Audit Reason: Incorrect Auto Integration

Report Date: 23-May-2018 09:11:44 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D09.D
Lab Sample ID: SVMS 3457 Client Sample ID: 1STD020CB
Injection Date: 22-May-2018 21:09:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3457
Misc. Info: 1STD020
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Ical, Level: 7 ALS Bottle: 7
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.829	3.829	0.000	223909	20.000	21.933	
2 N-Nitrosodimethylamine	42.0	4.017	4.017	0.000	486024	20.000	19.953	
1 pyridine	79.0	4.075	4.075	0.000	758516	20.000	23.669	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	1354624	20.000	20.148	
$ 9 Phenol-d5	99.0	5.482	5.482	0.000	1715676	20.000	19.797	
10 Phenol	94.0	5.493	5.493	0.000	1817876	20.000	19.684	
11 Aniline	66.0	5.546	5.546	0.000	137565	20.000	13.672	
12 bis(2-Chloroethyl)ether	63.0	5.552	5.552	0.000	947646	20.000	18.695	
201 n-Decane	57.0	5.584	5.584	0.000	1443304	20.000	20.306	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	1376798	20.000	19.676	
14 1,3-Dichlorobenzene	146.0	5.744	5.744	0.000	1447748	20.000	20.070	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	905073	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	1511187	20.000	19.991	
18 Benzyl alcohol	79.0	5.878	5.878	0.000	811159	20.000	27.357	
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	1399797	20.000	19.966	
20 o-Cresol	108.0	5.947	5.947	0.000	1328725	20.000	18.647	
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	1653145	20.000	17.705	
23 m+p-Cresol	107.0	6.065	6.065	0.000	1390725	20.000	18.869	
26 n-Nitroso-di-n-propylamine	70.0	6.060	6.060	0.000	898799	20.000	18.711	
24 Acetophenone	105.0	6.087	6.087	0.000	1771947	20.000	18.591	
28 Hexachloroethane	117.0	6.188	6.188	0.000	527165	20.000	20.669	
$ 29 Nitrobenzene-d5	82.0	6.220	6.220	0.000	1366383	20.000	21.514	
30 Nitrobenzene	77.0	6.236	6.236	0.000	1368352	20.000	20.506	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.402	6.402	0.000	2407967	20.000	21.907	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	930500	20.000	20.887	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	724417	20.000	23.173	
36 Benzoic acid	105.0	6.595	6.595	0.000	1670981	40.000	54.500	
35 bis(2-Chloroethoxy)methane	93.0	6.546	6.546	0.000	1475270	20.000	20.632	
38 2,4-Dichlorophenol	162.0	6.680	6.680	0.000	1079038	20.000	21.958	
40 1,2,4-Trichlorobenzene	180.0	6.739	6.739	0.000	1139932	20.000	21.246	
* 41 Naphthalene-d8	136.0	6.803	6.803	0.000	3627362	20.000	20.000	
43 Naphthalene	128.0	6.819	6.819	0.000	3740779	20.000	19.286	
45 2,6-Dichlorophenol	162.0	6.862	6.862	0.000	1099709	20.000	21.829	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	627782	20.000	21.549	
49 4-Chloro-3-methylphenol	107.0	7.236	7.236	0.000	1151014	20.000	21.813	
51 2-Methylnaphthalene	142.0	7.381	7.381	0.000	2600122	20.000	20.291	
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	2532349	20.000	20.061	
53 Hexachlorocyclopentadiene	237.0	7.504	7.504	0.000	3057871	100.00	105.63	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.515	7.515	0.000	1108388	20.000	21.793	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	714968	20.000	22.923	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	777019	20.000	23.009	
$ 56 2-Fluorobiphenyl	172.0	7.670	7.670	0.000	2887778	20.000	20.557	
184 Biphenyl	154.0	7.761	7.761	0.000	3235726	20.000	20.689	
58 2-Chloronaphthalene	162.0	7.798	7.798	0.000	2400150	20.000	21.014	
62 Dimethylphthalate	163.0	7.996	7.996	0.000	2590025	20.000	21.176	
65 2,6-Dinitrotoluene	165.0	8.065	8.065	0.000	647195	20.000	22.882	
64 Acenaphthylene	152.0	8.156	8.156	0.000	3439024	20.000	21.008	
* 67 Acenaphthene-d10	164.0	8.269	8.269	0.000	1901976	20.000	20.000	
68 Acenaphthene	153.0	8.295	8.295	0.000	2414021	20.000	19.847	
69 2,4-Dinitrophenol	184.0	8.306	8.306	0.000	714652	40.000	59.480	
70 4-Nitrophenol	109.0	8.376	8.376	0.000	601539	40.000	47.515	
73 2,4-Dinitrotoluene	165.0	8.408	8.408	0.000	815918	20.000	23.521	
71 Dibenzofuran	168.0	8.440	8.440	0.000	3154175	20.000	19.766	
76 2,3,4,6-Tetrachlorophenol	232.0	8.542	8.542	0.000	532741	20.000	23.821	
78 Diethylphthalate	149.0	8.574	8.574	0.000	2415620	20.000	20.944	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	1272309	20.000	21.311	
79 Fluorene	166.0	8.729	8.729	0.000	2776572	20.000	20.229	
84 4,6-Dinitro-2-methylphenol	198.0	8.755	8.755	0.000	429629	20.000	26.893	
86 n-Nitrosodiphenylamine	169.0	8.804	8.804	0.000	1957029	20.000	20.664	
87 Azobenzene	77.0	8.836	8.836	0.000	2772976	20.000	19.493	
$ 88 2,4,6-Tribromophenol	330.0	8.937	8.937	0.000	312115	20.000	27.073	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	702325	20.000	21.646	
96 Hexachlorobenzene	284.0	9.194	9.194	0.000	708249	20.000	21.760	
202 Octadecane	57.0	9.290	9.290	0.000	1692974	20.000	19.112	
99 Pentachlorophenol	266.0	9.365	9.365	0.000	991598	40.000	52.112	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3362144	20.000	20.000	
103 Phenanthrene	178.0	9.552	9.552	0.000	3709767	20.000	19.196	
104 Anthracene	178.0	9.595	9.595	0.000	3579401	20.000	20.558	
106 Carbazole	167.0	9.729	9.729	0.000	3264504	20.000	19.921	
109 Di-n-butylphthalate	149.0	9.927	9.927	0.000	4014865	20.000	21.194	
114 Fluoranthene	202.0	10.617	10.617	0.000	3679876	20.000	20.452	
116 Pyrene	202.0	10.863	10.863	0.000	3786029	20.000	20.185	
$ 117 Terphenyl-d14	244.0	10.954	10.954	0.000	2729601	20.000	20.611	
122 Butylbenzylphthalate	149.0	11.457	11.457	0.000	1800871	20.000	23.979	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.130	12.130	0.000	2501138	20.000	24.827	
127 Benzo(a)Anthracene	228.0	12.291	12.291	0.000	3482356	20.000	20.513	
* 128 Chrysene-d12	240.0	12.312	12.312	0.000	3092188	20.000	20.000	
129 Chrysene	228.0	12.350	12.350	0.000	3511143	20.000	19.940	
131 Di-n-octylphthalate	149.0	13.066	13.066	0.000	3960022	20.000	26.275	
132 Benzo(b)fluoranthene	252.0	13.879	13.879	0.000	3356291	20.000	22.734	
134 Benzo(k)fluoranthene	252.0	13.922	13.922	0.000	3431105	20.000	21.889	
135 Benzo(a)pyrene	252.0	14.398	14.398	0.000	2866145	20.000	22.894	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2876235	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.436	16.436	0.000	3442145	20.000	20.956	
139 Dibenzo(a,h)anthracene	278.0	16.441	16.441	0.000	3166160	20.000	21.464	
140 Benzo(g,h,i)perylene	276.0	17.019	17.019	0.000	2637166	20.000	19.282	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

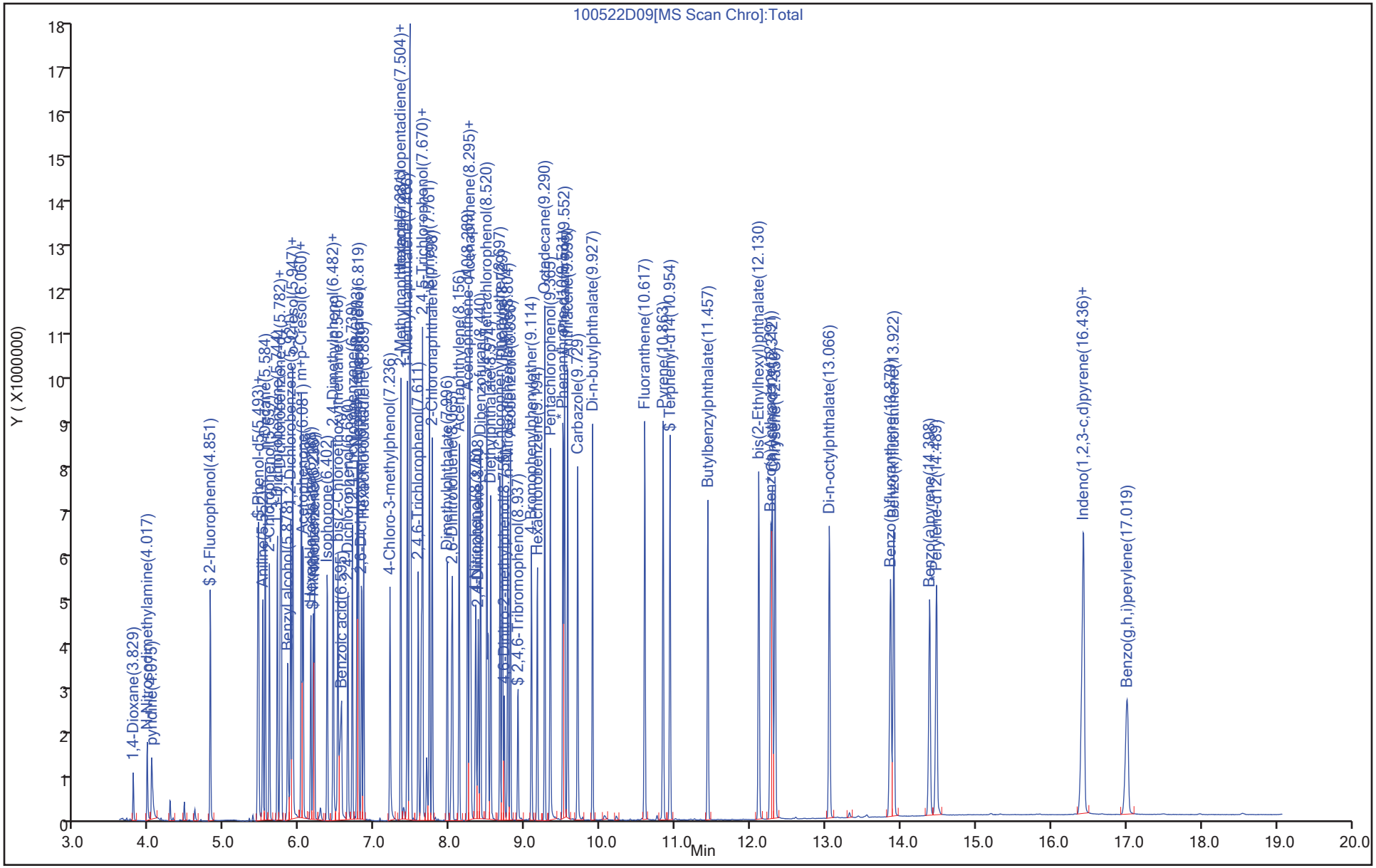
Processing Flags

Review Flags

Report Date: 23-May-2018 09:11:44 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D09.D				
Injection Date:	22-May-2018 21:09:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD020CB	Lab ID:	SVMS 3457		
Sample Info:	10052218D.b, SVMS 3457				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:45 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D10.D		
Lab Sample ID:	SVMS 3458	Client Sample ID:	1STD025CB
Injection Date:	22-May-2018 21:34:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3458		
Misc. Info:	1STD025		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 8	ALS Bottle:	8
Cpnd Sublist:	1STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.824	3.824	0.000	264188	25.000	29.320	
2 N-Nitrosodimethylamine	42.0	4.011	4.011	0.000	531934	25.000	25.407	
1 pyridine	79.0	4.070	4.070	0.000	911208	25.000	31.692	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	1542575	25.000	26.532	
$ 9 Phenol-d5	99.0	5.482	5.482	0.000	1975875	25.000	26.387	
10 Phenol	94.0	5.493	5.493	0.000	2065765	25.000	25.932	
11 Aniline	66.0	5.546	5.546	0.000	137779	25.000	16.844	
12 bis(2-Chloroethyl)ether	63.0	5.552	5.552	0.000	1064054	25.000	24.561	
201 n-Decane	57.0	5.584	5.584	0.000	1620603	25.000	26.358	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	1566899	25.000	25.957	
14 1,3-Dichlorobenzene	146.0	5.744	5.744	0.000	1603605	25.000	25.797	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	775821	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	1661520	25.000	25.548	
18 Benzyl alcohol	79.0	5.878	5.878	0.000	934623	25.000	34.455	
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	1549771	25.000	25.672	
20 o-Cresol	108.0	5.948	5.948	0.000	1531726	25.000	25.066	
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	1879741	25.000	23.691	
23 m+p-Cresol	107.0	6.065	6.065	0.000	1585238	25.000	25.078	
26 n-Nitroso-di-n-propylamine	70.0	6.060	6.060	0.000	1036373	25.000	25.145	
24 Acetophenone	105.0	6.081	6.081	0.000	2014463	25.000	24.705	
28 Hexachloroethane	117.0	6.183	6.183	0.000	579211	25.000	26.269	
$ 29 Nitrobenzene-d5	82.0	6.220	6.220	0.000	1568880	25.000	27.144	
30 Nitrobenzene	77.0	6.236	6.236	0.000	1553644	25.000	25.769	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.402	6.402	0.000	2789613	25.000	27.721	
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	1096355	25.000	27.011	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	840270	25.000	29.087	
36 Benzoic acid	105.0	6.600	6.600	0.000	1970024	50.000	67.347	
35 bis(2-Chloroethoxy)methane	93.0	6.547	6.547	0.000	1702837	25.000	26.269	
38 2,4-Dichlorophenol	162.0	6.680	6.680	0.000	1254175	25.000	27.853	
40 1,2,4-Trichlorobenzene	180.0	6.739	6.739	0.000	1310569	25.000	26.841	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3260630	20.000	20.000	
43 Naphthalene	128.0	6.819	6.819	0.000	4226412	25.000	24.333	
45 2,6-Dichlorophenol	162.0	6.862	6.862	0.000	1270517	25.000	27.574	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	719026	25.000	27.077	
49 4-Chloro-3-methylphenol	107.0	7.237	7.237	0.000	1323939	25.000	27.455	
51 2-Methylnaphthalene	142.0	7.381	7.381	0.000	3025001	25.000	26.097	
204 1-Methylnaphthalene	142.0	7.467	7.467	0.000	2944482	25.000	25.826	
53 Hexachlorocyclopentadiene	237.0	7.504	7.504	0.000	3466514	125.00	132.57	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.515	7.515	0.000	1293133	25.000	27.888	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	839340	25.000	29.246	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	899519	25.000	28.996	
$ 56 2-Fluorobiphenyl	172.0	7.670	7.670	0.000	3324213	25.000	26.273	
184 Biphenyl	154.0	7.761	7.761	0.000	3703890	25.000	26.263	
58 2-Chloronaphthalene	162.0	7.798	7.798	0.000	2761430	25.000	26.728	
62 Dimethylphthalate	163.0	8.001	8.001	0.000	2977806	25.000	26.887	
65 2,6-Dinitrotoluene	165.0	8.066	8.066	0.000	753526	25.000	29.001	
64 Acenaphthylene	152.0	8.157	8.157	0.000	3936545	25.000	26.643	
* 67 Acenaphthene-d10	164.0	8.269	8.269	0.000	1700610	20.000	20.000	
68 Acenaphthene	153.0	8.296	8.296	0.000	2759173	25.000	25.324	
69 2,4-Dinitrophenol	184.0	8.312	8.312	0.000	842311	50.000	72.520	
70 4-Nitrophenol	109.0	8.376	8.376	0.000	689841	50.000	59.094	
73 2,4-Dinitrotoluene	165.0	8.413	8.413	0.000	941700	25.000	29.459	
71 Dibenzofuran	168.0	8.440	8.440	0.000	3623283	25.000	25.344	
76 2,3,4,6-Tetrachlorophenol	232.0	8.542	8.542	0.000	621239	25.000	30.027	
78 Diethylphthalate	149.0	8.574	8.574	0.000	2788320	25.000	26.727	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	1494240	25.000	27.521	
79 Fluorene	166.0	8.729	8.729	0.000	3204549	25.000	25.967	
84 4,6-Dinitro-2-methylphenol	198.0	8.756	8.756	0.000	509556	25.000	34.024	
86 n-Nitrosodiphenylamine	169.0	8.804	8.804	0.000	2237325	25.000	26.537	
87 Azobenzene	77.0	8.836	8.836	0.000	3179143	25.000	25.311	
$ 88 2,4,6-Tribromophenol	330.0	8.937	8.937	0.000	366377	25.000	34.178	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	819166	25.000	28.068	
96 Hexachlorobenzene	284.0	9.194	9.194	0.000	842783	25.000	28.669	
202 Octadecane	57.0	9.290	9.290	0.000	1911012	25.000	24.558	
99 Pentachlorophenol	266.0	9.365	9.365	0.000	1148856	50.000	65.080	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2962324	20.000	20.000	
103 Phenanthrene	178.0	9.553	9.553	0.000	4265555	25.000	25.044	
104 Anthracene	178.0	9.595	9.595	0.000	4086057	25.000	26.419	
106 Carbazole	167.0	9.729	9.729	0.000	3716332	25.000	25.631	
109 Di-n-butylphthalate	149.0	9.927	9.927	0.000	4523269	25.000	26.779	
114 Fluoranthene	202.0	10.622	10.622	0.000	4207310	25.000	26.336	
116 Pyrene	202.0	10.863	10.863	0.000	4273670	25.000	26.091	
$ 117 Terphenyl-d14	244.0	10.954	10.954	0.000	3120203	25.000	26.859	
122 Butylbenzylphthalate	149.0	11.457	11.457	0.000	2004900	25.000	29.780	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.131	12.131	0.000	2810573	25.000	30.885	
127 Benzo(a)Anthracene	228.0	12.291	12.291	0.000	3952335	25.000	26.583	
* 128 Chrysene-d12	240.0	12.312	12.312	0.000	2683568	20.000	20.000	
129 Chrysene	228.0	12.350	12.350	0.000	3999801	25.000	26.021	
131 Di-n-octylphthalate	149.0	13.067	13.067	0.000	4465761	25.000	32.870	
132 Benzo(b)fluoranthene	252.0	13.880	13.880	0.000	3736211	25.000	28.958	
134 Benzo(k)fluoranthene	252.0	13.922	13.922	0.000	4009997	25.000	29.226	
135 Benzo(a)pyrene	252.0	14.398	14.398	0.000	3230497	25.000	29.444	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2456761	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.442	16.442	0.000	3823000	25.000	26.946	
139 Dibenzo(a,h)anthracene	278.0	16.447	16.447	0.000	3564925	25.000	27.836	
140 Benzo(g,h,i)perylene	276.0	17.025	17.025	0.000	2891986	25.000	24.785	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

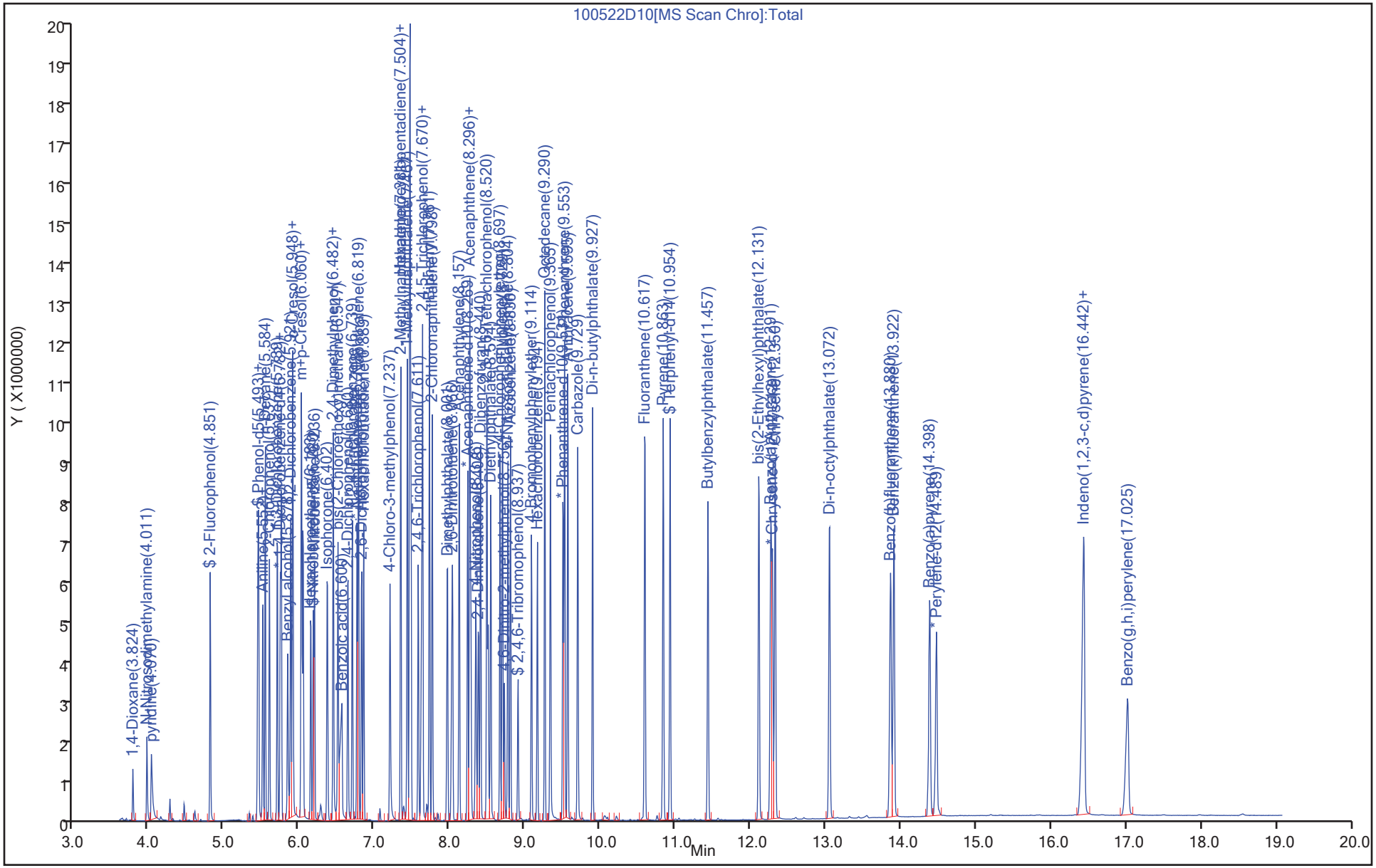
Processing Flags

Review Flags

Report Date: 23-May-2018 09:11:45 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D10.D				
Injection Date:	22-May-2018 21:34:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD025CB	Lab ID:	SVMS 3458		
Sample Info:	10052218D.b, SVMS 3458				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D11.D		
Lab Sample ID:	SVMS 3459	Client Sample ID:	1STD030CB
Injection Date:	22-May-2018 21:58:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3459		
Misc. Info:	1STD030		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 9	ALS Bottle:	9
Cpnd Sublist:	1STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.824	3.824	0.000	301270	30.000	29.850	
2 N-Nitrosodimethylamine	42.0	4.011	4.011	0.000	660995	30.000	28.383	
1 pyridine	79.0	4.076	4.076	0.000	964333	30.000	29.931	
$ 6 2-Fluorophenol	112.0	4.851	4.851	0.000	1973963	30.000	30.257	
$ 9 Phenol-d5	99.0	5.488	5.488	0.000	2458452	30.000	29.368	
10 Phenol	94.0	5.498	5.498	0.000	2574743	30.000	28.976	
11 Aniline	66.0	5.546	5.546	0.000	147960	30.000	17.127	
12 bis(2-Chloroethyl)ether	63.0	5.552	5.552	0.000	1310455	30.000	27.329	
201 n-Decane	57.0	5.584	5.584	0.000	1921756	30.000	28.133	
13 2-Chlorophenol	128.0	5.637	5.637	0.000	1968083	30.000	29.197	
14 1,3-Dichlorobenzene	146.0	5.744	5.744	0.000	2026053	30.000	29.189	
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	869616	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	2111681	30.000	29.093	
18 Benzyl alcohol	79.0	5.883	5.883	0.000	1152587	30.000	36.698	
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	1967695	30.000	29.192	
20 o-Cresol	108.0	5.948	5.948	0.000	1888559	30.000	27.854	
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	2271175	30.000	26.021	
23 m+p-Cresol	107.0	6.065	6.065	0.000	2014213	30.000	28.615	
26 n-Nitroso-di-n-propylamine	70.0	6.060	6.060	0.000	1286825	30.000	28.106	
24 Acetophenone	105.0	6.087	6.087	0.000	2507854	30.000	27.735	
28 Hexachloroethane	117.0	6.183	6.183	0.000	735414	30.000	29.786	
$ 29 Nitrobenzene-d5	82.0	6.220	6.220	0.000	1939422	30.000	30.798	
30 Nitrobenzene	77.0	6.236	6.236	0.000	1918404	30.000	29.388	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.408	6.408	0.000	3456592	30.000	31.419	
34 2,4-Dimethylphenol	107.0	6.488	6.488	0.000	1370623	30.000	30.956	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	1063657	30.000	33.364	
36 Benzoic acid	105.0	6.611	6.611	0.000	2523652	60.000	76.356	
35 bis(2-Chloroethoxy)methane	93.0	6.547	6.547	0.000	2144463	30.000	30.407	
38 2,4-Dichlorophenol	162.0	6.680	6.680	0.000	1612556	30.000	32.575	
40 1,2,4-Trichlorobenzene	180.0	6.739	6.739	0.000	1635005	30.000	30.730	
* 41 Naphthalene-d8	136.0	6.803	6.803	0.000	3540664	20.000	20.000	
43 Naphthalene	128.0	6.819	6.819	0.000	5159580	30.000	27.627	
45 2,6-Dichlorophenol	162.0	6.862	6.862	0.000	1622503	30.000	32.104	
47 Hexachlorobutadiene	224.6	6.889	6.889	0.000	905759	30.000	31.228	
49 4-Chloro-3-methylphenol	107.0	7.237	7.237	0.000	1655796	30.000	31.409	
51 2-Methylnaphthalene	142.0	7.381	7.381	0.000	3772154	30.000	29.972	
204 1-Methylnaphthalene	142.0	7.467	7.467	0.000	3636672	30.000	29.443	
53 Hexachlorocyclopentadiene	237.0	7.504	7.504	0.000	4074074	150.00	144.24	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.520	7.520	0.000	1649047	30.000	32.374	
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	1066284	30.000	33.618	
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	1134971	30.000	33.176	
$ 56 2-Fluorobiphenyl	172.0	7.670	7.670	0.000	4157563	30.000	30.226	
184 Biphenyl	154.0	7.761	7.761	0.000	4545090	30.000	29.713	
58 2-Chloronaphthalene	162.0	7.798	7.798	0.000	3468552	30.000	30.794	
62 Dimethylphthalate	163.0	8.001	8.001	0.000	3758114	30.000	31.082	
65 2,6-Dinitrotoluene	165.0	8.071	8.071	0.000	964234	30.000	33.585	
64 Acenaphthylene	152.0	8.157	8.157	0.000	4863146	30.000	30.270	
* 67 Acenaphthene-d10	164.0	8.269	8.269	0.000	1847052	20.000	20.000	
68 Acenaphthene	153.0	8.296	8.296	0.000	3420302	30.000	29.021	
69 2,4-Dinitrophenol	184.0	8.312	8.312	0.000	1109000	60.000	83.080	
70 4-Nitrophenol	109.0	8.381	8.381	0.000	850920	60.000	66.133	
73 2,4-Dinitrotoluene	165.0	8.413	8.413	0.000	1193542	30.000	33.762	
71 Dibenzofuran	168.0	8.440	8.440	0.000	4502225	30.000	29.104	
76 2,3,4,6-Tetrachlorophenol	232.0	8.542	8.542	0.000	806944	30.000	35.047	
78 Diethylphthalate	149.0	8.579	8.579	0.000	3457085	30.000	30.445	
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	1901453	30.000	31.946	
79 Fluorene	166.0	8.729	8.729	0.000	4030631	30.000	30.063	
84 4,6-Dinitro-2-methylphenol	198.0	8.756	8.756	0.000	653609	30.000	38.473	
86 n-Nitrosodiphenylamine	169.0	8.804	8.804	0.000	2825400	30.000	30.685	
87 Azobenzene	77.0	8.836	8.836	0.000	3913141	30.000	28.785	
$ 88 2,4,6-Tribromophenol	330.0	8.937	8.937	0.000	490544	30.000	40.242	
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	1061301	30.000	32.938	
96 Hexachlorobenzene	284.0	9.194	9.194	0.000	1088878	30.000	33.465	
202 Octadecane	57.0	9.290	9.290	0.000	2347878	30.000	27.982	
99 Pentachlorophenol	266.0	9.365	9.365	0.000	1525501	60.000	76.302	
* 102 Phenanthrene-d10	188.0	9.536	9.536	0.000	3224773	20.000	20.000	
103 Phenanthrene	178.0	9.558	9.558	0.000	5297841	30.000	28.725	
104 Anthracene	178.0	9.595	9.595	0.000	5043946	30.000	29.963	
106 Carbazole	167.0	9.729	9.729	0.000	4652376	30.000	29.539	
109 Di-n-butylphthalate	149.0	9.927	9.927	0.000	5566352	30.000	30.238	
114 Fluoranthene	202.0	10.622	10.622	0.000	5260994	30.000	30.224	
116 Pyrene	202.0	10.863	10.863	0.000	5416495	30.000	29.935	
$ 117 Terphenyl-d14	244.0	10.954	10.954	0.000	3976218	30.000	30.864	
122 Butylbenzylphthalate	149.0	11.457	11.457	0.000	2582570	30.000	34.047	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.136	12.136	0.000	3602624	30.000	34.979	
127 Benzo(a)Anthracene	228.0	12.291	12.291	0.000	5067355	30.000	30.749	
* 128 Chrysene-d12	240.0	12.312	12.312	0.000	2965295	20.000	20.000	
129 Chrysene	228.0	12.355	12.355	0.000	5062704	30.000	29.828	
131 Di-n-octylphthalate	149.0	13.072	13.072	0.000	5675407	30.000	37.035	
132 Benzo(b)fluoranthene	252.0	13.885	13.885	0.000	4695116	30.000	32.968	
134 Benzo(k)fluoranthene	252.0	13.928	13.928	0.000	5264556	30.000	34.532	
135 Benzo(a)pyrene	252.0	14.404	14.404	0.000	4160714	30.000	34.180	
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2678247	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.452	16.452	0.000	4788118	30.000	30.848	
139 Dibenzo(a,h)anthracene	278.0	16.452	16.452	0.000	4432321	30.000	31.542	
140 Benzo(g,h,i)perylene	276.0	17.030	17.030	0.000	3526929	30.000	27.963	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

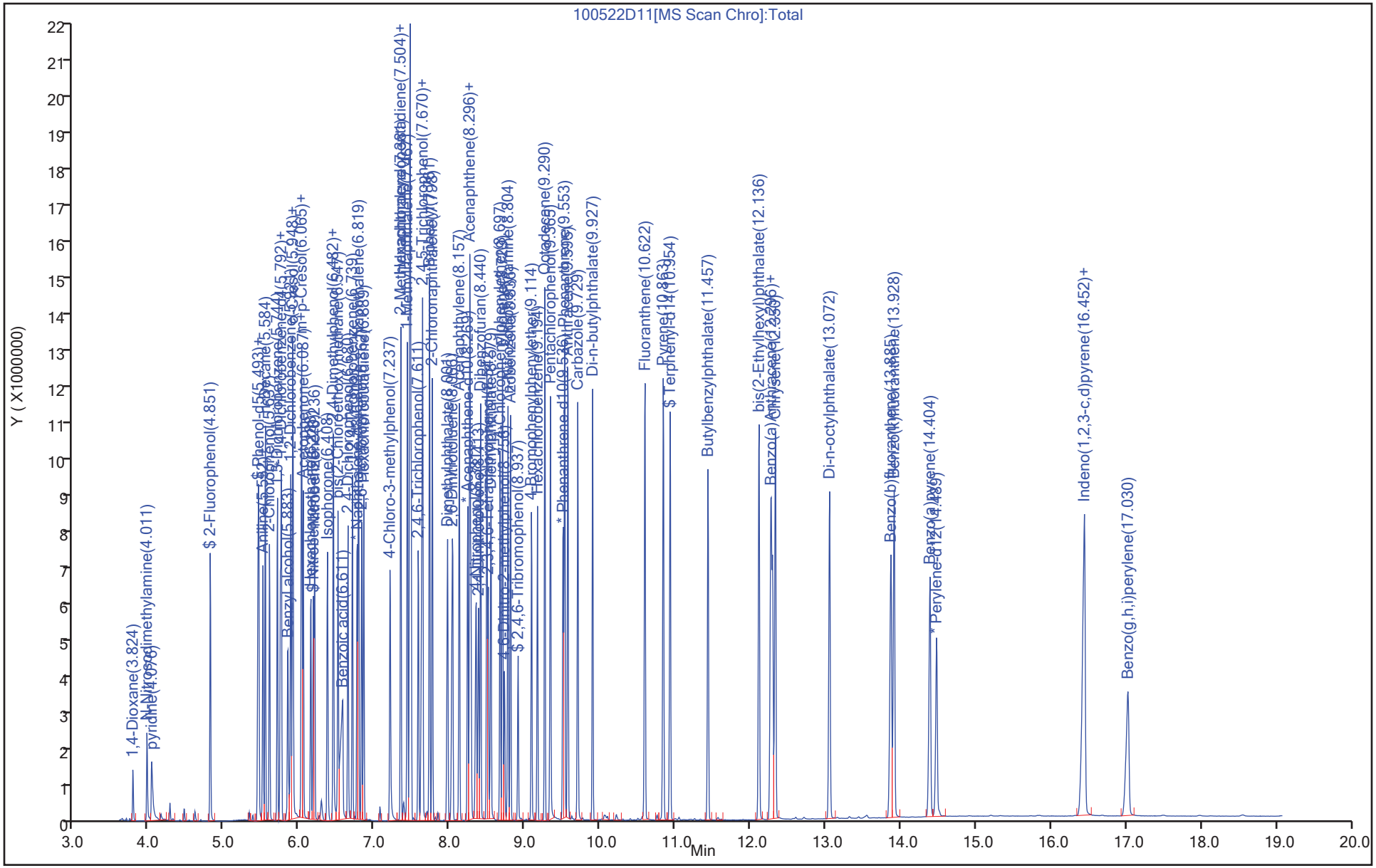
Processing Flags

Review Flags

Report Date: 23-May-2018 09:11:46 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D11.D				
Injection Date:	22-May-2018 21:58:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD030CB	Lab ID:	SVMS 3459		
Sample Info:	10052218D.b, SVMS 3459				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D13.D		
Lab Sample ID:	SVMS 3482	Client Sample ID:	3STD001CC
Injection Date:	22-May-2018 22:47:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3482		
Misc. Info:	3STD001		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 2	ALS Bottle:	11
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	759834	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	31975	1.0000	1.0000	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3659297	20.000	20.000	
44 4-Chloroaniline	127.0	6.857	6.857	0.000	56640	1.0000	1.0000	
196 Caprolactam	113.0	7.156	7.156	0.000	12303	1.0000	1.0000	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1883269	20.000	20.000	
200 Atrazine	200.0	9.215	9.215	0.000	23729	1.0000	1.0000	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3021359	20.000	20.000	
115 Benzidine	184.0	10.729	10.729	0.000	243075	5.0000	5.0000	
125 3,3'-Dichlorobenzidine	252.0	12.227	12.227	0.000	33325	1.0000	1.0000	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2748076	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2787197	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	22873	1.0000	1.0000	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	16985	1.0000	1.0000	
83 4-Nitroaniline	138.0	8.766	8.766	0.000	13991	1.0000	1.0000	

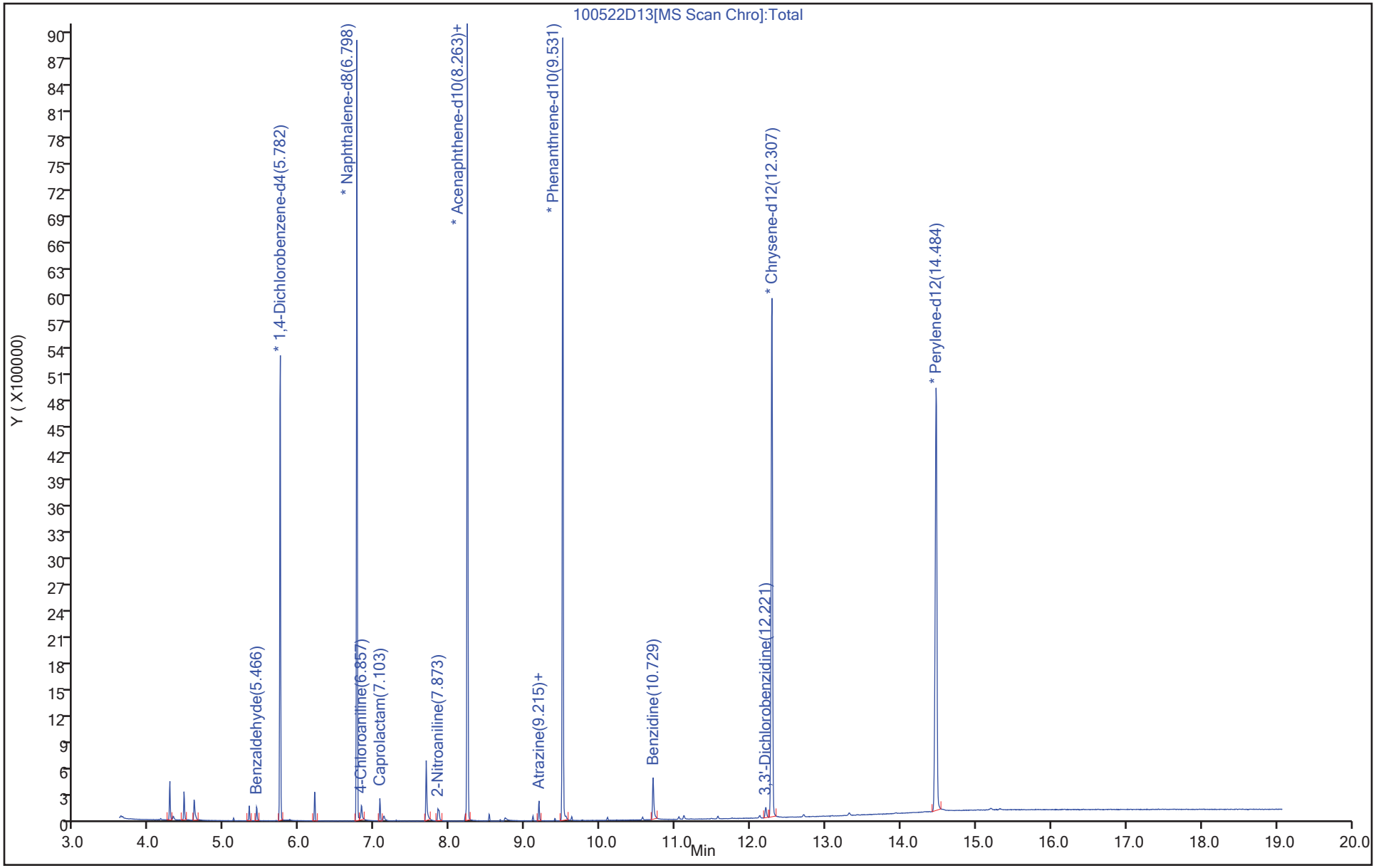
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:47 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D13.D				
Injection Date:	22-May-2018 22:47:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD001CC	Lab ID:	SVMS 3482		
Sample Info:	10052218D.b, SVMS 3482				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D14.D		
Lab Sample ID:	SVMS 3483	Client Sample ID:	3STD002CC
Injection Date:	22-May-2018 23:11:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3483		
Misc. Info:	3STD002		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 3	ALS Bottle:	12
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	738962	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	63127	2.0000	2.0149	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3564296	20.000	20.000	
44 4-Chloroaniline	127.0	6.857	6.857	0.000	121529	2.0000	2.0965	
196 Caprolactam	113.0	7.145	7.145	0.000	24745	2.0000	2.0319	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1827033	20.000	20.000	
200 Atrazine	200.0	9.215	9.215	0.000	46520	2.0000	2.0122	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2925591	20.000	20.000	
115 Benzidine	184.0	10.729	10.729	0.000	615640	10.000	11.327	
125 3,3'-Dichlorobenzidine	252.0	12.221	12.221	0.000	68307	2.0000	2.0554	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2664687	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2712092	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	46772	2.0000	2.0525	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	34290	2.0000	2.0397	
83 4-Nitroaniline	138.0	8.766	8.766	0.000	30261	2.0000	2.1085	

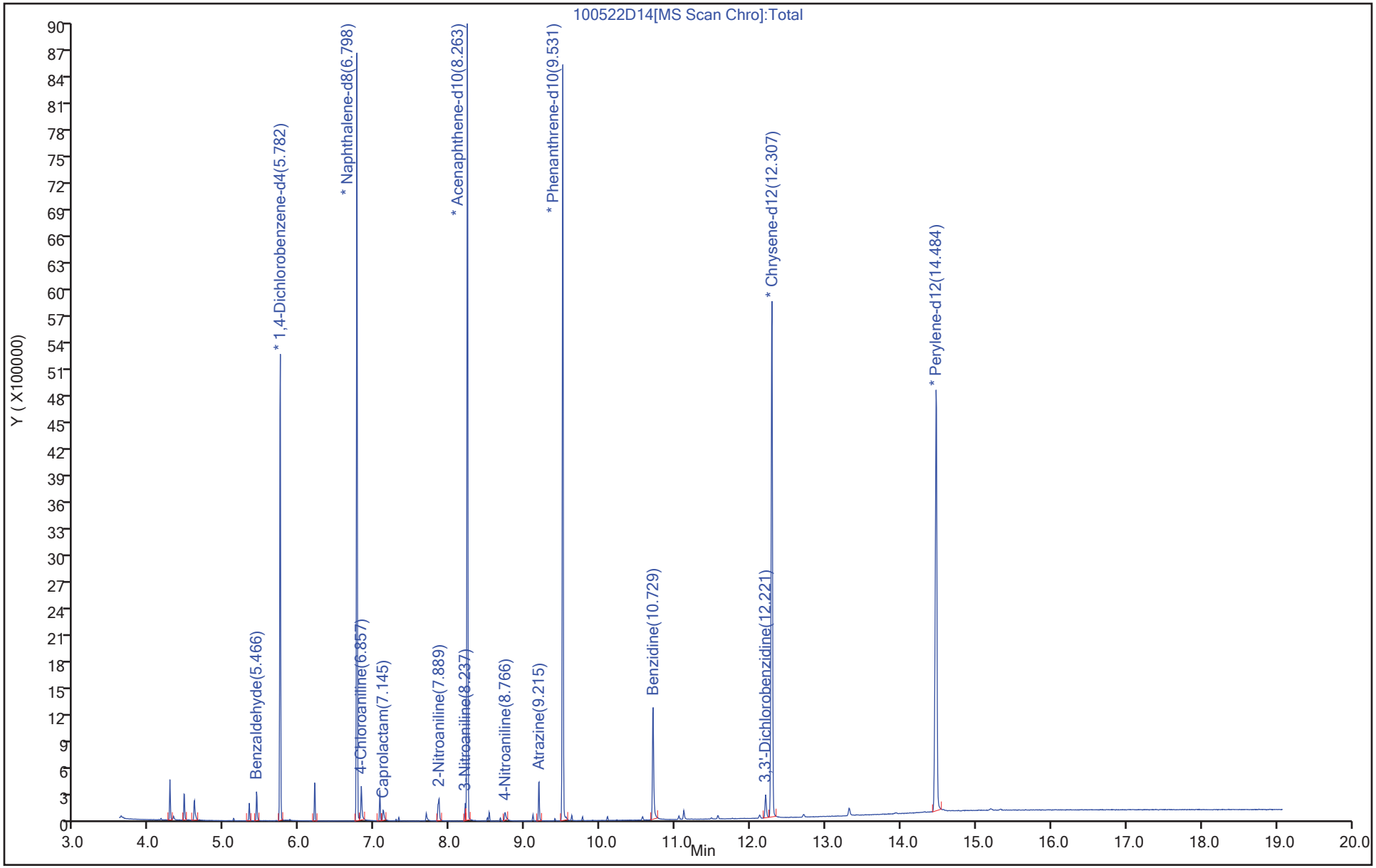
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:48 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D14.D				
Injection Date:	22-May-2018 23:11:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD002CC	Lab ID:	SVMS 3483		
Sample Info:	10052218D.b, SVMS 3483				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:48 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D15.D
Lab Sample ID: SVMS 3484 Client Sample ID: 3STD005CC
Injection Date: 22-May-2018 23:36:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3484
Misc. Info: 3STD005
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Ical, Level: 4 ALS Bottle: 13
Cpnd Sublist: 3STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 23-May-2018 09:10:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	797583	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	179933	5.0000	5.2095	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3425941	20.000	20.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	319704	5.0000	5.4689	
196 Caprolactam	113.0	7.140	7.140	0.000	74227	5.0000	5.8208	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1749102	20.000	20.000	
200 Atrazine	200.0	9.215	9.215	0.000	133796	5.0000	5.6750	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2782180	20.000	20.000	
115 Benzidine	184.0	10.729	10.729	0.000	2017632	25.000	33.240	
125 3,3'-Dichlorobenzidine	252.0	12.221	12.221	0.000	171852	5.0000	5.3500	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2485430	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2560382	20.000	20.000	
60 2-Nitroaniline	138.0	7.884	7.884	0.000	142342	5.0000	5.9227	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	111041	5.0000	6.1239	
83 4-Nitroaniline	138.0	8.761	8.761	0.000	101715	5.0000	6.3808	

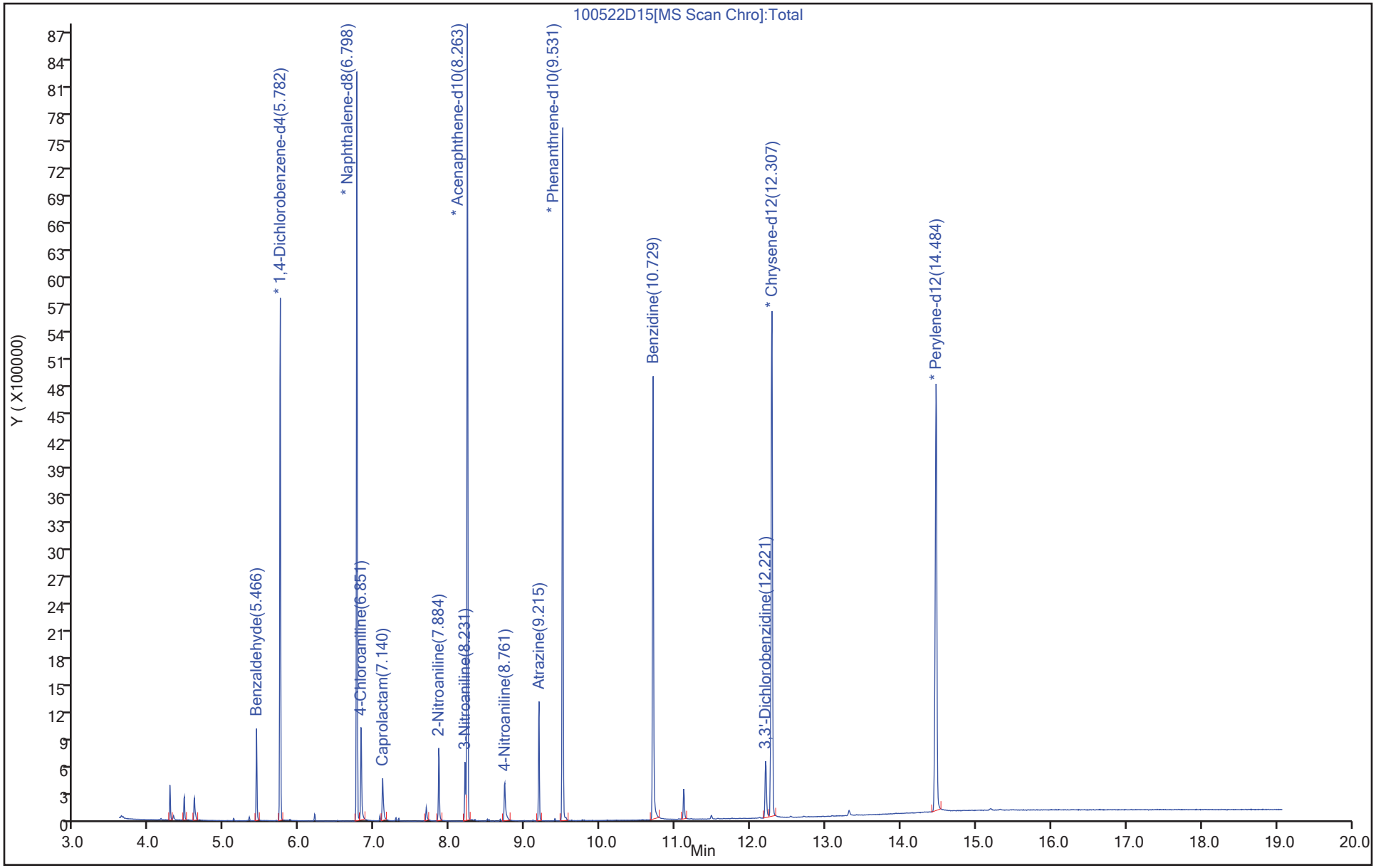
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:48 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D15.D				
Injection Date:	22-May-2018 23:36:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD005CC	Lab ID:	SVMS 3484		
Sample Info:	10052218D.b, SVMS 3484				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D16.D		
Lab Sample ID:	SVMS 3485	Client Sample ID:	3STD010CC
Injection Date:	23-May-2018 00:00:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3485		
Misc. Info:	3STD010		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 5	ALS Bottle:	14
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:11:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	712024	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	353486	10.000	11.059	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3737672	20.000	20.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	762763	10.000	11.401	
196 Caprolactam	113.0	7.140	7.140	0.000	188617	10.000	12.450	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1884358	20.000	20.000	
200 Atrazine	200.0	9.215	9.215	0.000	327210	10.000	11.920	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3032171	20.000	20.000	
115 Benzidine	184.0	10.734	10.734	0.000	5337517	50.000	70.207	
125 3,3'-Dichlorobenzidine	252.0	12.221	12.221	0.000	477956	10.000	12.558	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2693624	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2791187	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	360137	10.000	12.671	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	280646	10.000	12.953	
83 4-Nitroaniline	138.0	8.761	8.761	0.000	276147	10.000	13.958	

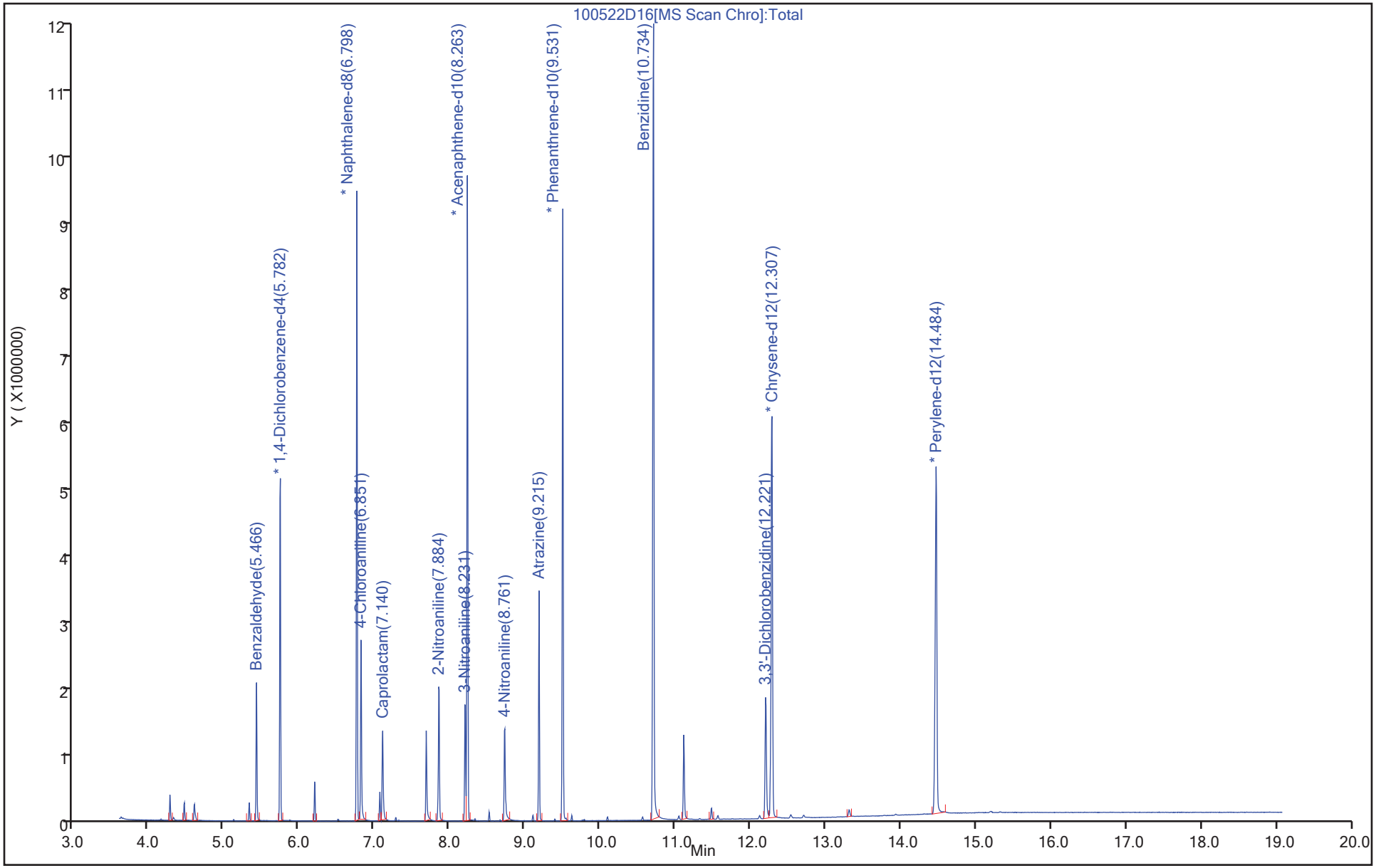
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:49 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D16.D				
Injection Date:	23-May-2018 00:00:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD010CC	Lab ID:	SVMS 3485		
Sample Info:	10052218D.b, SVMS 3485				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D17.D		
Lab Sample ID:	SVMS 3486	Client Sample ID:	3STD015CC
Injection Date:	23-May-2018 00:24:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3486		
Misc. Info:	3STD015		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 6	ALS Bottle:	15
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:11:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	697785	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	498883	15.000	15.732	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3587998	20.000	20.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	1102639	15.000	16.686	
196 Caprolactam	113.0	7.140	7.140	0.000	280981	15.000	18.268	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1846142	20.000	20.000	
200 Atrazine	200.0	9.215	9.215	0.000	477556	15.000	17.169	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2961190	20.000	20.000	
115 Benzidine	184.0	10.734	10.734	0.000	7873769	75.000	97.540	
125 3,3'-Dichlorobenzidine	252.0	12.227	12.227	0.000	764661	15.000	19.071	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2645207	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2722393	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	539062	15.000	18.295	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	423145	15.000	18.703	
83 4-Nitroaniline	138.0	8.761	8.761	0.000	420951	15.000	19.933	

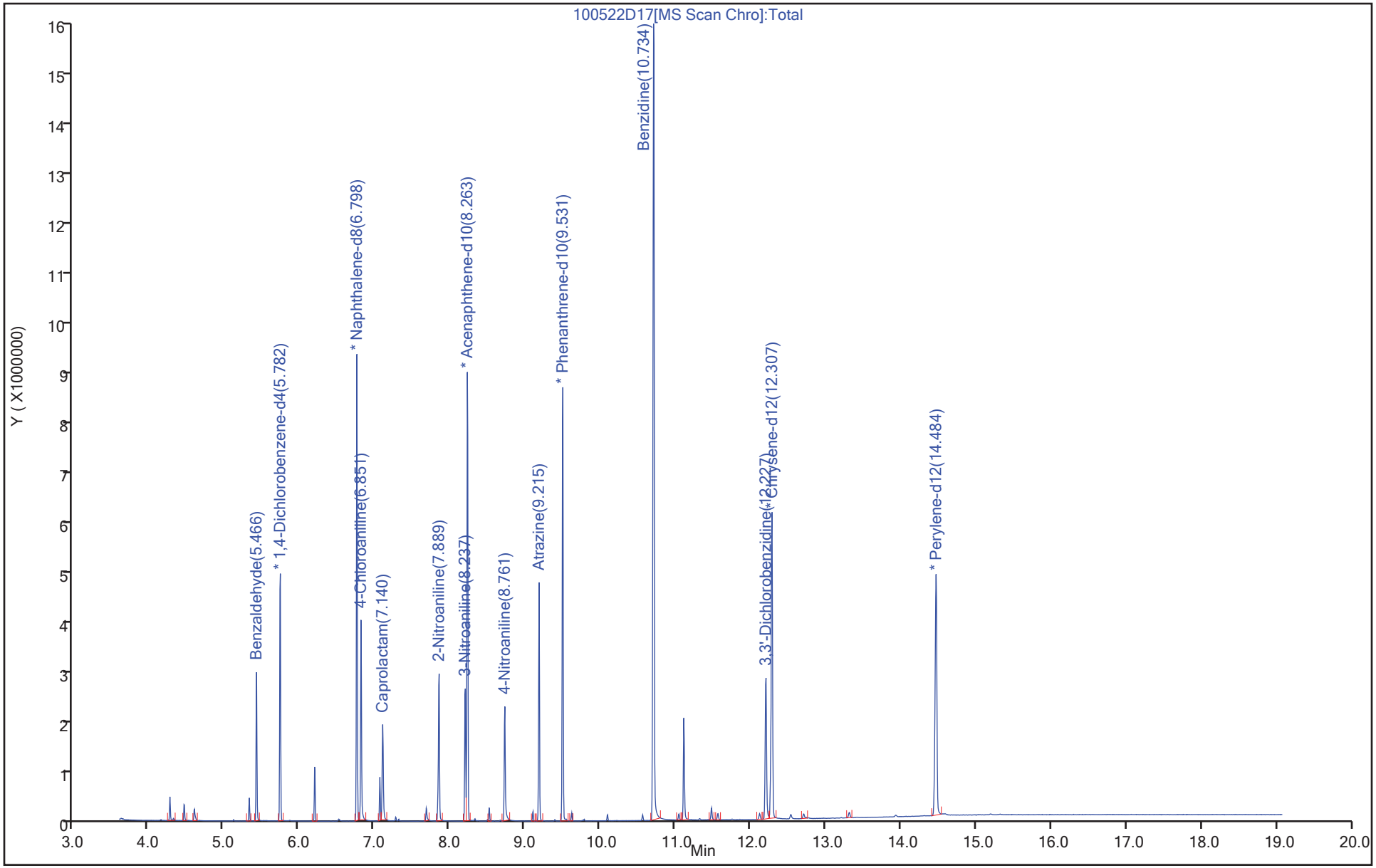
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:49 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D17.D				
Injection Date:	23-May-2018 00:24:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD015CC	Lab ID:	SVMS 3486		
Sample Info:	10052218D.b, SVMS 3486				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D18.D		
Lab Sample ID:	SVMS 3487	Client Sample ID:	3STD020CC
Injection Date:	23-May-2018 00:48:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3487		
Misc. Info:	3STD020		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 7	ALS Bottle:	16
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:11:30

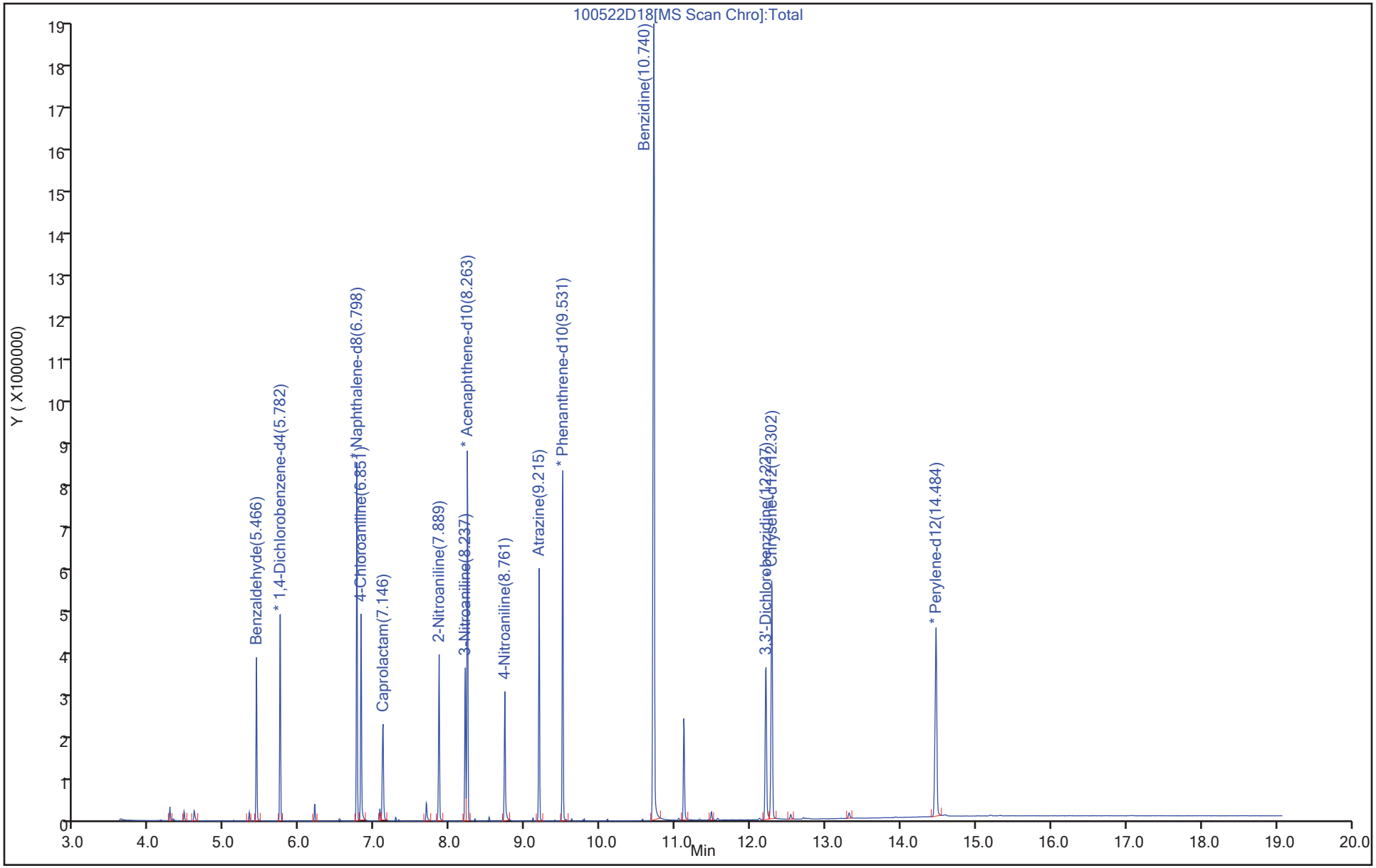
Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	729963	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	687741	20.000	20.606	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3499345	20.000	20.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	1437755	20.000	21.888	
196 Caprolactam	113.0	7.146	7.146	0.000	375865	20.000	24.043	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1786354	20.000	20.000	
200 Atrazine	200.0	9.215	9.215	0.000	643980	20.000	23.051	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2883460	20.000	20.000	
115 Benzidine	184.0	10.740	10.740	0.000	10291003	100.00	124.88	
125 3,3'-Dichlorobenzidine	252.0	12.227	12.227	0.000	1065975	20.000	25.813	
* 128 Chrysene-d12	240.0	12.302	12.302	0.000	2566099	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2559926	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	716705	20.000	24.106	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	576100	20.000	25.000	
83 4-Nitroaniline	138.0	8.761	8.761	0.000	569205	20.000	26.143	

Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D18.D				
Injection Date:	23-May-2018 00:48:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD020CC	Lab ID:	SVMS 3487		
Sample Info:	10052218D.b, SVMS 3487				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D19.D		
Lab Sample ID:	SVMS 3488	Client Sample ID:	3STD025CC
Injection Date:	23-May-2018 01:12:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3488		
Misc. Info:	3STD025		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	Ical, Level: 8	ALS Bottle:	17
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:11:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	858738	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	1053248	25.000	26.548	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3583728	20.000	20.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	1908060	25.000	27.829	
196 Caprolactam	113.0	7.146	7.146	0.000	508405	25.000	30.575	
* 67 Acenaphthene-d10	164.0	8.264	8.264	0.000	1869265	20.000	20.000	
200 Atrazine	200.0	9.216	9.216	0.000	851077	25.000	28.189	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3050014	20.000	20.000	
115 Benzidine	184.0	10.745	10.745	0.000	12922480	125.00	141.48	
125 3,3'-Dichlorobenzidine	252.0	12.227	12.227	0.000	1483225	25.000	31.662	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2781643	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2712761	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	941748	25.000	29.386	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	770400	25.000	30.729	
83 4-Nitroaniline	138.0	8.766	8.766	0.000	773611	25.000	32.303	

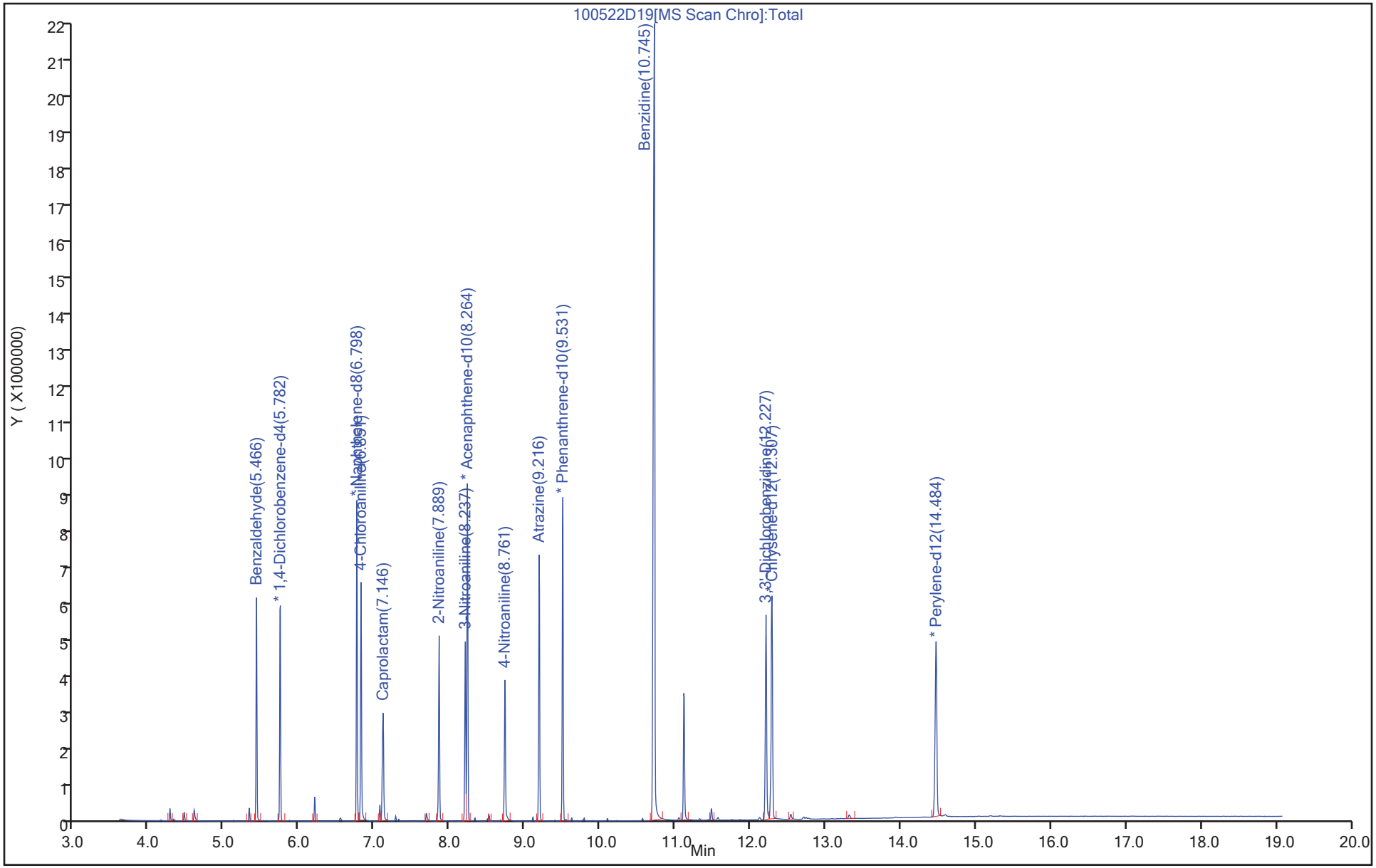
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D19.D				
Injection Date:	23-May-2018 01:12:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD025CC	Lab ID:	SVMS 3488		
Sample Info:	10052218D.b, SVMS 3488				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 23-May-2018 09:11:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D20.D
Lab Sample ID: SVMS 3489 Client Sample ID: 3STD030CC
Injection Date: 23-May-2018 01:37:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3489
Misc. Info: 3STD030
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: Ical, Level: 9 ALS Bottle: 18
Cpnd Sublist: 3STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 23-May-2018 09:11:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	748830	20.000	20.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	1093081	30.000	31.388	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3469698	20.000	20.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	2185759	30.000	32.530	
196 Caprolactam	113.0	7.145	7.145	0.000	580283	30.000	35.159	
* 67 Acenaphthene-d10	164.0	8.263	8.263	0.000	1786670	20.000	20.000	
200 Atrazine	200.0	9.221	9.221	0.000	969410	30.000	33.170	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2907746	20.000	20.000	
115 Benzidine	184.0	10.750	10.750	0.000	14431418	150.00	166.75	
125 3,3'-Dichlorobenzidine	252.0	12.227	12.227	0.000	1808613	30.000	39.527	
* 128 Chrysene-d12	240.0	12.307	12.307	0.000	2593682	20.000	20.000	
* 136 Perylene-d12	264.0	14.484	14.484	0.000	2522930	20.000	20.000	
60 2-Nitroaniline	138.0	7.889	7.889	0.000	1083482	30.000	34.597	
66 3-Nitroaniline	138.0	8.237	8.237	0.000	897436	30.000	36.323	
83 4-Nitroaniline	138.0	8.766	8.766	0.000	888483	30.000	37.439	

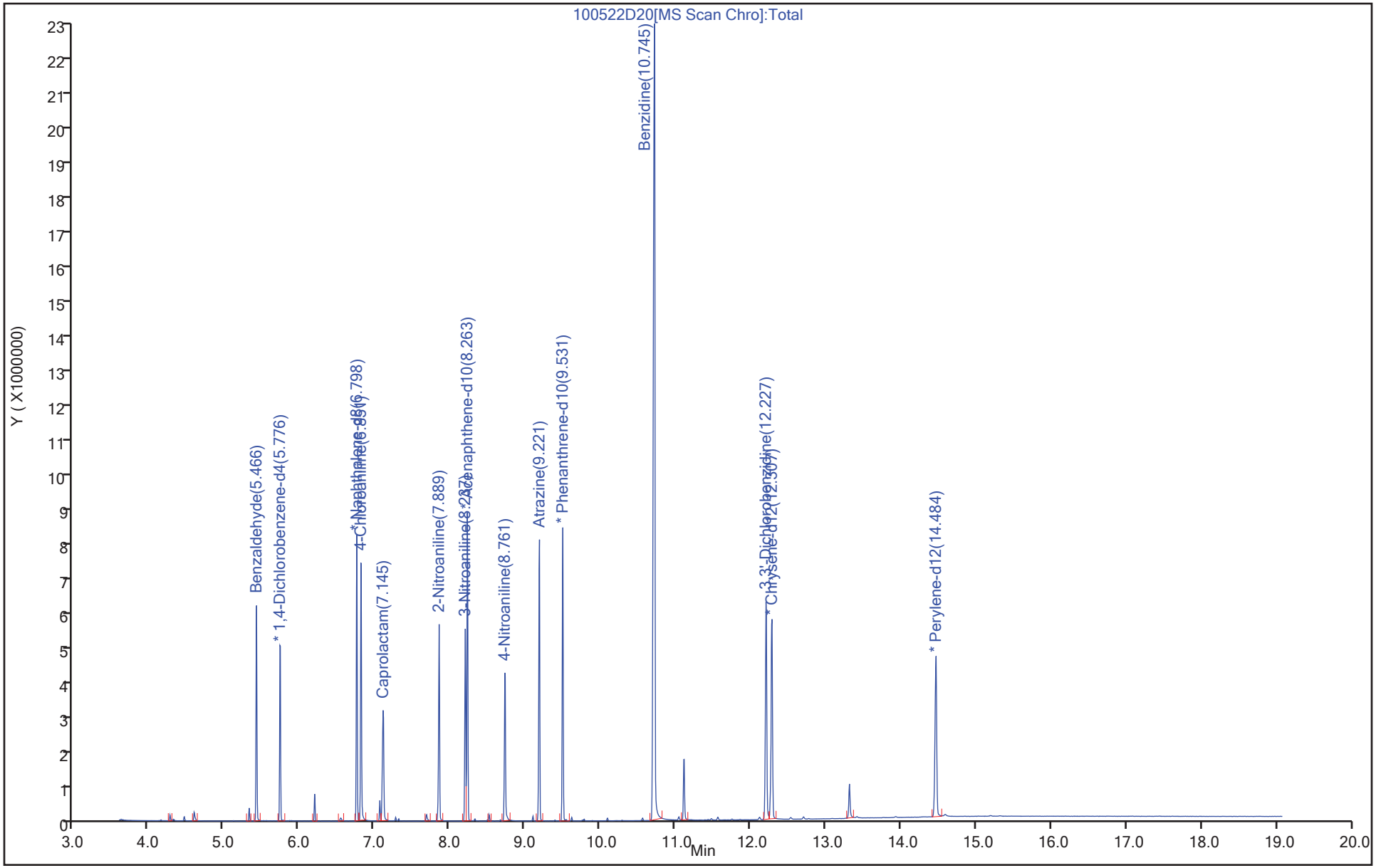
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 23-May-2018 09:11:51 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D20.D				
Injection Date:	23-May-2018 01:37:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD030CC	Lab ID:	SVMS 3489		
Sample Info:	10052218D.b, SVMS 3489				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
LCS, Lab Control Spike Report

Data File: \\Organics\hh\chem\msd10.i\10052218D.b\100522D12.D
Lab Sample ID: SVMS 3460 Client Sample ID: 1STDICV
Injection Date: 22-May-2018 22:23:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052218D.b, SVMS 3460
Misc. Info: 1STDICV
Method: \\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m
Method Date: 23-May-2018 08:37:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: LCS ALS Bottle: 10
Cpnd Sublist: 1STD.sub Spike List File: ICV1DOD.spk
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Compound	Amount Added	Amount Detected	%Drift	%Rec	%Rec Limits
1 pyridine	20	16.479	-17.6	82.4	80- 120
193 1,4-Dioxane	20	19.005	-5	95	80- 120
2 N-Nitrosodimethylamine	20	20.786	3.9	103	80- 120
10 Phenol	20	19.288	-3.6	96.4	80- 120
12 bis(2-Chloroethyl)ether	20	19.978	-0.1	99.9	80- 120
13 2-Chlorophenol	20	19.771	-1.1	98.9	80- 120
14 1,3-Dichlorobenzene	20	19.7	-1.5	98.5	80- 120
17 1,4-Dichlorobenzene	20	19.487	-2.6	97.4	80- 120
18 Benzyl alcohol	20	17.569	-12.2	87.8	80- 120
19 1,2-Dichlorobenzene	20	19.326	-3.4	96.6	80- 120
20 o-Cresol	20	23.562	17.8	117	80- 120
21 bis(2Chloro1methylethyl)eth	20	18.258	-8.7	91.3	80- 120
23 m+p-Cresol	20	22.265	11.3	111	80- 120
24 Acetophenone	20	21.016	5.1	105	80- 120
26 n-Nitroso-di-n-propylamine	20	21.599	8	107	80- 120
28 Hexachloroethane	20	19.734	-1.3	98.7	80- 120
30 Nitrobenzene	20	19.528	-2.4	97.6	80- 120
32 Isophorone	20	17.211	-13.9	86.1	80- 120
33 2-Nitrophenol	20	19.109	-4.5	95.5	80- 120
34 2,4-Dimethylphenol	20	21.761	8.8	108	80- 120
35 bis(2-Chloroethoxy)methane	20	21.489	7.4	107	80- 120
36 Benzoic acid	40	36.196	-9.5	90.5	80- 120
38 2,4-Dichlorophenol	20	19.456	-2.7	97.3	80- 120
40 1,2,4-Trichlorobenzene	20	19.032	-4.8	95.2	80- 120
43 Naphthalene	20	20.511	2.6	102	80- 120
45 2,6-Dichlorophenol	20	18.54	-7.3	92.7	80- 120
47 Hexachlorobutadiene	20	18.978	-5.1	94.9	80- 120
49 4-Chloro-3-methylphenol	20	19.632	-1.8	98.2	80- 120
51 2-Methylnaphthalene	20	19.431	-2.8	97.2	80- 120
52 1,2,4,5-Tetrachlorobenzene	20	18.528	-7.4	92.6	80- 120
53 Hexachlorocyclopentadiene	100	85.877	-14.1	85.9	80- 120
54 2,4,6-Trichlorophenol	20	18.807	-6	94	80- 120
55 2,4,5-Trichlorophenol	20	18.643	-6.8	93.2	80- 120
58 2-Chloronaphthalene	20	19.02	-4.9	95.1	80- 120

Compound	Amount Added	Amount Detected	%Drift	%Rec	%Rec Limits
62 Dimethylphthalate	20	19.576	-2.1	97.9	80- 120
64 Acenaphthylene	20	15.472	-22.6	* 77.4	80- 120
65 2,6-Dinitrotoluene	20	18.691	-6.5	93.5	80- 120
68 Acenaphthene	20	19.954	-0.2	99.8	80- 120
69 2,4-Dinitrophenol	40	35.466	-11.3	88.7	80- 120
70 4-Nitrophenol	40	36.951	-7.6	92.4	80- 120
71 Dibenzofuran	20	19.61	-2	98.1	80- 120
73 2,4-Dinitrotoluene	20	18.773	-6.1	93.9	80- 120
76 2,3,4,6-Tetrachlorophenol	20	17.752	-11.2	88.8	80- 120
78 Diethylphthalate	20	19.82	-0.9	99.1	80- 120
79 Fluorene	20	18.893	-5.5	94.5	80- 120
80 4-Chlorophenylphenylether	20	18.974	-5.1	94.9	80- 120
84 4,6-Dinitro-2-methylphenol	20	20.763	3.8	103	80- 120
86 n-Nitrosodiphenylamine	20	19.488	-2.6	97.4	80- 120
87 Azobenzene	20	18.809	-6	94	80- 120
94 4-Bromophenylphenylether	20	18.977	-5.1	94.9	80- 120
96 Hexachlorobenzene	20	18.305	-8.5	91.5	80- 120
99 Pentachlorophenol	40	34.596	-13.5	86.5	80- 120
103 Phenanthrene	20	19.52	-2.4	97.6	80- 120
104 Anthracene	20	18.682	-6.6	93.4	80- 120
106 Carbazole	20	20.651	3.3	103	80- 120
109 Di-n-butylphthalate	20	20.762	3.8	103	80- 120
114 Fluoranthene	20	20.357	1.8	101	80- 120
116 Pyrene	20	20.695	3.5	103	80- 120
122 Butylbenzylphthalate	20	20.221	1.1	101	80- 120
127 Benzo(a)Anthracene	20	19.721	-1.4	98.6	80- 120
129 Chrysene	20	19.663	-1.7	98.3	80- 120
130 bis(2-Ethylhexyl)phthalate	20	19.441	-2.8	97.2	80- 120
131 Di-n-octylphthalate	20	19.199	-4	96	80- 120
132 Benzo(b)fluoranthene	20	20.254	1.3	101	80- 120
134 Benzo(k)fluoranthene	20	20.033	0.2	100	80- 120
135 Benzo(a)pyrene	20	18.831	-5.8	94.2	80- 120
138 Indeno(1,2,3-c,d)pyrene	20	20.567	2.8	102	80- 120
139 Dibenzo(a,h)anthracene	20	20.32	1.6	101	80- 120
140 Benzo(g,h,i)perylene	20	19.848	-0.8	99.2	80- 120
184 Biphenyl	20	19.006	-5	95	80- 120
201 n-Decane	20	20.242	1.2	101	80- 120
202 Octadecane	20	20.62	3.1	103	80- 120

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D12.D		
Lab Sample ID:	SVMS 3460	Client Sample ID:	1STDICV
Injection Date:	22-May-2018 22:23:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3460		
Misc. Info:	1STDICV		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	LCS	ALS Bottle:	10
Cpnd Sublist:	1STD.sub	Spike List File:	ICV1DOD.spk
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:09:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
193 1,4-Dioxane	58.0	3.829	3.829	0.000	47825	4.7512	19.005	e
2 N-Nitrosodimethylamine	42.0	4.017	4.017	0.001	120698	5.1966	20.786	Q
1 pyridine	79.0	4.091	4.081	0.010	126510	4.1196	16.479	Qe
$ 6 2-Fluorophenol	112.0		4.851		ND			
$ 9 Phenol-d5	99.0		5.482		ND			
10 Phenol	94.0	5.487	5.493	-0.006	427326	4.8219	19.288	e
11 Aniline	66.0	5.546	5.546	0.000	7723	0.89633	3.5853	Qe
12 bis(2-Chloroethyl)ether	63.0	5.546	5.546	0.000	238859	4.9946	19.978	Qe
201 n-Decane	57.0	5.578	5.578	0.000	344767	5.0605	20.242	Q
13 2-Chlorophenol	128.0	5.637	5.637	0.000	332291	4.9428	19.771	e
14 1,3-Dichlorobenzene	146.0	5.739	5.739	0.000	340939	4.9250	19.700	e
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	867308	20.000	80.000	
17 1,4-Dichlorobenzene	146.0	5.792	5.792	0.000	352674	4.8717	19.487	e
18 Benzyl alcohol	79.0	5.878	5.878	0.000	131184	4.3921	17.569	Qe
19 1,2-Dichlorobenzene	146.0	5.921	5.921	0.000	324804	4.8314	19.326	e
20 o-Cresol	108.0	5.942	5.947	-0.005	373847	5.8905	23.562	
21 bis(2Chloro1methylethyl)ether	45.0	5.942	5.942	0.000	397344	4.5645	18.258	e
23 m+p-Cresol	107.0	6.060	6.060	0.000	390775	5.5663	22.265	
26 n-Nitroso-di-n-propylamine	70.0	6.049	6.054	-0.005	246570	5.3997	21.599	Q
24 Acetophenone	105.0	6.081	6.081	0.000	473820	5.2540	21.016	
28 Hexachloroethane	117.0	6.183	6.183	0.000	121486	4.9335	19.734	e
$ 29 Nitrobenzene-d5	82.0		6.215		ND			
30 Nitrobenzene	77.0	6.231	6.231	0.000	347814	4.8820	19.528	Qe

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
32 Isophorone	82.0	6.397	6.402	-0.005	516644	4.3029	17.211	e
34 2,4-Dimethylphenol	107.0	6.482	6.482	0.000	262888	5.4403	21.761	
33 2-Nitrophenol	139.0	6.482	6.482	0.000	170058	4.7773	19.109	e
36 Benzoic acid	105.0	6.552	6.573	-0.021	340129	9.0489	36.196	e
35 bis(2-Chloroethoxy)methane	93.0	6.541	6.546	-0.005	413495	5.3721	21.489	
38 2,4-Dichlorophenol	162.0	6.675	6.675	0.000	262777	4.8639	19.456	e
40 1,2,4-Trichlorobenzene	180.0	6.734	6.734	0.000	276288	4.7580	19.032	e
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3864180	20.000	80.000	
43 Naphthalene	128.0	6.814	6.819	-0.005	1045189	5.1278	20.511	
45 2,6-Dichlorophenol	162.0	6.857	6.857	0.000	255653	4.6350	18.540	e
47 Hexachlorobutadiene	224.6	6.883	6.889	-0.006	150185	4.7444	18.978	e
49 4-Chloro-3-methylphenol	107.0	7.236	7.236	0.000	282373	4.9079	19.632	e
51 2-Methylnaphthalene	142.0	7.376	7.381	-0.005	667219	4.8577	19.431	e
204 1-Methylnaphthalene	142.0	7.466	7.466	0.000	649850	4.8208	19.283	e
53 Hexachlorocyclopentadiene	237.0	7.499	7.498	0.001	661117	21.469	85.877	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.509	7.515	-0.005	257243	4.6321	18.528	e
54 2,4,6-Trichlorophenol	196.0	7.611	7.611	0.000	162590	4.7018	18.807	e
55 2,4,5-Trichlorophenol	196.0	7.654	7.654	0.000	173840	4.6608	18.643	e
$ 56 2-Fluorobiphenyl	172.0		7.670		ND			
184 Biphenyl	154.0	7.755	7.761	-0.006	792395	4.7514	19.006	e
58 2-Chloronaphthalene	162.0	7.793	7.798	-0.005	583920	4.7549	19.020	e
62 Dimethylphthalate	163.0	7.991	7.996	-0.005	645139	4.8939	19.576	e
65 2,6-Dinitrotoluene	165.0	8.060	8.065	-0.005	146264	4.6728	18.691	e
64 Acenaphthylene	152.0	8.151	8.151	0.000	677499	3.8679	15.472	eR
* 67 Acenaphthene-d10	164.0	8.263	8.269	-0.006	2013757	20.000	80.000	
68 Acenaphthene	153.0	8.290	8.295	-0.005	640988	4.9885	19.954	e
69 2,4-Dinitrophenol	184.0	8.301	8.306	-0.005	118623	8.8666	35.466	Q
70 4-Nitrophenol	109.0	8.370	8.370	0.000	125492	9.2377	36.951	
73 2,4-Dinitrotoluene	165.0	8.402	8.408	-0.006	185328	4.6933	18.773	e
71 Dibenzofuran	168.0	8.435	8.440	-0.005	826836	4.9024	19.610	e
76 2,3,4,6-Tetrachlorophenol	232.0	8.536	8.536	0.000	113425	4.4379	17.752	Qe
78 Diethylphthalate	149.0	8.568	8.568	0.000	613443	4.9551	19.820	e
80 4-Chlorophenylphenylether	204.0	8.697	8.697	0.000	307821	4.7435	18.974	e
79 Fluorene	166.0	8.723	8.729	-0.006	690412	4.7233	18.893	e
84 4,6-Dinitro-2-methylphenol	198.0	8.750	8.750	0.000	80373	5.1907	20.763	
86 n-Nitrosodiphenylamine	169.0	8.798	8.798	0.000	467322	4.8720	19.488	e
87 Azobenzene	77.0	8.830	8.830	0.000	665895	4.7022	18.809	Qe
$ 88 2,4,6-Tribromophenol	330.0		8.937		ND			
94 4-Bromophenylphenylether	248.0	9.114	9.114	0.000	159246	4.7444	18.977	e
96 Hexachlorobenzene	284.0	9.189	9.189	0.000	155118	4.5763	18.305	e
202 Octadecane	57.0	9.290	9.290	0.000	450588	5.1551	20.620	Q
99 Pentachlorophenol	266.0	9.360	9.365	-0.005	166534	8.6491	34.596	
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	3359313	20.000	80.000	
103 Phenanthrene	178.0	9.552	9.552	0.000	937549	4.8799	19.520	e
104 Anthracene	178.0	9.590	9.595	-0.005	819037	4.6705	18.682	e
106 Carbazole	167.0	9.724	9.729	-0.005	847028	5.1627	20.651	
109 Di-n-butylphthalate	149.0	9.921	9.927	-0.006	995356	5.1905	20.762	
114 Fluoranthene	202.0	10.617	10.617	0.000	922813	5.0891	20.357	
116 Pyrene	202.0	10.858	10.857	0.001	951939	5.1738	20.695	
$ 117 Terphenyl-d14	244.0		10.954		ND			
122 Butylbenzylphthalate	149.0	11.451	11.456	-0.005	404068	5.0552	20.221	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.125	12.130	-0.005	528769	4.8603	19.441	e
127 Benzo(a)Anthracene	228.0	12.286	12.285	0.001	826211	4.9304	19.721	e
* 128 Chrysene-d12	240.0	12.307	12.312	-0.005	3015255	20.000	80.000	
129 Chrysene	228.0	12.339	12.344	-0.005	848411	4.9158	19.663	e
131 Di-n-octylphthalate	149.0	13.061	13.066	-0.005	842366	4.7998	19.199	e
132 Benzo(b)fluoranthene	252.0	13.869	13.874	-0.005	785766	5.0636	20.254	
134 Benzo(k)fluoranthene	252.0	13.912	13.917	-0.005	831966	5.0083	20.033	
135 Benzo(a)pyrene	252.0	14.388	14.393	-0.005	624435	4.7078	18.831	e
* 136 Perylene-d12	264.0	14.489	14.489	0.000	2918283	20.000	80.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.415	16.420	-0.005	869605	5.1417	20.567	
139 Dibenzo(a,h)anthracene	278.0	16.420	16.431	-0.011	777801	5.0799	20.320	
140 Benzo(g,h,i)perylene	276.0	16.992	17.008	-0.016	681941	4.9619	19.848	e

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

Processing Flags

e - Compound Concentration Below Quantitation Limit

Q - Qualifier Signal(s) Fails Ratio Test

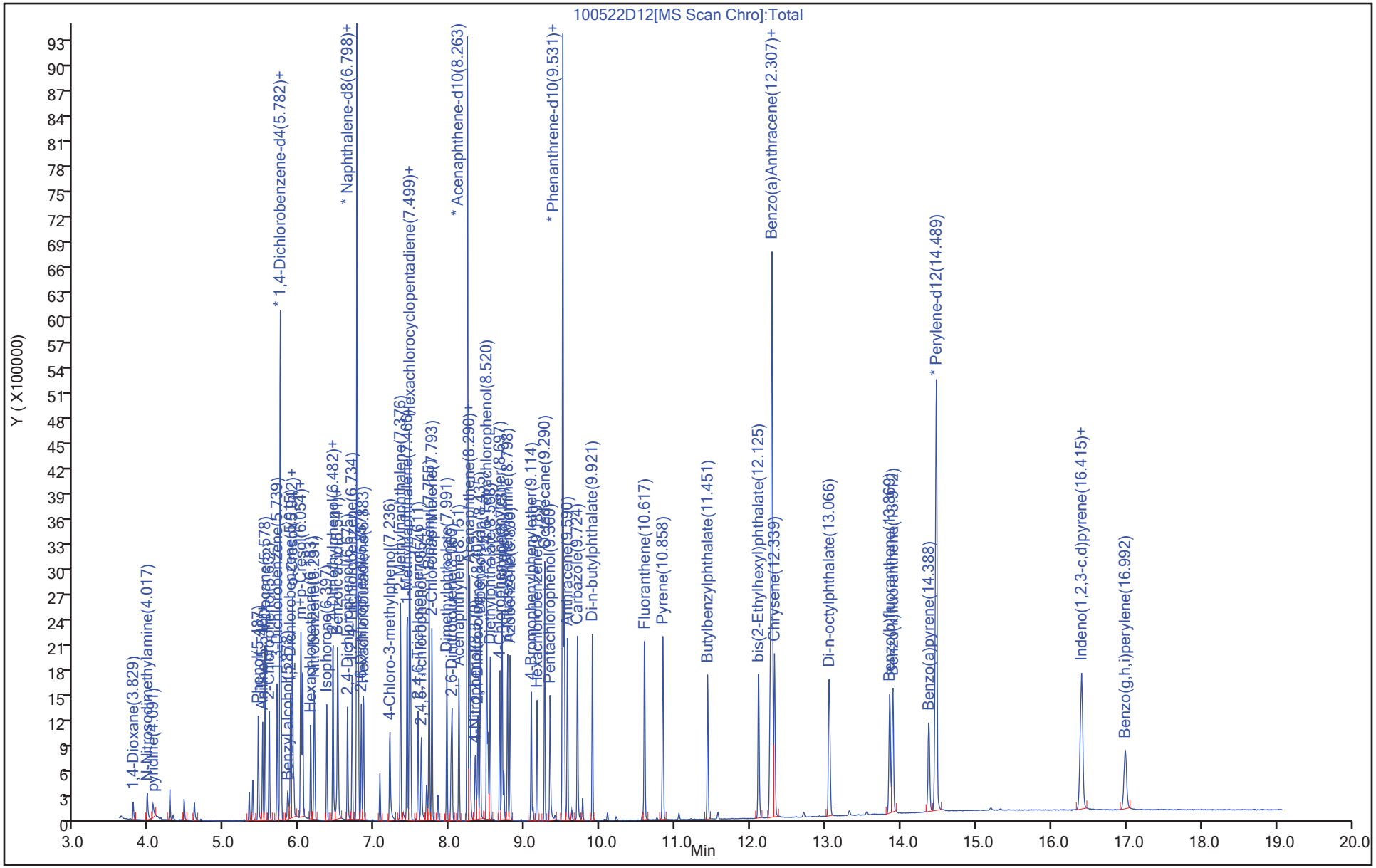
R - Spike/Surrogte Fails %Recovery Test

Review Flags

Report Date: 23-May-2018 09:11:46 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D12.D				
Injection Date:	22-May-2018 22:23:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STDICV	Lab ID:	SVMS 3460		
Sample Info:	10052218D.b, SVMS 3460				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services

LCS, Lab Control Spike Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D21.D		
Lab Sample ID:	SVMS 3480	Client Sample ID:	3STDICV
Injection Date:	23-May-2018 02:01:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3480		
Misc. Info:	3STDICV		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	LCS	ALS Bottle:	19
Cpnd Sublist:	3STD.sub	Spike List File:	ICV2DOD.spk
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Compound	Amount Added	Amount Detected	%Drift	%Rec	%Rec Limits
196 Caprolactam	40	37.965	-5.1	94.9	80- 120
44 4-Chloroaniline	40	43.165	7.9	107	80- 120
60 2-Nitroaniline	40	39.409	-1.5	98.5	80- 120
66 3-Nitroaniline	40	38.703	-3.2	96.8	80- 120
83 4-Nitroaniline	40	38.686	-3.3	96.7	80- 120
115 Benzidine	200	237.08	18.5	118	80- 120
125 3,3'-Dichlorobenzidine	40	39.771	-0.6	99.4	80- 120
199 Benzaldehyde	40	46.207	15.5	115	80- 120
200 Atrazine	40	40.56	1.4	101	80- 120

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D21.D		
Lab Sample ID:	SVMS 3480	Client Sample ID:	3STDICV
Injection Date:	23-May-2018 02:01:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052218D.b, SVMS 3480		
Misc. Info:	3STDICV		
Method:	\\Organics\hh\chem\msd10.i\10052218D.b\8270DLVI-10.m		
Method Date:	23-May-2018 08:37:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	LCS	ALS Bottle:	19
Cpnd Sublist:	3STD.sub	Spike List File:	ICV2DOD.spk
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	23-May-2018 09:11:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.782	5.782	0.000	706419	20.000	80.000	
199 Benzaldehyde	77.0	5.466	5.466	0.000	379507	11.552	46.207	
* 41 Naphthalene-d8	136.0	6.798	6.798	0.000	3577087	20.000	80.000	
44 4-Chloroaniline	127.0	6.851	6.851	0.000	747535	10.791	43.165	
196 Caprolactam	113.0	7.140	7.145	-0.005	177988	9.4913	37.965	Q
* 67 Acenaphthene-d10	164.0	8.263	8.269	-0.006	1827235	20.000	80.000	
200 Atrazine	200.0	9.215	9.221	-0.006	294631	10.140	40.560	Q
* 102 Phenanthrene-d10	188.0	9.531	9.531	0.000	2890961	20.000	80.000	
115 Benzidine	184.0	10.734	10.750	-0.016	5658676	59.270	237.08	
125 3,3'-Dichlorobenzidine	252.0	12.221	12.227	-0.006	495823	9.9428	39.771	
* 128 Chrysene-d12	240.0	12.307	12.312	-0.005	2555253	20.000	80.000	
* 136 Perylene-d12	264.0	14.484	14.489	-0.005	2642822	20.000	80.000	
60 2-Nitroaniline	138.0	7.884	7.889	-0.005	346622	9.8524	39.409	e
66 3-Nitroaniline	138.0	8.231	8.237	-0.006	273684	9.6757	38.703	e
83 4-Nitroaniline	138.0	8.761	8.766	-0.005	269335	9.6714	38.686	e

Compound Type Legend

* - ISTD

QC Flag Legend

Processing Flags

e - Compound Concentration Below Quantitation Limit

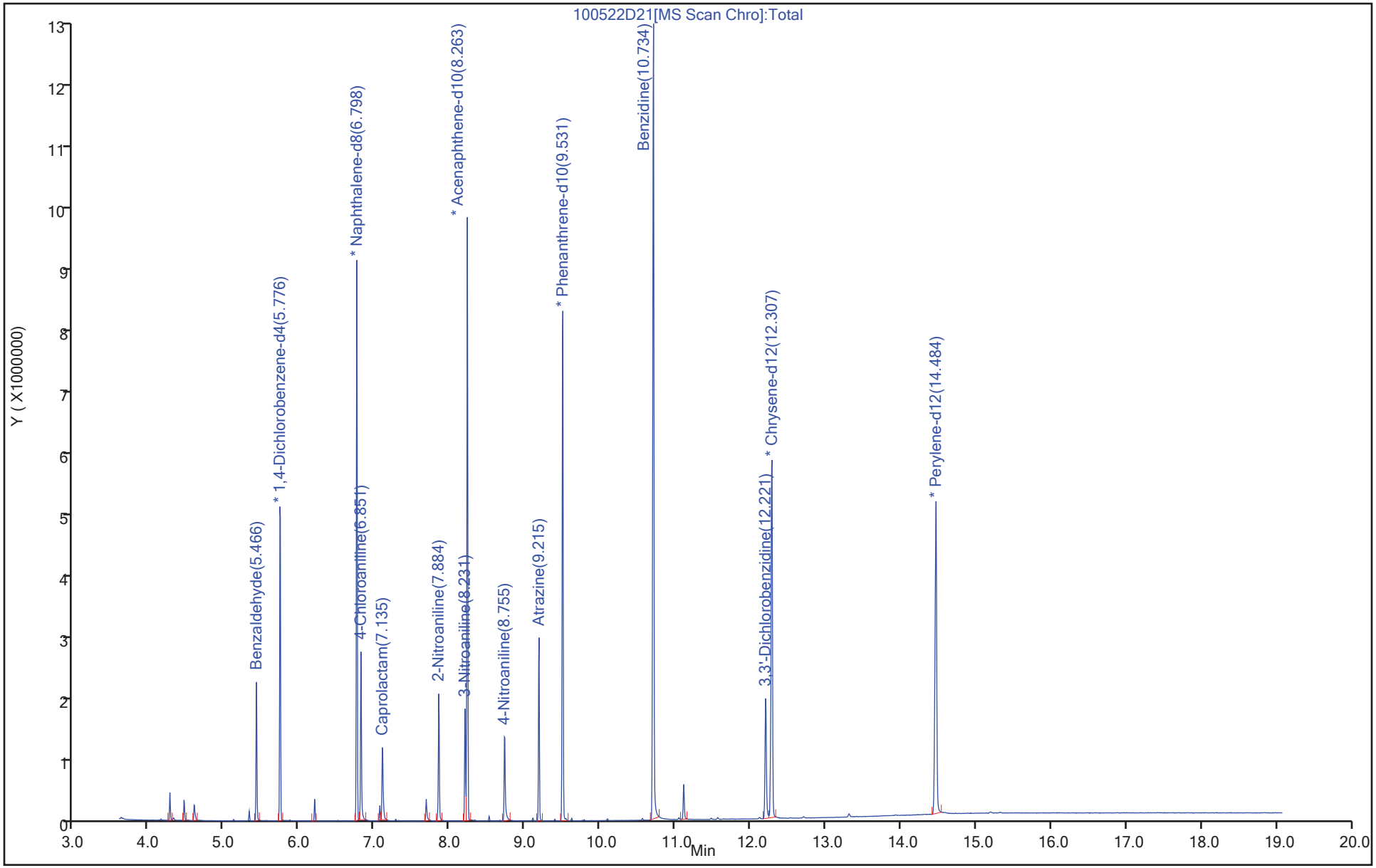
Q - Qualifier Signal(s) Fails Ratio Test

Review Flags

Report Date: 23-May-2018 09:11:52 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052218D.b\100522D21.D				
Injection Date:	23-May-2018 02:01:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STDICV	Lab ID:	SVMS 3480		
Sample Info:	10052218D.b, SVMS 3480				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Continuing Calibration Verification Report

Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B03.D
Lab Sample ID: SVMS 3455 Client Sample ID: 1STD010CS
Injection Date: 27-May-2018 11:46:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052718B.b, SVMS 3455
Misc. Info: 1STD010
Method: \\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m
Method Date: 27-May-2018 13:07:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 97
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
1 pyridine	0.708147		0.933016	0.05	* 31.8	20	132
193 1,4-Dioxane	0.232117		0.285799	0.05	* 23.1	20	123
2 N-Nitrosodimethylamine	0.5356		0.593388	0.05	10.8	20	111
$ 6 2-Fluorophenol	1.500418		1.722106	0.05	14.8	20	115
$ 9 Phenol-d5	1.925263		2.19473	0.05	14	20	114
10 Phenol	2.043619		2.19455	0.8	7.4	20	107
11 Aniline			* ND				
12 bis(2-Chloroethyl)ether	1.102808		1.324176	0.5	20.1	20	120
13 2-Chlorophenol	1.550251		1.639451	0.8	5.8	20	106
14 1,3-Dichlorobenzene	1.596353		1.659907	0.05	4	20	104
17 1,4-Dichlorobenzene	1.669347		1.705816	0.05	2.2	20	102
18 Benzyl alcohol			* ND				
19 1,2-Dichlorobenzene	1.550253		1.635818	0.05	5.5	20	106
20 o-Cresol	1.46351		1.596662	0.7	9.1	20	109
21 bis(2Chloro1methylethyl)	2.007403		2.470244	0.05	* 23.1	20	123
23 m+p-Cresol	1.618877		1.90567	0.6	17.7	20	118
24 Acetophenone	2.079614		2.194627	0.01	5.5	20	106
26 n-Nitroso-di-n-propylami	1.052997		1.201725	0.5	14.1	20	114
28 Hexachloroethane	0.567841		0.610623	0.3	7.5	20	108
$ 29 Nitrobenzene-d5	0.355708		0.42049	0.05	18.2	20	118
30 Nitrobenzene	0.36874		0.449585	0.2	* 21.9	20	122
32 Isophorone	0.621452		0.716377	0.4	15.3	20	115
33 2-Nitrophenol	10	10.116	0.196964	0.1	1.2	20	101
34 2,4-Dimethylphenol	0.250104		0.268444	0.1	7.3	20	107
35 bis(2-Chloroethoxy)metha	0.398379		0.456886	0.3	14.7	20	115
36 Benzoic acid	20	23.172	0.257065	0.05	15.9	20	116
38 2,4-Dichlorophenol	0.279623		0.286449	0.2	2.4	20	102
40 1,2,4-Trichlorobenzene	0.300544		0.305941	0.05	1.8	20	102
43 Naphthalene	1.054953		1.078014	0.7	2.2	20	102
45 2,6-Dichlorophenol	0.28548		0.272062	0.05	-4.7	20	95
47 Hexachlorobutadiene	0.163839		0.163537	0.01	-0.2	20	100
49 4-Chloro-3-methylphenol	0.29778		0.328303	0.1	10.3	20	110
51 2-Methylnaphthalene	0.710906		0.718574	0.4	1.1	20	101
52 1,2,4,5-Tetrachlorobenze	0.551553		0.500748	0.01	-9.2	20	91

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
53 Hexachlorocyclopentadien	0.305832		0.320187	0.05	4.7	20	105
54 2,4,6-Trichlorophenol	0.343439		0.347195	0.1	1.1	20	101
55 2,4,5-Trichlorophenol	0.370432		0.386674	0.1	4.4	20	104
$ 56 2-Fluorobiphenyl	1.489403		1.478557	0.05	-0.7	20	99
58 2-Chloronaphthalene	1.21965		1.263105	0.8	3.6	20	104
62 Dimethylphthalate	1.309235		1.383419	0.01	5.7	20	106
64 Acenaphthylene	1.739612		1.910033	0.9	9.8	20	110
65 2,6-Dinitrotoluene	0.310876		0.335483	0.1	7.9	20	108
68 Acenaphthene	1.276142		1.304214	0.9	2.2	20	102
69 2,4-Dinitrophenol	20	20.866	0.181431	0.01	4.3	20	104
70 4-Nitrophenol	20	20.762	0.156657	0.01	3.8	20	104
71 Dibenzofuran	1.675063		1.674095	0.8	-0.1	20	100
73 2,4-Dinitrotoluene	10	10.465	0.438469	0.1	4.6	20	105
76 2,3,4,6-Tetrachloropheno	10	8.753	0.237277	0.01	-12.5	20	88
78 Diethylphthalate	1.22955		1.327825	0.01	8	20	108
79 Fluorene	1.451735		1.4492	0.9	-0.2	20	100
80 4-Chlorophenylphenylethe	0.644493		0.628019	0.4	-2.6	20	97
84 4,6-Dinitro-2-methylphen	10	11.194	0.135061	0.01	11.9	20	112
86 n-Nitrosodiphenylamine	0.571073		0.622729	0.01	9	20	109
87 Azobenzene	0.843118		1.018866	0.05	* 20.8	20	121
$ 88 2,4,6-Tribromophenol	0.089563		0.079991	0.05	-10.7	20	89
94 4-Bromophenylphenylether	0.199834		0.198204	0.1	-0.8	20	99
96 Hexachlorobenzene	0.201801		0.200832	0.1	-0.5	20	100
99 Pentachlorophenol	20	19.372	0.134947	0.05	-3.1	20	97
103 Phenanthrene	1.143836		1.16866	0.7	2.2	20	102
104 Anthracene	1.04404		1.136319	0.7	8.8	20	109
106 Carbazole	0.976794		1.098998	0.01	12.5	20	113
109 Di-n-butylphthalate	1.141696		1.354779	0.01	18.7	20	119
114 Fluoranthene	1.079567		1.170548	0.6	8.4	20	108
116 Pyrene	1.220417		1.32174	0.6	8.3	20	108
$ 117 Terphenyl-d14	0.868911		0.881352	0.05	1.4	20	101
122 Butylbenzylphthalate	10	11.401	0.64776	0.01	14	20	114
127 Benzo(a)Anthracene	1.111523		1.206837	0.8	8.6	20	109
129 Chrysene	1.144767		1.197371	0.7	4.6	20	105
130 bis(2-Ethylhexyl)phthala	10	11.794	0.930321	0.01	17.9	20	118
131 Di-n-octylphthalate	10	10.837	1.445128	0.01	8.4	20	108
132 Benzo(b)fluoranthene	1.063498		1.106149	0.5	4	20	104
134 Benzo(k)fluoranthene	1.138462		1.191796	0.5	4.7	20	105
135 Benzo(a)pyrene	0.909026		0.999526	0.5	10	20	110
138 Indeno(1,2,3-c,d)pyrene	1.159099		1.262837	0.5	8.9	20	109
139 Dibenzo(a,h)anthracene	1.049339		1.129857	0.4	7.7	20	108
140 Benzo(g,h,i)perylene	0.941884		1.033263	0.5	9.7	20	110
184 Biphenyl	1.656318		1.715521	0.01	3.6	20	104
201 n-Decane	1.571049		1.898128	0.05	* 20.8	20	121
202 Octadecane	0.520381		0.70012	0.05	* 34.5	20	135
204 1-Methylnaphthalene	0.697699		0.691656	0.05	-0.9	20	99

Report Date: 29-May-2018 11:06:01 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B03.D
Lab Sample ID: SVMS 3455 Client Sample ID: 1STD010CS
Injection Date: 27-May-2018 11:46:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052718B.b, SVMS 3455
Misc. Info: 1STD010
Method: \\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m
Method Date: 27-May-2018 13:07:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 97
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 27-May-2018 14:42:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.760	3.760	0.000	136192	10.000	12.313	
2 N-Nitrosodimethylamine	42.0	3.952	3.952	0.000	282768	10.000	11.079	
1 pyridine	79.0	4.022	4.022	0.000	444611	10.000	13.175	
$ 6 2-Fluorophenol	112.0	4.808	4.808	0.000	820637	10.000	11.478	
$ 9 Phenol-d5	99.0	5.439	5.439	0.000	1045857	10.000	11.400	
10 Phenol	94.0	5.450	5.450	0.000	1045771	10.000	10.739	
11 Aniline	66.0		5.546		ND			
12 bis(2-Chloroethyl)ether	63.0	5.509	5.509	0.000	631011	10.000	12.007	
201 n-Decane	57.0	5.541	5.541	0.000	904517	10.000	12.082	
13 2-Chlorophenol	128.0	5.594	5.594	0.000	781249	10.000	10.575	
14 1,3-Dichlorobenzene	146.0	5.701	5.701	0.000	790997	10.000	10.398	
* 16 1,4-Dichlorobenzene-d4	152.0	5.739	5.739	0.000	953062	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.755	5.755	0.000	812874	10.000	10.218	
18 Benzyl alcohol	79.0		5.878		ND			
19 1,2-Dichlorobenzene	146.0	5.878	5.878	0.000	779518	10.000	10.552	
20 o-Cresol	108.0	5.905	5.905	0.000	760859	10.000	10.910	
21 bis(2Chloro1methylethyl)ether	45.0	5.905	5.905	0.000	1177148	10.000	12.306	
23 m+p-Cresol	107.0	6.022	6.022	0.000	908111	10.000	11.772	
26 n-Nitroso-di-n-propylamine	70.0	6.012	6.012	0.000	572659	10.000	11.412	
24 Acetophenone	105.0	6.038	6.038	0.000	1045808	10.000	10.553	
28 Hexachloroethane	117.0	6.145	6.145	0.000	290981	10.000	10.753	
$ 29 Nitrobenzene-d5	82.0	6.177	6.177	0.000	829721	10.000	11.821	
30 Nitrobenzene	77.0	6.193	6.193	0.000	887133	10.000	12.192	

Report Date: 29-May-2018 11:06:01 AIM Revision: 1.0 20-Sep-2017 14:04:40
Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B03.D

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.359	6.359	0.000	1413572	10.000	11.527	
34 2,4-Dimethylphenol	107.0	6.445	6.445	0.000	529701	10.000	10.733	
33 2-Nitrophenol	139.0	6.439	6.439	0.000	388654	10.000	10.116	
36 Benzoic acid	105.0	6.530	6.530	0.000	1014492	20.000	23.172	
35 bis(2-Chloroethoxy)methane	93.0	6.504	6.504	0.000	901539	10.000	11.469	
38 2,4-Dichlorophenol	162.0	6.637	6.637	0.000	565228	10.000	10.244	
40 1,2,4-Trichlorobenzene	180.0	6.696	6.696	0.000	603691	10.000	10.180	
* 41 Naphthalene-d8	136.0	6.760	6.760	0.000	3946449	20.000	20.000	
43 Naphthalene	128.0	6.776	6.776	0.000	2127163	10.000	10.219	
45 2,6-Dichlorophenol	162.0	6.819	6.819	0.000	536840	10.000	9.5300	
47 Hexachlorobutadiene	224.6	6.846	6.846	0.000	322696	10.000	9.9816	
49 4-Chloro-3-methylphenol	107.0	7.199	7.199	0.000	647816	10.000	11.025	
51 2-Methylnaphthalene	142.0	7.338	7.338	0.000	1417908	10.000	10.108	
204 1-Methylnaphthalene	142.0	7.424	7.424	0.000	1364792	10.000	9.9134	
53 Hexachlorocyclopentadiene	237.0	7.461	7.461	0.000	1646436	50.000	52.347	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.472	7.472	0.000	514980	10.000	9.0789	
54 2,4,6-Trichlorophenol	196.0	7.568	7.568	0.000	357063	10.000	10.109	
55 2,4,5-Trichlorophenol	196.0	7.611	7.611	0.000	397664	10.000	10.438	
$ 56 2-Fluorobiphenyl	172.0	7.627	7.627	0.000	1520580	10.000	9.9272	
184 Biphenyl	154.0	7.718	7.718	0.000	1764279	10.000	10.357	
58 2-Chloronaphthalene	162.0	7.755	7.755	0.000	1299004	10.000	10.356	
62 Dimethylphthalate	163.0	7.953	7.953	0.000	1422738	10.000	10.567	
65 2,6-Dinitrotoluene	165.0	8.023	8.023	0.000	345018	10.000	10.792	
64 Acenaphthylene	152.0	8.114	8.114	0.000	1964319	10.000	10.980	
* 67 Acenaphthene-d10	164.0	8.226	8.226	0.000	2056843	20.000	20.000	
68 Acenaphthene	153.0	8.253	8.253	0.000	1341282	10.000	10.220	
69 2,4-Dinitrophenol	184.0	8.263	8.263	0.000	373175	20.000	20.866	
70 4-Nitrophenol	109.0	8.328	8.328	0.000	322219	20.000	20.762	
73 2,4-Dinitrotoluene	165.0	8.365	8.365	0.000	450931	10.000	10.465	
71 Dibenzofuran	168.0	8.397	8.397	0.000	1721675	10.000	9.994	
76 2,3,4,6-Tetrachlorophenol	232.0	8.493	8.493	0.000	244021	10.000	8.7530	
78 Diethylphthalate	149.0	8.525	8.525	0.000	1365564	10.000	10.799	
80 4-Chlorophenylphenylether	204.0	8.654	8.654	0.000	645868	10.000	9.7444	
79 Fluorene	166.0	8.686	8.686	0.000	1490388	10.000	9.9825	
84 4,6-Dinitro-2-methylphenol	198.0	8.707	8.707	0.000	230594	10.000	11.194	
86 n-Nitrosodiphenylamine	169.0	8.755	8.755	0.000	1063204	10.000	10.905	
87 Azobenzene	77.0	8.793	8.793	0.000	1739540	10.000	12.085	
$ 88 2,4,6-Tribromophenol	330.0	8.889	8.889	0.000	136571	10.000	8.9312	
94 4-Bromophenylphenylether	248.0	9.071	9.071	0.000	338400	10.000	9.9184	
96 Hexachlorobenzene	284.0	9.146	9.146	0.000	342886	10.000	9.9520	
202 Octadecane	57.0	9.247	9.247	0.000	1195335	10.000	13.454	
99 Pentachlorophenol	266.0	9.317	9.317	0.000	460798	20.000	19.372	
* 102 Phenanthrene-d10	188.0	9.488	9.488	0.000	3414658	20.000	20.000	
103 Phenanthrene	178.0	9.510	9.510	0.000	1995287	10.000	10.217	
104 Anthracene	178.0	9.552	9.552	0.000	1940070	10.000	10.884	
106 Carbazole	167.0	9.681	9.681	0.000	1876352	10.000	11.251	
109 Di-n-butylphthalate	149.0	9.879	9.879	0.000	2313054	10.000	11.866	
114 Fluoranthene	202.0	10.563	10.563	0.000	1998510	10.000	10.843	
116 Pyrene	202.0	10.804	10.804	0.000	2077427	10.000	10.830	
$ 117 Terphenyl-d14	244.0	10.895	10.895	0.000	1385253	10.000	10.143	
122 Butylbenzylphthalate	149.0	11.398	11.398	0.000	1018109	10.000	11.401	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.066	12.066	0.000	1462220	10.000	11.794	
127 Benzo(a)Anthracene	228.0	12.216	12.216	0.000	1896831	10.000	10.858	
* 128 Chrysene-d12	240.0	12.237	12.237	0.000	3143474	20.000	20.000	
129 Chrysene	228.0	12.275	12.275	0.000	1881952	10.000	10.460	
131 Di-n-octylphthalate	149.0	12.992	12.992	0.000	2420136	10.000	10.837	
132 Benzo(b)fluoranthene	252.0	13.788	13.788	0.000	1852453	10.000	10.401	
134 Benzo(k)fluoranthene	252.0	13.831	13.831	0.000	1995884	10.000	10.468	
135 Benzo(a)pyrene	252.0	14.307	14.307	0.000	1673893	10.000	10.996	
* 136 Perylene-d12	264.0	14.398	14.398	0.000	3349372	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.286	16.286	0.000	2114856	10.000	10.895	
139 Dibenzo(a,h)anthracene	278.0	16.297	16.297	0.000	1892155	10.000	10.767	
140 Benzo(g,h,i)perylene	276.0	16.859	16.859	0.000	1730391	10.000	10.970	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

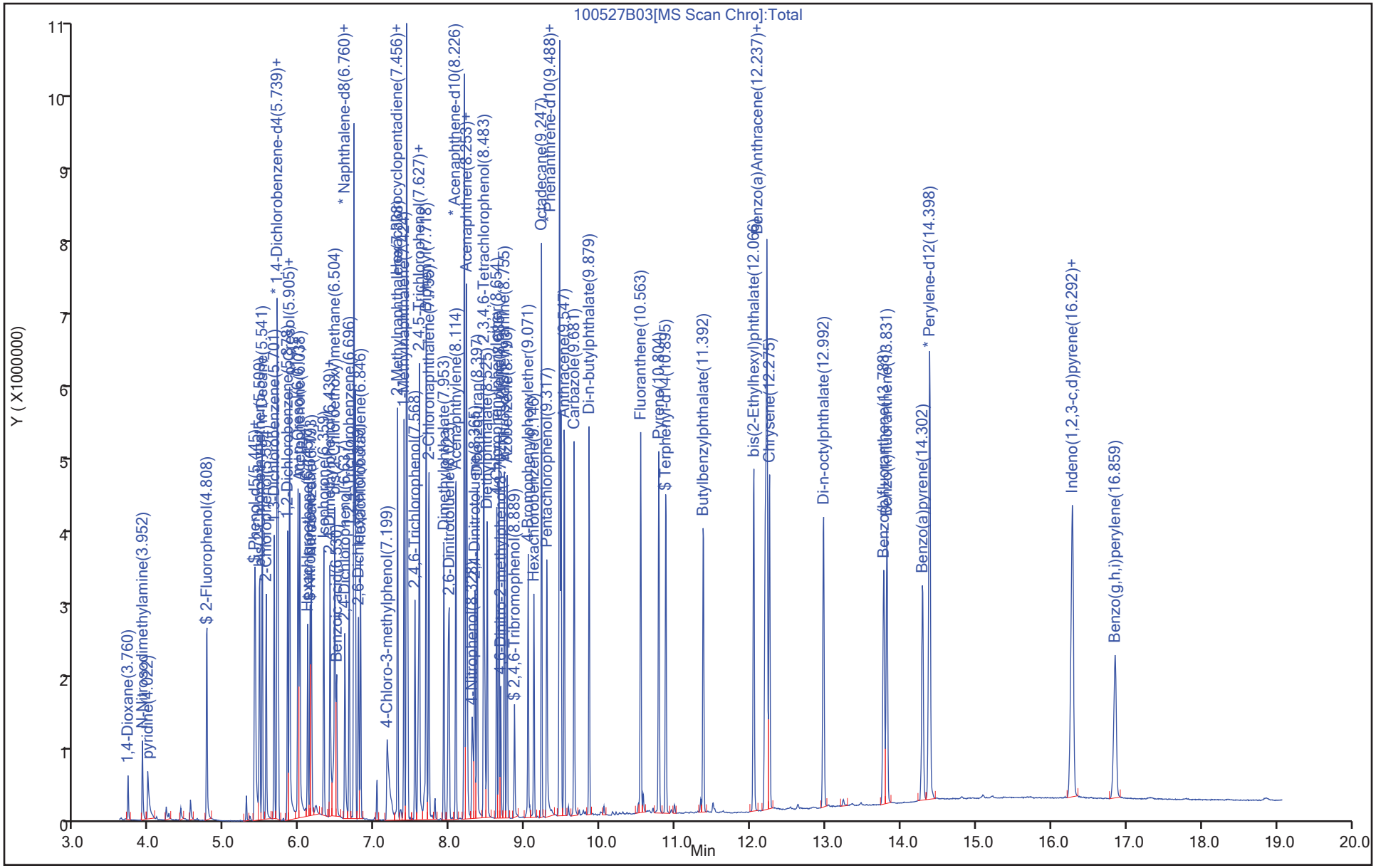
Processing Flags

Review Flags

Report Date: 29-May-2018 11:06:01 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B03.D				
Injection Date:	27-May-2018 11:46:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD010CS	Lab ID:	SVMS 3455		
Sample Info:	10052718B.b, SVMS 3455				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Report Date: 29-May-2018 11:06:01 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Resolution Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B03.D		
Injection Date:	27-May-2018 11:46:30	Inst. ID:	msd10.i
Client ID:	1STD010CS	Lab ID:	SVMS 3455
Sample Info:	10052718B.b, SVMS 3455		
Injection Vol.	5.00 uL	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan

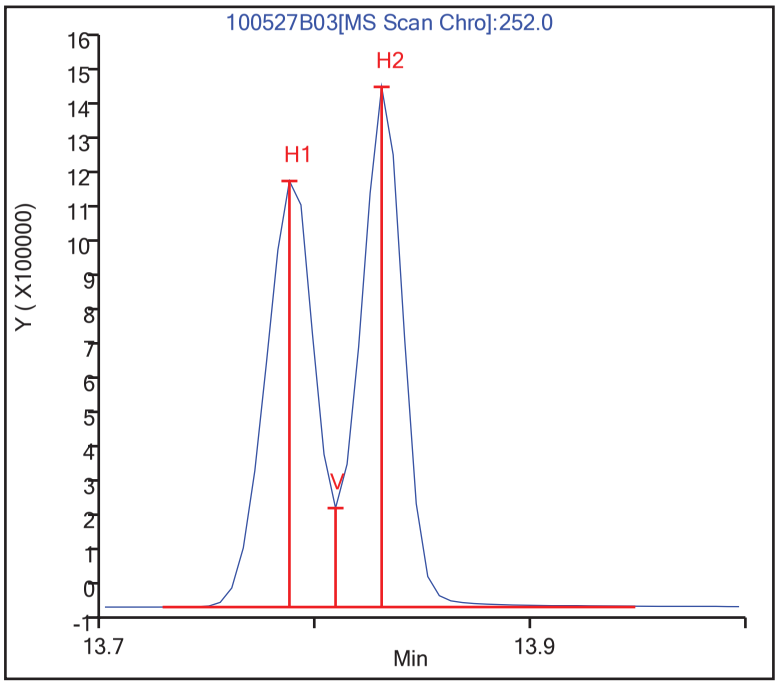
132 Benzo(b)fluoranthene @ 13.788 - 134 Benzo(k)fluoranthene @ 13.831

SW-846 Method
Version D

%Valley = (V / ((H1 + H2)/2)) * 100

V (Valley Height) = 269211
H1(132 Benzo(b)fluoranthen) = 1158952
H2(134 Benzo(k)fluoranthen) = 1414926

%Valley = 21 <= 50
Passed



Shealy Environmental Services
Continuing Calibration Verification Report

Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B04.D
Lab Sample ID: SVMS 3485 Client Sample ID: 3STD010CT
Injection Date: 27-May-2018 12:10:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052718B.b, SVMS 3485
Misc. Info: 3STD010
Method: \\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m
Method Date: 27-May-2018 13:07:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 98
Cpnd Sublist: 3STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
196 Caprolactam	10	11.183	0.118423	0.01	11.8	20	112
44 4-Chloroaniline	0.38731		0.423159	0.01	9.3	20	109
60 2-Nitroaniline	10	11.03	0.427464	0.01	10.3	20	110
66 3-Nitroaniline	10	10.877	0.339454	0.01	8.8	20	109
83 4-Nitroaniline	10	10.76	0.330831	0.01	7.6	20	108
115 Benzidine	50	56.208	0.837515	0.05	12.4	20	112
125 3,3'-Dichlorobenzidine	10	10.154	0.397994	0.01	1.5	20	102
199 Benzaldehyde	0.930122		1.089616	0.01	17.1	20	117
200 Atrazine	0.201016		0.216419	0.01	7.7	20	108

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B04.D		
Lab Sample ID:	SVMS 3485	Client Sample ID:	3STD010CT
Injection Date:	27-May-2018 12:10:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052718B.b, SVMS 3485		
Misc. Info:	3STD010		
Method:	\\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m		
Method Date:	27-May-2018 13:07:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	CCV	ALS Bottle:	98
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	27-May-2018 14:42:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.739	5.739	0.000	875637	20.000	20.000	
199 Benzaldehyde	77.0	5.423	5.423	0.000	477054	10.000	11.715	
* 41 Naphthalene-d8	136.0	6.755	6.755	0.000	3793143	20.000	20.000	
44 4-Chloroaniline	127.0	6.814	6.814	0.000	802551	10.000	10.926	
196 Caprolactam	113.0	7.092	7.092	0.000	224598	10.000	11.183	
* 67 Acenaphthene-d10	164.0	8.221	8.221	0.000	1876791	20.000	20.000	
200 Atrazine	200.0	9.173	9.173	0.000	324335	10.000	10.766	
* 102 Phenanthrene-d10	188.0	9.483	9.483	0.000	2997283	20.000	20.000	
115 Benzidine	184.0	10.681	10.681	0.000	5386254	50.000	56.208	
125 3,3'-Dichlorobenzidine	252.0	12.157	12.157	0.000	511918	10.000	10.154	
* 128 Chrysene-d12	240.0	12.232	12.232	0.000	2572494	20.000	20.000	
* 136 Perylene-d12	264.0	14.393	14.393	0.000	2822920	20.000	20.000	
60 2-Nitroaniline	138.0	7.846	7.846	0.000	401130	10.000	11.030	
66 3-Nitroaniline	138.0	8.189	8.189	0.000	318542	10.000	10.877	
83 4-Nitroaniline	138.0	8.713	8.713	0.000	310450	10.000	10.760	

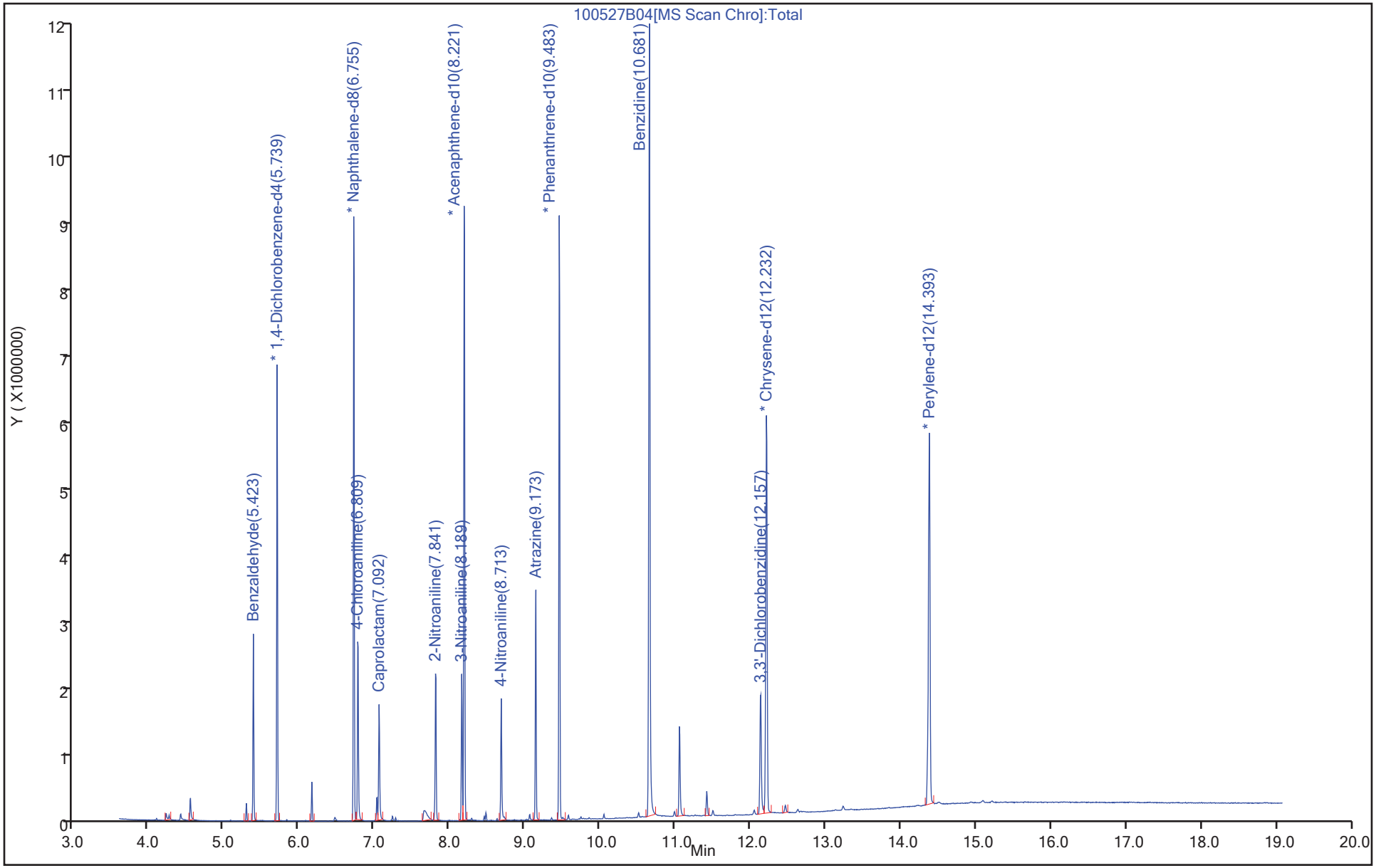
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 29-May-2018 11:06:01 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B04.D				
Injection Date:	27-May-2018 12:10:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD010CT	Lab ID:	SVMS 3485		
Sample Info:	10052718B.b, SVMS 3485				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Continuing Calibration Verification Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C03.D
Lab Sample ID: SVMS 3455 Client Sample ID: 1STD010CV
Injection Date: 29-May-2018 11:23:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, SVMS 3455
Misc. Info: 1STD010
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 97
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

QC

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
1 pyridine	0.708147		0.946843	0.05	* 33.7	20	134
193 1,4-Dioxane	0.232117		0.282804	0.05	* 21.8	20	122
2 N-Nitrosodimethylamine	0.5356		0.588259	0.05	9.8	20	110
$ 6 2-Fluorophenol	1.500418		1.792343	0.05	19.5	20	119
$ 9 Phenol-d5	1.925263		2.279055	0.05	18.4	20	118
10 Phenol	2.043619		2.306831	0.8	12.9	20	113
11 Aniline	0.198689		0.310964	0.05	* 56.5	20	157
12 bis(2-Chloroethyl)ether	1.102808		1.409671	0.5	* 27.8	20	128
13 2-Chlorophenol	1.550251		1.70707	0.8	10.1	20	110
14 1,3-Dichlorobenzene	1.596353		1.675898	0.05	5	20	105
17 1,4-Dichlorobenzene	1.669347		1.740446	0.05	4.3	20	104
18 Benzyl alcohol			* ND				
19 1,2-Dichlorobenzene	1.550253		1.656911	0.05	6.9	20	107
20 o-Cresol	1.46351		1.730759	0.7	18.3	20	118
21 bis(2Chloro1methylethyl)	2.007403		2.641895	0.05	* 31.6	20	132
23 m+p-Cresol	1.618877		1.926702	0.6	19	20	119
24 Acetophenone	2.079614		2.289706	0.01	10.1	20	110
26 n-Nitroso-di-n-propylami	1.052997		1.244822	0.5	18.2	20	118
28 Hexachloroethane	0.567841		0.616422	0.3	8.6	20	109
$ 29 Nitrobenzene-d5	0.355708		0.421351	0.05	18.5	20	118
30 Nitrobenzene	0.36874		0.445236	0.2	* 20.7	20	121
32 Isophorone	0.621452		0.743949	0.4	19.7	20	120
33 2-Nitrophenol	10	10.103	0.196693	0.1	1	20	101
34 2,4-Dimethylphenol	0.250104		0.261481	0.1	4.5	20	105
35 bis(2-Chloroethoxy)metha	0.398379		0.457598	0.3	14.9	20	115
36 Benzoic acid	20	22.398	0.247802	0.05	12	20	112
38 2,4-Dichlorophenol	0.279623		0.28498	0.2	1.9	20	102
40 1,2,4-Trichlorobenzene	0.300544		0.306877	0.05	2.1	20	102
43 Naphthalene	1.054953		1.08255	0.7	2.6	20	103
45 2,6-Dichlorophenol	0.28548		0.279277	0.05	-2.2	20	98
47 Hexachlorobutadiene	0.163839		0.163165	0.01	-0.4	20	100
49 4-Chloro-3-methylphenol	0.29778		0.329133	0.1	10.5	20	111
51 2-Methylnaphthalene	0.710906		0.728529	0.4	2.5	20	102
52 1,2,4,5-Tetrachlorobenze	0.551553		0.512073	0.01	-7.2	20	93

Report Date: 30-May-2018 08:28:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C03.D

QC

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
53 Hexachlorocyclopentadien	0.305832		0.308058	0.05	0.7	20	101
54 2,4,6-Trichlorophenol	0.343439		0.347693	0.1	1.2	20	101
55 2,4,5-Trichlorophenol	0.370432		0.376347	0.1	1.6	20	102
$ 56 2-Fluorobiphenyl	1.489403		1.485772	0.05	-0.2	20	100
58 2-Chloronaphthalene	1.21965		1.281973	0.8	5.1	20	105
62 Dimethylphthalate	1.309235		1.372618	0.01	4.8	20	105
64 Acenaphthylene	1.739612		1.91153	0.9	9.9	20	110
65 2,6-Dinitrotoluene	0.310876		0.331837	0.1	6.7	20	107
68 Acenaphthene	1.276142		1.313592	0.9	2.9	20	103
69 2,4-Dinitrophenol	20	20.193	0.174559	0.01	1	20	101
70 4-Nitrophenol	20	19.977	0.150229	0.01	-0.1	20	100
71 Dibenzofuran	1.675063		1.702241	0.8	1.6	20	102
73 2,4-Dinitrotoluene	10	10.261	0.429461	0.1	2.6	20	103
76 2,3,4,6-Tetrachloropheno	10	8.5615	0.231746	0.01	-14.4	20	86
78 Diethylphthalate	1.22955		1.311464	0.01	6.7	20	107
79 Fluorene	1.451735		1.470224	0.9	1.3	20	101
80 4-Chlorophenylphenylethe	0.644493		0.634463	0.4	-1.6	20	98
84 4,6-Dinitro-2-methylphen	10	11.132	0.134158	0.01	11.3	20	111
86 n-Nitrosodiphenylamine	0.571073		0.623513	0.01	9.2	20	109
87 Azobenzene	0.843118		1.038982	0.05	* 23.2	20	123
$ 88 2,4,6-Tribromophenol	0.089563		0.079603	0.05	-11.1	20	89
94 4-Bromophenylphenylether	0.199834		0.198043	0.1	-0.9	20	99
96 Hexachlorobenzene	0.201801		0.1963	0.1	-2.7	20	97
99 Pentachlorophenol	20	17.891	0.123155	0.05	-10.5	20	89
103 Phenanthrene	1.143836		1.177846	0.7	3	20	103
104 Anthracene	1.04404		1.149908	0.7	10.1	20	110
106 Carbazole	0.976794		1.086304	0.01	11.2	20	111
109 Di-n-butylphthalate	1.141696		1.323062	0.01	15.9	20	116
114 Fluoranthene	1.079567		1.15929	0.6	7.4	20	107
116 Pyrene	1.220417		1.377402	0.6	12.9	20	113
$ 117 Terphenyl-d14	0.868911		0.903874	0.05	4	20	104
122 Butylbenzylphthalate	10	10.994	0.623414	0.01	9.9	20	110
127 Benzo(a)Anthracene	1.111523		1.19018	0.8	7.1	20	107
129 Chrysene	1.144767		1.204603	0.7	5.2	20	105
130 bis(2-Ethylhexyl)phthala	10	11.418	0.898889	0.01	14.2	20	114
131 Di-n-octylphthalate	10	10.454	1.390091	0.01	4.5	20	105
132 Benzo(b)fluoranthene	1.063498		1.110678	0.5	4.4	20	104
134 Benzo(k)fluoranthene	1.138462		1.196558	0.5	5.1	20	105
135 Benzo(a)pyrene	0.909026		0.995208	0.5	9.5	20	109
138 Indeno(1,2,3-c,d)pyrene	1.159099		1.259678	0.5	8.7	20	109
139 Dibenzo(a,h)anthracene	1.049339		1.130853	0.4	7.8	20	108
140 Benzo(g,h,i)perylene	0.941884		1.0561	0.5	12.1	20	112
184 Biphenyl	1.656318		1.732833	0.01	4.6	20	105
201 n-Decane	1.571049		1.878504	0.05	19.6	20	120
202 Octadecane	0.520381		0.705116	0.05	* 35.5	20	135
204 1-Methylnaphthalene	0.697699		0.709409	0.05	1.7	20	102

Report Date: 30-May-2018 08:28:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C03.D
Lab Sample ID: SVMS 3455 Client Sample ID: 1STD010CV
Injection Date: 29-May-2018 11:23:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, SVMS 3455
Misc. Info: 1STD010
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 97
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 29-May-2018 14:14:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
193 1,4-Dioxane	58.0	3.696	3.696	0.000	122268	10.000	12.184	
2 N-Nitrosodimethylamine	42.0	3.894	3.894	0.000	254329	10.000	10.983	
1 pyridine	79.0	3.963	3.963	0.000	409360	10.000	13.371	
$ 6 2-Fluorophenol	112.0	4.776	4.776	0.000	774905	10.000	11.946	
$ 9 Phenol-d5	99.0	5.413	5.413	0.000	985331	10.000	11.838	
10 Phenol	94.0	5.423	5.423	0.000	997340	10.000	11.288	
11 Aniline	66.0	5.477	5.477	0.000	134443	10.000	15.651	
12 bis(2-Chloroethyl)ether	63.0	5.482	5.482	0.000	609460	10.000	12.783	
201 n-Decane	57.0	5.520	5.520	0.000	812156	10.000	11.957	
13 2-Chlorophenol	128.0	5.568	5.568	0.000	738038	10.000	11.012	
14 1,3-Dichlorobenzene	146.0	5.675	5.675	0.000	724561	10.000	10.498	
* 16 1,4-Dichlorobenzene-d4	152.0	5.717	5.717	0.000	864684	20.000	20.000	
17 1,4-Dichlorobenzene	146.0	5.728	5.728	0.000	752468	10.000	10.426	
18 Benzyl alcohol	79.0		5.878		ND			
19 1,2-Dichlorobenzene	146.0	5.857	5.857	0.000	716352	10.000	10.688	
20 o-Cresol	108.0	5.883	5.883	0.000	748280	10.000	11.826	
21 bis(2Chloro1methylethyl)ether	45.0	5.883	5.883	0.000	1142202	10.000	13.161	
23 m+p-Cresol	107.0	5.996	5.996	0.000	832994	10.000	11.901	
26 n-Nitroso-di-n-propylamine	70.0	5.990	5.990	0.000	538189	10.000	11.822	
24 Acetophenone	105.0	6.017	6.017	0.000	989936	10.000	11.010	
28 Hexachloroethane	117.0	6.119	6.119	0.000	266505	10.000	10.856	
$ 29 Nitrobenzene-d5	82.0	6.151	6.151	0.000	782704	10.000	11.845	
30 Nitrobenzene	77.0	6.167	6.167	0.000	827072	10.000	12.074	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
32 Isophorone	82.0	6.333	6.333	0.000	1381964	10.000	11.971	
34 2,4-Dimethylphenol	107.0	6.423	6.423	0.000	485728	10.000	10.455	
33 2-Nitrophenol	139.0	6.418	6.418	0.000	365378	10.000	10.103	
36 Benzoic acid	105.0	6.504	6.504	0.000	920638	20.000	22.398	
35 bis(2-Chloroethoxy)methane	93.0	6.482	6.482	0.000	850037	10.000	11.486	
38 2,4-Dichlorophenol	162.0	6.616	6.616	0.000	529380	10.000	10.192	
40 1,2,4-Trichlorobenzene	180.0	6.675	6.675	0.000	570057	10.000	10.211	
* 41 Naphthalene-d8	136.0	6.734	6.734	0.000	3715211	20.000	20.000	
43 Naphthalene	128.0	6.755	6.755	0.000	2010951	10.000	10.262	
45 2,6-Dichlorophenol	162.0	6.793	6.793	0.000	518787	10.000	9.7827	
47 Hexachlorobutadiene	224.6	6.825	6.825	0.000	303097	10.000	9.9589	
49 4-Chloro-3-methylphenol	107.0	7.172	7.172	0.000	611399	10.000	11.053	
51 2-Methylnaphthalene	142.0	7.317	7.317	0.000	1353320	10.000	10.248	
204 1-Methylnaphthalene	142.0	7.402	7.402	0.000	1317802	10.000	10.168	
53 Hexachlorocyclopentadiene	237.0	7.434	7.434	0.000	1488483	50.000	50.364	
52 1,2,4,5-Tetrachlorobenzene	216.0	7.450	7.450	0.000	494850	10.000	9.2842	
54 2,4,6-Trichlorophenol	196.0	7.547	7.547	0.000	335999	10.000	10.124	
55 2,4,5-Trichlorophenol	196.0	7.589	7.589	0.000	363689	10.000	10.160	
$ 56 2-Fluorobiphenyl	172.0	7.606	7.606	0.000	1435800	10.000	9.9756	
184 Biphenyl	154.0	7.691	7.691	0.000	1674552	10.000	10.462	
58 2-Chloronaphthalene	162.0	7.729	7.729	0.000	1238856	10.000	10.511	
62 Dimethylphthalate	163.0	7.926	7.926	0.000	1326452	10.000	10.484	
65 2,6-Dinitrotoluene	165.0	7.996	7.996	0.000	320676	10.000	10.674	
64 Acenaphthylene	152.0	8.087	8.087	0.000	1847239	10.000	10.988	
* 67 Acenaphthene-d10	164.0	8.199	8.199	0.000	1932733	20.000	20.000	
68 Acenaphthene	153.0	8.226	8.226	0.000	1269411	10.000	10.293	
69 2,4-Dinitrophenol	184.0	8.237	8.237	0.000	337376	20.000	20.193	
70 4-Nitrophenol	109.0	8.301	8.301	0.000	290353	20.000	19.977	
73 2,4-Dinitrotoluene	165.0	8.338	8.338	0.000	415017	10.000	10.261	
71 Dibenzofuran	168.0	8.370	8.370	0.000	1644989	10.000	10.162	
76 2,3,4,6-Tetrachlorophenol	232.0	8.472	8.472	0.000	223952	10.000	8.5615	
78 Diethylphthalate	149.0	8.504	8.504	0.000	1267355	10.000	10.666	
80 4-Chlorophenylphenylether	204.0	8.627	8.627	0.000	613124	10.000	9.8444	
79 Fluorene	166.0	8.659	8.659	0.000	1420775	10.000	10.127	
84 4,6-Dinitro-2-methylphenol	198.0	8.681	8.681	0.000	213723	10.000	11.132	
86 n-Nitrosodiphenylamine	169.0	8.729	8.729	0.000	993303	10.000	10.918	
87 Azobenzene	77.0	8.766	8.766	0.000	1655176	10.000	12.323	
$ 88 2,4,6-Tribromophenol	330.0	8.868	8.868	0.000	126814	10.000	8.8879	
94 4-Bromophenylphenylether	248.0	9.044	9.044	0.000	315497	10.000	9.9104	
96 Hexachlorobenzene	284.0	9.125	9.125	0.000	312720	10.000	9.7274	
202 Octadecane	57.0	9.226	9.226	0.000	1123303	10.000	13.550	
99 Pentachlorophenol	266.0	9.296	9.296	0.000	392391	20.000	17.891	
* 102 Phenanthrene-d10	188.0	9.461	9.461	0.000	3186149	20.000	20.000	
103 Phenanthrene	178.0	9.483	9.483	0.000	1876396	10.000	10.297	
104 Anthracene	178.0	9.526	9.526	0.000	1831889	10.000	11.014	
106 Carbazole	167.0	9.654	9.654	0.000	1730563	10.000	11.121	
109 Di-n-butylphthalate	149.0	9.857	9.857	0.000	2107736	10.000	11.589	
114 Fluoranthene	202.0	10.537	10.537	0.000	1846835	10.000	10.738	
116 Pyrene	202.0	10.772	10.772	0.000	1905771	10.000	11.286	
$ 117 Terphenyl-d14	244.0	10.863	10.863	0.000	1250599	10.000	10.402	
122 Butylbenzylphthalate	149.0	11.360	11.360	0.000	862554	10.000	10.994	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
130 bis(2-Ethylhexyl)phthalate	149.0	12.029	12.029	0.000	1243701	10.000	11.418	
127 Benzo(a)Anthracene	228.0	12.179	12.179	0.000	1646731	10.000	10.708	
* 128 Chrysene-d12	240.0	12.200	12.200	0.000	2767197	20.000	20.000	
129 Chrysene	228.0	12.232	12.232	0.000	1666687	10.000	10.523	
131 Di-n-octylphthalate	149.0	12.949	12.949	0.000	2052128	10.000	10.454	
132 Benzo(b)fluoranthene	252.0	13.740	13.740	0.000	1639643	10.000	10.444	
134 Benzo(k)fluoranthene	252.0	13.783	13.783	0.000	1766424	10.000	10.510	
135 Benzo(a)pyrene	252.0	14.254	14.254	0.000	1469180	10.000	10.948	
* 136 Perylene-d12	264.0	14.350	14.350	0.000	2952509	20.000	20.000	
138 Indeno(1,2,3-c,d)pyrene	276.0	16.217	16.217	0.000	1859605	10.000	10.868	
139 Dibenzo(a,h)anthracene	278.0	16.228	16.228	0.000	1669427	10.000	10.777	
140 Benzo(g,h,i)perylene	276.0	16.784	16.784	0.000	1559072	10.000	11.213	

Compound Type Legend

$ - Surrogate

* - ISTD

QC Flag Legend

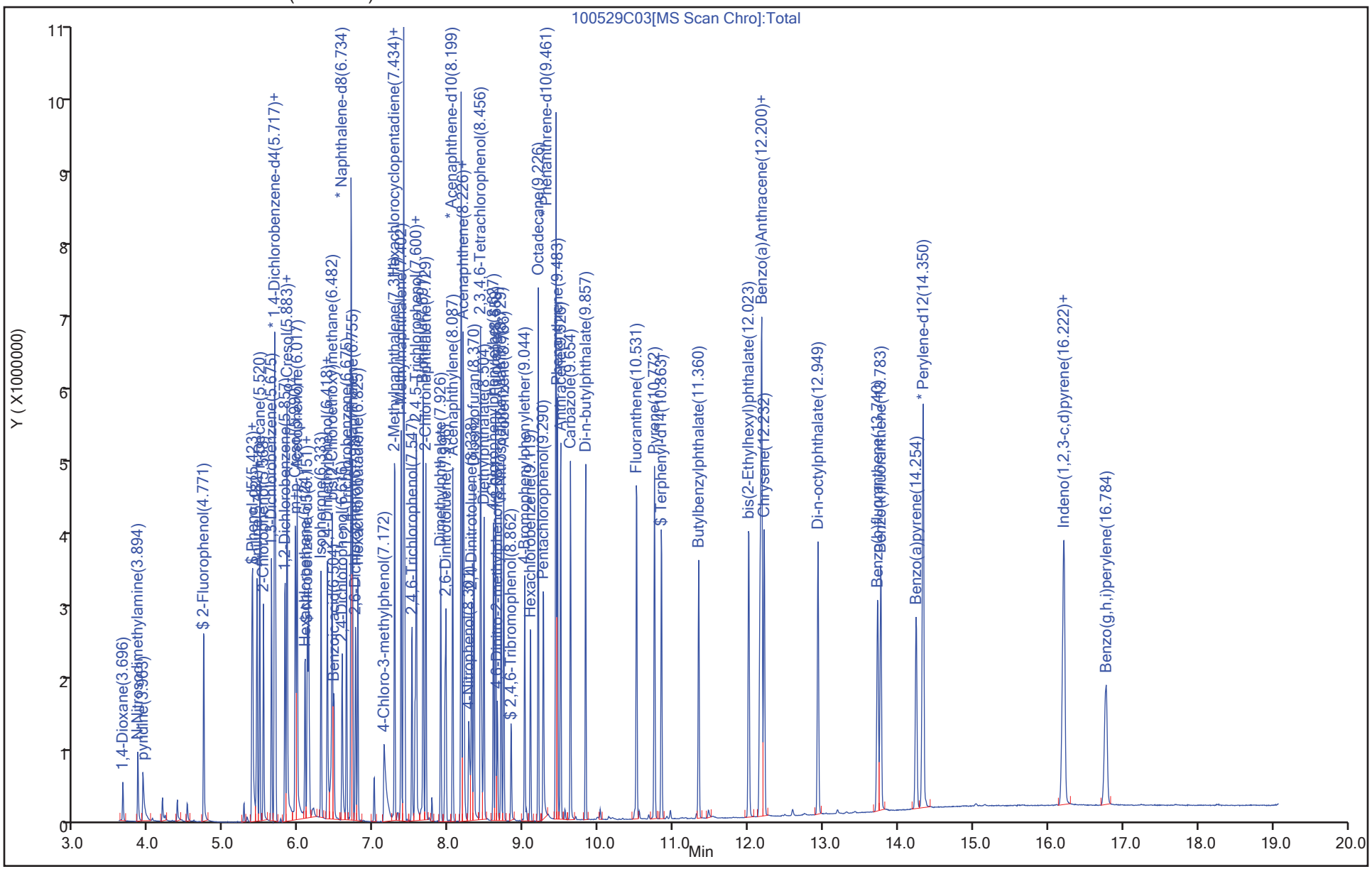
Processing Flags

Review Flags

Report Date: 30-May-2018 08:28:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C03.D				
Injection Date:	29-May-2018 11:23:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	1STD010CV	Lab ID:	SVMS 3455		
Sample Info:	10052918C.b, SVMS 3455				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Shealy Environmental Services
Continuing Calibration Verification Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C04.D		
Lab Sample ID:	SVMS 3485	Client Sample ID:	3STD010CW
Injection Date:	29-May-2018 11:48:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052918C.b, SVMS 3485		
Misc. Info:	3STD010		
Method:	\\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m		
Method Date:	30-May-2018 08:25:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	CCV	ALS Bottle:	98
Cpnd Sublist:	3STD.sub		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
196 Caprolactam	10	11.349	0.120279	0.01	13.5	20	113
44 4-Chloroaniline	0.38731		0.430652	0.01	11.2	20	111
60 2-Nitroaniline	10	10.902	0.422257	0.01	9	20	109
66 3-Nitroaniline	10	10.853	0.338652	0.01	8.5	20	109
83 4-Nitroaniline	10	10.842	0.333562	0.01	8.4	20	108
115 Benzidine	50	53.203	0.790104	0.05	6.4	20	106
125 3,3'-Dichlorobenzidine	10	9.9192	0.386979	0.01	-0.8	20	99
199 Benzaldehyde	0.930122		1.138433	0.01	* 22.4	20	122
200 Atrazine	0.201016		0.217425	0.01	8.2	20	108

Report Date: 30-May-2018 08:28:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C04.D
Lab Sample ID: SVMS 3485 Client Sample ID: 3STD010CW
Injection Date: 29-May-2018 11:48:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, SVMS 3485
Misc. Info: 3STD010
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 98
Cpnd Sublist: 3STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 29-May-2018 14:14:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	Cal Amt ng	OnCol Amt ng	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.717	5.717	0.000	894561	20.000	20.000	
199 Benzaldehyde	77.0	5.397	5.397	0.000	509199	10.000	12.240	
* 41 Naphthalene-d8	136.0	6.734	6.734	0.000	3962150	20.000	20.000	
44 4-Chloroaniline	127.0	6.787	6.787	0.000	853154	10.000	11.119	
196 Caprolactam	113.0	7.071	7.071	0.000	238282	10.000	11.349	
* 67 Acenaphthene-d10	164.0	8.199	8.199	0.000	2003723	20.000	20.000	
200 Atrazine	200.0	9.146	9.146	0.000	345504	10.000	10.816	
* 102 Phenanthrene-d10	188.0	9.462	9.462	0.000	3178137	20.000	20.000	
115 Benzidine	184.0	10.649	10.649	0.000	5492354	50.000	53.203	
125 3,3'-Dichlorobenzidine	252.0	12.114	12.114	0.000	538011	10.000	9.9192	
* 128 Chrysene-d12	240.0	12.195	12.195	0.000	2780571	20.000	20.000	
* 136 Perylene-d12	264.0	14.345	14.345	0.000	2991509	20.000	20.000	
60 2-Nitroaniline	138.0	7.819	7.819	0.000	423043	10.000	10.902	
66 3-Nitroaniline	138.0	8.167	8.167	0.000	339282	10.000	10.853	
83 4-Nitroaniline	138.0	8.686	8.686	0.000	334183	10.000	10.842	

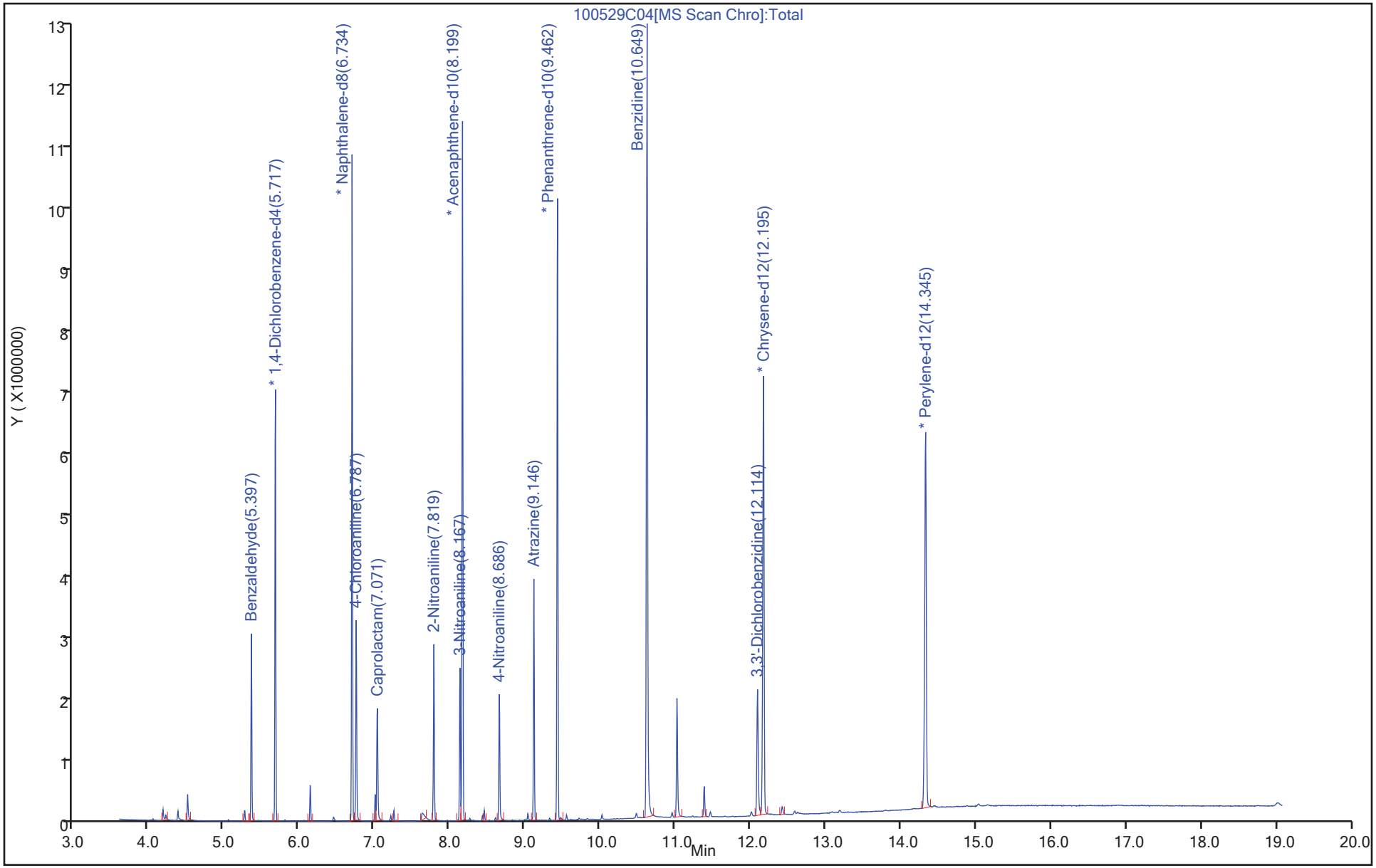
Compound Type Legend
* - ISTD

QC Flag Legend
Processing Flags
Review Flags

Report Date: 30-May-2018 08:28:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C04.D				
Injection Date:	29-May-2018 11:48:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	3STD010CW	Lab ID:	SVMS 3485		
Sample Info:	10052918C.b, SVMS 3485				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		

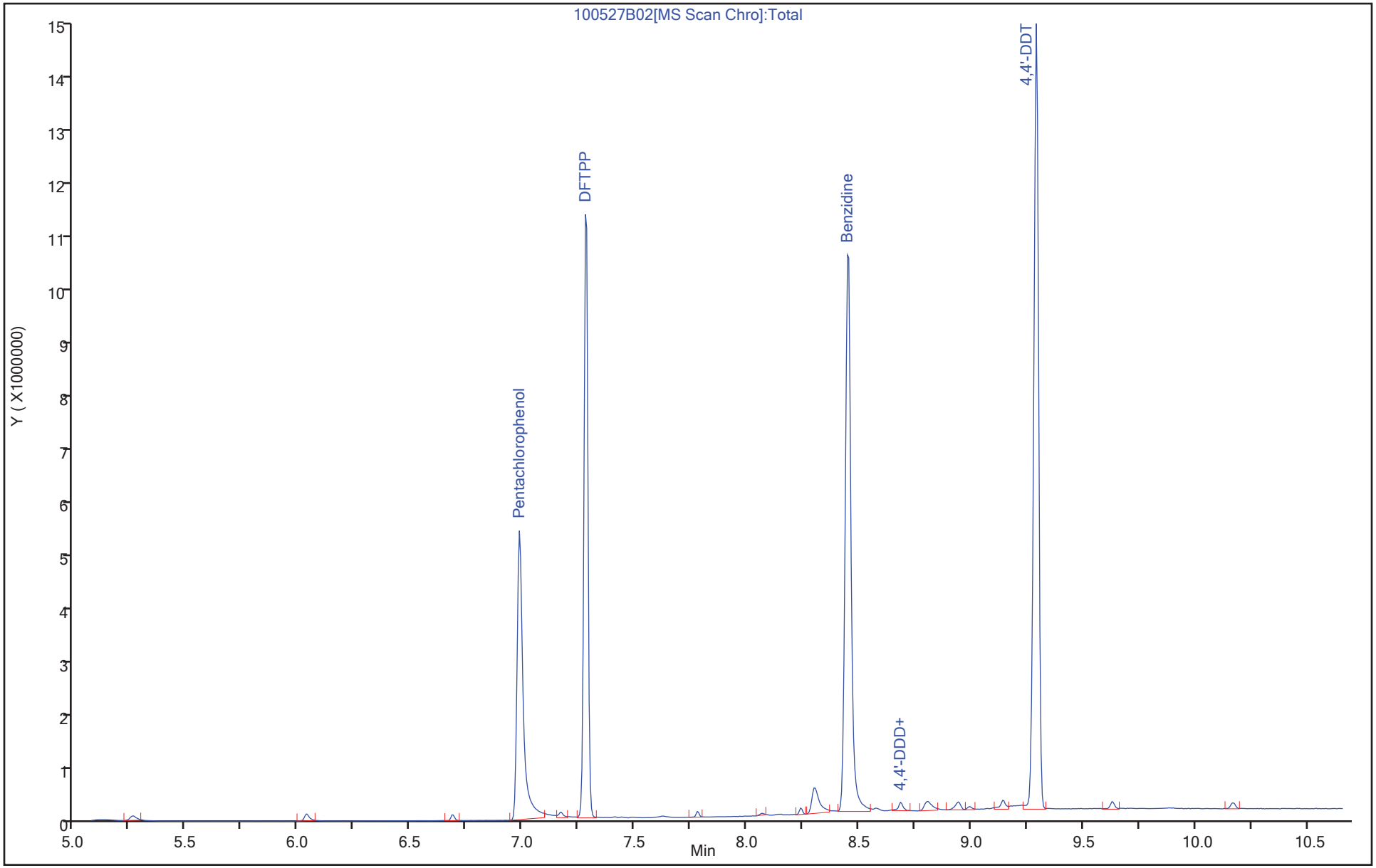


RAW QC DATA

Report Date: 29-May-2018 11:06:00 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D				
Injection Date:	27-May-2018 11:30:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	DFTPPCR	Lab ID:	SVMS 3462		
Sample Info:	10052718B.b, SVMS 3462				
Injection Vol.	1.00	Dil. Factor:	1.0		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan		



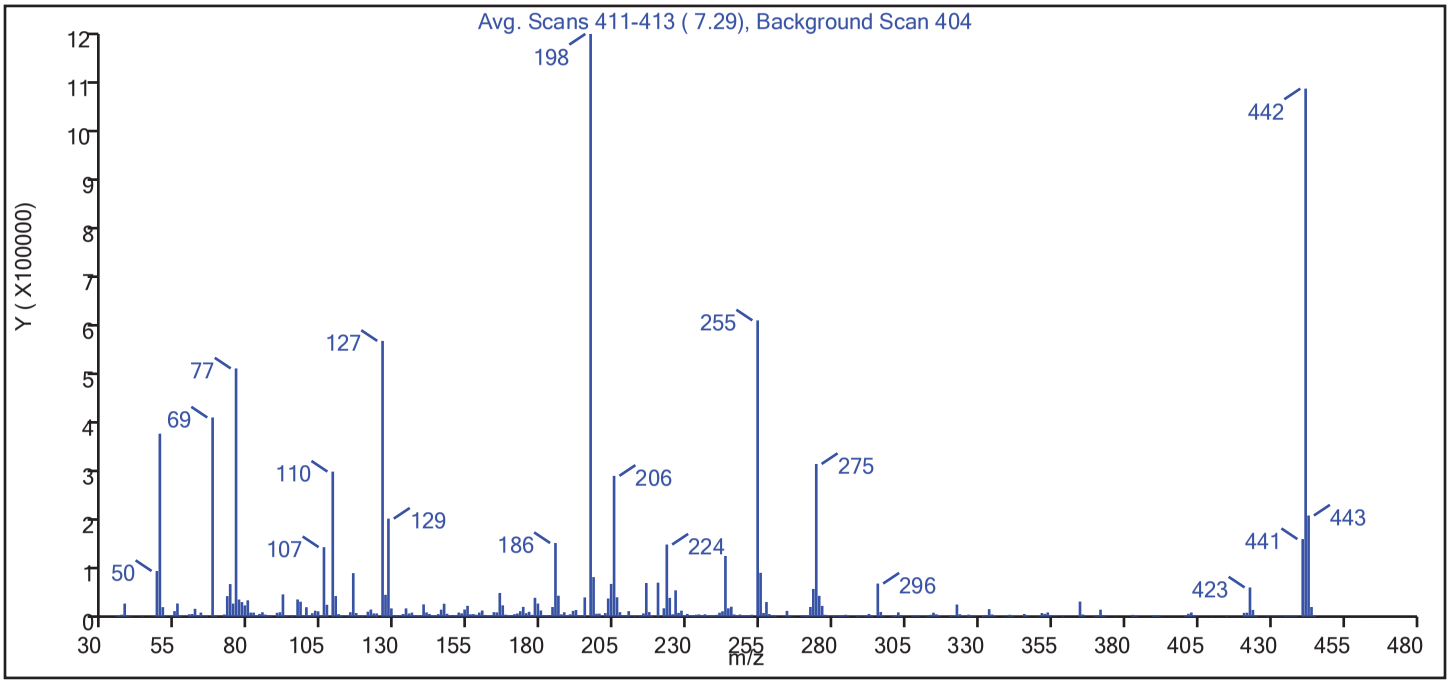
Report Date: 29-May-2018 11:06:00 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

MS Tune Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D		
Injection Date:	27-May-2018 11:30:30	Inst. ID:	msd10.i
Client ID:	DFTPPCR	Lab ID:	SVMS 3462
Sample Info:	10052718B.b, SVMS 3462		
Injection Vol.	1.00	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan

1 dftpp



m/z	Ion Abundance Criteria	% Relative Abundance
198	Base Peak, 100% relative abundance	100.0
51	10.00 - 80.00% of mass 198	31.4
68	Less than 2.00% of mass 69	0.0 (0.0)
69	Present	34.2
70	Less than 2.00% of mass 69	0.2 (0.5)
127	10.00 - 80.00% of mass 198	47.3
197	Less than 2.00% of mass 198	0.0
199	5.00 - 9.00% of mass 198	6.8
275	10.00 - 60.00% of mass 198	26.2
365	Greater than 1.00% of mass 198	2.6
441	0.01 - 24.00% of mass 442	13.3 (14.7)
442	Greater than 50.00% of mass 198	90.6
443	15.00 - 24.00% of mass 442	17.4 (19.1)

Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D
Injection Date: 27-May-2018 11:30:30
Spectrum: Avg. Scans 411-413 (7.29), Background Scan 404
Base Peak: 198.00
Minimum % Base Peak: 0
Number of Points: 367

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	539	136.00	6202	232.00	834	328.00	2448
37.00	1491	137.00	7951	233.00	1215	329.00	574
38.00	3872	138.00	1747	234.00	3796	330.00	52
39.00	25984	139.00	1284	235.00	4329	331.00	58
40.00	957	140.00	2751	236.00	2635	332.00	1909
41.00	579	141.00	24432	237.00	4654	333.00	2643
45.00	628	142.00	8414	238.00	809	334.00	14883
47.00	140	143.00	5336	239.00	2235	335.00	4235
48.00	266	144.00	1757	240.00	1697	336.00	586
49.00	528	145.00	1382	241.00	3512	339.00	437
50.00	90960	146.00	5000	242.00	7801	340.00	411
51.00	364864	147.00	13858	243.00	10611	341.00	3651
52.00	18864	148.00	25704	244.00	120904	342.00	993
53.00	922	149.00	5719	245.00	16504	343.00	119
55.00	1735	150.00	1819	246.00	19712	344.00	111
56.00	10965	151.00	3274	247.00	4324	346.00	5252
57.00	26128	152.00	2171	248.00	1074	347.00	988
58.00	1171	153.00	8081	249.00	4219	348.00	122
59.00	330	154.00	6533	250.00	1011	350.00	198
60.00	189	155.00	14130	251.00	1284	351.00	452
61.00	4688	156.00	21480	252.00	1510	352.00	7107
62.00	5313	157.00	4718	253.00	3735	353.00	5393
63.00	15581	158.00	5072	255.00	590848	354.00	8309
64.00	2024	159.00	3697	256.00	87360	355.00	2277
65.00	8027	160.00	8091	257.00	7322	356.00	423
66.00	742	161.00	12228	258.00	29024	357.00	447
67.00	660	162.00	3349	259.00	4986	358.00	74
69.00	397184	163.00	966	260.00	963	359.00	717
70.00	2089	164.00	1669	261.00	1108	360.00	72
71.00	201	165.00	8907	262.00	228	361.00	200
72.00	231	166.00	8412	263.00	166	363.00	60
73.00	4251	167.00	47208	264.00	430	365.00	30000
74.00	40824	168.00	22456	265.00	11405	366.00	4297

Report Date: 29-May-2018 11:06:00 AIM Revision: 1.0 20-Sep-2017 14:04:40
Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D
Injection Date: 27-May-2018 11:30:30
Spectrum: Avg. Scans 411-413 (7.29), Background Scan 404
Base Peak: 198.00
Minimum % Base Peak: 0
Number of Points: 367

m/z	Y	m/z	Y	m/z	Y	m/z	Y
75.00	64840	169.00	3876	266.00	1150	367.00	331
76.00	25944	170.00	1691	267.00	376	369.00	64
77.00	495040	171.00	2648	269.00	3	370.00	766
78.00	34048	172.00	4826	270.00	883	371.00	2273
79.00	28952	173.00	6192	271.00	1397	372.00	13848
80.00	22344	174.00	10874	272.00	1477	373.00	3288
81.00	32472	175.00	19392	273.00	19280	374.00	469
82.00	8003	176.00	6830	274.00	55192	377.00	311
83.00	7982	177.00	9617	275.00	304512	383.00	3564
84.00	957	178.00	3632	276.00	41504	384.00	1115
85.00	5330	179.00	37496	277.00	21392	385.00	428
86.00	8651	180.00	26016	278.00	3650	389.00	81
87.00	4043	181.00	12229	279.00	939	390.00	1766
88.00	1605	182.00	2049	280.00	237	391.00	1311
89.00	803	183.00	1508	281.00	1798	392.00	1006
90.00	108	184.00	3194	282.00	930	393.00	194
91.00	7611	185.00	19096	283.00	2550	395.00	60
92.00	8744	186.00	146752	284.00	2107	397.00	155
93.00	44312	187.00	41720	285.00	3770	400.00	70
94.00	3209	188.00	4503	286.00	795	401.00	1081
95.00	471	189.00	8639	288.00	248	402.00	5737
96.00	2511	190.00	1452	289.00	1012	403.00	8202
97.00	506	191.00	4551	290.00	950	404.00	2867
98.00	34192	192.00	11440	291.00	508	405.00	493
99.00	29768	193.00	13135	292.00	1189	410.00	252
100.00	2974	194.00	3036	293.00	5314	415.00	747
101.00	18688	195.00	2133	294.00	1556	416.00	279
102.00	1054	196.00	38304	296.00	65928	417.00	128
103.00	6732	198.00	1162240	297.00	9222	418.00	65
104.00	11775	199.00	78768	298.00	794	419.00	197
105.00	10532	200.00	5851	299.00	209	421.00	7439
106.00	1579	201.00	5993	300.00	219	422.00	7883
107.00	138560	203.00	7031	301.00	1043	423.00	58152
108.00	23584	204.00	36112	302.00	1512	424.00	13324

Report Date: 29-May-2018 11:06:00 AIM Revision: 1.0 20-Sep-2017 14:04:40
Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D
Injection Date: 27-May-2018 11:30:30
Spectrum: Avg. Scans 411-413 (7.29), Background Scan 404
Base Peak: 198.00
Minimum % Base Peak: 0
Number of Points: 367

m/z	Y	m/z	Y	m/z	Y	m/z	Y
110.00	289216	205.00	65208	303.00	8477	425.00	1346
111.00	40936	206.00	280832	304.00	2505	426.00	192
112.00	4926	207.00	38528	305.00	328	427.00	156
113.00	1636	208.00	8908	306.00	58	428.00	160
114.00	298	209.00	2918	307.00	114	429.00	685
115.00	718	210.00	2898	308.00	949	430.00	235
116.00	8714	211.00	10952	309.00	891	431.00	511
117.00	86728	212.00	566	310.00	1027	432.00	417
118.00	7133	213.00	877	311.00	273	433.00	626
119.00	1060	214.00	581	312.00	325	434.00	279
120.00	1821	215.00	2726	313.00	722	435.00	938
121.00	566	216.00	6379	314.00	3580	436.00	823
122.00	9908	217.00	67048	315.00	7771	437.00	693
123.00	14115	218.00	9032	316.00	4541	438.00	960
124.00	6335	219.00	1121	317.00	795	439.00	561
125.00	6349	221.00	67720	318.00	137	441.00	154624
127.00	549952	223.00	16584	319.00	138	442.00	1053184
128.00	43488	224.00	143744	320.00	368	443.00	201664
129.00	195456	225.00	37344	321.00	2543	444.00	19120
130.00	16346	226.00	4656	322.00	911	445.00	1230
131.00	2970	227.00	52392	323.00	24136	459.00	57
132.00	1368	228.00	7470	324.00	4727	461.00	135
133.00	740	229.00	11869	325.00	462	475.00	69
134.00	5213	230.00	1307	326.00	549	476.00	60
135.00	16369	231.00	5357	327.00	3941		

Report Date: 29-May-2018 11:06:00 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Breakdown Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D		
Injection Date:	27-May-2018 11:30:30	Inst. ID:	msd10.i
Client ID:	DFTPPCR	Lab ID:	SVMS 3462
Sample Info:	10052718B.b, SVMS 3462		
Injection Vol.	1.00	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan

5 4,4'-DDT

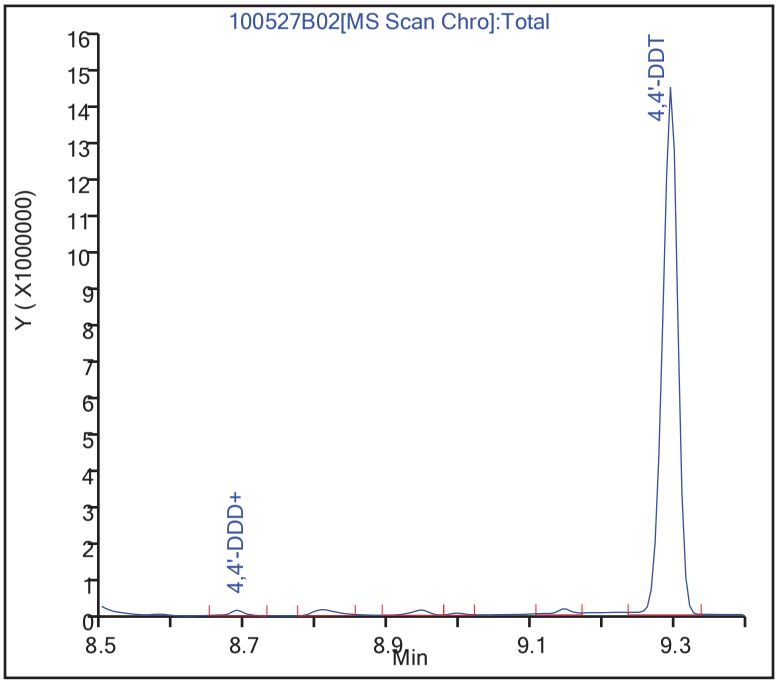
SW-846 Method

%Breakdown =
(Sum of Degrad. Peak Areas/
Total Area All Peaks) * 100

5 4,4'-DDT, Area = 4290739 @ 9.30

6 4,4'-DDE, Area = 5335 @ 8.58
4 4,4'-DDD, Area = 1030 @ 8.67

%Breakdown:0.15%, Max Limit:20%
Passed



Report Date: 29-May-2018 11:06:00 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Peak Tailing Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B02.D		
Injection Date:	27-May-2018 11:30:30	Inst. ID:	msd10.i
Client ID:	DFTPPCR	Lab ID:	SVMS 3462
Sample Info:	10052718B.b, SVMS 3462		
Injection Vol.	1.00	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan

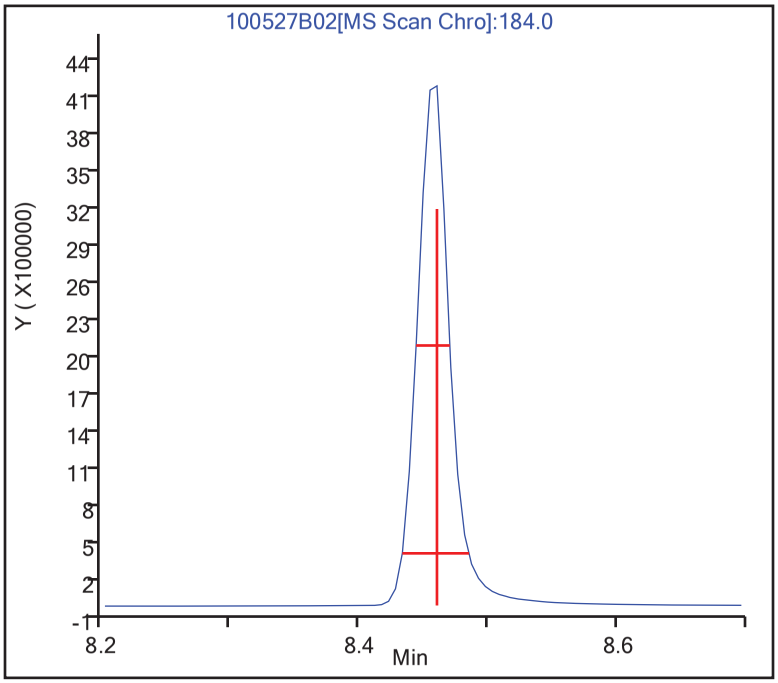
3 Benzidine

SW-846 Method

Peak Tailing Factor =
BackWidth/FrontWidth @ 10% Peak Height

Back Width = 0.025 (min.)
Front Width = 0.027 (min.)

Tailing Factor = 0.93, Max. Tailing < 2.00
Passed



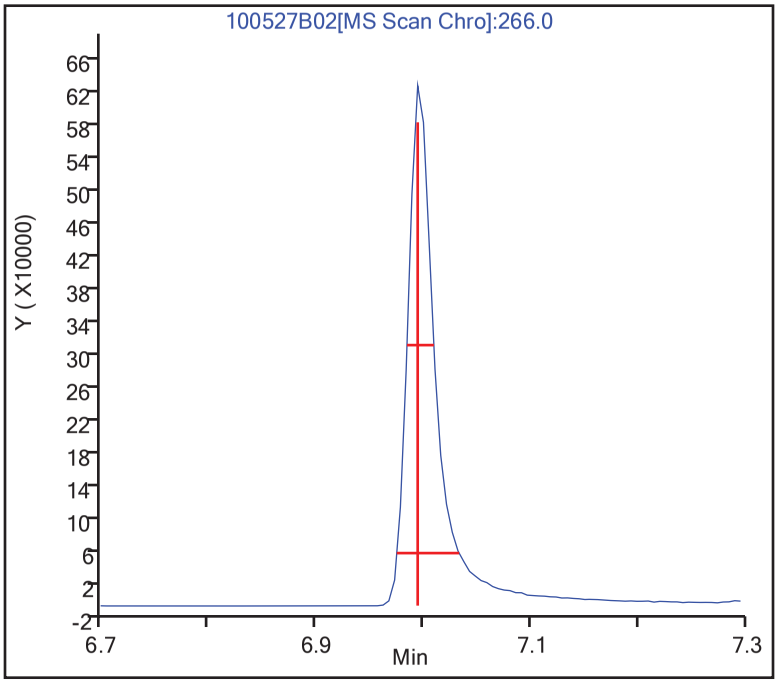
2 Pentachlorophenol

SW-846 Method

Peak Tailing Factor =
BackWidth/FrontWidth @ 10% Peak Height

Back Width = 0.038 (min.)
Front Width = 0.019 (min.)

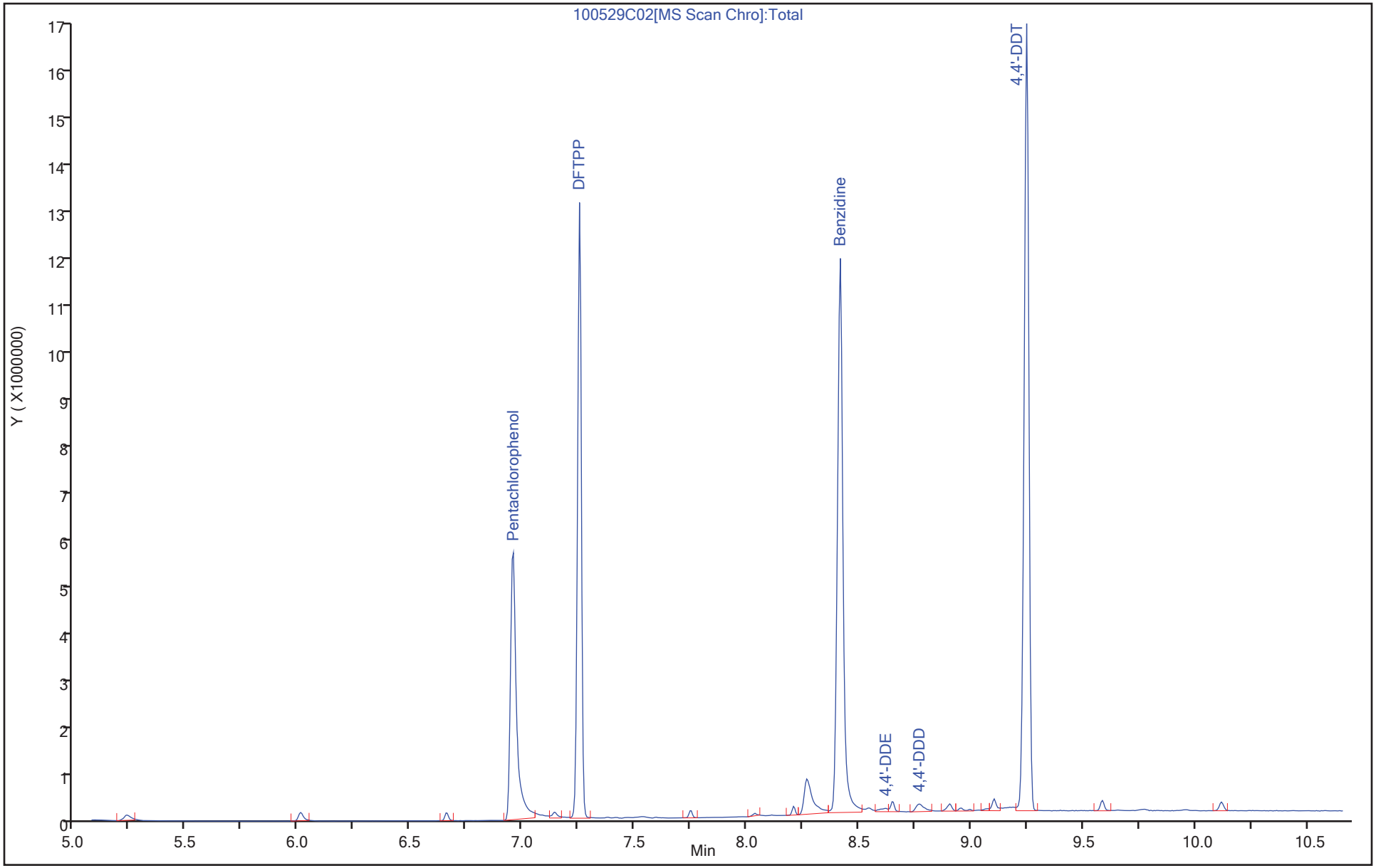
Tailing Factor = 1.98, Max. Tailing < 2.00
Passed



Report Date: 30-May-2018 08:28:39 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D				
Injection Date:	29-May-2018 11:06:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	DFTPPCU	Lab ID:	SVMS 3462		
Sample Info:	10052918C.b, SVMS 3462				
Injection Vol.	1.00	Dil. Factor:	1.0		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan		



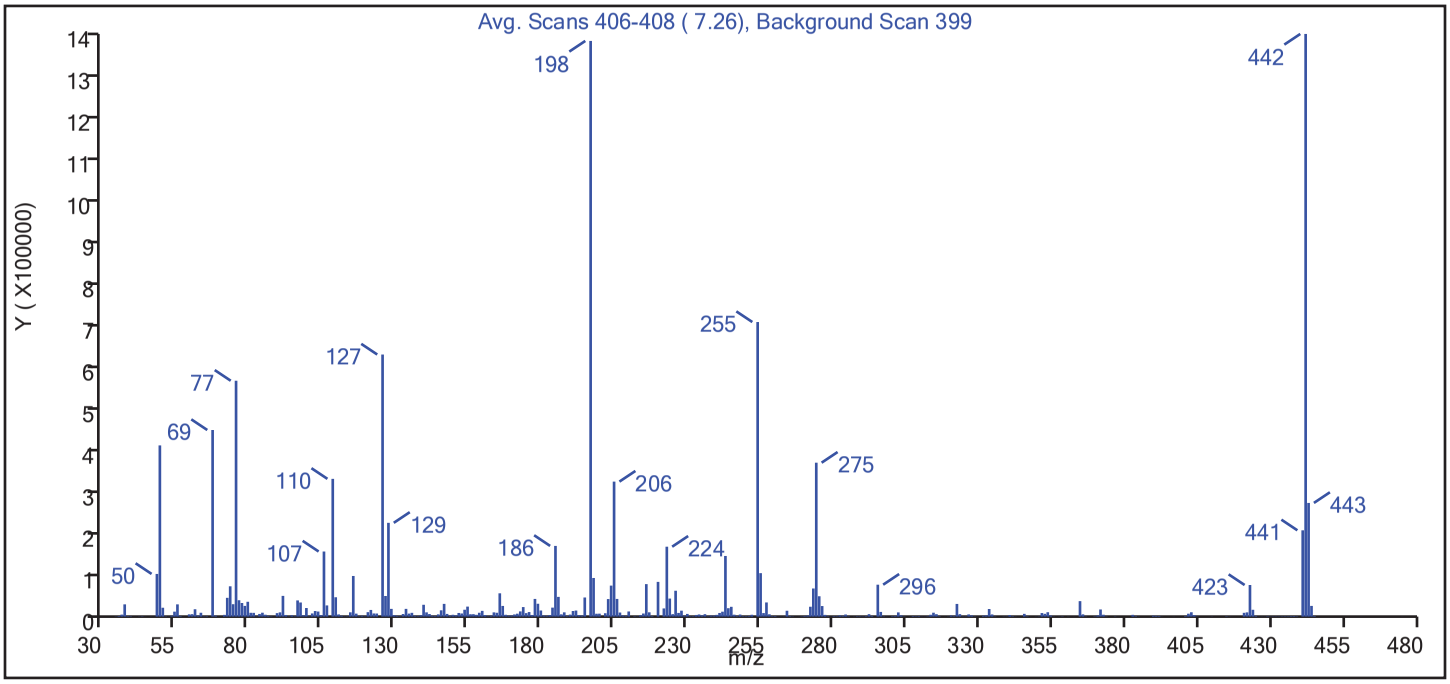
Report Date: 30-May-2018 08:28:39 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

MS Tune Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D		
Injection Date:	29-May-2018 11:06:30	Inst. ID:	msd10.i
Client ID:	DFTPPCU	Lab ID:	SVMS 3462
Sample Info:	10052918C.b, SVMS 3462		
Injection Vol.	1.00	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan

1 dftpp



m/z	Ion Abundance Criteria	% Relative Abundance
198	Base Peak, 100% relative abundance	100.0
51	10.00 - 80.00% of mass 198	29.7
68	Less than 2.00% of mass 69	0.0 (0.0)
69	Present	32.4
70	Less than 2.00% of mass 69	0.2 (0.5)
127	10.00 - 80.00% of mass 198	45.5
197	Less than 2.00% of mass 198	0.0
199	5.00 - 9.00% of mass 198	6.7
275	10.00 - 60.00% of mass 198	26.7
365	Greater than 1.00% of mass 198	2.7
441	0.01 - 24.00% of mass 442	15.0 (14.8)
442	Greater than 50.00% of mass 198	101.2
443	15.00 - 24.00% of mass 442	19.7 (19.5)

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D
Injection Date: 29-May-2018 11:06:30
Spectrum: Avg. Scans 406-408 (7.26), Background Scan 399
Base Peak: 442.00
Minimum % Base Peak: 0
Number of Points: 373

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	442	133.00	848	232.00	1024	329.00	617
37.00	1383	134.00	5841	233.00	1167	330.00	164
38.00	4530	135.00	17592	234.00	3765	331.00	82
39.00	27864	136.00	6843	235.00	4866	332.00	2054
40.00	1174	137.00	8596	236.00	3048	333.00	2990
41.00	961	138.00	1935	237.00	5517	334.00	17272
42.00	124	139.00	1124	238.00	876	335.00	4924
43.00	112	140.00	2996	239.00	2342	336.00	582
44.00	396	141.00	26904	240.00	2185	338.00	73
45.00	745	142.00	9659	241.00	3968	339.00	466
46.00	165	143.00	5841	242.00	8273	340.00	517
47.00	17	144.00	1938	243.00	11193	341.00	3598
48.00	298	145.00	1535	244.00	137856	342.00	1061
49.00	170	146.00	5069	245.00	19072	343.00	350
50.00	97000	147.00	14310	246.00	22272	344.00	124
51.00	389184	148.00	28952	247.00	4367	346.00	6265
52.00	20168	149.00	6122	248.00	1405	347.00	939
53.00	766	150.00	2064	249.00	4714	348.00	147
54.00	261	151.00	4170	250.00	1134	350.00	247
55.00	1901	152.00	2789	251.00	1129	351.00	540
56.00	11268	153.00	8293	252.00	1578	352.00	8116
57.00	27840	154.00	7100	253.00	4215	353.00	6327
58.00	1304	155.00	15625	255.00	669632	354.00	9967
59.00	211	156.00	22744	256.00	98784	355.00	2450
60.00	62	157.00	5404	257.00	8025	356.00	398
61.00	5140	158.00	5537	258.00	32184	357.00	87
62.00	5515	159.00	4088	259.00	5237	358.00	270
63.00	16720	160.00	8754	260.00	1061	359.00	663
64.00	2417	161.00	13077	261.00	1281	361.00	288
65.00	8753	162.00	3492	262.00	253	362.00	70
66.00	686	163.00	897	263.00	376	363.00	204
67.00	966	164.00	1932	264.00	500	365.00	35152
69.00	424192	165.00	9611	265.00	13314	366.00	5128

Report Date: 30-May-2018 08:28:39 AIM Revision: 1.0 20-Sep-2017 14:04:40
Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D
Injection Date: 29-May-2018 11:06:30
Spectrum: Avg. Scans 406-408 (7.26), Background Scan 399
Base Peak: 442.00
Minimum % Base Peak: 0
Number of Points: 373

m/z	Y	m/z	Y	m/z	Y	m/z	Y
70.00	2194	166.00	8747	266.00	1187	367.00	516
71.00	175	167.00	52960	267.00	601	370.00	805
72.00	208	168.00	24264	268.00	153	371.00	2552
73.00	3996	169.00	4166	269.00	237	372.00	16249
74.00	42688	170.00	2011	270.00	718	373.00	4278
75.00	68896	171.00	2390	271.00	1512	374.00	573
76.00	28160	172.00	4945	272.00	2457	377.00	532
77.00	536192	173.00	6642	273.00	22448	378.00	96
78.00	37216	174.00	11834	274.00	63904	383.00	4038
79.00	30928	175.00	21664	275.00	349888	384.00	1148
80.00	24352	176.00	7898	276.00	46264	385.00	371
81.00	33712	177.00	10338	277.00	23984	387.00	55
82.00	8679	178.00	3712	278.00	3952	389.00	50
83.00	8544	179.00	40208	279.00	952	390.00	2143
84.00	729	180.00	29208	280.00	157	391.00	1695
85.00	6049	181.00	13877	281.00	1146	392.00	1307
86.00	8855	182.00	2575	282.00	991	393.00	236
87.00	4310	183.00	1655	283.00	2727	395.00	52
88.00	1748	184.00	3508	284.00	1821	397.00	186
89.00	782	185.00	20432	285.00	4825	401.00	1346
90.00	234	186.00	160704	286.00	878	402.00	6618
91.00	7908	187.00	44856	287.00	91	403.00	9889
92.00	9656	188.00	5144	288.00	372	404.00	3405
93.00	47112	189.00	9691	289.00	939	405.00	533
94.00	3706	190.00	1452	290.00	845	409.00	57
95.00	661	191.00	4544	291.00	646	410.00	324
96.00	2995	192.00	12721	292.00	1246	415.00	786
97.00	867	193.00	13785	293.00	5510	416.00	319
98.00	36808	194.00	3359	294.00	1629	417.00	123
99.00	32080	195.00	2434	296.00	72552	418.00	50
100.00	2981	196.00	43448	297.00	10676	419.00	67
101.00	19528	198.00	1308672	298.00	735	421.00	8627
102.00	809	199.00	87800	299.00	316	422.00	9643
103.00	7189	200.00	6549	300.00	206	423.00	71832

Report Date: 30-May-2018 08:28:39 AIM Revision: 1.0 20-Sep-2017 14:04:40
Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D
Injection Date: 29-May-2018 11:06:30
Spectrum: Avg. Scans 406-408 (7.26), Background Scan 399
Base Peak: 442.00
Minimum % Base Peak: 0
Number of Points: 373

m/z	Y	m/z	Y	m/z	Y	m/z	Y
104.00	12673	201.00	6731	301.00	1138	424.00	15525
105.00	11496	203.00	7661	302.00	1687	425.00	1615
106.00	3318	204.00	39856	303.00	9577	426.00	218
107.00	147968	205.00	70448	304.00	2793	427.00	264
108.00	25416	206.00	306880	305.00	528	428.00	206
110.00	313152	207.00	40192	307.00	206	429.00	819
111.00	43992	208.00	9264	308.00	1246	430.00	391
112.00	4975	209.00	2798	309.00	946	431.00	586
113.00	2049	210.00	1434	310.00	1216	432.00	572
114.00	610	211.00	11692	311.00	341	433.00	537
115.00	830	213.00	872	312.00	340	434.00	700
116.00	9734	214.00	495	313.00	824	435.00	798
117.00	92376	215.00	3203	314.00	4195	436.00	788
118.00	6756	216.00	7026	315.00	8867	437.00	1201
119.00	922	217.00	73848	316.00	5465	438.00	1278
120.00	2084	218.00	9730	317.00	1024	439.00	827
121.00	745	219.00	1277	318.00	80	441.00	196160
122.00	10098	221.00	78944	319.00	147	442.00	1324544
123.00	15150	223.00	18584	320.00	406	443.00	258432
124.00	7148	224.00	158912	321.00	2525	444.00	24344
125.00	6983	225.00	41016	322.00	1227	445.00	1463
127.00	595776	226.00	5530	323.00	28824	461.00	120
128.00	46856	227.00	58808	324.00	5577	462.00	66
129.00	213184	228.00	8396	325.00	644	475.00	115
130.00	17600	229.00	13495	326.00	725		
131.00	3350	230.00	1785	327.00	4947		
132.00	1672	231.00	6109	328.00	2879		

Report Date: 30-May-2018 08:28:39 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Breakdown Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D		
Injection Date:	29-May-2018 11:06:30	Inst. ID:	msd10.i
Client ID:	DFTPPCU	Lab ID:	SVMS 3462
Sample Info:	10052918C.b, SVMS 3462		
Injection Vol.	1.00	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan

5 4,4'-DDT

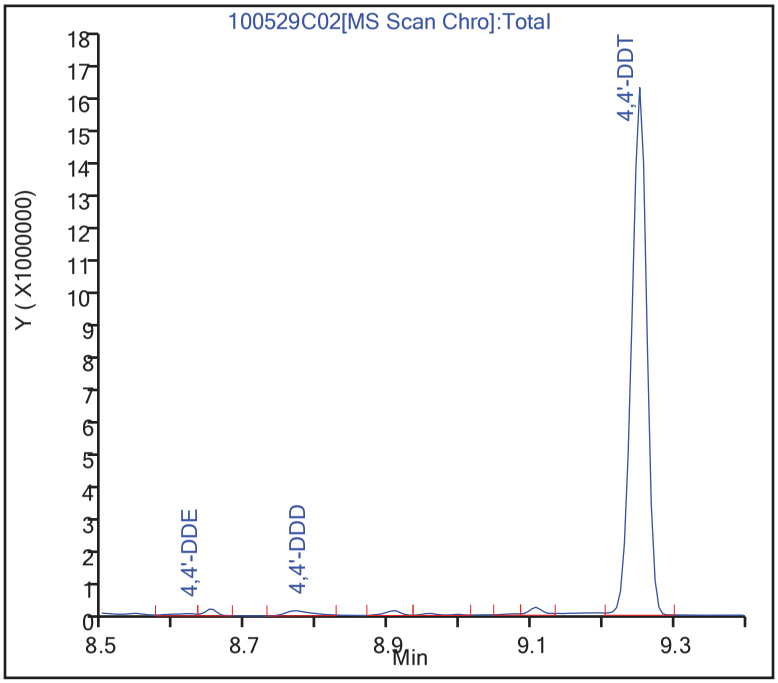
SW-846 Method

%Breakdown =
(Sum of Degrad. Peak Areas/
Total Area All Peaks) * 100

5 4,4'-DDT, Area = 4855337 @ 9.25

6 4,4'-DDE, Area = 8840 @ 8.55
4 4,4'-DDD, Area = 532 @ 8.72

%Breakdown:0.19%, Max Limit:20%
Passed



Report Date: 30-May-2018 08:28:39 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Peak Tailing Report

Data File:	\\Organics\hh\chem\msd10.i\10052918C.b\100529C02.D		
Injection Date:	29-May-2018 11:06:30	Inst. ID:	msd10.i
Client ID:	DFTPPCU	Lab ID:	SVMS 3462
Sample Info:	10052918C.b, SVMS 3462		
Injection Vol.	1.00	Dil. Factor:	1.0
Operator:	CMP2		
Column1:	Zebron ZB-SV (0.25 mm)	Detector:	MS Scan

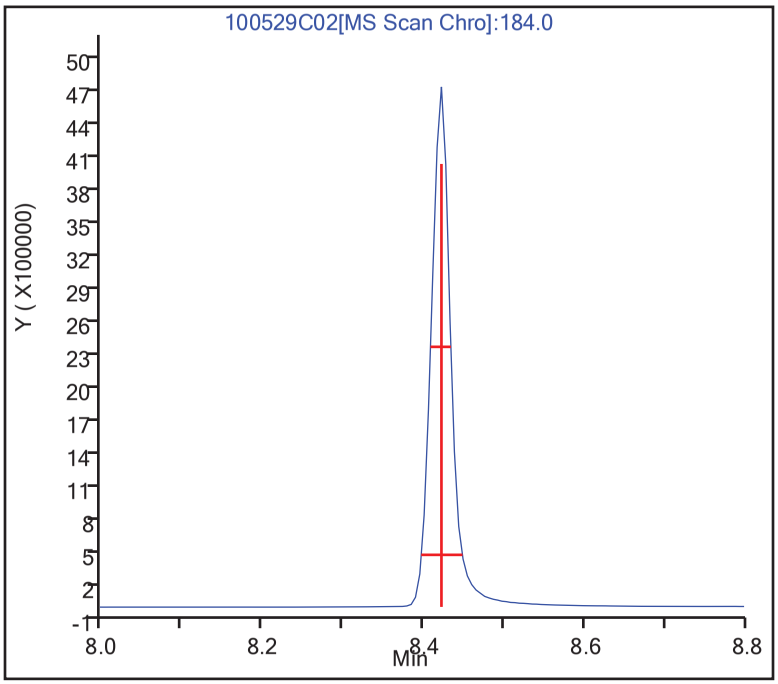
3 Benzidine

SW-846 Method

Peak Tailing Factor =
BackWidth/FrontWidth @ 10% Peak Height

Back Width = 0.026 (min.)
Front Width = 0.025 (min.)

Tailing Factor = 1.04, Max. Tailing < 2.00
Passed



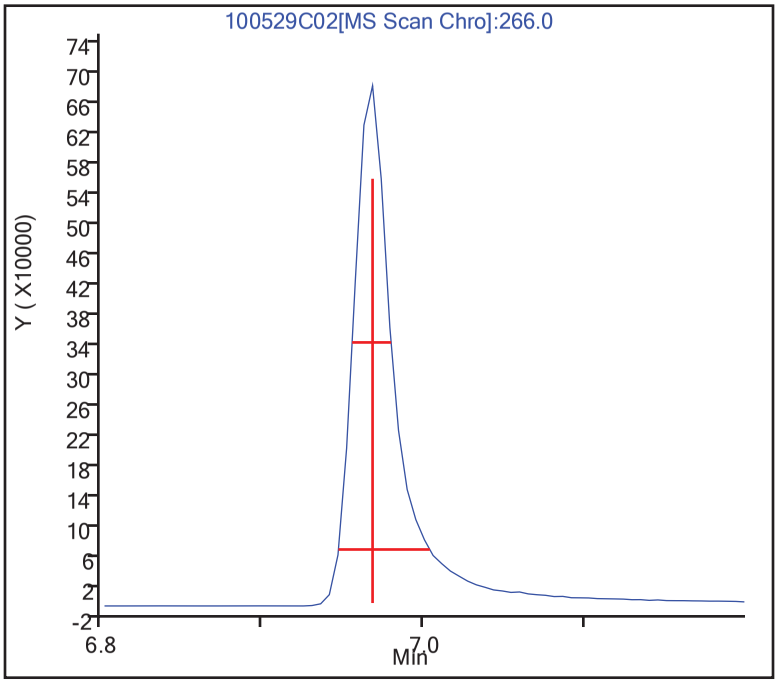
2 Pentachlorophenol

SW-846 Method

Peak Tailing Factor =
BackWidth/FrontWidth @ 10% Peak Height

Back Width = 0.035 (min.)
Front Width = 0.021 (min.)

Tailing Factor = 1.68, Max. Tailing < 2.00
Passed



Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ72993-001
Batch: 72993
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,1'-Biphenyl	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2,4,5-Trichlorophenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2,4,6-Trichlorophenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2,4-Dichlorophenol	8.0	U	1	8.0	1.0	ug/L	05/27/2018 1234
2,4-Dimethylphenol	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
2,4-Dinitrophenol	20	U	1	20	1.0	ug/L	05/27/2018 1234
2,4-Dinitrotoluene	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
2,6-Dinitrotoluene	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
2-Chloronaphthalene	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2-Chlorophenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
2-Methylnaphthalene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
2-Methylphenol	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
2-Nitroaniline	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
2-Nitrophenol	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
3,3'-Dichlorobenzidine	4.0	U	1	4.0	1.8	ug/L	05/27/2018 1234
3+4-Methylphenol	4.0	U	1	4.0	1.5	ug/L	05/27/2018 1234
3-Nitroaniline	8.0	U	1	8.0	1.0	ug/L	05/27/2018 1234
4,6-Dinitro-2-methylphenol	20	U	1	20	1.0	ug/L	05/27/2018 1234
4-Bromophenyl phenyl ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
4-Chloro-3-methyl phenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
4-Chloroaniline	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
4-Chlorophenyl phenyl ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
4-Nitroaniline	8.0	U	1	8.0	1.5	ug/L	05/27/2018 1234
4-Nitrophenol	20	U	1	20	2.0	ug/L	05/27/2018 1234
Acenaphthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Acenaphthylene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Acetophenone	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Anthracene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Atrazine	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Benzaldehyde	8.0	U	1	8.0	0.50	ug/L	05/27/2018 1234
Benzo(a)anthracene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(a)pyrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(b)fluoranthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(g,h,i)perylene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Benzo(k)fluoranthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
bis (2-Chloro-1-methylethyl) ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
bis(2-Chloroethoxy)methane	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
bis(2-Chloroethyl)ether	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
bis(2-Ethylhexyl)phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Butyl benzyl phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Caprolactam	8.0	U	1	8.0	1.0	ug/L	05/27/2018 1234
Carbazole	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Chrysene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Dibenzo(a,h)anthracene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ72993-001
Batch: 72993
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Dibenzofuran	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Diethylphthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Dimethyl phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Di-n-butyl phthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Di-n-octylphthalate	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Fluoranthene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Fluorene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Hexachlorobenzene	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Hexachlorobutadiene	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Hexachlorocyclopentadiene	20	U	1	20	2.0	ug/L	05/27/2018 1234
Hexachloroethane	4.0	U	1	4.0	1.0	ug/L	05/27/2018 1234
Indeno(1,2,3-c,d)pyrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Isophorone	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Naphthalene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Nitrobenzene	4.0	U	1	4.0	1.5	ug/L	05/27/2018 1234
N-Nitrosodi-n-propylamine	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
N-Nitrosodiphenylamine (Diphenylamine)	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Pentachlorophenol	20	U	1	20	2.0	ug/L	05/27/2018 1234
Phenanthrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234
Phenol	4.0	U	1	4.0	0.50	ug/L	05/27/2018 1234
Pyrene	0.80	U	1	0.80	0.20	ug/L	05/27/2018 1234

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		65	24-127
Nitrobenzene-d5		79	38-127
Phenol-d5		71	28-128
Terphenyl-d14		85	10-148
2,4,6-Tribromophenol		54	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services
Target Compound Quantitation Report

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B05.D		
Lab Sample ID:	TQ72993-001	Client Sample ID:	SBLK93
Injection Date:	27-May-2018 12:34:30	Dil. Factor:	1.0
Operator:	CMP2	Inst. ID:	msd10.i
Sample Info:	10052718B.b, TQ72993-001		
Misc. Info:	72992		
Method:	\\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m		
Method Date:	27-May-2018 13:07:30	Quant Method:	ISTD
Calib Date:	23-May-2018 04:25:30	Calib File:	100522D27.D
Sample Type:	BLANK	ALS Bottle:	1
Cpnd Sublist:	sample.sb		
Matrix/Level:	Water/Low		
Target 4.14		Integrator:	falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan
Data Reviewer:	cmp2	Review Date:	27-May-2018 14:42:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.733	5.739	-0.006	1014412	20.000	80.000	
* 41 Naphthalene-d8	136.0	6.755	6.760	-0.005	4053321	20.000	80.000	
* 67 Acenaphthene-d10	164.0	8.221	8.226	-0.005	2045540	20.000	80.000	
* 102 Phenanthrene-d10	188.0	9.483	9.488	-0.005	3157929	20.000	80.000	
* 128 Chrysene-d12	240.0	12.232	12.237	-0.005	2784742	20.000	80.000	
* 136 Perylene-d12	264.0	14.398	14.398	0.000	3194427	20.000	80.000	
$ 6 2-Fluorophenol	112.0	4.792	4.808	-0.016	498023	6.5441	26.177	
199 Benzaldehyde	77.0		5.423		ND			
$ 9 Phenol-d5	99.0	5.434	5.439	-0.005	697955	7.1475	28.590	
10 Phenol	94.0		5.450		ND			
12 bis(2-Chloroethyl)ether	63.0		5.509		ND			
13 2-Chlorophenol	128.0		5.594		ND			
20 o-Cresol	108.0		5.905		ND			
21 bis(2Chloro1methylethyl)ether	45.0		5.905		ND			
26 n-Nitroso-di-n-propylamine	70.0		6.012		ND			
23 m+p-Cresol	107.0		6.022		ND			
24 Acetophenone	105.0		6.038		ND			
28 Hexachloroethane	117.0		6.145		ND			
$ 29 Nitrobenzene-d5	82.0	6.172	6.177	-0.005	568132	7.8809	31.524	
30 Nitrobenzene	77.0		6.193		ND			
32 Isophorone	82.0		6.359		ND			
33 2-Nitrophenol	139.0		6.439		ND			
34 2,4-Dimethylphenol	107.0		6.445		ND			

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
35 bis(2-Chloroethoxy)methane	93.0		6.504		ND			
38 2,4-Dichlorophenol	162.0		6.637		ND			
43 Naphthalene	128.0		6.776		ND			
44 4-Chloroaniline	127.0		6.814		ND			
47 Hexachlorobutadiene	224.6		6.846		ND			
196 Caprolactam	113.0		7.092		ND			
49 4-Chloro-3-methylphenol	107.0		7.199		ND			
51 2-Methylnaphthalene	142.0		7.338		ND			
53 Hexachlorocyclopentadiene	237.0		7.461		ND			
54 2,4,6-Trichlorophenol	196.0		7.568		ND			
55 2,4,5-Trichlorophenol	196.0		7.611		ND			
$ 56 2-Fluorobiphenyl	172.0	7.622	7.627	-0.005	950843	6.2419	24.968	
184 Biphenyl	154.0		7.718		ND			
58 2-Chloronaphthalene	162.0		7.755		ND			
60 2-Nitroaniline	138.0		7.846		ND			
62 Dimethylphthalate	163.0		7.953		ND			
65 2,6-Dinitrotoluene	165.0		8.023		ND			
64 Acenaphthylene	152.0		8.114		ND			
66 3-Nitroaniline	138.0		8.189		ND			
68 Acenaphthene	153.0		8.253		ND			
69 2,4-Dinitrophenol	184.0		8.263		ND			
70 4-Nitrophenol	109.0		8.328		ND			
73 2,4-Dinitrotoluene	165.0		8.365		ND			
71 Dibenzofuran	168.0		8.397		ND			
78 Diethylphthalate	149.0		8.525		ND			
80 4-Chlorophenylphenylether	204.0		8.654		ND			
79 Fluorene	166.0		8.686		ND			
84 4,6-Dinitro-2-methylphenol	198.0		8.707		ND			
83 4-Nitroaniline	138.0		8.713		ND			
86 n-Nitrosodiphenylamine	169.0		8.755		ND			
$ 88 2,4,6-Tribromophenol	330.0	8.889	8.889	0.000	76029	5.3762	21.505	
94 4-Bromophenylphenylether	248.0		9.071		ND			
96 Hexachlorobenzene	284.0		9.146		ND			
200 Atrazine	200.0		9.173		ND			
99 Pentachlorophenol	266.0		9.317		ND			
103 Phenanthrene	178.0		9.510		ND			
104 Anthracene	178.0		9.552		ND			
106 Carbazole	167.0		9.681		ND			
109 Di-n-butylphthalate	149.0		9.879		ND			
114 Fluoranthene	202.0		10.563		ND			
116 Pyrene	202.0		10.804		ND			
$ 117 Terphenyl-d14	244.0	10.895	10.895	0.000	1027312	8.4913	33.965	
122 Butylbenzylphthalate	149.0		11.398		ND			
130 bis(2-Ethylhexyl)phthalate	149.0		12.066		ND			
125 3,3'-Dichlorobenzidine	252.0		12.157		ND			
127 Benzo(a)Anthracene	228.0		12.216		ND			
129 Chrysene	228.0		12.275		ND			
131 Di-n-octylphthalate	149.0		12.992		ND			
132 Benzo(b)fluoranthene	252.0		13.788		ND			
134 Benzo(k)fluoranthene	252.0		13.831		ND			
135 Benzo(a)pyrene	252.0		14.307		ND			

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
138 Indeno(1,2,3-c,d)pyrene	276.0		16.286		ND			
139 Dibenzo(a,h)anthracene	278.0		16.297		ND			
140 Benzo(g,h,i)perylene	276.0		16.859		ND			

Compound Type Legend

* - ISTD

$ - Surrogate

QC Flag Legend

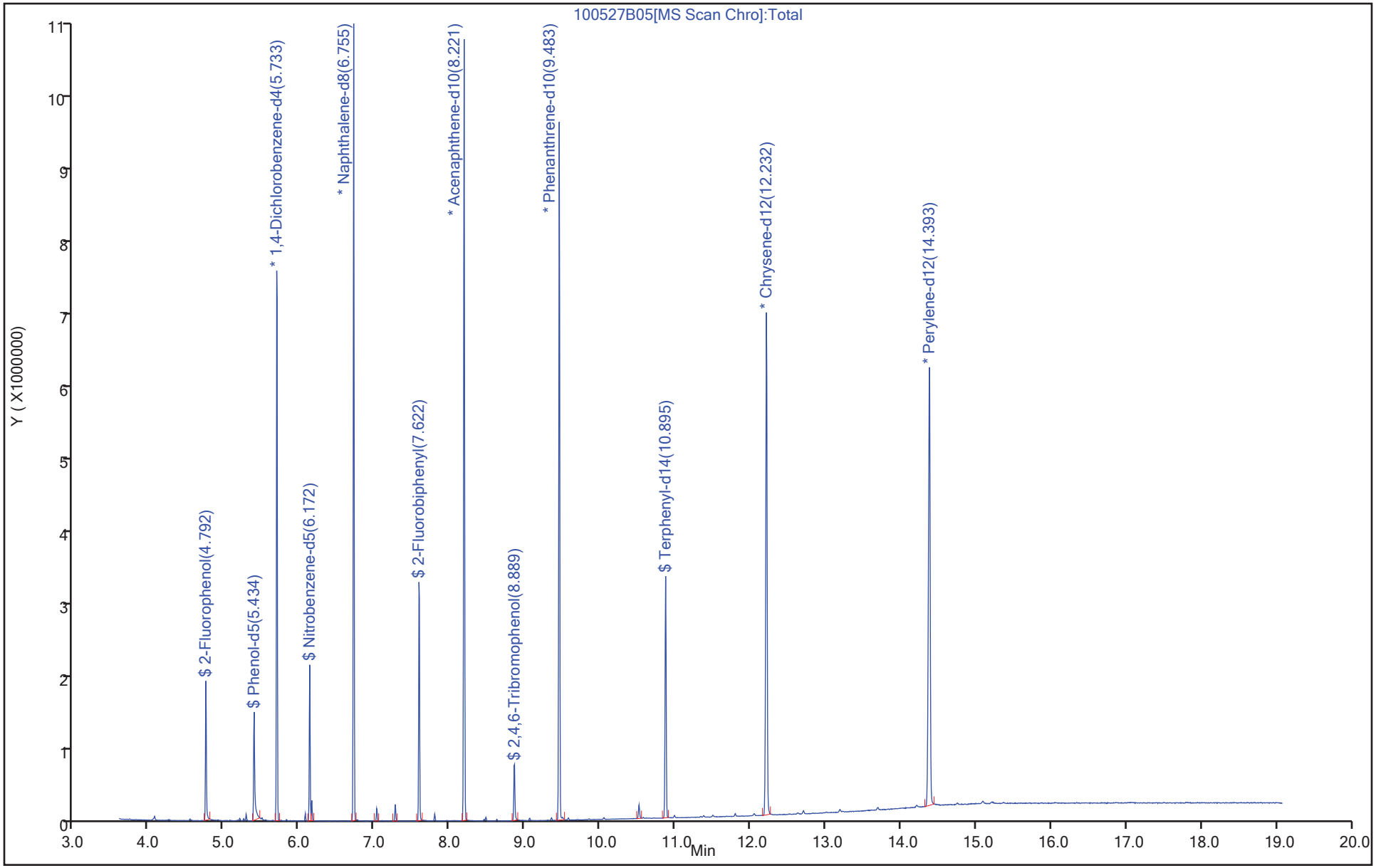
Processing Flags

Review Flags

Report Date: 29-May-2018 11:06:02 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B05.D				
Injection Date:	27-May-2018 12:34:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	SBLK93	Lab ID:	TQ72993-001		
Sample Info:	10052718B.b, TQ72993-001				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ72993-002
Batch: 72993
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,1'-Biphenyl	40	31		1	78	30-130	05/27/2018 1258
2,4,5-Trichlorophenol	40	30		1	74	30-123	05/27/2018 1258
2,4,6-Trichlorophenol	40	31		1	77	30-130	05/27/2018 1258
2,4-Dichlorophenol	40	28		1	71	30-121	05/27/2018 1258
2,4-Dimethylphenol	40	24		1	61	20-125	05/27/2018 1258
2,4-Dinitrophenol	80	54		1	67	11-126	05/27/2018 1258
2,4-Dinitrotoluene	40	32		1	79	30-130	05/27/2018 1258
2,6-Dinitrotoluene	40	33		1	81	30-130	05/27/2018 1258
2-Chloronaphthalene	40	31		1	76	30-130	05/27/2018 1258
2-Chlorophenol	40	32		1	81	30-130	05/27/2018 1258
2-Methylnaphthalene	40	31		1	78	40-132	05/27/2018 1258
2-Methylphenol	40	33		1	81	30-130	05/27/2018 1258
2-Nitroaniline	40	35		1	88	30-130	05/27/2018 1258
2-Nitrophenol	40	30		1	75	30-130	05/27/2018 1258
3,3'-Dichlorobenzidine	40	28		1	71	10-126	05/27/2018 1258
3+4-Methylphenol	40	34		1	86	30-130	05/27/2018 1258
3-Nitroaniline	40	28		1	70	30-130	05/27/2018 1258
4,6-Dinitro-2-methylphenol	40	33		1	83	30-130	05/27/2018 1258
4-Bromophenyl phenyl ether	40	30		1	74	30-124	05/27/2018 1258
4-Chloro-3-methyl phenol	40	34		1	86	30-123	05/27/2018 1258
4-Chloroaniline	40	24		1	59	12-157	05/27/2018 1258
4-Chlorophenyl phenyl ether	40	30		1	74	30-121	05/27/2018 1258
4-Nitroaniline	40	37		1	92	30-135	05/27/2018 1258
4-Nitrophenol	80	62		1	78	30-130	05/27/2018 1258
Acenaphthene	40	31		1	77	30-122	05/27/2018 1258
Acenaphthylene	40	33		1	82	30-130	05/27/2018 1258
Acetophenone	40	33		1	84	30-130	05/27/2018 1258
Anthracene	40	34		1	84	30-123	05/27/2018 1258
Atrazine	40	35		1	87	30-130	05/27/2018 1258
Benzaldehyde	40	15		1	37	20-115	05/27/2018 1258
Benzo(a)anthracene	40	33		1	83	40-125	05/27/2018 1258
Benzo(a)pyrene	40	31		1	78	40-128	05/27/2018 1258
Benzo(b)fluoranthene	40	31		1	78	30-130	05/27/2018 1258
Benzo(g,h,i)perylene	40	33		1	83	30-130	05/27/2018 1258
Benzo(k)fluoranthene	40	31		1	77	30-130	05/27/2018 1258
bis (2-Chloro-1-methylethyl) ether	40	39		1	98	30-130	05/27/2018 1258
bis(2-Chloroethoxy)methane	40	35		1	87	30-130	05/27/2018 1258
bis(2-Chloroethyl)ether	40	38		1	96	30-130	05/27/2018 1258
bis(2-Ethylhexyl)phthalate	40	34		1	84	30-130	05/27/2018 1258
Butyl benzyl phthalate	40	35		1	88	30-130	05/27/2018 1258
Caprolactam	40	38		1	94	30-130	05/27/2018 1258
Carbazole	40	34		1	84	30-130	05/27/2018 1258
Chrysene	40	33		1	82	30-130	05/27/2018 1258
Dibenzo(a,h)anthracene	40	33		1	81	30-130	05/27/2018 1258

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ72993-002
Batch: 72993
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2018 1913

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Dibenzofuran	40	31		1	77	30-118	05/27/2018 1258
Diethylphthalate	40	33		1	84	40-125	05/27/2018 1258
Dimethyl phthalate	40	33		1	82	40-127	05/27/2018 1258
Di-n-butyl phthalate	40	36		1	89	40-127	05/27/2018 1258
Di-n-octylphthalate	40	30		1	76	30-130	05/27/2018 1258
Fluoranthene	40	32		1	80	40-128	05/27/2018 1258
Fluorene	40	31		1	77	30-124	05/27/2018 1258
Hexachlorobenzene	40	29		1	73	30-125	05/27/2018 1258
Hexachlorobutadiene	40	28		1	71	24-110	05/27/2018 1258
Hexachlorocyclopentadiene	200	85		1	43	22-122	05/27/2018 1258
Hexachloroethane	40	31		1	77	30-130	05/27/2018 1258
Indeno(1,2,3-c,d)pyrene	40	32		1	80	30-130	05/27/2018 1258
Isophorone	40	36		1	90	30-130	05/27/2018 1258
Naphthalene	40	31		1	77	30-130	05/27/2018 1258
Nitrobenzene	40	36		1	89	30-130	05/27/2018 1258
N-Nitrosodi-n-propylamine	40	36		1	91	30-130	05/27/2018 1258
N-Nitrosodiphenylamine (Diphenylamine)	40	29		1	73	30-123	05/27/2018 1258
Pentachlorophenol	80	56		1	70	30-130	05/27/2018 1258
Phenanthrene	40	31		1	78	40-123	05/27/2018 1258
Phenol	40	31		1	78	30-130	05/27/2018 1258
Pyrene	40	36		1	90	40-126	05/27/2018 1258

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		73	37-129
2-Fluorophenol		85	24-127
Nitrobenzene-d5		93	38-127
Phenol-d5		88	28-128
Terphenyl-d14		87	10-148
2,4,6-Tribromophenol		68	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
U = Not detected at or above the detection limit

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services
LCS, Lab Control Spike Report

Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B06.D
Lab Sample ID: TQ72993-002 Client Sample ID: SLCS92
Injection Date: 27-May-2018 12:58:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052718B.b, TQ72993-002
Misc. Info: 72992
Method: \\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m
Method Date: 27-May-2018 13:07:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: LCS ALS Bottle: 2
Cpnd Sublist: sample.sb Spike List File: 8270water.spk
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Compound	Amount Added	Amount Detected	%Drift	%Rec	%Rec Limits
196 Caprolactam	40	37.635	-5.9	94.1	70- 130
10 Phenol	40	31.067	-22.3	77.7	58- 122
12 bis(2-Chloroethyl)ether	40	38.414	-4	96	35- 114
13 2-Chlorophenol	40	32.378	-19.1	80.9	39- 115
20 o-Cresol	40	32.515	-18.7	81.3	37- 115
23 m+p-Cresol	40	34.269	-14.3	85.7	44- 112
24 Acetophenone	40	33.427	-16.4	83.6	70- 130
26 n-Nitroso-di-n-propylamine	40	36.433	-8.9	91.1	39- 119
28 Hexachloroethane	40	30.868	-22.8	77.2	28- 116
30 Nitrobenzene	40	35.773	-10.6	89.4	39- 123
32 Isophorone	40	36.142	-9.6	90.4	44- 123
33 2-Nitrophenol	40	30.161	-24.6	75.4	36- 123
34 2,4-Dimethylphenol	40	24.47	-38.8	61.2	38- 125
35 bis(2-Chloroethoxy)methane	40	34.6	-13.5	86.5	40- 119
38 2,4-Dichlorophenol	40	28.409	-29	71	45- 121
43 Naphthalene	40	30.637	-23.4	76.6	40- 122
44 4-Chloroaniline	40	23.585	-41	59	48- 101
47 Hexachlorobutadiene	40	28.455	-28.9	71.1	33- 120
49 4-Chloro-3-methylphenol	40	34.263	-14.3	85.7	54- 123
51 2-Methylnaphthalene	40	31.064	-22.3	77.7	44- 115
53 Hexachlorocyclopentadiene	200	85.208	-57.4	42.6	22- 122
54 2,4,6-Trichlorophenol	40	30.632	-23.4	76.6	41- 121
55 2,4,5-Trichlorophenol	40	29.603	-26	74	50- 126
58 2-Chloronaphthalene	40	30.537	-23.7	76.3	39- 128
60 2-Nitroaniline	40	35.033	-12.4	87.6	49- 128
62 Dimethylphthalate	40	32.7	-18.2	81.8	52- 124
64 Acenaphthylene	40	32.928	-17.7	82.3	47- 129
65 2,6-Dinitrotoluene	40	32.517	-18.7	81.3	48- 133
66 3-Nitroaniline	40	28.107	-29.7	70.3	31- 128
68 Acenaphthene	40	30.726	-23.2	76.8	51- 121
69 2,4-Dinitrophenol	80	53.531	-33.1	66.9	37- 135
70 4-Nitrophenol	80	62.477	-21.9	78.1	31- 145
71 Dibenzofuran	40	30.615	-23.5	76.5	48- 118
73 2,4-Dinitrotoluene	40	31.626	-20.9	79.1	51- 128

Compound	Amount Added	Amount Detected	%Drift	%Rec	%Rec Limits
78 Diethylphthalate	40	33.439	-16.4	83.6	55- 124
79 Fluorene	40	30.791	-23	77	52- 124
80 4-Chlorophenylphenylether	40	29.585	-26	74	50- 122
83 4-Nitroaniline	40	36.92	-7.7	92.3	40- 138
84 4,6-Dinitro-2-methylphenol	40	33.041	-17.4	82.6	46- 134
86 n-Nitrosodiphenylamine	40	29.248	-26.9	73.1	46- 160
94 4-Bromophenylphenylether	40	29.57	-26.1	73.9	50- 122
96 Hexachlorobenzene	40	29.05	-27.4	72.6	49- 128
99 Pentachlorophenol	80	55.633	-30.5	69.5	34- 137
103 Phenanthrene	40	31.088	-22.3	77.7	54- 123
104 Anthracene	40	33.581	-16	84	55- 122
106 Carbazole	40	33.564	-16.1	83.9	42- 138
109 Di-n-butylphthalate	40	35.625	-10.9	89.1	57- 132
114 Fluoranthene	40	32.114	-19.7	80.3	55- 127
116 Pyrene	40	35.932	-10.2	89.8	51- 126
122 Butylbenzylphthalate	40	35.282	-11.8	88.2	49- 132
125 3,3'-Dichlorobenzidine	40	28.21	-29.5	70.5	53- 118
127 Benzo(a)Anthracene	40	33.119	-17.2	82.8	50- 127
129 Chrysene	40	32.697	-18.3	81.7	50- 130
130 bis(2-Ethylhexyl)phthalate	40	33.558	-16.1	83.9	50- 133
131 Di-n-octylphthalate	40	30.342	-24.1	75.9	55- 143
132 Benzo(b)fluoranthene	40	31.191	-22	78	32- 145
134 Benzo(k)fluoranthene	40	30.772	-23.1	76.9	50- 135
135 Benzo(a)pyrene	40	31.13	-22.2	77.8	59- 135
138 Indeno(1,2,3-c,d)pyrene	40	31.871	-20.3	79.7	50- 125
139 Dibenzo(a,h)anthracene	40	32.526	-18.7	81.3	66- 121
140 Benzo(g,h,i)perylene	40	33.207	-17	83	42- 128
184 Biphenyl	40	31.086	-22.3	77.7	70- 130
200 Atrazine	40	34.757	-13.1	86.9	70- 130

Report Date: 29-May-2018 11:06:02 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Target Compound Quantitation Report

Data File: \\Organics\hh\chem\msd10.i\10052718B.b\100527B06.D
Lab Sample ID: TQ72993-002 Client Sample ID: SLCS92
Injection Date: 27-May-2018 12:58:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052718B.b, TQ72993-002
Misc. Info: 72992
Method: \\Organics\hh\chem\msd10.i\10052718B.b\8270DLVI-10.m
Method Date: 27-May-2018 13:07:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: LCS ALS Bottle: 2
Cpnd Sublist: sample.sb Spike List File: 8270water.spk
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

Concentration Formula: Amt * DF * (Uf * Vt/Vo)/Vi * CpndVariable

Name	Value	Description
DF	1.0000	Dilution Factor
Uf	1.0000	ng unit correction factor
Vt	5000.00	Volume of final extract (uL)
Vo	250.00	Volume of sample extracted (mL)
Vi	5.0000	Volume injected (uL)
Cpnd Variable		Local Cpnd Variable

Column1: ZebronZB-SV (0.25 mm) Detector: MS Scan
Data Reviewer: cmp2 Review Date: 27-May-2018 14:24:30

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
* 16 1,4-Dichlorobenzene-d4	152.0	5.739	5.739	0.000	906446	20.000	80.000	
* 41 Naphthalene-d8	136.0	6.755	6.760	-0.005	3892289	20.000	80.000	
* 67 Acenaphthene-d10	164.0	8.221	8.226	-0.005	2072907	20.000	80.000	
* 102 Phenanthrene-d10	188.0	9.488	9.488	0.000	3469469	20.000	80.000	
* 128 Chrysene-d12	240.0	12.237	12.237	0.000	2821549	20.000	80.000	
* 136 Perylene-d12	264.0	14.398	14.398	0.000	3053002	20.000	80.000	
$ 6 2-Fluorophenol	112.0	4.803	4.808	-0.005	579487	8.5216	34.086	
199 Benzaldehyde	77.0	5.423	5.423	0.000	156348	3.7089	14.835	e
$ 9 Phenol-d5	99.0	5.439	5.439	0.000	765617	8.7742	35.097	
10 Phenol	94.0	5.445	5.450	-0.005	719362	7.7667	31.067	
12 bis(2-Chloroethyl)ether	63.0	5.503	5.509	-0.006	479997	9.6034	38.414	
13 2-Chlorophenol	128.0	5.589	5.594	-0.005	568730	8.0945	32.378	
20 o-Cresol	108.0	5.905	5.905	0.000	539172	8.1287	32.515	
21 bis(2Chloro1methylethyl)ether	45.0	5.905	5.905	0.000	895275	9.8403	39.361	
26 n-Nitroso-di-n-propylamine	70.0	6.012	6.012	0.000	434683	9.1082	36.433	
23 m+p-Cresol	107.0	6.017	6.022	-0.005	628587	8.5672	34.269	Q
24 Acetophenone	105.0	6.038	6.038	0.000	787646	8.3567	33.427	
28 Hexachloroethane	117.0	6.145	6.145	0.000	198602	7.7169	30.868	
$ 29 Nitrobenzene-d5	82.0	6.172	6.177	-0.005	644313	9.3074	37.230	
30 Nitrobenzene	77.0	6.188	6.193	-0.005	641796	8.9434	35.773	
32 Isophorone	82.0	6.354	6.359	-0.005	1092779	9.0354	36.142	
33 2-Nitrophenol	139.0	6.439	6.439	0.000	281027	7.5403	30.161	
34 2,4-Dimethylphenol	107.0	6.445	6.445	0.000	297758	6.1174	24.470	Q

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
35 bis(2-Chloroethoxy)methane	93.0	6.504	6.504	0.000	670643	8.6501	34.600	
38 2,4-Dichlorophenol	162.0	6.632	6.637	-0.005	386501	7.1023	28.409	
43 Naphthalene	128.0	6.776	6.776	0.000	1572531	7.6593	30.637	
44 4-Chloroaniline	127.0	6.814	6.814	0.000	444443	5.8963	23.585	
47 Hexachlorobutadiene	224.6	6.846	6.846	0.000	226825	7.1138	28.455	
196 Caprolactam	113.0	7.108	7.092	0.016	191879	9.4088	37.635	
49 4-Chloro-3-methylphenol	107.0	7.199	7.199	0.000	496411	8.5658	34.263	
51 2-Methylnaphthalene	142.0	7.338	7.338	0.000	1074434	7.7659	31.064	
53 Hexachlorocyclopentadiene	237.0	7.456	7.461	-0.005	675236	21.302	85.208	
54 2,4,6-Trichlorophenol	196.0	7.568	7.568	0.000	272590	7.6579	30.632	
55 2,4,5-Trichlorophenol	196.0	7.611	7.611	0.000	284137	7.4006	29.603	
$ 56 2-Fluorobiphenyl	172.0	7.627	7.627	0.000	1133557	7.3431	29.373	
184 Biphenyl	154.0	7.718	7.718	0.000	1334113	7.7714	31.086	
58 2-Chloronaphthalene	162.0	7.755	7.755	0.000	965040	7.6341	30.537	
60 2-Nitroaniline	138.0	7.846	7.846	0.000	346921	8.7583	35.033	e
62 Dimethylphthalate	163.0	7.948	7.953	-0.005	1109327	8.1751	32.700	
65 2,6-Dinitrotoluene	165.0	8.017	8.023	-0.006	261933	8.1293	32.517	
64 Acenaphthylene	152.0	8.108	8.114	-0.006	1484272	8.2321	32.928	
66 3-Nitroaniline	138.0	8.194	8.189	0.005	219291	7.0268	28.107	e
68 Acenaphthene	153.0	8.253	8.253	0.000	1016009	7.6815	30.726	
69 2,4-Dinitrophenol	184.0	8.263	8.263	0.000	217695	13.383	53.531	
70 4-Nitrophenol	109.0	8.328	8.328	0.000	237463	15.619	62.477	Q
73 2,4-Dinitrotoluene	165.0	8.365	8.365	0.000	337569	7.9065	31.626	
71 Dibenzofuran	168.0	8.392	8.397	-0.005	1328803	7.6538	30.615	
78 Diethylphthalate	149.0	8.525	8.525	0.000	1065346	8.3598	33.439	
80 4-Chlorophenylphenylether	204.0	8.654	8.654	0.000	494058	7.3962	29.585	
79 Fluorene	166.0	8.681	8.686	-0.005	1158254	7.6978	30.791	
84 4,6-Dinitro-2-methylphenol	198.0	8.707	8.707	0.000	160364	8.2601	33.041	
83 4-Nitroaniline	138.0	8.713	8.713	0.000	290403	9.2300	36.920	e
86 n-Nitrosodiphenylamine	169.0	8.755	8.755	0.000	724378	7.3121	29.248	
$ 88 2,4,6-Tribromophenol	330.0	8.889	8.889	0.000	105102	6.7647	27.059	
94 4-Bromophenylphenylether	248.0	9.071	9.071	0.000	256268	7.3925	29.570	
96 Hexachlorobenzene	284.0	9.146	9.146	0.000	254241	7.2625	29.050	
200 Atrazine	200.0	9.173	9.173	0.000	303006	8.6894	34.757	
99 Pentachlorophenol	266.0	9.317	9.317	0.000	317273	13.908	55.633	
103 Phenanthrene	178.0	9.504	9.510	-0.006	1542168	7.7720	31.088	
104 Anthracene	178.0	9.547	9.552	-0.005	1520481	8.3952	33.581	
106 Carbazole	167.0	9.681	9.681	0.000	1421818	8.3909	33.564	
109 Di-n-butylphthalate	149.0	9.879	9.879	0.000	1763922	8.9063	35.625	
114 Fluoranthene	202.0	10.563	10.563	0.000	1503532	8.0284	32.114	
116 Pyrene	202.0	10.804	10.804	0.000	1546626	8.9830	35.932	
$ 117 Terphenyl-d14	244.0	10.895	10.895	0.000	1071118	8.7378	34.951	
122 Butylbenzylphthalate	149.0	11.392	11.398	-0.006	695970	8.8204	35.282	
130 bis(2-Ethylhexyl)phthalate	149.0	12.061	12.066	-0.005	910977	8.3894	33.558	
125 3,3'-Dichlorobenzidine	252.0	12.157	12.157	0.000	356349	7.0525	28.210	
127 Benzo(a)Anthracene	228.0	12.216	12.216	0.000	1298351	8.2797	33.119	
129 Chrysene	228.0	12.270	12.275	-0.005	1320151	8.1743	32.697	
131 Di-n-octylphthalate	149.0	12.986	12.992	-0.006	1492483	7.5855	30.342	
132 Benzo(b)fluoranthene	252.0	13.783	13.788	-0.005	1265904	7.7977	31.191	
134 Benzo(k)fluoranthene	252.0	13.826	13.831	-0.005	1336918	7.6929	30.772	
135 Benzo(a)pyrene	252.0	14.302	14.307	-0.005	1079923	7.7825	31.130	

Compound	Sig	RT (min.)	Cal RT (min.)	Dlt RT (min.)	Response	OnCol Amt ng	Final Conc ug/L	Flags
138 Indeno(1,2,3-c,d)pyrene	276.0	16.276	16.286	-0.010	1409765	7.9676	31.871	
139 Dibenzo(a,h)anthracene	278.0	16.286	16.297	-0.011	1302519	8.1315	32.526	
140 Benzo(g,h,i)perylene	276.0	16.853	16.859	-0.006	1193624	8.3018	33.207	

Compound Type Legend

* - ISTD

$ - Surrogate

QC Flag Legend

Processing Flags

e - Compound Concentration Below Quantitation Limit

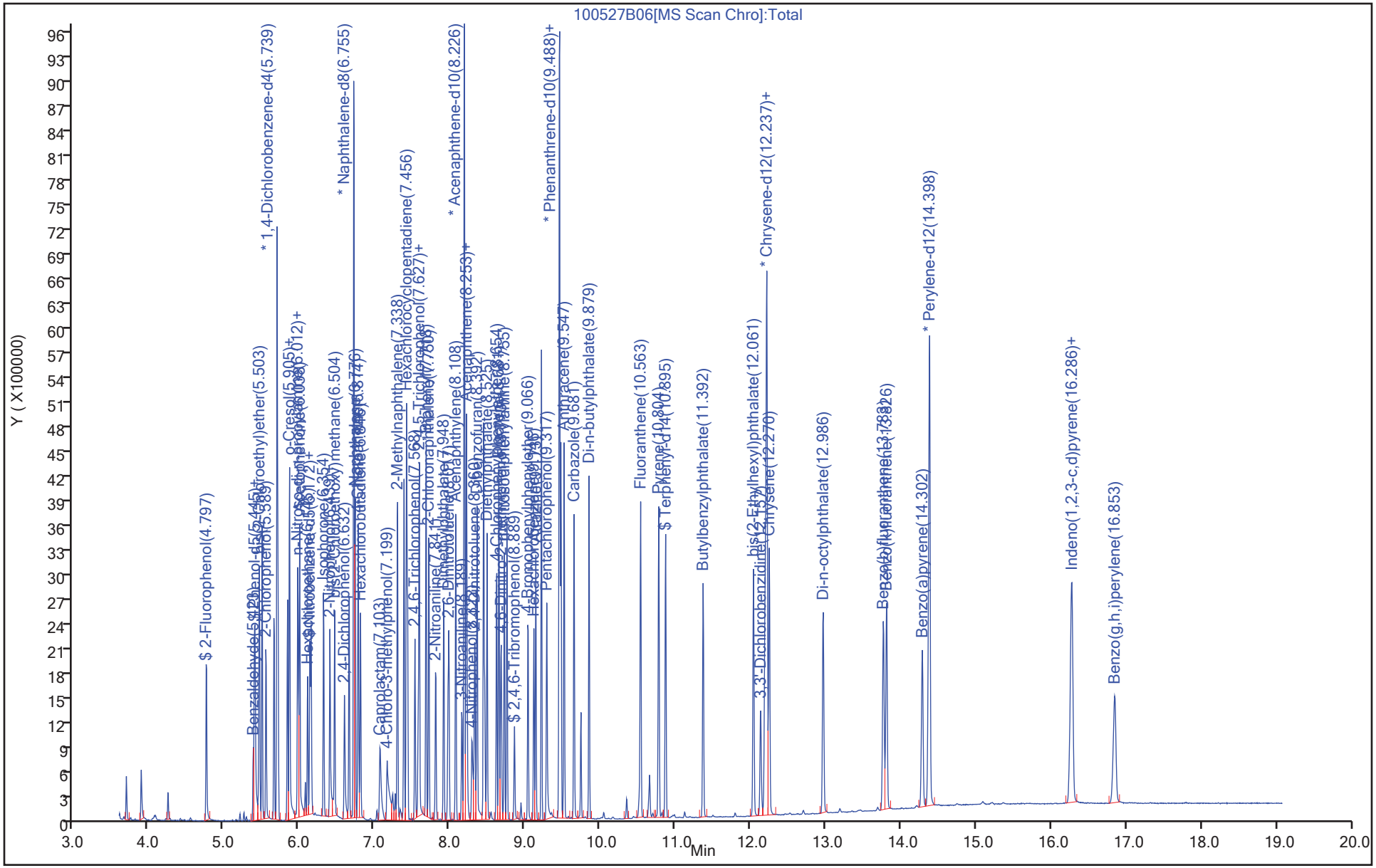
Q - Qualifier Signal(s) Fails Ratio Test

Review Flags

Report Date: 29-May-2018 11:06:02 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services

Data File:	\\Organics\hh\chem\msd10.i\10052718B.b\100527B06.D				
Injection Date:	27-May-2018 12:58:30	Inst. ID:	msd10.i	Operator:	CMP2
Client ID:	SLCS92	Lab ID:	TQ72993-002		
Sample Info:	10052718B.b, TQ72993-002				
Injection Vol.	5.00 uL	Dil. Factor:	1.0		
Column1:	ZebronZB-SV (0.25 mm)	Detector:	MS Scan		



MISC. DATA

Shealy Environmental Services
Run Log Report

Batch Path: \\Organics\hh\chem\msd10.i\10052218D.b
Inst. ID: msd10.i Method: 8270DLVI-10
Matrix: Water Operator: CMP2
Srch Tics: Yes Quant Tics: Yes Maximum Tics: 20

ALS Vial	Lab Sample ID	Injection Date/Time	Data File	Sample Type	ICal Lvl	Client Sample ID	Matrix	Dil Fact	Sublist	SpikeList	Rpt Tics	Tics Det.	MS Tune	Inst QC	pH	Std Lot#	Comments	Method
96	SVMS 3462	22-May-2018 18:01:30	100522D01.D	DFTPP		DFTPPCA	Water	1	all				Yes	Yes			IS:18-565	8270D-tun
100	SVMS IBLK	22-May-2018 18:18:30	100522D02.D	Client		IBLK	Water	1	1STD									8270DLVI-10
1	SVMS 3451	22-May-2018 18:42:30	100522D03.D	Ical	1	1STD0.2CB	Water	1	PAH+								ICAL	8270DLVI-10
2	SVMS 3452	22-May-2018 19:07:30	100522D04.D	Ical	2	1STD001CB	Water	1	1STD									8270DLVI-10
3	SVMS 3453	22-May-2018 19:31:30	100522D05.D	Ical	3	1STD002CB	Water	1	1STD									8270DLVI-10
4	SVMS 3454	22-May-2018 19:56:30	100522D06.D	Ical	4	1STD005CB	Water	1	1STD									8270DLVI-10
5	SVMS 3455	22-May-2018 20:20:30	100522D07.D	Ical	5	1STD010CB	Water	1	1STD									8270DLVI-10
6	SVMS 3456	22-May-2018 20:45:30	100522D08.D	Ical	6	1STD015CB	Water	1	1STD									8270DLVI-10
7	SVMS 3457	22-May-2018 21:09:30	100522D09.D	Ical	7	1STD020CB	Water	1	1STD									8270DLVI-10
8	SVMS 3458	22-May-2018 21:34:30	100522D10.D	Ical	8	1STD025CB	Water	1	1STD									8270DLVI-10
9	SVMS 3459	22-May-2018 21:58:30	100522D11.D	Ical	9	1STD030CB	Water	1	1STD									8270DLVI-10
10	SVMS 3460	22-May-2018 22:23:30	100522D12.D	LCS		1STDICV	Water	1	1STD	ICV1DOD								8270DLVI-10
11	SVMS 3482	22-May-2018 22:47:30	100522D13.D	Ical	2	3STD001CC	Water	1	3STD									8270DLVI-10
12	SVMS 3483	22-May-2018 23:11:30	100522D14.D	Ical	3	3STD002CC	Water	1	3STD									8270DLVI-10
13	SVMS 3484	22-May-2018 23:36:30	100522D15.D	Ical	4	3STD005CC	Water	1	3STD									8270DLVI-10
14	SVMS 3485	23-May-2018 00:00:30	100522D16.D	Ical	5	3STD010CC	Water	1	3STD									8270DLVI-10
15	SVMS 3486	23-May-2018 00:24:30	100522D17.D	Ical	6	3STD015CC	Water	1	3STD									8270DLVI-10
16	SVMS 3487	23-May-2018 00:48:30	100522D18.D	Ical	7	3STD020CC	Water	1	3STD									8270DLVI-10
17	SVMS 3488	23-May-2018 01:12:30	100522D19.D	Ical	8	3STD025CC	Water	1	3STD									8270DLVI-10
18	SVMS 3489	23-May-2018 01:37:30	100522D20.D	Ical	9	3STD030CC	Water	1	3STD									8270DLVI-10
19	SVMS 3480	23-May-2018 02:01:30	100522D21.D	LCS		3STDICV	Water	1	3STD	ICV2DOD								8270DLVI-10
20	SVMS 3390	23-May-2018 02:25:30	100522D22.D	Ical	2	DPE001CD	Water	1	Diphenyl								Diphenyl Ether ICAL	8270DLVI-10
21	SVMS 3391	23-May-2018 02:49:30	100522D23.D	Ical	3	DPE002CD	Water	1	Diphenyl									8270DLVI-10
22	SVMS 3392	23-May-2018 03:13:30	100522D24.D	Ical	4	DPE005CD	Water	1	Diphenyl									8270DLVI-10
23	SVMS 3393	23-May-2018 03:37:30	100522D25.D	Ical	5	DPE010CD	Water	1	Diphenyl									8270DLVI-10
24	SVMS 3394	23-May-2018 04:01:30	100522D26.D	Ical	6	DPE015CD	Water	1	Diphenyl									8270DLVI-10
25	SVMS 3395	23-May-2018 04:25:30	100522D27.D	Ical	7	DPE020CD	Water	1	Diphenyl									8270DLVI-10
100	SVMS IBLK	23-May-2018 04:49:30	100522D28.D	Client			Water	1	1STD									8270DLVI-10
100	SVMS IBLK	23-May-2018 05:13:30	100522D29.D	Client			Water	1	1STD									8270DLVI-10

Acenaphthylene ICV-77.36%

Shealy Environmental Services
Run Log Report

Batch Path: \\Organics\hh\chem\msd10.i\10052718B.b
Inst. ID: msd10.i Method: 8270DLVI-10
Matrix: Water Operator: CMP2
Srch Tics: Yes Quant Tics: Yes Maximum Tics: 20

ALS Vial	Lab Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix	Dil Fact	Sublist	SpikeList	Rpt Tics	Tics Det.	MS Tune	Inst QC	pH	Std Lot#	Comments	Method
96		27-May-2018 11:16:30	100527B01.D	DFTPP		Water	1	all				Yes	Yes			IS:18-565	8270D-tun
96	SVMS 3462	27-May-2018 11:30:30	100527B02.D	DFTPP	DFTPPCR	Water	1	all				Yes	Yes				8270D-tun
97	SVMS 3455	27-May-2018 11:46:30	100527B03.D	Ccv	1STD010CS	Water	1	1STD					Yes				8270DLVI-10
98	SVMS 3485	27-May-2018 12:10:30	100527B04.D	Ccv	3STD010CT	Water	1	3STD									8270DLVI-10
1	TQ72993-001	27-May-2018 12:34:30	100527B05.D	BLANK	SBLK93	Water	1	sample								AB:73246	8270DLVI-10
2	TQ72993-002	27-May-2018 12:58:30	100527B06.D	LCS	SLCS92	Water	1	sample	8270water								8270DLVI-10
3	TQ72835-001	27-May-2018 13:22:30	100527B07.D	BLANK	SBLK35	Water	1	sample								AB:73245	8270DLVI-10
4	TQ72835-002	27-May-2018 13:46:30	100527B08.D	LCS	SLCS35	Water	1	sample	8270water								8270DLVI-10
5	TE18077-010	27-May-2018 14:10:30	100527B09.D	Client	TMW-4	Water	1	sample								AB:73062	8270DLVI-10
6	TE18011-002	27-May-2018 14:34:30	100527B10.D	Client	WSW-50	Water	5	sample								RR@1x	8270DLVI-10
7	TE18077-007	27-May-2018 14:58:30	100527B11.D	Client	SB-7, 6-8	Soil	1	sample								AB:73171	8270DLVI-10
8	TE18077-008	27-May-2018 15:23:30	100527B12.D	Client	SB-9, 4-6	Soil	1	sample									8270DLVI-10
26	TE18009-002	27-May-2018 15:47:30	100527B13.D	Client	MET-MW-1-DUP	Water	5	sample								AB:73178	8270DLVI-10
9	TE18010-003	27-May-2018 16:11:30	100527B14.D	Client	BS-17 (4-5)	Soil	1	sample									8270DLVI-10
10	TE18010-004	27-May-2018 16:35:30	100527B15.D	Client	BS-18 (4-5)	Soil	1	sample									8270DLVI-10
11	TE18010-005	27-May-2018 16:59:30	100527B16.D	Client	BS-19 (4-5)	Soil	1	sample									8270DLVI-10
12	TE18066-001	27-May-2018 17:23:30	100527B17.D	Client	35 MW-1	Soil	1	sample									8270DLVI-10
13	TE18066-002	27-May-2018 17:47:30	100527B18.D	Client	35 Dup MW-1	Soil	1	sample									8270DLVI-10
14	TE22007-001	27-May-2018 18:11:30	100527B19.D	Client	SB-1-06066	Soil	1	sample									8270DLVI-10
15	TE22007-001MS	27-May-2018 18:35:30	100527B20.D	MS	SB-1-06066MS	Soil	1	sample	8270soil								8270DLVI-10
16	TE22007-001MD	27-May-2018 18:59:30	100527B21.D	MSD	SB-1-06066MSD	Soil	1	sample	8270soil								8270DLVI-10
17	TE22045-001	27-May-2018 19:23:30	100527B22.D	Client	BW16GW65	Water	1	sample								RR@5x	8270DLVI-10
18	TE22045-002	27-May-2018 19:47:30	100527B23.D	Client	BW916GW65	Water	1	sample								RR@5x	8270DLVI-10
19	TE22045-003	27-May-2018 20:11:30	100527B24.D	Client	BW16GW12	Water	10	sample								RR@100x	8270DLVI-10
20	TE22036-001	27-May-2018 20:35:30	100527B25.D	Client	GW-1	Water	1	sample									8270DLVI-10
21	TE22036-002	27-May-2018 21:00:30	100527B26.D	Client	GW-2	Water	1	sample									8270DLVI-10
22	TE22036-003	27-May-2018 21:24:30	100527B27.D	Client	GW-3	Water	1	sample									8270DLVI-10
23	TE17073-004	27-May-2018 21:48:30	100527B28.D	Client	MW05s	Water	250	sample									8270DLVI-10
24	TE17073-022	27-May-2018 22:12:30	100527B29.D	Client	MW45s	Water	250	sample									8270DLVI-10
25	TE18039-001	27-May-2018 22:36:30	100527B30.D	Client	Filter cake	Soil	50	sample									8270DLVI-10
100	SVMS IBLK	27-May-2018 23:00:30	100527B31.D	Client		Water	1	1STD									8270DLVI-10
100	SVMS IBLK	27-May-2018 23:24:30	100527B32.D	Client		Water	1	1STD									8270DLVI-10
100	SVMS IBLK	27-May-2018 23:48:30	100527B33.D	Client		Water	1	1STD									8270DLVI-10

Report Date: 30-May-2018 08:30:41 AIM Revision: 1.0 20-Sep-2017 14:04:40

Shealy Environmental Services
Run Log Report

Batch Path: \\Organics\hh\chem\msd10.i\10052918C.b
Inst. ID: msd10.i Method: 8270DLVI-10
Matrix: Water Operator: CMP2
Srch Tics: Yes Quant Tics: Yes Maximum Tics: 20

ALS Vial	Lab Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix	Dil Fact	Sublist	SpikeList	Rpt Tics	Tics Det.	MS Tune	Inst QC	pH	Std Lot#	Comments	Method
96		29-May-2018 10:50:30	100529C01.D	DFTPP		Water	1	all				Yes	Yes			IS:18-565	8270D-tun
96	SVMS 3462	29-May-2018 11:06:30	100529C02.D	DFTPP	DFTPPCU	Water	1	all				Yes	Yes				8270D-tun
97	SVMS 3455	29-May-2018 11:23:30	100529C03.D	Ccv	1STD010CV	Water	1	1STD									8270DLVI-10
98	SVMS 3485	29-May-2018 11:48:30	100529C04.D	Ccv	3STD010CW	Water	1	3STD									8270DLVI-10
1	TQ73259-001	29-May-2018 12:12:30	100529C05.D	BLANK	SBLK59	Soil	1	sample								AB:73311	8270DLVI-10
2	TQ73259-002	29-May-2018 12:37:30	100529C06.D	LCS	SLCS59	Soil	1	sample	dodsoils								8270DLVI-10
3	TQ73193-001	29-May-2018 13:02:30	100529C07.D	BLANK	SBLK93	Water	1	sample								AB:73320	8270DLVI-10
4	TQ73193-002	29-May-2018 13:26:30	100529C08.D	LCS	SLCS93	Water	1	sample	tclp								8270DLVI-10
5	TQ73264-001	29-May-2018 13:51:30	100529C09.D	Client	SBLK64	Soil	1	sample									8270DLVI-10
6	TQ73264-002	29-May-2018 14:16:30	100529C10.D	LCS	SLCS64	Soil	1	sample	8270soil								8270DLVI-10
7	TE24006-016	29-May-2018 14:40:30	100529C11.D	Client	LF003-SSS-72	Soil	10	sample									8270DLVI-10
8	TE24006-017	29-May-2018 15:05:30	100529C12.D	Client	LF003-SSS-73	Soil	10	sample									8270DLVI-10
9	TE24006-018	29-May-2018 15:30:30	100529C13.D	Client	LF003-SSS-74	Soil	10	sample								IS-RR@20x	8270DLVI-10
10	TE24006-019	29-May-2018 15:54:30	100529C14.D	Client	LF003-SSS-75	Soil	10	sample									8270DLVI-10
11	TE24006-020	29-May-2018 16:19:30	100529C15.D	Client	LF003-SSS-76	Soil	10	sample									8270DLVI-10
27	TE24006-018	29-May-2018 16:44:30	100529C16.D	Client	LF003-SSS-74	Soil	20	sample								IS	8270DLVI-10
12	TE08059-005	29-May-2018 17:09:30	100529C17.D	Client	TCLP-Stockpile 1	Water	1	sample									8270DLVI-10
13	TE22072-001	29-May-2018 17:33:30	100529C18.D	Client	Comp 4ft.	Soil	1	sample									8270DLVI-10
14	TE22072-001MS	29-May-2018 17:58:30	100529C19.D	MS	Comp 4ft.MS	Soil	1	sample	8270soil								8270DLVI-10
15	TE22072-001MD	29-May-2018 18:23:30	100529C20.D	MSD	Comp 4ft.MSD	Soil	1	sample	8270soil								8270DLVI-10
16	TE22072-002	29-May-2018 18:48:30	100529C21.D	Client	Comp 8ft.	Soil	1	sample									8270DLVI-10
17	TE22072-003	29-May-2018 19:12:30	100529C22.D	Client	Comp 12ft.	Soil	1	sample									8270DLVI-10
18	TE22072-008	29-May-2018 19:37:30	100529C23.D	Client	CompDUP 052118	Soil	1	sample									8270DLVI-10
19	TE18011-002	29-May-2018 20:01:30	100529C24.D	Client	WSW-50	Water	1	sample								AB:73062	8270DLVI-10
22	TE22045-001	29-May-2018 20:26:30	100529C25.D	Client	BW16GW65	Water	5	sample								AB:73246	8270DLVI-10
23	TE22045-002	29-May-2018 20:50:30	100529C26.D	Client	BW916GW65	Water	5	sample									8270DLVI-10
24	TE22045-003	29-May-2018 21:15:30	100529C27.D	Client	BW16GW12	Water	100	sample									8270DLVI-10
97	SVMS 3455	29-May-2018 21:40:30	100529C28.D	Ccv	1STD010CX	Water	1	1STD									8270DLVI-10
98	SVMS 3485	29-May-2018 22:04:30	100529C29.D	Ccv	3STD010CY	Water	1	3STD									8270DLVI-10
100	SVMS IBLK	29-May-2018 22:28:30	100529C30.D	Client		Water	1	1STD									8270DLVI-10
100	SVMS IBLK	29-May-2018 22:53:30	100529C31.D	Client		Water	1	1STD									8270DLVI-10
100	SVMS IBLK	29-May-2018 23:17:30	100529C32.D	Client		Water	1	1STD									8270DLVI-10

Analyst: NFB
Status: Level 2 review released
Matrix: Aqueous

Printed: 06/15/18 1003

Prep Batch: 72993

3520C RVE (5.0 mL FV - Acid Only) - Continuous Liquid-Liquid Extraction

Start Date: 05/23/2018 1913
End Date: 05/24/2018 1325

Level 2 Analyst: JBK
Conc Analyst: BFP
Conc Start Date: 05/24/2018 1441
Conc End Date: 05/24/2018 1522
Sodium Sulfate ID: extr-4713

Surrogate: extw-5060exp103018
Surrogate Vol. (mL): 0.5

Ext Solvent: CH2Cl2 > CH2Cl2
Reagents Vol. (mL): 170
Chem ID: 18-897>18-897

Sample ID	QC Code	Client Sample ID	Run	Analysis Descript	Initial Vol. (mL)	Spike ID	Spike Vol. (mL)	Final Vol. (mL)	pH Adjust 1	Comments
TQ72993-001	MB		1	8270D	250		0.0	5.0	2	witness:ARP/QC associated with batch 72992
TQ72993-002	LCS		1	8270D	250	extw-4936exp0615	0.5	5.0	2	extw-5053exp101818/extw-4935exp061518/extw-4994exp090118
TE22045-001	Sample	BW16GW65	1	8270D	250		0.0	5.0	2	1:1 sulfuric acid: extr-4701
TE22045-002	Sample	BW916GW65	1	8270D	250		0.0	5.0	2	pH strip: 16-454
TE22045-003	Sample	BW16GW12	1	8270D	250		0.0	5.0	2	boiling chip: extr-4702/glass wool: 18-181
TE22045-003MS	MS		1	8270D	250		0.0	5.0	0	MS associated with batch 72992
TE22045-003MD	MSD		1	8270D	250		0.0	5.0	0	MD associated with batch 72992

(end of report) **Total Samples: 3**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Jun 7, 2018

4SESD-ASB

MEMORANDUM

SUBJECT: FINAL Ana9ytica9Report
Project: 18-0442l American Creosote
Superfund Remedia9

FROM: Diana Burdette
OCS Ana9yst

THRU: F9oyd We99bornl C, ief
ASB Organic C, emistry Section

TO: Peter T, orpe

Attac, ed are t, e fina9resu9ts for t, e ana9ytica9groups 9isted be9ow. T, ese ana9yses were performed in accordance wit, t, e Ana9ytica9Support Branc, 's (ASB) Laboratory Operations and Qua9ity Assurance Manua9 (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data qua9ity objectives specified in writing by t, e data requestor , ave a9so been incorporated into t, e data un9ess ot, erwise noted in t, e Report Narrative. C, emistry data , ave been verified based on t, e ASB LOQAM specifications and , ave been qua9ified by t, is 9aboratory if t, e app9icab9e qua9ity contro9criteria were not met. Verification is defined in Section 6.5 of t, e ASB LOQAM. For a 9isting of specific data qua9ifiers and exp9anationsl p9ease refer to t, e Data Qua9ifier Definitions inc9uded in t, is report. T, e reported resu9ts are accurate wit, in t, e 9imits of t, e met, od(s) and are representative on9y of t, e samp9es as received by t, e 9aboratory.

Ana9yses Inc9uded in t, is report:	Met, od Used:	Accreditations:
Semi Volatile Organics (SVOA)		
Semivo9ati9e organic compounds	EPA 8570D (Water)	ISO

Sampn Disposan Porice

Due to 9mited space for 9ong term samp9e storagel ASB's po9icy is to dispose of samp9es on a periodic sc, edu9e. Air samp9es co99ected in summa canisters wi99be disposed of h0 days fo99owing t, e issuance of t, is report. A99 ot, er samp9e media inc9uding origina9samp9esl samp9e extracts and or digestates wi99be disposed ofl in accordance wit, app9icab9e regu9ationsl 30 days from t, e date of t, is report.

T, is samp9e disposa9po9icy does not app9y to crimina9samp9es w, ic, are , e9d unti9t, e 9aboratory is notified by t, e crimina9investigators t, at case deve9opment and 9itigation are comp9ete.

T, ese samp9es may be , e9d in t, e 9aboratory's custody for a 9onger period of time. If samp9es require storage beyond t, e 30-day periodl p9ease contact t, e Samp9e Contro9Coordinator by e-mai9at R4Samp9eCustody@epa.gov.

cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co92ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

SAMPx ES bNCx UDED bN THbS REPORT

Pdoll cy: 18-0447, Aml dicaj Cdl osoyl

Sampnl bD	x aLodayode bD	Maydir	Dayl Coml cyl v	Dayl Rl cl it l v
MW08A	E185h06-05	Groundwater	3/7/18 02:60	3/8/18 10:06
MW208A	E185h06-0h	Groundwater	3/7/18 02:60	3/8/18 10:06
MW08B	E185h06-04	Groundwater	3/7/18 10:16	3/8/18 10:06
MW08C	E185h06-06	Groundwater	3/7/18 14:h0	3/8/18 10:06

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

DATA QUAx bFbER DEFbNbTbONS

U	T, e ana9yte was not detected at or above t, e reporting 9imit.
J	T, e identification of t, e ana9yte is acceptab9e; t, e reported va9ue is an estimate.
Q-5	Resu9t greater t, an MDL but 9ess t, an MRL.

ACRONYMS AND ABBREVbATbONS

CAS	C, emica9Abstracts Service Note: Ana9ytes wit, no %nown CAS identifiers , ave been assigned codes beginning wit, kEkl t, e EPA ID as assigned by t, e EPA Substance Registry System (www.epa.gov/srs)l or beginning wit, kR4-kl a unique identifier assigned by t, e EPA Region 4 9aboratory.
MDL	Met, od Detection Limit - T, e minimum concentration of a substance (an ana9yte) t, at can be measured and reported wit, a 22" confidence t, at t, e ana9yte concentration is greater t, an zero.
MRL	Minimum Reporting Limit - Ana9yte concentration t, at corresponds to t, e 9owest demonstrated 9eve9of acceptab9e quantitation. T, e MRL is samp9e-specific and accounts for preparation weig, ts and vo9umesl di9utionsl and moisture content of soi9sediments.
TIC	Tentative9y Identified Compound - An ana9yte identified based on a matc, wit, t, e instrument software's mass spectra99ibrary. A ca9ibration standard , as not been ana9yzed to confirm t, e compound's identification or t, e estimated concentration reported.

ACCREDITATIONS:

ISO	ASB is accredited by ISO/IEC 17056l inc9uding an amp9fication for forensic accreditation t, roug, ANSI-ASQ Nationa9Accreditation Board. Refer to t, e certificate and scope of accreditation AT-1344 at: , ttp://www.epa.gov/aboutepa/about-region-4s-science-and-ecosystem-support-division-sesd
NR	T, e EPA Region 4 Laboratory , as not requested accreditation for t, is test.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics

Pdoll cy: 18-0447, Aml dicaj Cdl osoyl

Sampnl bD: MW08A **x aL bD: E182C0w-02**

Syayioj bD: MW08A **Maydir: 5 douj v/ ayl d**

Dayl Coml cyl v: 6/8/18 7:w0

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
1h12-77-h	(h-and/or 4-)Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
25-65-4	1l1-Bip, eny9	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
106-37-2	5l4-Dimet, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
26-48-7	5-Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
8h-h5-2	Acenap, t, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
150-15-7	Ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
63-66-h	Benzo(a)ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
60-h5-8	Benzo(a)pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
506-22-5	Benzo(b)f9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
121-54-5	Benzo(gl, li)pery9ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
507-08-2	Benzo(%)f9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
83-74-8	Carbazo9e	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
518-01-2	C, rysene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
6h-70-h	Dibenz(al,)ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
1h5-34-2	Dibenzofuran	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
503-44-0	F9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
83-7h-7	F9uorene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
12h-h2-6	Indeno (1l5lh-cd) pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
21-50-h	Nap, t, a9ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
87-83-6	Pentac, 9orop, eno9	7.1	U	ug/L	7.1	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
86-01-8	P, enant, rene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
108-26-5	P, eno9	3.1	U	ug/L	3.1	3/15/18 8:h7	3/18/18 15:12	EPA 8570D
152-00-0	Pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:12	EPA 8570D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics

Pdoll cy: 18-0447, Aml dicaj Cdl osoyl

Sampnl bD: MW708A **x aL bD: E182C0w-0G**
Syayioj bD: MW08A **Maydir: 5 douj v/ ayl d**

Dayl Coml cyl v: 6/8/18 7:w0

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
1h12-77-h	(h-and/or 4-)Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
25-65-4	1l1-Bip, eny9	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
106-37-2	5l4-Dimet, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
26-48-7	5-Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
8h-h5-2	Acenap, t, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
150-15-7	Ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
63-66-h	Benzo(a)ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
60-h5-8	Benzo(a)pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
506-22-5	Benzo(b)f9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
121-54-5	Benzo(gl, li)pery9ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
507-08-2	Benzo(%)f9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
83-74-8	Carbazo9e	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
518-01-2	C, rysene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
6h-70-h	Dibenz(al,)ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
1h5-34-2	Dibenzofuran	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
503-44-0	F9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
83-7h-7	F9uorene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
12h-h2-6	Indeno (1l5lh-cd) pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
21-50-h	Nap, t, a9ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
87-83-6	Pentac, 9orop, eno9	7.0	U	ug/L	7.0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
86-01-8	P, enant, rene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
108-26-5	P, eno9	3.0	U	ug/L	3.0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D
152-00-0	Pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 15:48	EPA 8570D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics

Pdoll cy: 18-0447, Aml dicaj Cdl osoyl

Sampnl bD: MW08B
Syayioj bD: MW08B

x aL bD: E182C0w-04
Maydir: 5 douj v/ ayl d

Dayl Coml cyl v: 6/8/18 10:1w

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
1h12-77-h	(h-and/or 4-)Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
25-65-4	1l1-Bip, eny9	5.1	U	ug/L	5.1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
106-37-2	5l4-Dimet, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
26-48-7	5-Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
8h-h5-2	Acenap, t, ene	h.0		ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
150-15-7	Ant, racene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
63-66-h	Benzo(a)ant, racene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
60-h5-8	Benzo(a)pyrene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
506-22-5	Benzo(b)f9uorant, ene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
121-54-5	Benzo(gl, li)pery9ene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
507-08-2	Benzo(%)f9uorant, ene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
83-74-8	Carbazo9e	5.1	U	ug/L	5.1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
518-01-2	C, rysene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
6h-70-h	Dibenz(al,)ant, racene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
1h5-34-2	Dibenzofuran	0.8h	Jl Q-5	ug/L	5.1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
503-44-0	F9uorant, ene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
83-7h-7	F9uorene	0.4h		ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
12h-h2-6	Indeno (1l5lh-cd) pyrene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
21-50-h	Nap, t, a9ene	1.5		ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
87-83-6	Pentac, 9orop, eno9	140		ug/L	h3	3/15/18 8:h7	3/18/18 16:18	EPA 8570D
86-01-8	P, enant, rene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
108-26-5	P, eno9	3.5	U	ug/L	3.5	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D
152-00-0	Pyrene	0.h1	U	ug/L	0.h1	3/15/18 8:h7	3/18/18 1h:18	EPA 8570D

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D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics

Pdoll cy: 18-0447, Aml dicaj Cdl osoyl

Sampnl bD: MW08C
Syayioj bD: MW08C

x aL bD: E182C0w-0w
Maydir: 5 douj v/ ayl d

Dayl Coml cyl v: 6/8/18 14:C0

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
1h12-77-h	(h-and/or 4-)Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
25-65-4	1l1-Bip, eny9	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
106-37-2	5l4-Dimet, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
26-48-7	5-Met, y9p, eno9	10	U	ug/L	10	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
8h-h5-2	Acenap, t, ene	8.h		ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
150-15-7	Ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
63-66-h	Benzo(a)ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
60-h5-8	Benzo(a)pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
506-22-5	Benzo(b)f9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
121-54-5	Benzo(gl, li)pery9ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
507-08-2	Benzo(%)f9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
83-74-8	Carbazo9e	5.0	U	ug/L	5.0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
518-01-2	C, rysene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
6h-70-h	Dibenz(al,)ant, racene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
1h5-34-2	Dibenzofuran	7.1		ug/L	5.0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
503-44-0	F9uorant, ene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
83-7h-7	F9uorene	4.6		ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
12h-h2-6	Indeno (1l5lh-cd) pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
21-50-h	Nap, t, a9ene	1.4		ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
87-83-6	Pentac, 9rop, eno9	56		ug/L	7.0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
86-01-8	P, enant, rene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
108-26-5	P, eno9	3.0	U	ug/L	3.0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D
152-00-0	Pyrene	0.h0	U	ug/L	0.h0	3/15/18 8:h7	3/18/18 1h:48	EPA 8570D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics (SVOA) - Quariye Coj ydon

US-EPA, Rl gioj 4, SESD

Ana9yte	Resu9	Reporting Limit	Units	Spi%e Leve9	Source Resu9	" REC	" REC Limits	RPD	RPD Limit	Notes
Baych 180601G- E Gv20 x x E										
Bmj k (180601GBx K1)				Prepared: 03/15/18 Ana9yzed: 03/18/18						
EPA 8270D										
(h-and/or 4-)Met, y9p, eno9	U	10	ug/L							U
111-Bip, eny9	U	5.0	k							U
5l4-Dimet, y9p, eno9	U	10	k							U
5-Met, y9p, eno9	U	10	k							U
Acenap, t, ene	U	0.h0	k							U
Ant, racene	U	0.h0	k							U
Benzo(a)ant, racene	U	0.h0	k							U
Benzo(a)pyrene	U	0.h0	k							U
Benzo(b)f9uorant, ene	U	0.h0	k							U
Benzo(gl, li)pery9ene	U	0.h0	k							U
Benzo(%)f9uorant, ene	U	0.h0	k							U
Carbazo9e	U	5.0	k							U
C, rysene	U	0.h0	k							U
Dibenz(al,)ant, racene	U	0.h0	k							U
Dibenzofuran	U	5.0	k							U
F9uorant, ene	U	0.h0	k							U
F9uorene	U	0.h0	k							U
Indeno (1l5lh-cd) pyrene	U	0.h0	k							U
Nap, t, a9ene	U	0.h0	k							U
Pentac, 9orop, eno9	U	7.0	k							U
P, enant, rene	U	0.h0	k							U
P, eno9	U	3.0	k							U
Pyrene	U	0.h0	k							U
x CS (180601GBS1)				Prepared: 03/15/18 Ana9yzed: 03/18/18						
EPA 8270D										
(h-and/or 4-)Met, y9p, eno9	46.644	10	ug/L	30.000		76.2	60-105			
111-Bip, eny9	48.274	5.0	k	30.000		81.3	68-10h			
5l4-Dimet, y9p, eno9	47.1h7	10	k	30.000		78.3	43-23			
5-Met, y9p, eno9	46.613	10	k	30.000		76.2	42-101			
Acenap, t, ene	61.254	0.h0	k	30.000		83.6	35-101			
Ant, racene	66.646	0.h0	k	30.000		25.3	35-115			
Benzo(a)ant, racene	64.403	0.h0	k	30.000		20.7	34-11h			
Benzo(a)pyrene	67.767	0.h0	k	30.000		23.h	62-158			
Benzo(b)f9uorant, ene	66.7h3	0.h0	k	30.000		25.2	62-158			
Benzo(gl, li)pery9ene	63.207	0.h0	k	30.000		24.8	46-15h			
Benzo(%)f9uorant, ene	62.533	0.h0	k	30.000		28.8	3h-156			
Carbazo9e	64.002	5.0	k	30.000		20.0	34-113			
C, rysene	66.068	0.h0	k	30.000		21.8	3h-11h			

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics (SVOA) - Quariye Coj ydon

US-EPA, Rl gioj 4, SESD

Ana9yte	Resu9t	Reporting Limit	Units	Spi%e Leve9	Source Resu9t	" REC	" REC Limits	RPD	RPD Limit	Notes
Baych 180601G- E Gv20 x x E										
x CS (180601GBS1)				Prepared: 03/15/18 Ana9yzed: 03/18/18						
Dibenz(al,)ant, racene	67.668	0.h0	ug/L	30.000		26.2	60-153			
Dibenzofuran	42.626	5.0	k	30.000		85.7	33-104			
F9uorant, ene	63.h23	0.h0	k	30.000		24.0	36-117			
F9uorene	66.h22	0.h0	k	30.000		25.h	34-110			
Indeno (1l5lh-cd) pyrene	67.556	0.h0	k	30.000		26.4	48-152			
Nap, t, a9ene	46.441	0.h0	k	30.000		76.7	60-100			
Pentac, 9brop, eno9	35.7h2	7.0	k	30.000		106	30-113			
P, enant, rene	65.338	0.h0	k	30.000		87.8	35-102			
P, eno9	4h.085	3.0	k	30.000		71.8	44-28			
Pyrene	68.885	0.h0	k	30.000		28.1	30-117			
Maydir Spikl (180601GMS1)	**Soudcl : E182C0w-0w**			Prepared: 03/15/18 Ana9yzed: 03/18/18						
EPA 8270D										
(h-and/or 4-)Met, y9p, eno9	47.835	2.2	ug/L	62.403	U	80.3	55-151			
1l1-Bip, eny9	6h.533	5.0	k	62.403	U	82.7	5h-158			
5l4-Dimet, y9p, eno9	66.533	2.2	k	62.403	U	2h.0	h5-155			
5-Met, y9p, eno9	47.857	2.2	k	62.403	U	80.6	h7-107			
Acenap, t, ene	35.231	0.h0	k	62.403	8.hh8h	21.2	63-102			
Ant, racene	67.558	0.h0	k	62.403	U	23.h	1h-165			
Benzo(a)ant, racene	6h.486	0.h0	k	62.403	U	20.0	66-118			
Benzo(a)pyrene	66.244	0.h0	k	62.403	U	24.5	30-112			
Benzo(b)f9uorant, ene	6h.464	0.h0	k	62.403	U	20.0	10-176			
Benzo(gl, li)pery9ene	65.503	0.h0	k	62.403	U	87.2	45-107			
Benzo(%)f9uorant, ene	30.h72	0.h0	k	62.403	U	105	42-158			
Carbazo9e	31.56h	5.0	k	62.403	U	10h	h3-16h			
C, rysene	6h.210	0.h0	k	62.403	U	20.7	30-115			
Dibenz(al,)ant, racene	65.410	0.h0	k	62.403	U	88.5	43-114			
Dibenzofuran	68.3h5	5.0	k	62.403	7.06h7	83.8	67-10h			
F9uorant, ene	67.664	0.h0	k	62.403	U	23.2	31-118			
F9uorene	35.4h0	0.h0	k	62.403	4.4256	27.6	34-110			
Indeno (1l5lh-cd) pyrene	65.558	0.h0	k	62.403	U	87.2	47-111			
Nap, t, a9ene	61.152	0.h0	k	62.403	1.4162	8h.7	46-22			
Pentac, 9brop, eno9	20.015	3.2	k	62.403	56.425	102	10-120			
P, enant, rene	64.130	0.h0	k	62.403	U	21.5	34-107			
P, eno9	44.084	6.2	k	62.403	U	74.5	52-106			
Pyrene	66.12h	0.h0	k	62.403	U	25.2	68-15h			

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
280 Co9ege Station Roadl At, ensl Georgia h0306-5700
D.A.R.T. Id: 18-0442
Project: 18-0449, American Creosote - Reported by Diana Burdette

Sl mi Vomyirl Odgaj ics (SVOA) - Quariye Coj ydon

US-EPA, Rl gioj 4, SESD

Ana9yte	Resu9t	Reporting Limit	Units	Spi%e Leve9	Source Resu9t	" REC	" REC Limits	RPD	RPD Limit	Notes
Baych 180601G- E Gv20 x x E										
Maydir Spikl Dup (180601GMSD1)		**Soudcl : E182C0w-0w**		Prepared: 03/15/18 Ana9yzed: 03/18/18						
EPA 8270D										
(h-and/or 4-)Met, y9p, eno9	48.580	10	ug/L	30.000	U	80.6	55-151	0.832	hh	
111-Bip, eny9	60.383	5.0	k	30.000	U	84.6	5h-158	4.23	53	
5l4-Dimet, y9p, eno9	67.000	10	k	30.000	U	26.0	h5-155	h.02	52	
5-Met, y9p, eno9	48.h38	10	k	30.000	U	80.3	h7-107	1.1h	hh	
Acenap, t, ene	30.772	0.h0	k	30.000	8.hh8h	87.4	63-102	h.6h	51	
Ant, racene	6h.367	0.h0	k	30.000	U	82.4	1h-165	3.44	5h	
Benzo(a)ant, racene	60.642	0.h0	k	30.000	U	84.5	66-118	6.34	h7	
Benzo(a)pyrene	6h.358	0.h0	k	30.000	U	82.4	30-112	4.5h	51	
Benzo(b)f9uorant, ene	6h.338	0.h0	k	30.000	U	82.4	10-176	0.h22	100	
Benzo(gl, li)pery9ene	61.7h5	0.h0	k	30.000	U	83.5	45-107	0.215	55	
Benzo(%)f9uorant, ene	67.052	0.h0	k	30.000	U	26.0	42-158	6.71	65	
Carbazo9e	68.602	5.0	k	30.000	U	27.6	h3-16h	4.68	55	
C, rysene	60.733	0.h0	k	30.000	U	84.3	30-115	3.01	45	
Dibenz(al,)ant, racene	65.610	0.h0	k	30.000	U	87.6	43-114	0.121	51	
Dibenzofuran	63.384	5.0	k	30.000	7.06h7	85.7	67-10h	h.h8	12	
F9uorant, ene	6h.744	0.h0	k	30.000	U	82.3	31-118	3.86	16	
F9uorene	30.55h	0.h0	k	30.000	4.4256	25.2	34-110	h.30	17	
Indeno (1l5lh-cd) pyrene	61.75h	0.h0	k	30.000	U	83.5	47-111	0.271	51	
Nap, t, a9ene	60.4h4	0.h0	k	30.000	1.4162	81.7	46-22	1.h7	h1	
Pentac, 9orop, eno9	88.532	7.0	k	30.000	56.425	106	10-120	1.23	53	
P, enant, rene	61.4h4	0.h0	k	30.000	U	86.7	34-107	6.13	16	
P, eno9	46.0h8	3.0	k	30.000	U	76.1	52-106	5.14	h3	
Pyrene	61.200	0.h0	k	30.000	U	83.6	68-15h	3.16	18	
MRx Vl dificayioj (180601GPS1)				Prepared: 03/15/18 Ana9yzed: 03/18/18						
EPA 8270D										
(h-and/or 4-)Met, y9p, eno9	8.5670	10	ug/L	10.000		85.3	h0-155			Q-51 MRL-51 J
111-Bip, eny9	1.8h00	5.0	k	5.0000		21.6	h8-11h			Q-51 MRL-51 J
5l4-Dimet, y9p, eno9	8.4820	10	k	10.000		84.2	53-113			Q-51 MRL-51 J
5-Met, y9p, eno9	8.5040	10	k	10.000		85.0	52-151			Q-51 MRL-51 J
Carbazo9e	1.86h0	5.0	k	5.0000		25.3	44-1h3			Q-51 MRL-51 J
Dibenzofuran	1.3620	5.0	k	5.0000		8h.0	43-154			Q-51 MRL-51 J
Pentac, 9orop, eno9	2.5120	7.0	k	10.000		25.5	40-153			MRL-5
P, eno9	7.2120	3.0	k	10.000		72.5	54-118			MRL-5

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Sl mi Vomyirl Odgaj ics (SVOA) - Quariye Coj ydon

US-EPA, Rl gioj 4, SESD

Ana9yte	Resu9t	Reporting Limit	Units	Spi%e Leve9	Source Resu9t	" REC	" REC Limits	RPD	RPD Limit	Notes
Baych 180601G- E Gv20 x x E										
MRx Vl dificayioj (180601GPS2)				Prepared: 03/15/18 Ana9yzed: 03/18/18						
EPA 8270D										
Acenap, t, ene	0.12h00	0.h0	ug/L	0.h0000		34.h	45-151			Q-51 MRL-51 J
Ant, racene	0.5h500	0.h0	k	0.h0000		77.h	45-1h5			Q-51 MRL-51 J
Benzo(a)ant, racene	0.52300	0.h0	k	0.h0000		28.7	44-1hh			Q-51 MRL-51 J
Benzo(a)pyrene	0.53300	0.h0	k	0.h0000		88.7	h2-148			Q-51 MRL-51 J
Benzo(b)f9uorant, ene	0.57800	0.h0	k	0.h0000		25.7	h2-148			Q-51 MRL-51 J
Benzo(gl, li)pery9ene	0.5h700	0.h0	k	0.h0000		72.0	56-14h			Q-51 MRL-51 J
Benzo(%)f9uorant, ene	0.53700	0.h0	k	0.h0000		82.0	4h-146			Q-51 MRL-51 J
C, rysene	0.5h600	0.h0	k	0.h0000		78.h	4h-1hh			Q-51 MRL-51 J
Dibenz(al,)ant, racene	0.56700	0.h0	k	0.h0000		86.7	h0-143			Q-51 MRL-51 J
F9uorant, ene	0.56100	0.h0	k	0.h0000		8h.7	46-1h7			Q-51 MRL-51 J
F9uorene	0.51600	0.h0	k	0.h0000		71.7	44-1h0			Q-51 MRL-51 J
Indeno (1l5lh-cd) pyrene	0.5h400	0.h0	k	0.h0000		78.0	58-142			Q-51 MRL-51 J
Nap, t, a9ene	0.50h00	0.h0	k	0.h0000		37.7	h0-150			Q-51 MRL-51 J
P, enant, rene	0.56100	0.h0	k	0.h0000		8h.7	45-152			Q-51 MRL-51 J
Pyrene	0.53800	0.h0	k	0.h0000		82.h	40-1h7			Q-51 MRL-51 J

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Noyl s aj v Dl fij iyioj s fod QC Sampıl s

U	T, e ana9yte was not detected at or above t, e reporting 9imit.
J	T, e identification of t, e ana9yte is acceptab9e; t, e reported va9ue is an estimate.
MRL-5	MRL verification for Non-Potab9e Water matrix
Q-5	Resu9t greater t, an MDL but 9ess t, an MRL.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Sallie Hale

June 7, 2017,

FUMUN4RUS

8 MB E ORAND8

UDS JMBCT FINAL Analytical Report
Project: 18-0449, American Creosote
Superfund Remedial

: OE 8 T Sallie Hale
OCS Analyst

C- ODT Floyd Wellborn, Chief
ASB Organic Chemistry Section

CE T Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and have been qualified by this laboratory if the applicable quality control criteria were not met. Verification is defined in Section 5.2 of the ASB LOQAM. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:	Method Used:	Accreditations:
Volatile Organics (VOA)		
Volatile organic compounds	EPA 8260C (Water)	ISO

UHa mpe Nlimsi Hpos dPc

Due to limited space for long term sample storage, ASB's policy is to dispose of samples on a periodic schedule. Air samples collected in summa canisters will be disposed of 30 days following the issuance of this report. All other sample media including original samples, sample extracts and or digestates will be disposed of, in accordance with applicable regulations, 60 days from the date of this report.

This sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time. If samples require storage beyond the 60-day period, please contact the Sample Control Coordinator by e-mail at R4SampleCustody@epa.gov.

cc: Nardina Turner

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UR8 o x MUbABx DNMN bA C- bUOMbEOC

o ds IePyT7, 4lFFj 2Ra edlPHn Bdesi s ye

UHa mpe bN	x HLs dHjs dc bN	8 Hjdlr	NHje Bs ppePyev	NHje OePelt ev
TB001	E182305-01	Trip Blank - Water	6/7/18 08:00	6/8/18 10:05
MW08A	E182305-02	Groundwater	6/7/18 09:50	6/8/18 10:05
MW908A	E182305-03	Groundwater	6/7/18 09:50	6/8/18 10:05
MW08B	E182305-04	Groundwater	6/7/18 10:15	6/8/18 10:05
MW08C	E182305-05	Groundwater	6/7/18 14:30	6/8/18 10:05

NRCR QDRx b: bMO NM: bAbCbE AU

U	The analyte was not detected at or above the reporting limit.
C-6	Sample aliquot taken from VOA vial with headspace (air bubble greater than 5-6 mm diameter).
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-2	Result greater than MDL but less than MRL.

RBOE AY8 URAN RSS OMVbRCbE AU

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

ACCREDITATIONS:

ISO ASB is accredited by ISO/IEC 17025, including an amplification for forensic accreditation through ANSI-ASQ National Accreditation Board.

Refer to the certificate and scope of accreditation AT-1644 at:
http://www.epa.gov/aboutepa/about-region-4s-science-and-ecosystem-support-division-sesd

NR The EPA Region 4 Laboratory has not requested accreditation for this test.

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Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
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Vs pHylpe E dg HnlPi

o ds IePyT7, 41FFj 2Ra edlPHn Bdes is ye

UHa mpe bNT CS 117 **x HL bNT M7, 0WG417**

UyHyls n bNT **8 HydlrT CdlmS pHnw 45 Hyed**

NHye Bs ppePyev T / 6967, , T11

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	1.0	U	ug/L	1.0	6/11/18 16:34	6/11/18 17:27	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
271-89-6	2,3-Benzofuran	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
67-64-1	Acetone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 17:27	EPA 8260C
71-43-2	Benzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
108-90-7	Chlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
100-41-4	Ethyl Benzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
78-93-3	Methyl Ethyl Ketone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 17:27	EPA 8260C
95-47-6	o-Xylene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
100-42-5	Styrene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
108-88-3	Toluene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C
75-01-4	Vinyl chloride	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:27	EPA 8260C

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Vs pHylpe E dg HnlPi

o ds IePyT7, 41FFj 2Ra edlPHn Bdes is ye

UHa mpe bNT8 5 1, R **x HL bNT M7, 0WG410**

UyHyls n bNT8 5 1, R **8 HydlrT3 ds unv(Hyed**

NHye Bs ppePyev T / 6967, j TG1

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	1.0	U	ug/L	1.0	6/11/18 16:34	6/11/18 19:39	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
271-89-6	2,3-Benzofuran	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
67-64-1	Acetone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 19:39	EPA 8260C
71-43-2	Benzene	0.080	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
108-90-7	Chlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
100-41-4	Ethyl Benzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
78-93-3	Methyl Ethyl Ketone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 19:39	EPA 8260C
95-47-6	o-Xylene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
100-42-5	Styrene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
108-88-3	Toluene	0.17	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C
75-01-4	Vinyl chloride	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 19:39	EPA 8260C

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Vs pHylpe E dg HnlPi

o ds IePyT7, 41FFj 2Ra edlPHn Bdes is ye

UHa mpe bNT8 5 j 1, R **x HL bNT M7, 0WG41W**

UyHyls n bNT8 5 1, R **8 HydlrT3 ds unv(Hyed**

NHye Bs ppePyev T / 6967, j TG1

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	1.0	U	ug/L	1.0	6/11/18 16:34	6/11/18 20:05	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
271-89-6	2,3-Benzofuran	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
67-64-1	Acetone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 20:05	EPA 8260C
71-43-2	Benzene	0.080	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
108-90-7	Chlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
100-41-4	Ethyl Benzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
78-93-3	Methyl Ethyl Ketone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 20:05	EPA 8260C
95-47-6	o-Xylene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
100-42-5	Styrene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
108-88-3	Toluene	0.16	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C
75-01-4	Vinyl chloride	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 20:05	EPA 8260C

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Vs pHyIpe E dgHnlPi

o ds IePyT7, 41FFj 2Ra edlPHn Bdesi s ye

UHa mpe bNT8 5 1, S
UyHyls n bNT8 5 1, S

x HL bNT M7, 0WG41F
8 HydlrT3 ds unv(Hyed

NHye Bs pePyevT / 0967, 71T7G

CAS Number	Analyte	Results Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	0.91 J, Q-2, C-6	ug/L	1.0	6/11/18 16:34	6/11/18 20:32	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	0.50 U, J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
271-89-6	2,3-Benzofuran	0.50 U, J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
67-64-1	Acetone	11 J, C-6	ug/L	4.0	6/11/18 16:34	6/11/18 20:32	EPA 8260C
71-43-2	Benzene	0.50 U, J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
108-90-7	Chlorobenzene	0.50 U, J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
100-41-4	Ethyl Benzene	0.80 J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
78-93-3	Methyl Ethyl Ketone	4.0 U, J, C-6	ug/L	4.0	6/11/18 16:34	6/11/18 20:32	EPA 8260C
95-47-6	o-Xylene	0.79 J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
100-42-5	Styrene	0.50 U, J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
108-88-3	Toluene	0.14 J, Q-2, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C
75-01-4	Vinyl chloride	0.50 U, J, C-6	ug/L	0.50	6/11/18 16:34	6/11/18 20:32	EPA 8260C

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Vs pHylpe E dg HnlPi

o ds IePyT7, 41FFj 2Ra edlPHn Bdes is ye

UHa mpe bNT8 5 1, B **x HL bNT M7, 0WG41G**

UyHyls n bNT8 5 1, B **8 HydlrT3 ds unv(Hyed**

NHye Bs ppePyev T / 6967, 7FTW

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
R4-7156	(m- and/or p-)Xylene	0.15	J, Q-2	ug/L	1.0	6/11/18 16:34	6/11/18 17:54	EPA 8260C
120-82-1	1,2,4-Trichlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
271-89-6	2,3-Benzofuran	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
67-64-1	Acetone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 17:54	EPA 8260C
71-43-2	Benzene	0.090	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
108-90-7	Chlorobenzene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
100-41-4	Ethyl Benzene	0.090	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
78-93-3	Methyl Ethyl Ketone	4.0	U	ug/L	4.0	6/11/18 16:34	6/11/18 17:54	EPA 8260C
95-47-6	o-Xylene	0.12	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
100-42-5	Styrene	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
108-88-3	Toluene	0.12	J, Q-2	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C
75-01-4	Vinyl chloride	0.50	U	ug/L	0.50	6/11/18 16:34	6/11/18 17:54	EPA 8260C

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VspHylpe EdgHnlPi)VE Rh4QuHplyc Bsnydsp
DU4MbR2Oeglsn F2UMUN

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
SHyPk 7, 1/11j 4V GlWS VER 5 ydodem										
SpHnw)7, 1/11j 4Sx K7h				Prepared & Analyzed: 06/11/18						
EPA 8260C										
(m- and/or p-)Xylene	U	1.0	ug/L							U
1,2,4-Trichlorobenzene	U	0.50	"							U
2,3-Benzofuran	U	0.50	"							U
Acetone	U	4.0	"							U
Benzene	U	0.50	"							U
Chlorobenzene	U	0.50	"							U
Ethyl Benzene	U	0.50	"							U
Methyl Ethyl Ketone	U	4.0	"							U
o-Xylene	U	0.50	"							U
Styrene	U	0.50	"							U
Toluene	U	0.50	"							U
Vinyl chloride	U	0.50	"							U
xBU)7, 1/11j 4SU7h				Prepared & Analyzed: 06/11/18						
EPA 8260C										
(m- and/or p-)Xylene	40.330		ug/L	40.000		101	91.3-117			
1,2,4-Trichlorobenzene	20.260		"	20.000		101	83.9-117			
2,3-Benzofuran	20.390		"	20.000		102	70-130			
Acetone	38.930		"	40.000		97.3	49.7-153			
Benzene	19.840		"	20.000		99.2	89.6-113			
Chlorobenzene	19.460		"	20.000		97.3	88.4-109			
Ethyl Benzene	19.890		"	20.000		99.4	90-114			
Methyl Ethyl Ketone	40.280		"	40.000		101	68.1-135			
o-Xylene	20.040		"	20.000		100	88.9-116			
Styrene	20.880		"	20.000		104	89.9-119			
Toluene	19.840		"	20.000		99.2	87.7-111			
Vinyl chloride	20.280		"	20.000		101	78.8-115			
8 Hydlr Umlwe)7, 1/11j 48 U7h		**UsudPeTM7, 0WtG41G**		Prepared & Analyzed: 06/11/18						
EPA 8260C										
(m- and/or p-)Xylene	22.790		ug/L	20.465	0.15000	111	81.5-138			
1,2,4-Trichlorobenzene	11.250		"	10.233	0.0000	110	67.6-125			
2,3-Benzofuran	11.050		"	10.233	0.0000	108	50-150			
Acetone	20.780		"	20.465	3.5800	84.0	48.2-133			
Benzene	11.050		"	10.233	0.090000	107	88.8-127			
Chlorobenzene	11.110		"	10.233	0.0000	109	85.5-123			
Ethyl Benzene	11.550		"	10.233	0.090000	112	85-130			
Methyl Ethyl Ketone	20.790		"	20.465	0.0000	102	60.8-127			

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VspHylpe EdgHnlPi)VE Rh4QuHplyc Bsnydsp
DU4MbR2Oeglsn F2UMUN

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
SHyPk 7, 1/11j 4V GlWS VER 5 ydodem										
8 Hydlr Umlwe)7, 1/11j 48 U7h		**UsudPeTM7, 0WG41G**		Prepared & Analyzed: 06/11/18						
o-Xylene	11.470		ug/L	10.233	0.12000	111	78.6-130			
Styrene	11.560		"	10.233	0.0000	113	34.5-158			
Toluene	11.450		"	10.233	0.12000	111	85.6-126			
Vinyl chloride	11.330		"	10.233	0.0000	111	84.5-135			
8 Hydlr Umlwe Num)7, 1/11j 48 UN7h		**UsudPeTM7, 0WG41G**		Prepared & Analyzed: 06/11/18						
EPA 8260C										
(m- and/or p-)Xylene	21.860		ug/L	20.465	0.15000	106	81.5-138	4.17	10.3	C-6
1,2,4-Trichlorobenzene	10.940		"	10.233	0.0000	107	67.6-125	2.79	14.3	C-6
2,3-Benzofuran	10.450		"	10.233	0.0000	102	50-150	5.58	20	C-6
Acetone	18.940		"	20.465	3.5800	75.1	48.2-133	9.26	18.2	C-6
Benzene	10.700		"	10.233	0.090000	104	88.8-127	3.22	10	C-6
Chlorobenzene	10.560		"	10.233	0.0000	103	85.5-123	5.08	10.6	C-6
Ethyl Benzene	11.000		"	10.233	0.090000	107	85-130	4.88	10	C-6
Methyl Ethyl Ketone	19.160		"	20.465	0.0000	93.6	60.8-127	8.16	15	C-6
o-Xylene	10.940		"	10.233	0.12000	106	78.6-130	4.73	10	C-6
Styrene	10.950		"	10.233	0.0000	107	34.5-158	5.42	22.6	C-6
Toluene	10.760		"	10.233	0.12000	104	85.6-126	6.21	10	C-6
Vinyl chloride	10.980		"	10.233	0.0000	107	84.5-135	3.14	14.1	C-6
8 Ox VedlflPHylsn)7, 1/11j 4oU7h				Prepared & Analyzed: 06/11/18						
EPA 8260C										
(m- and/or p-)Xylene	1.0000		ug/L	1.0000		100	71.3-137			MRL-2
1,2,4-Trichlorobenzene	0.48000		"	0.50000		96.0	63.9-137			MRL-2
2,3-Benzofuran	0.48000		"	0.50000		96.0	50-150			MRL-2
Acetone	1.9200		"	1.0000		192	29.7-173			
Benzene	0.50000		"	0.50000		100	69.6-133			MRL-2
Chlorobenzene	0.53000		"	0.50000		106	68.4-129			MRL-2
Ethyl Benzene	0.50000		"	0.50000		100	70-134			MRL-2
Methyl Ethyl Ketone	0.96000		"	1.0000		96.0	48.1-155			
o-Xylene	0.51000		"	0.50000		102	68.9-136			MRL-2
Styrene	0.43000		"	0.50000		86.0	69.9-139			MRL-2
Toluene	0.51000		"	0.50000		102	67.7-131			MRL-2
Vinyl chloride	0.48000		"	0.50000		96.0	58.8-135			MRL-2

Asyei Hnv Neflnlylsni fsdQB UHa mpei

U	The analyte was not detected at or above the reporting limit.
C-6	Sample aliquot taken from VOA vial with headspace (air bubble greater than 5-6 mm diameter).
MRL-2	MRL verification for Non-Potable Water matrix

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

August 10, 2018

4SESD-MTSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0458, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)
Dioxin	Contract SOW (Water)

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Report Narrative for Work Order: C182506

Site Name: American Creosote, Pensacola, FL
Case 47674, ELEMENT Sample Nos. C182506-01 through C182506-52,
C182507-01 through C182507-02 (PES)

Dioxin Analysis: Analytical Resources, Inc., Tukwila, WA

The ESAT Work Team reviewed data for the project cited above consisting of five water and 47 soil samples analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 06/04/18 and 06/08/18 and received by the laboratory between 06/07/18 and 06/11/18. The final data package was received by the EPA on 7/13/18. The analytical results were reported in three sample delivery groups (SDGs) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation samples (PES) for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

The laboratory satisfied all technical holding time requirements.

The laboratory scored within warning limits for all spiked analytes in the spiked PES except for 1,2,3,4,6,7,8-HpCDD, OCDD, and OCDF which were scored action high. All soil sample positive results for 1,2,3,4,6,7,8-HpCDD, OCDD, and OCDF were qualified "J" (CLP28). The laboratory scored within warning limits for all spiked analytes in the PES blind spike. Additionally, OCDD was scored as a PES contaminant at less than the Contract Required Quantitation Limit (CRQL).

The laboratory stated in the case narrative that "an application specific column [RTX-Dioxin2 - 60 meters long, 0.25 mm ID, 0.24 µm film thickness] recently developed by Restek" was used instead of the SOW specified DB-5 (primary) and DB-225 (2,3,7,8-TCDF confirmation) columns in Exhibit D, Sections 6.8.1.1.3 and 6.8.1.1.4. An alternative resolution test mixture consisting of 2,3,4,8-TCDF, 2,3,7,8-TCDF, and 3,4,6,7-TCDF was used at the beginning and ending of each analytical sequence to demonstrate that the method minimum valley between isomers of 25% was satisfied. The laboratory's performance provides comparable resolution for 2,3,7,8-TCDF analyzed on this single column as required by the SOW for the DB-225 confirmation column. The results for 2,3,7,8-TCDF are as reliable as those reported by other laboratories for other projects which have been identified (CLP10) as being confirmed on the DB-225 confirmation column. Additionally, retention time windows specified by the SOW do not apply to this specialty column, but data quality was not adversely impacted. The laboratory stated that "the column literature [included in submittals] may be used as a guide to the elution order. ARI has compiled data establishing retention time windows."

Only minimal Chlorodiphenyl Ether interferences with target congeners were observed for 2,3,7,8-TCDF in samples C182506-06, and 42, and for 1,2,3,7,8-PeCDF in samples C182506-15, 17, 25, 36, and 48, and for 2,3,4,7,8-PeCDF in sample C182506-47. These results were qualified "U" (D-4).

The concentration of OCDD exceeded the calibration range in samples C182506-10, 12, 14, 15, 17, 24, 26, 32, 33, 34, 35, 38, 39, 41, and 46. These OCDD results were qualified "J" (CLP02). The SOW does not require the laboratory to perform dilutions for OCDD or OCDF.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL, the MDL or the EMPC as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

Results are reported as not detected at an elevated detection limit when method blank contamination is evident, or when one or more of the qualitative identification criteria have not been met. In the event of method blank contamination, detection limits may be raised as much as five times (10X for OCDD and OCDF) the level of contamination to discount false positive results. If qualitative identification criteria are not met for an analyte, an estimated maximum possible concentration (EMPC) value is reported, and is qualified as a non-detect "U" (CLP18).

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0458, American Creosote **Contract Lab Case: 47674**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
SS1034RB001	C182506-01		AX27	Trip Blank - Water	6/8/18 08:15
MW08A	C182506-02		AX23	Groundwater	6/7/18 09:50
MW908A	C182506-03		AX26	Groundwater	6/7/18 09:50
MW08B	C182506-04		AX24	Groundwater	6/7/18 10:15
MW08C	C182506-05		AX25	Groundwater	6/7/18 14:30
SS1006F_A	C182506-06		AX40	Surface Soil	6/4/18 16:10
SS1006F_B	C182506-07		AX41	Surface Soil	6/4/18 16:13
SS1006R_A	C182506-08		AX42	Surface Soil	6/4/18 16:02
SS1006R_B	C182506-09		AX43	Surface Soil	6/4/18 16:08
SS1014F_A	C182506-10		AWW7	Surface Soil	6/6/18 08:53
SS1014F_B	C182506-11		AWW8	Surface Soil	6/6/18 08:58
SS1014R_A	C182506-12		AWW9	Surface Soil	6/6/18 09:05
SS1014R_B	C182506-13		AWX0	Surface Soil	6/6/18 09:10
SS91014R_A	C182506-14		AX46	Surface Soil	6/6/18 09:05
SS1015F_A	C182506-15		AWX1	Surface Soil	6/6/18 10:15
SS1015F_B	C182506-16		AWX2	Surface Soil	6/6/18 10:20
SS91015F_A	C182506-17		AX45	Surface Soil	6/6/18 10:15
SS1015R_A	C182506-18		AWX3	Surface Soil	6/6/18 10:23
SS1015R_B	C182506-19		AWX4	Surface Soil	6/6/18 10:25
SS1022F_A	C182506-20		AWX5	Surface Soil	6/4/18 11:33
SS1022F_B	C182506-21		AWX6	Surface Soil	6/4/18 11:35
SS1022R_A	C182506-22		AWX7	Surface Soil	6/4/18 11:40
SS1022R_B	C182506-23		AWX8	Surface Soil	6/4/18 11:45
SS1024F_A	C182506-24		AWX9	Surface Soil	6/4/18 15:15
SS1024F_B	C182506-25		AWY0	Surface Soil	6/4/18 15:20
SS1024R_A	C182506-26		AWY1	Surface Soil	6/4/18 15:08
SS1024R_B	C182506-27		AWY2	Surface Soil	6/4/18 15:12
SS1028F_A	C182506-28		AWZ1	Surface Soil	6/6/18 08:05
SS1028F_B	C182506-29		AWZ2	Surface Soil	6/6/18 08:10
SS1028R_A	C182506-30		AWZ3	Surface Soil	6/6/18 08:20
SS1028R_B	C182506-31		AWZ4	Surface Soil	6/6/18 08:25
SS1033F_A	C182506-32		AWZ9	Surface Soil	6/4/18 13:45
SS1033F_B	C182506-33		AX00	Surface Soil	6/4/18 13:48
SS91033F_A	C182506-34		AX44	Surface Soil	6/4/18 13:45

SS1033R_A	C182506-35	AX01	Surface Soil	6/4/18 13:52
SS1033R_B	C182506-36	AX02	Surface Soil	6/4/18 13:56
SS1034F_A	C182506-37	AX03	Surface Soil	6/8/18 09:05
SS1034F_B	C182506-38	AX04	Surface Soil	6/8/18 09:10
SS1034R_A	C182506-39	AX05	Surface Soil	6/8/18 09:18
SS1034R_B	C182506-40	AX06	Surface Soil	6/8/18 09:22
SS1048F_A	C182506-41	AX07	Surface Soil	6/6/18 09:45
SS1048F_B	C182506-42	AX08	Surface Soil	6/6/18 09:50
SS1048R_A	C182506-43	AX09	Surface Soil	6/6/18 09:52
SS1048R_B	C182506-44	AX10	Surface Soil	6/6/18 09:58
SS1049F_A	C182506-45	AX11	Surface Soil	6/6/18 11:10
SS1049F_B	C182506-46	AX12	Surface Soil	6/6/18 11:15
SS1049R_A	C182506-47	AX13	Surface Soil	6/6/18 11:19
SS1049R_B	C182506-48	AX14	Surface Soil	6/6/18 11:22
SS1054F_A	C182506-49	AX19	Surface Soil	6/4/18 10:55
SS1054F_B	C182506-50	AX20	Surface Soil	6/4/18 10:57
SS1054R_A	C182506-51	AX21	Surface Soil	6/4/18 11:00
SS1054R_B	C182506-52	AX22	Surface Soil	6/4/18 11:05

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DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP18	Estimated Maximum Possible Concentration (EMPC) Reported
CLP28	PE sample recovery scored as action high.
D-4	MRL elevated due to interferences.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.
QC-3	Analyte calibration criteria not met

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034RB001
Station ID:

Lab ID: C182506-01
Matrix: Trip Blank - Water

MD No:
D No: AX27 ARI

Date Collected: 6/8/18 8:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0031	J, CLP01	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0016	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0017	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0015	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0013	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0012	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0012	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0023	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0018	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.00099	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0011	U	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00064	U	ng/L	0.0099	6/23/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00078	U	ng/L	0.0099	6/23/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0047	J, Q-3	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0013	U, J, Q-3	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0011	U, J, Q-3	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.022	J, CLP01	ng/L	0.099	6/23/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0032	U	ng/L	0.099	6/23/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0023	U, J, Q-3	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0014	U, J, Q-3	ng/L	0.049	6/23/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0057	J, D-5	ng/L	0.0057	6/23/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0049	J, D-5	ng/L	0.0049	6/23/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0043	J, D-5	ng/L	0.0043	6/23/18	6/26/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00064	U, J, Q-3	ng/L	0.0099	6/23/18	6/26/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034RB001
Station ID:

Lab ID: C182506-01
Matrix: Trip Blank - Water

MD No:
D No: AX27 ARI

Date Collected: 6/8/18 8:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00078	U, J, Q-3	ng/L	0.0099	6/23/18	6/26/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW08A
Station ID: MW08A

Lab ID: C182506-02
Matrix: Groundwater

MD No:
D No: AX23 ARI

Date Collected: 6/7/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0012	U, CLP18	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0016	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0017	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0015	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0013	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0017	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.00097	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00063	U	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00050	U	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0023	J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0013	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0011	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.011	J, CLP01	ng/L	0.097	6/19/18	6/22/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0031	U	ng/L	0.097	6/19/18	6/22/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0022	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0014	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0053	J, D-5	ng/L	0.0053	6/19/18	6/22/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0047	J, D-5	ng/L	0.0047	6/19/18	6/22/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0041	J, D-5	ng/L	0.0041	6/19/18	6/22/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00063	U, J, Q-3	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW08A
Station ID: MW08A

Lab ID: C182506-02
Matrix: Groundwater

MD No:
D No: AX23 ARI

Date Collected: 6/7/18 9:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00050	U, J, Q-3	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW908A
Station ID: MW08A

Lab ID: C182506-03
Matrix: Groundwater

MD No:
D No: AX26 ARI

Date Collected: 6/7/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0016	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0017	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0015	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0013	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0017	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.00097	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00063	U	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00050	U	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.0012	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0013	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0011	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.0086	J, CLP01	ng/L	0.097	6/19/18	6/22/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0031	U	ng/L	0.097	6/19/18	6/22/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0022	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0014	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0053	J, D-5	ng/L	0.0053	6/19/18	6/22/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0047	J, D-5	ng/L	0.0047	6/19/18	6/22/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0041	J, D-5	ng/L	0.0041	6/19/18	6/22/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00063	U, J, Q-3	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW908A
Station ID: MW08A

Lab ID: C182506-03
Matrix: Groundwater

MD No:
D No: AX26 ARI

Date Collected: 6/7/18 9:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00050	U, J, Q-3	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW08B
Station ID: MW08B

Lab ID: C182506-04
Matrix: Groundwater

MD No:
D No: AX24 ARI

Date Collected: 6/7/18 10:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.020	J, CLP01	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0016	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0017	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0015	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0011	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0013	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0012	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0016	J, CLP01	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0011	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0018	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.00098	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0011	U	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00063	U	ng/L	0.0095	6/19/18	6/22/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00075	U	ng/L	0.0095	6/19/18	6/22/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.044	J, Q-3	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.011	J, Q-3	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0015	U, J, Q-3	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.56		ng/L	0.095	6/19/18	6/22/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0031	U	ng/L	0.095	6/19/18	6/22/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0022	U, J, Q-3	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0014	U, J, Q-3	ng/L	0.047	6/19/18	6/22/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0057	J, D-5	ng/L	0.0057	6/19/18	6/22/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0048	J, D-5	ng/L	0.0048	6/19/18	6/22/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0046	J, D-5	ng/L	0.0046	6/19/18	6/22/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00063	U, J, Q-3	ng/L	0.0095	6/19/18	6/22/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW08B

Station ID: MW08B

Lab ID: C182506-04

Matrix: Groundwater

MD No:

D No: AX24 ARI

Date Collected: 6/7/18 10:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00075	U, J, Q-3	ng/L	0.0095	6/19/18	6/22/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW08C
Station ID: MW08C

Lab ID: C182506-05
Matrix: Groundwater

MD No:
D No: AX25 ARI

Date Collected: 6/7/18 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0060	J, CLP01	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0016	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0017	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0015	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0013	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0012	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.0022	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.0018	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.00097	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.0011	U	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.00070	U	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00061	U	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	0.017	J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	0.0016	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	0.0080	J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.0011	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	0.072	J, CLP01	ng/L	0.097	6/19/18	6/22/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	0.0031	U	ng/L	0.097	6/19/18	6/22/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.0022	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.0014	U, J, Q-3	ng/L	0.049	6/19/18	6/22/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.0055	J, D-5	ng/L	0.0055	6/19/18	6/22/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.0048	J, D-5	ng/L	0.0048	6/19/18	6/22/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.0043	J, D-5	ng/L	0.0043	6/19/18	6/22/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.00070	U, J, Q-3	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: MW08C

Station ID: MW08C

Lab ID: C182506-05

Matrix: Groundwater

MD No:

D No: AX25 ARI

Date Collected: 6/7/18 14:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
30402-14-3	Tetrachlorodibenzofuran (Total)	0.00061	U, J, Q-3	ng/L	0.0097	6/19/18	6/22/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006F_A
Station ID: SS1006F

Lab ID: C182506-06
Matrix: Surface Soil

MD No:
D No: AX40 ARI

Date Collected: 6/4/18 16:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	15		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	180	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	50		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.75	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.46	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	9.4		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.67	U, D-4	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	310	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	33	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2100	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	150	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.6	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	200	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.5	J, D-5	ng/kg dry	7.5	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.6	J, D-5	ng/kg dry	5.6	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.2	J, D-5	ng/kg dry	7.2	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006F_A
Station ID: SS1006F

Lab ID: C182506-06
Matrix: Surface Soil

MD No:
D No: AX40 ARI

Date Collected: 6/4/18 16:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.5	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	48	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006F_B
Station ID: SS1006F

Lab ID: C182506-07
Matrix: Surface Soil

MD No:
D No: AX41 ARI

Date Collected: 6/4/18 16:13

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.7		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	240	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	71		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.4		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.2		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.68	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.8		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.20	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.0		ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	410	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	260	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	46	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	240	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2900	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	210	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.3	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	290	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.5	J, D-5	ng/kg dry	9.5	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	6.9	J, D-5	ng/kg dry	6.9	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.2	J, D-5	ng/kg dry	9.2	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006F_B
Station ID: SS1006F

Lab ID: C182506-07
Matrix: Surface Soil

MD No:
D No: AX41 ARI

Date Collected: 6/4/18 16:13

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.5	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	81	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006R_A
Station ID: SS1006R

Lab ID: C182506-08
Matrix: Surface Soil

MD No:
D No: AX42 ARI

Date Collected: 6/4/18 16:02

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.2		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	12	J, CLP28	ng/kg dry	5.0	6/24/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.15	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.23	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.41	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.12	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.49	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	25	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	3.9	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	3.2	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1.1	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	450	J, CLP28	ng/kg dry	10	6/24/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	4.2	J, CLP01, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.23	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.10	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.75	J, D-5	ng/kg dry	0.75	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.64	J, D-5	ng/kg dry	0.64	6/24/18	6/27/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006R_A
Station ID: SS1006R

Lab ID: C182506-08
Matrix: Surface Soil

MD No:
D No: AX42 ARI

Date Collected: 6/4/18 16:02

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.80	J, D-5	ng/kg dry	0.80	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.23	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	0.14	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006R_B
Station ID: SS1006R

Lab ID: C182506-09
Matrix: Surface Soil

MD No:
D No: AX43 ARI

Date Collected: 6/4/18 16:08

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.3		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	7.8	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.83	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.15	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.17	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.26	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.12	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.32	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.16	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2.3	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1.8	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.40	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	390	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	3.6	J, CLP01, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.22	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.14	U, J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.64	J, D-5	ng/kg dry	0.64	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.52	J, D-5	ng/kg dry	0.52	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1006R_B
Station ID: SS1006R

Lab ID: C182506-09
Matrix: Surface Soil

MD No:
D No: AX43 ARI

Date Collected: 6/4/18 16:08

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.62	J, D-5	ng/kg dry	0.62	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.070	U, J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	0.080	U, J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014F_A
Station ID: SS1014F

Lab ID: C182506-10
Matrix: Surface Soil

MD No:
D No: AWW7 ARI

Date Collected: 6/6/18 8:53

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.9		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1400	J, CLP28	ng/kg dry	4.9	6/14/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	200		ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	13		ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.6		ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.2		ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	33		ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	14		ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.63	U	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.1	U, CLP18	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.25	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.44	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2300	J, Q-3	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	770	J, Q-3	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	180	J, Q-3	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	15000	J, CLP02, CLP28	ng/kg dry	9.9	6/14/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	840	J, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	4.9	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	6/14/18	6/20/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014F_A
Station ID: SS1014F

Lab ID: C182506-10
Matrix: Surface Soil

MD No:
D No: AWW7 ARI

Date Collected: 6/6/18 8:53

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	31	J, D-5	ng/kg dry	31	6/14/18	6/20/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.7	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	9.4	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014F_B
Station ID: SS1014F

Lab ID: C182506-11
Matrix: Surface Soil

MD No:
D No: AWW8 ARI

Date Collected: 6/6/18 8:58

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.9		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	300	J, CLP28	ng/kg dry	5.0	6/14/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	47		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.4		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.52	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.93	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.26	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.3	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.22	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	540	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	58	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	55	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3200	J, CLP28	ng/kg dry	9.9	6/14/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	160	J, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	9.7	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.5	J, D-5	ng/kg dry	4.5	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.4	J, D-5	ng/kg dry	4.4	6/14/18	6/20/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.7	J, D-5	ng/kg dry	7.7	6/14/18	6/20/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014F_B
Station ID: SS1014F

Lab ID: C182506-11
Matrix: Surface Soil

MD No:
D No: AWW8 ARI

Date Collected: 6/6/18 8:58

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.9	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014R_A
Station ID: SS1014R

Lab ID: C182506-12
Matrix: Surface Soil

MD No:
D No: AWW9 ARI

Date Collected: 6/6/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.0		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1000	J, CLP28	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	220		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	8.8		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	8.2		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	27		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	19		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.62	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.5	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.44	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.34	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	630	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	190	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8200	J, CLP02, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	680	J, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	30	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	6/14/18	6/20/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014R_A
Station ID: SS1014R

Lab ID: C182506-12
Matrix: Surface Soil

MD No:
D No: AWW9 ARI

Date Collected: 6/6/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	27	J, D-5	ng/kg dry	27	6/14/18	6/20/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.5	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	8.3	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014R_B
Station ID: SS1014R

Lab ID: C182506-13
Matrix: Surface Soil

MD No:
D No: AWX0 ARI

Date Collected: 6/6/18 9:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.8		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	120	J, CLP28	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	27		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.55	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.28	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.54	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.90	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.23	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	73	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	26	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1000	J, CLP28	ng/kg dry	10	6/14/18	6/20/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	75	J, CLP28	ng/kg dry	10	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.3	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	4.4	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.0	J, D-5	ng/kg dry	2.0	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.2	J, D-5	ng/kg dry	2.2	6/14/18	6/20/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.4	J, D-5	ng/kg dry	3.4	6/14/18	6/20/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1014R_B
Station ID: SS1014R

Lab ID: C182506-13
Matrix: Surface Soil

MD No:
D No: AWX0 ARI

Date Collected: 6/6/18 9:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.4	J, Q-3	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS91014R_A
Station ID: SS1014R

Lab ID: C182506-14
Matrix: Surface Soil

MD No:
D No: AX46 ARI

Date Collected: 6/6/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.2		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1100	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	240		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	9.3		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	9.1		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.6	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.0		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	21		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.1	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.57	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.3	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.28	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.29	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	690	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	220	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8900	J, CLP02, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	740	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	16	J, D-5	ng/kg dry	16	6/24/18	6/27/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS91014R_A
Station ID: SS1014R

Lab ID: C182506-14
Matrix: Surface Soil

MD No:
D No: AX46 ARI

Date Collected: 6/6/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	29	J, D-5	ng/kg dry	29	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.0	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015F_A
Station ID: SS1015F

Lab ID: C182506-15
Matrix: Surface Soil

MD No:
D No: AWX1 ARI

Date Collected: 6/6/18 10:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.3		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1700	J, CLP28	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	470		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	32		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	8.1		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	47		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	5.7		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	16		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	3.4	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.85	U, D-4	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.35	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.68	J, CLP01	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2800	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1900	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	380	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	17000	J, CLP02, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1900	J, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	55	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	21	J, D-5	ng/kg dry	21	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	21	J, D-5	ng/kg dry	21	6/14/18	6/20/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015F_A
Station ID: SS1015F

Lab ID: C182506-15
Matrix: Surface Soil

MD No:
D No: AWX1 ARI

Date Collected: 6/6/18 10:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	42	J, D-5	ng/kg dry	42	6/14/18	6/20/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.2	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	22	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2

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Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015F_B
Station ID: SS1015F

Lab ID: C182506-16
Matrix: Surface Soil

MD No:
D No: AWX2 ARI

Date Collected: 6/6/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.6		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	150	J, CLP28	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	40		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.72	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.99	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.46	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.4	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.51	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.83	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.16	U, CLP18	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	230	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	29	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500	J, CLP28	ng/kg dry	10	6/14/18	6/20/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	160	J, CLP28	ng/kg dry	10	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.4	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.9	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.2	J, D-5	ng/kg dry	2.2	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.2	J, D-5	ng/kg dry	2.2	6/14/18	6/20/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.0	J, D-5	ng/kg dry	4.0	6/14/18	6/20/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015F_B
Station ID: SS1015F

Lab ID: C182506-16
Matrix: Surface Soil

MD No:
D No: AWX2 ARI

Date Collected: 6/6/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.71	J, Q-3	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.5	J, Q-3	ng/kg dry	1.0	6/14/18	6/20/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS91015F_A
Station ID: SS1015F

Lab ID: C182506-17
Matrix: Surface Soil

MD No:
D No: AX45 ARI

Date Collected: 6/6/18 10:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.4		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1800	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	470		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	32		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	8.0		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	49		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	6.2		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	16		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	3.5	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.90	U, D-4	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.33	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.74	J, CLP01	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2900	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2000	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	220	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	410	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	17000	J, CLP28, CLP02	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1900	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	19	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	64	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	22	J, D-5	ng/kg dry	22	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	22	J, D-5	ng/kg dry	22	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS91015F_A
Station ID: SS1015F

Lab ID: C182506-17
Matrix: Surface Soil

MD No:
D No: AX45 ARI

Date Collected: 6/6/18 10:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	44	J, D-5	ng/kg dry	44	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.7	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015R_A
Station ID: SS1015R

Lab ID: C182506-18
Matrix: Surface Soil

MD No:
D No: AWX3 ARI

Date Collected: 6/6/18 10:23

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.2		%		6/14/18	6/20/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	2900	J, CLP28	ng/kg dry	50	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	600		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	42		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	17		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	14		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	68		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	9.9		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	35		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	6.3		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.0	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	16		ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.0	U, CLP18	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.38	U, CLP18	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.64	J, CLP01	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	4100	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2400	J, Q-3	ng/kg dry	50	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	330	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	460	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	28000	J, CLP28	ng/kg dry	100	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2300	J, CLP28	ng/kg dry	9.9	6/14/18	6/20/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	24	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	5.0	6/14/18	6/20/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	31	J, D-5	ng/kg dry	31	6/14/18	6/20/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	34	J, D-5	ng/kg dry	34	6/14/18	6/20/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	68	J, D-5	ng/kg dry	68	6/14/18	6/20/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015R_A
Station ID: SS1015R

Lab ID: C182506-18
Matrix: Surface Soil

MD No:
D No: AWX3 ARI

Date Collected: 6/6/18 10:23

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.2	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	0.99	6/14/18	6/20/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015R_B
Station ID: SS1015R

Lab ID: C182506-19
Matrix: Surface Soil

MD No:
D No: AWX4 ARI

Date Collected: 6/6/18 10:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.2		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	390	J, CLP28	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	90		ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.5		ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	9.5		ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.5	U, CLP18	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.1		ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.68	U, CLP18	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.26	U, CLP18	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.51	U, CLP18	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.30	J, CLP01	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	590	J, Q-3	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	320	J, Q-3	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	48	J, Q-3	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	69	J, Q-3	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3600	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	310	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.4	J, Q-3	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	4.9	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.5	J, D-5	ng/kg dry	5.5	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.7	J, D-5	ng/kg dry	5.7	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	10	J, D-5	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1015R_B
Station ID: SS1015R

Lab ID: C182506-19
Matrix: Surface Soil

MD No:
D No: AWX4 ARI

Date Collected: 6/6/18 10:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.0	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	7.0	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022F_A
Station ID: SS1022F

Lab ID: C182506-20
Matrix: Surface Soil

MD No:
D No: AWX5 ARI

Date Collected: 6/4/18 11:33

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.2		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	26	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	4.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.20	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.33	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.16	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.77	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.15	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.58	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.20	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.12	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.31	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	51	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	6.8	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	4.1	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	300	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	12	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.9	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.80	J, D-5	ng/kg dry	0.80	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.73	J, D-5	ng/kg dry	0.73	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.98	J, D-5	ng/kg dry	0.98	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022F_A
Station ID: SS1022F

Lab ID: C182506-20
Matrix: Surface Soil

MD No:
D No: AWX5 ARI

Date Collected: 6/4/18 11:33

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.65	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022F_B
Station ID: SS1022F

Lab ID: C182506-21
Matrix: Surface Soil

MD No:
D No: AWX6 ARI

Date Collected: 6/4/18 11:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.7		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	4.7	J, CLP01, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.54	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.15	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.17	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.12	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.19	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.11	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	8.9	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1.5	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1.2	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	0.40	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	67	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1.5	J, CLP01, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.11	U, J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.14	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.61	J, D-5	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.50	J, D-5	ng/kg dry	0.0	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022F_B
Station ID: SS1022F

Lab ID: C182506-21
Matrix: Surface Soil

MD No:
D No: AWX6 ARI

Date Collected: 6/4/18 11:35

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	0.49	J, D-5	ng/kg dry	0.0	6/14/18	6/21/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.24	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.8	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022R_A
Station ID: SS1022R

Lab ID: C182506-22
Matrix: Surface Soil

MD No:
D No: AWX7 ARI

Date Collected: 6/4/18 11:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.8		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	280	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	110		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.0		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.3	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.43	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	8.4		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	510	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	250	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	59	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2700	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	170	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.6	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.7	J, D-5	ng/kg dry	7.7	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.0	J, D-5	ng/kg dry	7.0	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.7	J, D-5	ng/kg dry	9.6	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022R_A
Station ID: SS1022R

Lab ID: C182506-22
Matrix: Surface Soil

MD No:
D No: AWX7 ARI

Date Collected: 6/4/18 11:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.5	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022R_B
Station ID: SS1022R

Lab ID: C182506-23
Matrix: Surface Soil

MD No:
D No: AWX8 ARI

Date Collected: 6/4/18 11:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.3		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	39	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	29		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.49	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.42	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.46	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.74	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.45	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.27	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.19	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.4	U, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.83	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.18	J, CLP01	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	71	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	57	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	52	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	410	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	27	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.9	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	65	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.2	J, D-5	ng/kg dry	2.2	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1022R_B
Station ID: SS1022R

Lab ID: C182506-23
Matrix: Surface Soil

MD No:
D No: AWX8 ARI

Date Collected: 6/4/18 11:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.3	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024F_A
Station ID: SS1024F

Lab ID: C182506-24
Matrix: Surface Soil

MD No:
D No: AWX9 ARI

Date Collected: 6/4/18 15:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.8		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	750	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	140		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.6		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	6.1		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	19		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	10		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.5	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.95	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.9		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.21	U, CLP18	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.79	U, CLP18	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1300	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	440	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	7100	J, CLP02, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	440	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024F_A
Station ID: SS1024F

Lab ID: C182506-24
Matrix: Surface Soil

MD No:
D No: AWX9 ARI

Date Collected: 6/4/18 15:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	20	J, D-5	ng/kg dry	20	6/14/18	6/21/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.2	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024F_B
Station ID: SS1024F

Lab ID: C182506-25
Matrix: Surface Soil

MD No:
D No: AWY0 ARI

Date Collected: 6/4/18 15:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.6		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	180	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	38		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.3		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.9	U, D-4	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.38	J, CLP18	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.3		ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	310	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	40	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1700	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	94	J, CLP28	ng/kg dry	10	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	82	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.3	J, D-5	ng/kg dry	7.3	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	8.5	J, D-5	ng/kg dry	8.5	6/14/18	6/21/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024F_B
Station ID: SS1024F

Lab ID: C182506-25
Matrix: Surface Soil

MD No:
D No: AWY0 ARI

Date Collected: 6/4/18 15:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.6	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	1.0	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024R_A
Station ID: SS1024R

Lab ID: C182506-26
Matrix: Surface Soil

MD No:
D No: AWY1 ARI

Date Collected: 6/4/18 15:08

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.4		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	850	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	160		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	8.3		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	6.8		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	21		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.1	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.63	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.3		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U, CLP18	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.39	U, CLP18	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	490	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8600	J, CLP02, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	480	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	6/14/18	6/21/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024R_A
Station ID: SS1024R

Lab ID: C182506-26
Matrix: Surface Soil

MD No:
D No: AWY1 ARI

Date Collected: 6/4/18 15:08

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	21	J, D-5	ng/kg dry	21	6/14/18	6/21/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.5	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024R_B
Station ID: SS1024R

Lab ID: C182506-27
Matrix: Surface Soil

MD No:
D No: AWY2 ARI

Date Collected: 6/4/18 15:12

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.6		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	130	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	23		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.64	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.4	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.53	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.20	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.47	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.83	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.29	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.12	U, CLP18	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	230	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	68	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1200	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	64	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	4.1	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.0	J, D-5	ng/kg dry	2.0	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.1	J, D-5	ng/kg dry	2.1	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.4	J, D-5	ng/kg dry	3.4	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1024R_B
Station ID: SS1024R

Lab ID: C182506-27
Matrix: Surface Soil

MD No:
D No: AWY2 ARI

Date Collected: 6/4/18 15:12

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.2	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.3	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028F_A
Station ID: SS1028F

Lab ID: C182506-28
Matrix: Surface Soil

MD No:
D No: AWZ1 ARI

Date Collected: 6/6/18 8:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.2		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	280	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	98		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.6		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.3		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.76	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.48	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.55	J, CLP01	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	520	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	61	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	72	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2800	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	150	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.1	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.5	J, D-5	ng/kg dry	7.0	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	6.6	J, D-5	ng/kg dry	7.0	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.4	J, D-5	ng/kg dry	9.0	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028F_A
Station ID: SS1028F

Lab ID: C182506-28
Matrix: Surface Soil

MD No:
D No: AWZ1 ARI

Date Collected: 6/6/18 8:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.6	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028F_B
Station ID: SS1028F

Lab ID: C182506-29
Matrix: Surface Soil

MD No:
D No: AWZ2 ARI

Date Collected: 6/6/18 8:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.1		%		6/14/18	6/21/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	25	J, CLP28	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	11		ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.15	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.33	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.18	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.74	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.23	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.58	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.19	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.29	J, CLP01	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	J, CLP01	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	47	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	6.4	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	7.4	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	280	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	13	J, CLP28	ng/kg dry	9.9	6/14/18	6/21/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.86	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	4.7	J, Q-3	ng/kg dry	5.0	6/14/18	6/21/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	0.99	J, D-5	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.86	J, D-5	ng/kg dry	0.86	6/14/18	6/21/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.1	J, D-5	ng/kg dry	1.1	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028F_B
Station ID: SS1028F

Lab ID: C182506-29
Matrix: Surface Soil

MD No:
D No: AWZ2 ARI

Date Collected: 6/6/18 8:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.44	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.2	J, Q-3	ng/kg dry	0.99	6/14/18	6/21/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028R_A
Station ID: SS1028R

Lab ID: C182506-30
Matrix: Surface Soil

MD No:
D No: AWZ3 ARI

Date Collected: 6/6/18 8:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.5		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	80	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	21		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.93	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.88	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.79	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.84	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.40	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.82	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.53	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.28	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.77	J, CLP01	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	730	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	64	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.4	J, D-5	ng/kg dry	4.4	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.1	J, D-5	ng/kg dry	3.1	6/17/18	6/25/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.8	J, D-5	ng/kg dry	3.8	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028R_A
Station ID: SS1028R

Lab ID: C182506-30
Matrix: Surface Soil

MD No:
D No: AWZ3 ARI

Date Collected: 6/6/18 8:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.1	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028R_B
Station ID: SS1028R

Lab ID: C182506-31
Matrix: Surface Soil

MD No:
D No: AWZ4 ARI

Date Collected: 6/6/18 8:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.3		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	15	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.9	J	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.15	U	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.26	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.14	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.60	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.20	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.42	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.21	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.31	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.16	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.30	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.18	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	25	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	9.6	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	4.2	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	3.3	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	180	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	11	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.78	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.3	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	0.99	J, D-5	ng/kg dry	0.99	6/17/18	6/25/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.1	J, D-5	ng/kg dry	1.1	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1028R_B
Station ID: SS1028R

Lab ID: C182506-31
Matrix: Surface Soil

MD No:
D No: AWZ4 ARI

Date Collected: 6/6/18 8:25

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.83	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.9	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033F_A
Station ID: SS1033F

Lab ID: C182506-32
Matrix: Surface Soil

MD No:
D No: AWZ9 ARI

Date Collected: 6/4/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.4		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1100	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	180		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	9.3		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.4		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	25		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.6	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.23	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.27	J, CLP01	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	580	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	12000	J, CLP02, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	570	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033F_A
Station ID: SS1033F

Lab ID: C182506-32
Matrix: Surface Soil

MD No:
D No: AWZ9 ARI

Date Collected: 6/4/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	26	J, D-5	ng/kg dry	26	6/17/18	6/25/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.6	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033F_B
Station ID: SS1033F

Lab ID: C182506-33
Matrix: Surface Soil

MD No:
D No: AX00 ARI

Date Collected: 6/4/18 13:48

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.9		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	460	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	78		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	4.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.59	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.30	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.52	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.17	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	810	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	250	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	65	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	58	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5100	J, CLP02, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	250	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	8.0	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.2	J, D-5	ng/kg dry	5.2	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.8	J, D-5	ng/kg dry	5.8	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033F_B
Station ID: SS1033F

Lab ID: C182506-33
Matrix: Surface Soil

MD No:
D No: AX00 ARI

Date Collected: 6/4/18 13:48

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	6/17/18	6/25/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.2	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.4	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS91033F_A
Station ID: SS1033F

Lab ID: C182506-34
Matrix: Surface Soil

MD No:
D No: AX44 ARI

Date Collected: 6/4/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.3		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1100	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	180		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	9.9		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.1		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.7	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	24		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.0	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.5	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.52	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.1		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.24	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.28	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2000	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	590	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	12000	J, CLP02, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	590	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	6/24/18	6/27/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS91033F_A
Station ID: SS1033F

Lab ID: C182506-34
Matrix: Surface Soil

MD No:
D No: AX44 ARI

Date Collected: 6/4/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	26	J, D-5	ng/kg dry	26	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.9	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.2	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033R_A
Station ID: SS1033R

Lab ID: C182506-35
Matrix: Surface Soil

MD No:
D No: AX01 ARI

Date Collected: 6/4/18 13:52

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.0		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	540	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	96		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.6		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	14		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	6.5		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.85	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.67	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.32	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.27	J, CLP01	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	960	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	310	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	83	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	74	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5700	J, CLP02, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	310	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.7	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.8	J, D-5	ng/kg dry	6.8	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.3	J, D-5	ng/kg dry	7.3	6/17/18	6/25/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033R_A
Station ID: SS1033R

Lab ID: C182506-35
Matrix: Surface Soil

MD No:
D No: AX01 ARI

Date Collected: 6/4/18 13:52

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	14	J, D-5	ng/kg dry	14	6/17/18	6/25/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.1	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	6.1	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033R_B
Station ID: SS1033R

Lab ID: C182506-36
Matrix: Surface Soil

MD No:
D No: AX02 ARI

Date Collected: 6/4/18 13:56

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.7		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	76	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	15		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.81	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.56	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.5	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.22	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.30	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.15	U, D-4	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.56	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.18	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.56	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.14	J, CLP01	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	13	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	860	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	46	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.5	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.5	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.8	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.8	J, D-5	ng/kg dry	1.8	6/17/18	6/25/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.7	J, D-5	ng/kg dry	2.7	6/17/18	6/25/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1033R_B
Station ID: SS1033R

Lab ID: C182506-36
Matrix: Surface Soil

MD No:
D No: AX02 ARI

Date Collected: 6/4/18 13:56

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.2	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	8.1	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034F_A
Station ID: SS1034F

Lab ID: C182506-37
Matrix: Surface Soil

MD No:
D No: AX03 ARI

Date Collected: 6/8/18 9:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.9		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	2600	J, CLP28	ng/kg dry	50	6/24/18	6/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	740		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	60		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	8.2		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	110		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	73		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	16		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	9.8		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.8	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	39		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	7.8		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.24	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	4200	J, Q-3	ng/kg dry	50	6/24/18	6/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2500	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1100	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	29000	J, CLP28	ng/kg dry	100	6/24/18	6/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	1000	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	95	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	46	J, D-5	ng/kg dry	46	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	44	J, D-5	ng/kg dry	44	6/24/18	6/27/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	76	J, D-5	ng/kg dry	76	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034F_A
Station ID: SS1034F

Lab ID: C182506-37
Matrix: Surface Soil

MD No:
D No: AX03 ARI

Date Collected: 6/8/18 9:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.6	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034F_B
Station ID: SS1034F

Lab ID: C182506-38
Matrix: Surface Soil

MD No:
D No: AX04 ARI

Date Collected: 6/8/18 9:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.6		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	510	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	160		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	12		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.9	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	21		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	14		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.6	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.1	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.57	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.30	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	7.6		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.10	U	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	820	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	510	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	53	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	220	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5400	J, CLP02, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	200	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.4	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.6	J, D-5	ng/kg dry	9.6	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.1	J, D-5	ng/kg dry	9.1	6/24/18	6/27/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034F_B
Station ID: SS1034F

Lab ID: C182506-38
Matrix: Surface Soil

MD No:
D No: AX04 ARI

Date Collected: 6/8/18 9:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	15	J, D-5	ng/kg dry	15	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.94	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.0	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034R_A
Station ID: SS1034R

Lab ID: C182506-39
Matrix: Surface Soil

MD No:
D No: AX05 ARI

Date Collected: 6/8/18 9:18

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.4		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	570	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	120		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	6.2		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.4	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.3	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	16		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	7.8		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.75	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	6.6		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.8	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.27	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.63	J, CLP01	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1000	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	340	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	98	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5700	J, CLP02, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	320	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	48	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.7	J, D-5	ng/kg dry	9.7	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034R_A
Station ID: SS1034R

Lab ID: C182506-39
Matrix: Surface Soil

MD No:
D No: AX05 ARI

Date Collected: 6/8/18 9:18

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	16	J, D-5	ng/kg dry	16	6/24/18	6/27/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.7	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034R_B
Station ID: SS1034R

Lab ID: C182506-40
Matrix: Surface Soil

MD No:
D No: AX06 ARI

Date Collected: 6/8/18 9:22

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.3		%		6/24/18	6/27/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	52	J, CLP28	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	10		ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.67	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.37	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.50	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.42	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.79	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.21	U, CLP18	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.57	J, CLP01	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.11	U, CLP18	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	92	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	29	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	8.8	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	570	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	27	J, CLP28	ng/kg dry	10	6/24/18	6/27/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.70	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	4.1	J, Q-3	ng/kg dry	5.0	6/24/18	6/27/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.1	J, D-5	ng/kg dry	1.1	6/24/18	6/27/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.0	J, D-5	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.6	J, D-5	ng/kg dry	1.6	6/24/18	6/27/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1034R_B
Station ID: SS1034R

Lab ID: C182506-40
Matrix: Surface Soil

MD No:
D No: AX06 ARI

Date Collected: 6/8/18 9:22

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.44	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.3	J, Q-3	ng/kg dry	1.0	6/24/18	6/27/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048F_A
Station ID: SS1048F

Lab ID: C182506-41
Matrix: Surface Soil

MD No:
D No: AX07 ARI

Date Collected: 6/6/18 9:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.7		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	500	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	170		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	6.1		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	7.8		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	17		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	8.6		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.3		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.6	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	8.1		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.26	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.2		ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	950	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	370	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	280	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4700	J, CLP02, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	240	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	280	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	20	J, D-5	ng/kg dry	20	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	16	J, D-5	ng/kg dry	16	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048F_A
Station ID: SS1048F

Lab ID: C182506-41
Matrix: Surface Soil

MD No:
D No: AX07 ARI

Date Collected: 6/6/18 9:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	20	J, D-5	ng/kg dry	20	6/17/18	6/25/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	85	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048F_B
Station ID: SS1048F

Lab ID: C182506-42
Matrix: Surface Soil

MD No:
D No: AX08 ARI

Date Collected: 6/6/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.2		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	190	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	56		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.0		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.5	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.95	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.51	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.1	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	5.2	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.66	U, D-4	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	410	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	67	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1900	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	87	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	9.8	J, D-5	ng/kg dry	9.8	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.1	J, D-5	ng/kg dry	7.1	6/17/18	6/25/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	8.3	J, D-5	ng/kg dry	8.3	6/17/18	6/25/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048F_B
Station ID: SS1048F

Lab ID: C182506-42
Matrix: Surface Soil

MD No:
D No: AX08 ARI

Date Collected: 6/6/18 9:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.6	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048R_A
Station ID: SS1048R

Lab ID: C182506-43
Matrix: Surface Soil

MD No:
D No: AX09 ARI

Date Collected: 6/6/18 9:52

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.3		%		6/17/18	6/25/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	420	J, CLP28	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	72		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	10		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.7	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	6.2		ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.3	U, CLP18	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.37	U, CLP18	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	760	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	210	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	87	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	66	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3800	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	210	J, CLP28	ng/kg dry	10	6/17/18	6/25/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.8	J, QC-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	5.0	6/17/18	6/25/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.0	J, D-5	ng/kg dry	6.0	6/17/18	6/25/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	6.0	J, D-5	ng/kg dry	6.0	6/17/18	6/25/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	6/17/18	6/25/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048R_A
Station ID: SS1048R

Lab ID: C182506-43
Matrix: Surface Soil

MD No:
D No: AX09 ARI

Date Collected: 6/6/18 9:52

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.2	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.6	J, Q-3	ng/kg dry	1.0	6/17/18	6/25/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048R_B
Station ID: SS1048R

Lab ID: C182506-44
Matrix: Surface Soil

MD No:
D No: AX10 ARI

Date Collected: 6/6/18 9:58

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.3		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	52		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.95	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.78	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.69	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.39	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.45	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	220	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	31	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	43	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1100	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	58	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.0	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.8	J, D-5	ng/kg dry	3.8	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.1	J, D-5	ng/kg dry	3.1	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.2	J, D-5	ng/kg dry	4.2	6/17/18	6/26/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1048R_B
Station ID: SS1048R

Lab ID: C182506-44
Matrix: Surface Soil

MD No:
D No: AX10 ARI

Date Collected: 6/6/18 9:58

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.1	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	13	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049F_A
Station ID: SS1049F

Lab ID: C182506-45
Matrix: Surface Soil

MD No:
D No: AX11 ARI

Date Collected: 6/6/18 11:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.0		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	420	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	85		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.2		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	13		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	7.5		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.87	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.0	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.40	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.48	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	730	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	250	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	87	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	92	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3700	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	240	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.6	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.2	J, D-5	ng/kg dry	9.2	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	13	J, D-5	ng/kg dry	13	6/17/18	6/26/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049F_A
Station ID: SS1049F

Lab ID: C182506-45
Matrix: Surface Soil

MD No:
D No: AX11 ARI

Date Collected: 6/6/18 11:10

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.5	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049F_B
Station ID: SS1049F

Lab ID: C182506-46
Matrix: Surface Soil

MD No:
D No: AX12 ARI

Date Collected: 6/6/18 11:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.2		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	500	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	95		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.9		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	14		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.0		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.63	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.42	J, CLP01	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	880	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	290	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	110	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	4600	J, CLP02, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	280	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	70	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.9	J, D-5	ng/kg dry	9.9	6/17/18	6/26/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049F_B
Station ID: SS1049F

Lab ID: C182506-46
Matrix: Surface Soil

MD No:
D No: AX12 ARI

Date Collected: 6/6/18 11:15

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	15	J, D-5	ng/kg dry	15	6/17/18	6/26/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.4	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049R_A
Station ID: SS1049R

Lab ID: C182506-47
Matrix: Surface Soil

MD No:
D No: AX13 ARI

Date Collected: 6/6/18 11:19

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.2		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	290	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	64		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.6		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.0		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.69	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.47	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.9	U, D-4	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.57	J, CLP01	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	520	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	62	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	73	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2700	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	160	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	8.9	J, D-5	ng/kg dry	8.8	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	7.1	J, D-5	ng/kg dry	7.1	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.7	J, D-5	ng/kg dry	9.7	6/17/18	6/26/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049R_A
Station ID: SS1049R

Lab ID: C182506-47
Matrix: Surface Soil

MD No:
D No: AX13 ARI

Date Collected: 6/6/18 11:19

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.3	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049R_B
Station ID: SS1049R

Lab ID: C182506-48
Matrix: Surface Soil

MD No:
D No: AX14 ARI

Date Collected: 6/6/18 11:22

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.0		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	380	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	82		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	4.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	7.1		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	7.1	U, D-4	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.8		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.7		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.27	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.3		ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	740	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	240	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	98	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	3400	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	210	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	11	J, D-5	ng/kg dry	11	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	14	J, D-5	ng/kg dry	14	6/17/18	6/26/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1049R_B
Station ID: SS1049R

Lab ID: C182506-48
Matrix: Surface Soil

MD No:
D No: AX14 ARI

Date Collected: 6/6/18 11:22

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.0	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054F_A
Station ID: SS1054F

Lab ID: C182506-49
Matrix: Surface Soil

MD No:
D No: AX19 ARI

Date Collected: 6/4/18 10:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.1		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	100	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	18		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.82	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.76	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.78	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.38	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.45	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.21	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.40	J, CLP01	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	48	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1200	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	46	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.4	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	25	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.0	J, D-5	ng/kg dry	4.0	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.6	J, D-5	ng/kg dry	3.6	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054F_A
Station ID: SS1054F

Lab ID: C182506-49
Matrix: Surface Soil

MD No:
D No: AX19 ARI

Date Collected: 6/4/18 10:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.3	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054F_B
Station ID: SS1054F

Lab ID: C182506-50
Matrix: Surface Soil

MD No:
D No: AX20 ARI

Date Collected: 6/4/18 10:57

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.7		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	68	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	12		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.67	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.51	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.57	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.56	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.37	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.28	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.91	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.5	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.24	J, CLP01	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	31	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	870	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	36	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.4	J, D-5	ng/kg dry	2.4	6/17/18	6/26/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054F_B
Station ID: SS1054F

Lab ID: C182506-50
Matrix: Surface Soil

MD No:
D No: AX20 ARI

Date Collected: 6/4/18 10:57

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.0	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054R_A
Station ID: SS1054R

Lab ID: C182506-51
Matrix: Surface Soil

MD No:
D No: AX21 ARI

Date Collected: 6/4/18 11:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.6		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	39	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	8.9		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.40	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.44	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.31	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.88	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.18	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.36	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.19	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.53	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.28	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.19	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	70	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	9.1	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	450	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	18	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.4	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.5	J, D-5	ng/kg dry	1.5	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.7	J, D-5	ng/kg dry	1.7	6/17/18	6/26/18	CL HRSM01.2

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Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054R_A
Station ID: SS1054R

Lab ID: C182506-51
Matrix: Surface Soil

MD No:
D No: AX21 ARI

Date Collected: 6/4/18 11:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.3	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.9	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

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Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054R_B
Station ID: SS1054R

Lab ID: C182506-52
Matrix: Surface Soil

MD No:
D No: AX22 ARI

Date Collected: 6/4/18 11:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.1		%		6/17/18	6/26/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140	J, CLP28	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	40		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.3		ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.71	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.57	U, CLP18	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.22	U, CLP18	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.85	J, CLP01	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	93	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	55	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	45	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1300	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	61	J, CLP28	ng/kg dry	10	6/17/18	6/26/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.5	J, D-5	ng/kg dry	6.5	6/17/18	6/26/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.0	J, D-5	ng/kg dry	5.0	6/17/18	6/26/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	6.3	J, D-5	ng/kg dry	6.3	6/17/18	6/26/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0458, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0458, American Creosote

Contract Lab Case: 47674

Sample ID: SS1054R_B
Station ID: SS1054R

Lab ID: C182506-52
Matrix: Surface Soil

MD No:
D No: AX22 ARI

Date Collected: 6/4/18 11:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.8	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	1.0	6/17/18	6/26/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

September 6, 2018

4SESD-QATSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0530, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Report Narrative for Work Order: C183005 Analysis: DIO

Site Name: American Creosote, Pensacola, FL
Case 47722, ELEMENT Sample Nos. C183005-01 through C183005-19,
C183006-01 through C183006-02 (PES)

Dioxin Analysis: Analytical Resources, Inc., Tukwila, WA

The ESAT Work Team reviewed data for the project cited above consisting of 19 soil samples analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 2/20/18 and 2/25/18 and received by the laboratory on 6/26/2018. The final data package was received by the EPA on 8/01/18. The analytical results were reported in one sample delivery group (SDG) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation samples (PES) for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

Samples were collected between 2/20/18 and 2/25/18 and stored at < 6º C until shipment to the laboratory

The laboratory satisfied all technical holding time requirements.

The laboratory scored within warning limits for all analytes in the PES blind spike. Additionally, 1,2,3,4,6,7,8-HpCDD and OCDD were scored as PES contaminants at less than the Contract Required Quantitation Limit (CRQL). The laboratory scored within warning limits for all spiked analytes in the spiked PES.

The laboratory stated in the case narrative that "an application specific column [RTX-Dioxin2 - 60 meters long, 0.25 mm ID, 0.24 µm film thickness] recently developed by Restek" was used instead of the SOW specified DB-5 (primary) and DB-225 (2,3,7,8-TCDF confirmation) columns in Exhibit D, Sections 6.8.1.1.3 and 6.8.1.1.4. An alternative resolution test mixture consisting of 2,3,4,8-TCDF, 2,3,7,8-TCDF, and 3,4,6,7-TCDF was used at the beginning and ending of each analytical sequence to demonstrate that the method minimum valley between isomers of 25% was satisfied. The laboratory's performance provides comparable resolution for 2,3,7,8-TCDF analyzed on this single column as required by the SOW for the DB-225 confirmation column. The results for 2,3,7,8-TCDF are as reliable as those reported by other laboratories for other projects which have been identified (CLP10) as being confirmed on the DB-225 confirmation column. Additionally, retention time windows specified by the SOW do not apply to this specialty column, but data quality was not adversely impacted. The laboratory stated that "the column literature [included in submittals] may be used as a guide to the elution order. ARI has compiled data establishing retention time windows."

Recoveries of the labeled compound 13C12-1,2,3,7,8,9 HxCDF were less than the lower quality control limit in samples C183005-02 and 08. The corresponding 1,2,3,7,8,9 HxCDF results for these samples were qualified "J" (QI-1).

Only minimal Chlorodiphenyl Ether interferences with target congeners were observed for 2,3,7,8-TCDF in samples C183005-07 and 17, and for 1,2,3,7,8-PeCDF in samples C182506-15, 17, 25, 36, and 48, and for 2,3,4,7,8-PeCDF in sample C183005-19. These results were qualified "U" (D-4).

The concentration of OCDD exceeded the calibration range in samples C183005-02, 03, 15, and 17. These OCDD results were qualified "J" (CLP02). The SOW does not require the laboratory to perform dilutions for OCDD or OCDF.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL, the MDL or the EMPC as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

Results are reported as not detected at an elevated detection limit when method blank contamination is evident, or when one or more of the qualitative identification criteria have not been met. In the event of method blank contamination, detection limits may be raised as much as five times (10X for OCDD and OCDF) the level of contamination to discount false positive results. If qualitative identification criteria are not met for an analyte, an estimated maximum possible concentration (EMPC) value is reported, and is qualified as a non-detect "U" (CLP18).

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0530, American Creosote **Contract Lab Case: 47722**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
SS1000C	C183005-01		B0D6	Subsurface Soil	2/20/18 09:40
SS1002C	C183005-02		B0D7	Subsurface Soil	2/20/18 13:20
SS1003C	C183005-03		B0D8	Subsurface Soil	2/20/18 13:45
SS1004C	C183005-04		B0E0	Subsurface Soil	2/20/18 15:30
SS1008C	C183005-05		B0E4	Subsurface Soil	2/23/18 08:00
SS1009C	C183005-06		B0E5	Subsurface Soil	2/23/18 10:00
SS1010C	C183005-07		B0E7	Subsurface Soil	2/23/18 13:30
SS1011C	C183005-08		B0E6	Subsurface Soil	2/23/18 10:30
SS1016C	C183005-09		B0F3	Subsurface Soil	2/25/18 08:40
SS1029C	C183005-10		B0E3	Subsurface Soil	2/22/18 13:45
SS1030C	C183005-11		B0F1	Subsurface Soil	2/24/18 11:05
SS91030C	C183005-12		B0F2	Subsurface Soil	2/24/18 11:05
SS1038C	C183005-13		B0E1	Subsurface Soil	2/21/18 13:00
SS1039C	C183005-14		B0F4	Subsurface Soil	2/25/18 09:15
SS1042C	C183005-15		B0D9	Subsurface Soil	2/20/18 14:30
SS1043C	C183005-16		B0E8	Subsurface Soil	2/24/18 08:25
SS1045C	C183005-17		B0E9	Subsurface Soil	2/24/18 09:25
SS1046C	C183005-18		B0F0	Subsurface Soil	2/24/18 10:20
SS1053C	C183005-19		B0E2	Subsurface Soil	2/21/18 14:40

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP18	Estimated Maximum Possible Concentration (EMPC) Reported
D-4	MRL elevated due to interferences.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.
QI-1	Internal standard was outside of method control limits.

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1000C
Station ID: SS1000

Lab ID: C183005-01
Matrix: Subsurface Soil

MD No:
D No: B0D6 ARI

Date Collected: 2/20/18 9:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	16		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.96	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.32	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.55	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.24	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.37	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.22	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	60	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	61		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.0	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	2.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.0	J, D-5	ng/kg dry	2.0	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.2	J, D-5	ng/kg dry	3.2	7/01/18	7/10/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1000C
Station ID: SS1000

Lab ID: C183005-01
Matrix: Subsurface Soil

MD No:
D No: B0D6 ARI

Date Collected: 2/20/18 9:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.8	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.2	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1002C
Station ID: SS1002

Lab ID: C183005-02
Matrix: Subsurface Soil

MD No:
D No: B0D7 ARI

Date Collected: 2/20/18 13:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	970		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	180		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	12		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	10		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	6.3		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	7.1		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	19		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.7	J, CLP01, QI-1	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.9		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.41	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.43	J, CLP01	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	520	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	200	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9600	J, CLP02	ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	44	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	18	J, D-5	ng/kg dry	18	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	18	J, D-5	ng/kg dry	18	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	29	J, D-5	ng/kg dry	29	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1002C
Station ID: SS1002

Lab ID: C183005-02
Matrix: Subsurface Soil

MD No:
D No: B0D7 ARI

Date Collected: 2/20/18 13:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	6.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1003C
Station ID: SS1003

Lab ID: C183005-03
Matrix: Subsurface Soil

MD No:
D No: B0D8 ARI

Date Collected: 2/20/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	710		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	110		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	8.0		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	7.1		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.7		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	13		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.9	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.3	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.7	U	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.66	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.81	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1500	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	360	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	6600	CLP02	ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	370		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.5	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	12	J, D-5	ng/kg dry	12	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	20	J, D-5	ng/kg dry	20	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1003C
Station ID: SS1003

Lab ID: C183005-03
Matrix: Subsurface Soil

MD No:
D No: B0D8 ARI

Date Collected: 2/20/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1004C
Station ID: SS1004
Lab ID: C183005-04
Matrix: Subsurface Soil
MD No:
D No: B0E0 ARI

Date Collected: 2/20/18 15:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	72		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	11		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.67	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.49	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.18	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.82	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.24	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.35	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	32	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	12	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	7.2	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	720		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	36		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.1	J, D-5	ng/kg dry	1.1	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.1	J, D-5	ng/kg dry	1.1	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.9	J, D-5	ng/kg dry	1.9	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1004C
Station ID: SS1004

Lab ID: C183005-04
Matrix: Subsurface Soil

MD No:
D No: B0E0 ARI

Date Collected: 2/20/18 15:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.86	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.2	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1008C
Station ID: SS1008

Lab ID: C183005-05
Matrix: Subsurface Soil

MD No:
D No: B0E4 ARI

Date Collected: 2/23/18 8:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	220		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	32		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.88	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	4.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.14	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.56	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.18	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.080	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	380	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	32	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	25	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	100		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.3	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.8	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.3	J, D-5	ng/kg dry	2.3	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.1	J, D-5	ng/kg dry	5.1	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1008C
Station ID: SS1008

Lab ID: C183005-05
Matrix: Subsurface Soil

MD No:
D No: B0E4 ARI

Date Collected: 2/23/18 8:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.4	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.3	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1009C
Station ID: SS1009

Lab ID: C183005-06
Matrix: Subsurface Soil

MD No:
D No: B0E5 ARI

Date Collected: 2/23/18 10:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	79		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	15		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.59	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.78	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.28	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.25	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.51	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.15	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.54	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.21	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.11	J, CLP01	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	39	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	750		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	38		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.1	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.4	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.4	J, D-5	ng/kg dry	2.4	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1009C
Station ID: SS1009

Lab ID: C183005-06
Matrix: Subsurface Soil

MD No:
D No: B0E5 ARI

Date Collected: 2/23/18 10:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.6	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.1	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1010C
Station ID: SS1010

Lab ID: C183005-07
Matrix: Subsurface Soil

MD No:
D No: B0E7 ARI

Date Collected: 2/23/18 13:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	84		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	33		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.97	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	8.1		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.94	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	23		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.5		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.25	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.5	U, D-4	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	78	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	30	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	310	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	930		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	38		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	9.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	510	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.4	J, D-5	ng/kg dry	9.4	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.2	J, D-5	ng/kg dry	9.2	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1010C
Station ID: SS1010

Lab ID: C183005-07
Matrix: Subsurface Soil

MD No:
D No: B0E7 ARI

Date Collected: 2/23/18 13:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1011C
Station ID: SS1011

Lab ID: C183005-08
Matrix: Subsurface Soil

MD No:
D No: B0E6 ARI

Date Collected: 2/23/18 10:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		7/01/18	7/13/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	100		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.4	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.2		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	9.7		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.7	J, CLP01, QI-1	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.4	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	7.1		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.22	U, CLP18	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.7		ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	200	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	51	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	400	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	96		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	470	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	7/01/18	7/13/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	11	J, D-5	ng/kg dry	11	7/01/18	7/13/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1011C
Station ID: SS1011

Lab ID: C183005-08
Matrix: Subsurface Soil

MD No:
D No: B0E6 ARI

Date Collected: 2/23/18 10:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	160	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1016C
Station ID: SS1016

Lab ID: C183005-09
Matrix: Subsurface Soil

MD No:
D No: B0F3 ARI

Date Collected: 2/25/18 8:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3800		ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	630		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	16		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	78		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	17		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	64		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	7.3	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	10		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	28		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.47	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.30	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	5500	J, Q-3	ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	1900	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	460	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	470	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	33000		ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2000		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	75	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	42		ng/kg dry	42	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	49		ng/kg dry	49	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	91		ng/kg dry	91	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1016C
Station ID: SS1016

Lab ID: C183005-09
Matrix: Subsurface Soil

MD No:
D No: B0F3 ARI

Date Collected: 2/25/18 8:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	9.3	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	22	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1029C
Station ID: SS1029

Lab ID: C183005-10
Matrix: Subsurface Soil

MD No:
D No: B0E3 ARI

Date Collected: 2/22/18 13:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.3		%		7/01/18	7/13/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	12		ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.93	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.63	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.3	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.27	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.41	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.31	J, CLP01	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.33	U, CLP18	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.16	U, CLP18	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.22	U, CLP18	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	42	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2200		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	45		ng/kg dry	10	7/01/18	7/13/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/13/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	2.0	7/01/18	7/13/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.7	J, D-5	ng/kg dry	1.7	7/01/18	7/13/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.5	J, D-5	ng/kg dry	3.5	7/01/18	7/13/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1029C
Station ID: SS1029

Lab ID: C183005-10
Matrix: Subsurface Soil

MD No:
D No: B0E3 ARI

Date Collected: 2/22/18 13:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.0	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.9	J, Q-3	ng/kg dry	1.0	7/01/18	7/13/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1030C
Station ID: SS1030

Lab ID: C183005-11
Matrix: Subsurface Soil

MD No:
D No: B0F1 ARI

Date Collected: 2/24/18 11:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	52		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	9.3		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.43	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.34	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.92	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.33	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.12	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.54	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.28	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.13	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	89	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	8.5	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	550		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	26		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	3.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.3	J, D-5	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.7	J, D-5	ng/kg dry	2.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1030C
Station ID: SS1030

Lab ID: C183005-11
Matrix: Subsurface Soil

MD No:
D No: B0F1 ARI

Date Collected: 2/24/18 11:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.0	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS91030C
Station ID: SS1030
Lab ID: C183005-12
Matrix: Subsurface Soil
MD No:
D No: B0F2 ARI

Date Collected: 2/24/18 11:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.7		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	72		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	13		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.90	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.64	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.55	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.23	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.44	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.11	U	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.49	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.24	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	38	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	12	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	760		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	35		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.7	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	5.1	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.8	J, D-5	ng/kg dry	1.8	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.6	J, D-5	ng/kg dry	1.6	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.4	J, D-5	ng/kg dry	2.4	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS91030C
Station ID: SS1030

Lab ID: C183005-12
Matrix: Subsurface Soil

MD No:
D No: B0F2 ARI

Date Collected: 2/24/18 11:05

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	5.7	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1038C
Station ID: SS1038

Lab ID: C183005-13
Matrix: Subsurface Soil

MD No:
D No: B0E1 ARI

Date Collected: 2/21/18 13:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	18		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	280		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	46		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.8		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.78	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.97	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	510	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	45	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2400		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	120		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.0	J, D-5	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.5	J, D-5	ng/kg dry	4.5	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	7.8	J, D-5	ng/kg dry	7.8	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1038C
Station ID: SS1038

Lab ID: C183005-13
Matrix: Subsurface Soil

MD No:
D No: B0E1 ARI

Date Collected: 2/21/18 13:00

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.2	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1039C
Station ID: SS1039

Lab ID: C183005-14
Matrix: Subsurface Soil

MD No:
D No: B0F4 ARI

Date Collected: 2/25/18 9:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	57		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	32		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.71	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.45	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.99	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.87	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.38	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.33	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	530		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	33		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.2	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	81	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.0	J, D-5	ng/kg dry	4.0	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.9	J, D-5	ng/kg dry	2.9	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.3	J, D-5	ng/kg dry	3.3	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1039C
Station ID: SS1039

Lab ID: C183005-14
Matrix: Subsurface Soil

MD No:
D No: B0F4 ARI

Date Collected: 2/25/18 9:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1042C
Station ID: SS1042

Lab ID: C183005-15
Matrix: Subsurface Soil

MD No:
D No: B0D9 ARI

Date Collected: 2/20/18 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	13		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	5600		ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	810		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	77		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	26		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	27		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	130		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	22		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	46		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	9.7		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	42		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	4.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.39	U, CLP18	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.41	J, CLP01	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	8600	J, Q-3	ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	3000	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	530	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	830	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	64000	J, CLP02	ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	3200		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	42	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	54	J, D-5	ng/kg dry	54	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	59	J, D-5	ng/kg dry	59	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	130	J, D-5	ng/kg dry	130	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1042C
Station ID: SS1042

Lab ID: C183005-15
Matrix: Subsurface Soil

MD No:
D No: B0D9 ARI

Date Collected: 2/20/18 14:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	26	J, Q-3	ng/kg dry	0.99	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1043C
Station ID: SS1043

Lab ID: C183005-16
Matrix: Subsurface Soil

MD No:
D No: B0E8 ARI

Date Collected: 2/24/18 8:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	12		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	46		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.53	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.70	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.54	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.47	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.69	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	81	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	50	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	81	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	440		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	42		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.9	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.9	J, D-5	ng/kg dry	4.9	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.2	J, D-5	ng/kg dry	3.2	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.3	J, D-5	ng/kg dry	3.3	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1043C
Station ID: SS1043

Lab ID: C183005-16
Matrix: Subsurface Soil

MD No:
D No: B0E8 ARI

Date Collected: 2/24/18 8:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.4	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1045C
Station ID: SS1045

Lab ID: C183005-17
Matrix: Subsurface Soil

MD No:
D No: B0E9 ARI

Date Collected: 2/24/18 9:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.5		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	9100		ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1200		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	78		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	33		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	43		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	200		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	17		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	76		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	20		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	9.1		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	4.5	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	40		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.6		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.25	U, CLP18	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.4	U, D-4	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	18000	J, Q-3	ng/kg dry	50	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	5200	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	900	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1200	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	110000	J, CLP02	ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	5700		ng/kg dry	100	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	300	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	78	J, D-5	ng/kg dry	78	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	79	J, D-5	ng/kg dry	79	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	190	J, D-5	ng/kg dry	190	7/01/18	7/11/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1045C
Station ID: SS1045

Lab ID: C183005-17
Matrix: Subsurface Soil

MD No:
D No: B0E9 ARI

Date Collected: 2/24/18 9:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
41903-57-5	Tetrachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	79	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1046C
Station ID: SS1046

Lab ID: C183005-18
Matrix: Subsurface Soil

MD No:
D No: B0F0 ARI

Date Collected: 2/24/18 10:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	14		%		7/01/18	7/11/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	120		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.74	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.63	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.18	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.39	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.22	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.82	J, CLP01	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.38	U, CLP18	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.070	U	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.21	J, CLP01	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	230	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1300		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	59		ng/kg dry	10	7/01/18	7/11/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.6	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	6.8	J, Q-3	ng/kg dry	5.0	7/01/18	7/11/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.9	J, D-5	ng/kg dry	1.9	7/01/18	7/11/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.8	J, D-5	ng/kg dry	1.8	7/01/18	7/11/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.1	J, D-5	ng/kg dry	3.1	7/01/18	7/11/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1046C
Station ID: SS1046

Lab ID: C183005-18
Matrix: Subsurface Soil

MD No:
D No: B0F0 ARI

Date Collected: 2/24/18 10:20

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.50	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	3.0	J, Q-3	ng/kg dry	1.0	7/01/18	7/11/18	CL HRSM01.2

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Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1053C
Station ID: SS1053

Lab ID: C183005-19
Matrix: Subsurface Soil

MD No:
D No: B0E2 ARI

Date Collected: 2/21/18 14:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.8		%		7/01/18	7/10/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.2	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.0	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.9	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.92	U, CLP18	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.32	U, D-4	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.6	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.22	U, CLP18	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.0		ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	31	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	39	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	910		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	35		ng/kg dry	10	7/01/18	7/10/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.5	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	51	J, Q-3	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.2	J, D-5	ng/kg dry	7.2	7/01/18	7/10/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.2	J, D-5	ng/kg dry	4.2	7/01/18	7/10/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.0	J, D-5	ng/kg dry	5.0	7/01/18	7/10/18	CL HRSM01.2

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D.A.R.T. Id: 18-0530
Project: 18-0530, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0530, American Creosote

Contract Lab Case: 47722

Sample ID: SS1053C
Station ID: SS1053

Lab ID: C183005-19
Matrix: Subsurface Soil

MD No:
D No: B0E2 ARI

Date Collected: 2/21/18 14:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.9	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	67	J, Q-3	ng/kg dry	1.0	7/01/18	7/10/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

July 13, 2018

4SESD-ASB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0449, American Creosote
Superfund Remedial

FROM: Daniel Adams
ICS Analyst

THRU: Jeffrey Hendel, Chief
ASB Inorganic Chemistry Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and have been qualified by this laboratory if the applicable quality control criteria were not met. Verification is defined in Section 5.2 of the ASB LOQAM. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:	Method Used:	Accreditations:
Classical/Nutrient Analyses (CNA)		
Ammonia as N	EPA 350.1 (Water)	ISO
Classical/Nutrients	EPA 300.0 (Water)	ISO
Classical/Nutrients	SM 2320B (Water)	ISO
Classical/Nutrients	SM 5310B (Water)	ISO
Nitrate and/or Nitrite	EPA 353.2 (Water)	ISO
Phosphorous	EPA 365.1 (Water)	ISO

Sample Disposal Policy

Due to limited space for long term sample storage, ASB's policy is to dispose of samples on a periodic schedule. Air samples collected in summa canisters will be disposed of 30 days following the issuance of this report. All other sample media including original samples, sample extracts and or digestates will be disposed of, in accordance with applicable regulations, 60 days from the date of this report.

This sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time. If samples require storage beyond the 60-day period, please contact the Sample Control Coordinator by e-mail at R4SampleCustody@epa.gov.

cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0449, American Creosote

Sample ID	Laboratory ID	Matrix	Date Collected	Date Received
MW08A	E182305-02	Groundwater	6/7/18 09:50	6/8/18 10:05
MW908A	E182305-03	Groundwater	6/7/18 09:50	6/8/18 10:05
MW08B	E182305-04	Groundwater	6/7/18 10:15	6/8/18 10:05
MW08C	E182305-05	Groundwater	6/7/18 14:30	6/8/18 10:05

DATA QUALIFIER DEFINITIONS

U — The analyte was not detected at or above the reporting limit.

ACRONYMS AND ABBREVIATIONS

CAS — Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL — Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL — Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC — Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

ACCREDITATIONS:

ISO — ASB is accredited by ISO/IEC 17025, including an amplification for forensic accreditation through ANSI-ASQ National Accreditation Board.

Refer to the certificate and scope of accreditation AT-1644 at:
http://www.epa.gov/aboutepa/about-region-4s-science-and-ecosystem-support-division-sesd

NR — The EPA Region 4 Laboratory has not requested accreditation for this test.

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D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

Classical/Nutrient Analyses

Project: 18-0449, American Creosote

Sample ID: MW08A
Station ID: MW08A
Lab ID: E182305-02
Matrix: Groundwater

Date Collected: 6/7/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.33		mg/L	0.050	6/15/18 15:53	6/15/18 16:47	EPA 350.1
E1640192	Alkalinity, Total (as CaCO3)	88		mg/L	1.0	6/14/18 10:33	6/14/18 10:33	SM 2320B
14808-79-8	Sulfate as SO4	7.9		mg/L	0.10	6/13/18 16:28	6/15/18 2:02	EPA 300.0
E701250	Total Organic Carbon	4.5		mg/L	1.0	6/19/18 10:39	6/19/18 19:07	SM 5310B
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	6/12/18 11:00	6/12/18 15:19	EPA 353.2
7723-14-0	Total Phosphorus	0.038		mg/L	0.010	6/20/18 13:28	6/25/18 20:43	EPA 365.1

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D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

Classical/Nutrient Analyses

Project: 18-0449, American Creosote

Sample ID: MW908A
Station ID: MW08A
Lab ID: E182305-03
Matrix: Groundwater

Date Collected: 6/7/18 9:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.33		mg/L	0.050	6/15/18 15:53	6/15/18 16:47	EPA 350.1
E1640192	Alkalinity, Total (as CaCO3)	88		mg/L	1.0	6/14/18 10:41	6/14/18 10:41	SM 2320B
14808-79-8	Sulfate as SO4	8.1		mg/L	0.10	6/13/18 16:28	6/15/18 2:23	EPA 300.0
E701250	Total Organic Carbon	1.5		mg/L	1.0	6/19/18 10:39	6/19/18 19:31	SM 5310B
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	6/12/18 11:00	6/12/18 15:19	EPA 353.2
7723-14-0	Total Phosphorus	0.038		mg/L	0.010	6/20/18 13:28	6/25/18 20:43	EPA 365.1

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D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

Classical/Nutrient Analyses

Project: 18-0449, American Creosote

Sample ID: MW08B
Station ID: MW08B
Lab ID: E182305-04
Matrix: Groundwater

Date Collected: 6/7/18 10:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.22		mg/L	0.050	6/15/18 15:53	6/15/18 16:47	EPA 350.1
E1640192	Alkalinity, Total (as CaCO3)	38		mg/L	1.0	6/14/18 10:49	6/14/18 10:49	SM 2320B
14808-79-8	Sulfate as SO4	12		mg/L	0.10	6/13/18 16:28	6/15/18 2:45	EPA 300.0
E701250	Total Organic Carbon	1.0	U	mg/L	1.0	6/19/18 10:39	6/19/18 19:56	SM 5310B
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	6/12/18 11:00	6/12/18 15:19	EPA 353.2
7723-14-0	Total Phosphorus	0.042		mg/L	0.010	6/20/18 13:28	6/25/18 20:43	EPA 365.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

Classical/Nutrient Analyses

Project: 18-0449, American Creosote

Sample ID: MW08C
Station ID: MW08C
Lab ID: E182305-05
Matrix: Groundwater

Date Collected: 6/7/18 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.061		mg/L	0.050	6/15/18 15:53	6/15/18 16:47	EPA 350.1
E1640192	Alkalinity, Total (as CaCO3)	50		mg/L	1.0	6/14/18 11:02	6/14/18 11:02	SM 2320B
14808-79-8	Sulfate as SO4	10		mg/L	0.10	6/13/18 16:28	6/15/18 3:06	EPA 300.0
E701250	Total Organic Carbon	5.8		mg/L	1.0	6/19/18 10:39	6/19/18 20:21	SM 5310B
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	6/12/18 11:00	6/12/18 15:19	EPA 353.2
7723-14-0	Total Phosphorus	0.26		mg/L	0.010	6/20/18 13:28	6/25/18 20:43	EPA 365.1

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806014 - C 353.2 NO3-NO2										
Blank (1806014-BLK1)				Prepared & Analyzed: 06/12/18						
EPA 353.2										
Nitrate/Nitrite as N	U	0.050	mg/L							U
LCS (1806014-BS1)				Prepared & Analyzed: 06/12/18						
EPA 353.2										
Nitrate/Nitrite as N	0.47400	0.050	mg/L	0.50050		94.7	90-110			
Matrix Spike (1806014-MS1)		**Source: E182305-05**		Prepared & Analyzed: 06/12/18						
EPA 353.2										
Nitrate/Nitrite as N	0.48590	0.050	mg/L	0.50050	0.027300	91.6	90-110			
Matrix Spike Dup (1806014-MSD1)		**Source: E182305-05**		Prepared & Analyzed: 06/12/18						
EPA 353.2										
Nitrate/Nitrite as N	0.49770	0.050	mg/L	0.50050	0.027300	94.0	90-110	2.40	10	
MRL Verification (1806014-PS1)				Prepared & Analyzed: 06/12/18						
EPA 353.2										
Nitrate/Nitrite as N	0.045700	0.050	mg/L	0.050000		91.4	70-130			MRL-2, U
Batch 1806022 - C 300.0 Ion Chromat										
Blank (1806022-BLK1)				Prepared: 06/13/18 Analyzed: 06/14/18						
EPA 300.0										
Sulfate as SO4	U	0.10	mg/L							U
Blank (1806022-BLK2)				Prepared: 06/13/18 Analyzed: 06/15/18						
EPA 300.0										
Sulfate as SO4	U	0.10	mg/L							U
Blank (1806022-BLK3)				Prepared: 06/13/18 Analyzed: 06/15/18						
EPA 300.0										
Sulfate as SO4	U	0.10	mg/L							U
Matrix Spike (1806022-MS1)		**Source: E182401-01**		Prepared: 06/13/18 Analyzed: 06/14/18						
EPA 300.0										
Sulfate as SO4	199.58	0.10	mg/L	200.00	2.1590	98.7	90-110			

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806022 - C 300.0 Ion Chromat										
Matrix Spike (1806022-MS2)	**Source: E182305-05**			Prepared: 06/13/18 Analyzed: 06/15/18						
EPA 300.0										
Sulfate as SO4	206.33	0.10	mg/L	200.00	10.392	98.0	90-110			
MRL Verification (1806022-PS1)				Prepared: 06/13/18 Analyzed: 06/14/18						
EPA 300.0										
Sulfate as SO4	0.090000	0.10	mg/L	0.10000		90.0	70-130			MRL-2, U
Batch 1806025 - C 2320B Alkalinity										
Blank (1806025-BLK1)				Prepared & Analyzed: 06/14/18						
SM 2320B										
Alkalinity, Total (as CaCO3)	U	1.0	mg/L							U
LCS (1806025-BS1)				Prepared & Analyzed: 06/14/18						
SM 2320B										
Alkalinity, Total (as CaCO3)	49.974	1.0	mg/L	50.000		99.9	92-115			
LCS Dup (1806025-BSD1)				Prepared & Analyzed: 06/14/18						
SM 2320B										
Alkalinity, Total (as CaCO3)	46.809	1.0	mg/L	50.000		93.6	92-115	6.54	10	
Duplicate (1806025-DUP1)	**Source: E182401-04**			Prepared & Analyzed: 06/14/18						
SM 2320B										
Alkalinity, Total (as CaCO3)	2.4150	1.0	mg/L		2.0880			14.5	10	XD-2
Duplicate (1806025-DUP2)	**Source: E182305-04**			Prepared & Analyzed: 06/14/18						
SM 2320B										
Alkalinity, Total (as CaCO3)	37.373	1.0	mg/L		37.593			0.587	10	
MRL Verification (1806025-PS1)				Prepared & Analyzed: 06/14/18						
SM 2320B										
Alkalinity, Total (as CaCO3)	1.0020	1.0	mg/L	1.0000		100	72-135			MRL-2

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806035 - C 350.1 Ammonia										
Blank (1806035-BLK1)				Prepared & Analyzed: 06/15/18						
EPA 350.1										
Ammonia as N	U	0.050	mg/L							U
LCS (1806035-BS1)				Prepared & Analyzed: 06/15/18						
EPA 350.1										
Ammonia as N	0.98500	0.050	mg/L	0.99900		98.6	90-110			
Matrix Spike (1806035-MS1)	**Source: E182305-03**			Prepared & Analyzed: 06/15/18						
EPA 350.1										
Ammonia as N	1.2440	0.050	mg/L	0.99900	0.32900	91.6	90-110			
Matrix Spike Dup (1806035-MSD1)	**Source: E182305-03**			Prepared & Analyzed: 06/15/18						
EPA 350.1										
Ammonia as N	1.2500	0.050	mg/L	0.99900	0.32900	92.2	90-110	0.481	10	
MRL Verification (1806035-PS1)				Prepared & Analyzed: 06/15/18						
EPA 350.1										
Ammonia as N	0.041000	0.050	mg/L	0.050000		82.0	70-130			MRL-2, U
Batch 1806043 - C 415 TOC Wtr										
Blank (1806043-BLK1)				Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	U	1.0	mg/L							U
LCS (1806043-BS1)				Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	48.470	1.0	mg/L	50.000		96.9	90-110			
LCS (1806043-BS2)				Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	4.9670	1.0	mg/L	5.0000		99.3	90-110			
LCS Dup (1806043-BSD1)				Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	48.900	1.0	mg/L	50.000		97.8	90-110	0.883	10	

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806043 - C 415 TOC Wtr										
Matrix Spike (1806043-MS1)	**Source: E182305-05**			Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	55.590	1.0	mg/L	50.000	5.8360	99.5	86.7-107			
Matrix Spike Dup (1806043-MSD1)	**Source: E182305-05**			Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	55.070	1.0	mg/L	50.000	5.8360	98.5	86.7-107	0.940	10	
MRL Verification (1806043-PS1)				Prepared & Analyzed: 06/19/18						
SM 5310B										
Total Organic Carbon	1.0820	1.0	mg/L	1.0000		108	70-130			MRL-2
Batch 1806054 - C 365.1 TPhos										
Blank (1806054-BLK1)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
Blank (1806054-BLK2)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
Blank (1806054-BLK3)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
Blank (1806054-BLK4)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
LCS (1806054-BS1)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.36430	0.010	mg/L	0.36750		99.1	90-110			
LCS (1806054-BS2)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.36600	0.010	mg/L	0.36750		99.6	90-110			

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806054 - C 365.1 TPhos										
LCS (1806054-BS3)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.36140	0.010	mg/L	0.36750		98.3	90-110			
LCS (1806054-BS4)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.36040	0.010	mg/L	0.36750		98.1	90-110			
Matrix Spike (1806054-MS1)		**Source: E182305-02**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.52870	0.010	mg/L	0.50100	0.037600	98.0	90-110			
Matrix Spike (1806054-MS2)		**Source: E182401-07**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.50090	0.010	mg/L	0.50100	0.0051000	99.0	90-110			
Matrix Spike (1806054-MS3)		**Source: E182406-07**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.56400	0.010	mg/L	0.50100	0.071400	98.3	90-110			
Matrix Spike (1806054-MS4)		**Source: E182406-17**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.56880	0.010	mg/L	0.50100	0.073300	98.9	90-110			
Matrix Spike (1806054-MS5)		**Source: E182406-27**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.61580	0.010	mg/L	0.50100	0.14160	94.7	90-110			
Matrix Spike (1806054-MS6)		**Source: E182406-37**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.58580	0.010	mg/L	0.50100	0.091600	98.6	90-110			
Matrix Spike (1806054-MS7)		**Source: E182406-42**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.72270	0.010	mg/L	0.50100	0.23180	98.0	90-110			
Matrix Spike Dup (1806054-MSD1)		**Source: E182305-02**		Prepared: 06/20/18 Analyzed: 06/25/18						

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806054 - C 365.1 TPhos										
Matrix Spike Dup (1806054-MSD1)		**Source: E182305-02**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.52750	0.010	mg/L	0.50100	0.037600	97.8	90-110	0.227	10	
Matrix Spike Dup (1806054-MSD2)		**Source: E182401-07**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.49730	0.010	mg/L	0.50100	0.0051000	98.2	90-110	0.721	10	
Matrix Spike Dup (1806054-MSD3)		**Source: E182406-07**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.56790	0.010	mg/L	0.50100	0.071400	99.1	90-110	0.689	10	
Matrix Spike Dup (1806054-MSD4)		**Source: E182406-17**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.56720	0.010	mg/L	0.50100	0.073300	98.6	90-110	0.282	10	
Matrix Spike Dup (1806054-MSD5)		**Source: E182406-27**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.61100	0.010	mg/L	0.50100	0.14160	93.7	90-110	0.783	10	
Matrix Spike Dup (1806054-MSD6)		**Source: E182406-37**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.58600	0.010	mg/L	0.50100	0.091600	98.7	90-110	0.0341	10	
Matrix Spike Dup (1806054-MSD7)		**Source: E182406-42**		Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.73050	0.010	mg/L	0.50100	0.23180	99.5	90-110	1.07	10	
MRL Verification (1806054-PS1)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.0095000		mg/L	0.010000		95.0	70-130			MRL-2
MRL Verification (1806054-PS2)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.0091000		mg/L	0.010000		91.0	70-130			MRL-2
MRL Verification (1806054-PS3)				Prepared: 06/20/18 Analyzed: 06/25/18						

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D.A.R.T. Id: 18-0449
Project: 18-0449, American Creosote - Reported by Daniel Adams

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806054 - C 365.1 TPhos										
MRL Verification (1806054-PS3)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.0079000		mg/L	0.010000		79.0	70-130			MRL-2
MRL Verification (1806054-PS4)				Prepared: 06/20/18 Analyzed: 06/25/18						
EPA 365.1										
Total Phosphorus	0.0082000		mg/L	0.010000		82.0	70-130			MRL-2

Notes and Definitions for QC Samples

U	The analyte was not detected at or above the reporting limit.
MRL-2	MRL verification for Non-Potable Water matrix
XD-2	Duplicate results less than 5X MRL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

October 2, 2018

4SESD-QATSB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 18-0611, American Creosote
Superfund Remedial

FROM: Nancy Seabolt
Quality Assurance Section, Chemist

THRU: Sandra Aker, Chief
Quality Assurance Section

TO: Peter Thorpe

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Report Narrative for Work Order: C183801 Analysis: DIO

Site Name: American Creosote, Pensacola, FL
Case 47782, ELEMENT Sample Nos. C183801-01 through C183801-09,
C183802-01 through C183802-02 (PES)

Dioxin Analysis: Frontier Analytical Laboratory, El Dorado Hills, CA

The ESAT Work Team reviewed data for the project cited above consisting of nine soil samples. analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected between 7/24/18 and 7/25/18 and received by the on 07/31/18. The final data package was received by the EPA on 08/30/18. The analytical results were reported in one sample delivery group (SDG) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation samples (PES) for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

The laboratory satisfied all technical and contractual holding time requirements.

The laboratory scored within warning limits for all spiked analytes in the PES blind spike. OCDD was reported by the laboratory and scored as a PES contaminant at less than the Contract Required Quantitation Limit (CRQL) in the PES blind blank. All OCDD sample results exceeded 10X the concentration reported in the PES blind blank.

All 2,3,7,8-TCDF results were reported from the confirmatory DB-225 column (CLP10) except for sample C183801-09. This sample was apparently analyzed on the DB-225 column and was reported in the electronic data. However, neither raw supporting data nor a hardcopy reported result on a Form 1A-HR were included in the data package received. The SOW did not require that the confirmation be performed since the result was less than the CRQL on the DB-5 column. The 2,3,7,8-TCDF result was reported from the DB-5 column and considered to be not confirmed (CLP24).

Chlorodiphenyl Ether interferences with target congeners were not observed for any samples in this Case.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL or the

MDL as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value.

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

SAMPLES INCLUDED IN THIS REPORT

Project: 18-0611, American Creosote **Contract Lab Case: 47782**

Sample ID	Laboratory ID	MD#	D#	Matrix	Date Collected
SS1018F_A	C183801-01		B2F4	Surface Soil	7/24/18 15:30
SS1018F_B	C183801-02		B2F5	Subsurface Soil	7/24/18 15:35
SS1018R_A	C183801-03		B2F8	Surface Soil	7/24/18 15:45
SS1018R_B	C183801-04		B2F7	Subsurface Soil	7/24/18 15:50
SS91018F_A	C183801-05		B2F6	Surface Soil	7/24/18 15:30
SS1060F_A	C183801-06		B2F2	Surface Soil	7/25/18 17:40
SS1060F_B	C183801-07		B2F3	Subsurface Soil	7/25/18 17:45
SS1060R_A	C183801-08		B2F1	Surface Soil	7/25/18 17:50
SS1060R_B	C183801-09		B2F0	Subsurface Soil	7/25/18 17:55

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP10	2,3,7,8-TCDF confirmed by second column.
CLP24	Result has not been confirmed by second column analysis.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.

ACRONYMS AND ABBREVIATIONS

CAS — Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL — Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL — Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC — Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

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Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018F_A
Station ID: SS1018

Lab ID: C183801-01
Matrix: Surface Soil

MD No:
D No: B2F4 FRONT

Date Collected: 7/24/18 15:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.5		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	230		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	40		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.9		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.33	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.0	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.24	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.45	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.078	U	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.12	J, CLP01, CLP10	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	490	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	120	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	53	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	37	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2200		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	140		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	6.2	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	11	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.7	J, D-5	ng/kg dry	3.7	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	4.0	J, D-5	ng/kg dry	4.0	8/10/18	8/14/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018F_A
Station ID: SS1018

Lab ID: C183801-01
Matrix: Surface Soil

MD No:
D No: B2F4 FRONT

Date Collected: 7/24/18 15:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	6.6	J, D-5	ng/kg dry	6.6	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.84	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.9	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018F_B
Station ID: SS1018

Lab ID: C183801-02
Matrix: Subsurface Soil

MD No:
D No: B2F5 FRONT

Date Collected: 7/24/18 15:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.1		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	610		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	100		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.3		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	6.0		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	20		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	11		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.83	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.58	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.3		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.20	J, CLP01	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.48	J, CLP01, CLP10	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1400	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	330	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	140	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	100	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	5700		ng/kg dry	50	8/10/18	8/15/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	390		ng/kg dry	9.9	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	18	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	36	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2

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D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018F_B
Station ID: SS1018

Lab ID: C183801-02
Matrix: Subsurface Soil

MD No:
D No: B2F5 FRONT

Date Collected: 7/24/18 15:35

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	17	J, D-5	ng/kg dry	17	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2

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Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018R_A
Station ID: SS1018
Lab ID: C183801-03
Matrix: Surface Soil
MD No:
D No: B2F8 FRONT

Date Collected: 7/24/18 15:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	1.7		%		8/10/18	8/15/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	110		ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	20		ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.87	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.9	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.81	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.6	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.37	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.55	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.28	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.47	J, CLP01	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.084	U	ng/kg dry	1.0	8/10/18	8/15/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.22	J, CLP10, CLP01	ng/kg dry	1.0	8/10/18	8/15/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	58	J, Q-3	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	31	J, Q-3	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	21	J, Q-3	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1000		ng/kg dry	10	8/10/18	8/15/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	63		ng/kg dry	10	8/10/18	8/15/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.9	J, Q-3	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	6.7	J, Q-3	ng/kg dry	5.0	8/10/18	8/15/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.5	J, D-5	ng/kg dry	2.5	8/10/18	8/15/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.4	J, D-5	ng/kg dry	2.4	8/10/18	8/15/18	CL HRSM01.2

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D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018R_A
Station ID: SS1018

Lab ID: C183801-03
Matrix: Surface Soil

MD No:
D No: B2F8 FRONT

Date Collected: 7/24/18 15:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.6	J, D-5	ng/kg dry	3.6	8/10/18	8/15/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.1	J, Q-3	ng/kg dry	1.0	8/10/18	8/15/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	4.5	J, Q-3	ng/kg dry	1.0	8/10/18	8/15/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018R_B
Station ID: SS1018
Lab ID: C183801-04
Matrix: Subsurface Soil
MD No:
D No: B2F7 FRONT

Date Collected: 7/24/18 15:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	1.1		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	220		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	44		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	3.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.7	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	8.4		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	5.5		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.73	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.3	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.28	J, CLP01	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.93	J, CLP01, CLP10	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	430	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	130	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	75	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	53	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1900		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	120		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	17	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	7.4	J, D-5	ng/kg dry	7.4	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	6.3	J, D-5	ng/kg dry	6.3	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1018R_B
Station ID: SS1018

Lab ID: C183801-04
Matrix: Subsurface Soil

MD No:
D No: B2F7 FRONT

Date Collected: 7/24/18 15:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	8.3	J, D-5	ng/kg dry	8.3	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	7.4	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS91018F_A
Station ID: SS1018
Lab ID: C183801-05
Matrix: Surface Soil
MD No:
D No: B2F6 FRONT

Date Collected: 7/24/18 15:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.5		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	210		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	37		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.5	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	7.2		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.9	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.33	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.77	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.23	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.6	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.47	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.056	U	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.13	J, CLP01, CLP10	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	460	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	48	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	31	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	2100		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	130		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.8	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	6.9	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.3	J, D-5	ng/kg dry	3.3	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.6	J, D-5	ng/kg dry	3.6	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS91018F_A
Station ID: SS1018

Lab ID: C183801-05
Matrix: Surface Soil

MD No:
D No: B2F6 FRONT

Date Collected: 7/24/18 15:30

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.9	J, D-5	ng/kg dry	5.9	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.73	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.5	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060F_A
Station ID: SS1060

Lab ID: C183801-06
Matrix: Surface Soil

MD No:
D No: B2F2 FRONT

Date Collected: 7/25/18 17:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.9		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	140		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	27		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.7	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.3	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	3.9	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.85	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.33	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	J, CLP01	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.30	J, CLP01, CLP10	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	260	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	71	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	44	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	31	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1200		ng/kg dry	9.9	8/10/18	8/14/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	72		ng/kg dry	9.9	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	8.2	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	4.0	J, D-5	ng/kg dry	4.0	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.7	J, D-5	ng/kg dry	3.7	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060F_A
Station ID: SS1060

Lab ID: C183801-06
Matrix: Surface Soil

MD No:
D No: B2F2 FRONT

Date Collected: 7/25/18 17:40

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.0	J, D-5	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.6	J, Q-3	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	10	J, Q-3	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060F_B
Station ID: SS1060

Lab ID: C183801-07
Matrix: Subsurface Soil

MD No:
D No: B2F3 FRONT

Date Collected: 7/25/18 17:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	4.4		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	35		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	6.2		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.52	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.64	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.38	U	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.42	U	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.44	U	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.32	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.22	U	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.41	U	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.31	U	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.064	U	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.11	J, CLP01, CLP10	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	65	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	5.6	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	310		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	17		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	2.1	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	2.6	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.3	J, D-5	ng/kg dry	1.3	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060F_B
Station ID: SS1060

Lab ID: C183801-07
Matrix: Subsurface Soil

MD No:
D No: B2F3 FRONT

Date Collected: 7/25/18 17:45

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.5	J, D-5	ng/kg dry	1.5	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.48	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.5	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2

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Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060R_A
Station ID: SS1060

Lab ID: C183801-08
Matrix: Surface Soil

MD No:
D No: B2F1 FRONT

Date Collected: 7/25/18 17:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.3		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3900		ng/kg dry	50	8/10/18	8/15/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	89		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.1		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	5.5		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	60		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	32		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.84	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	4.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.15	J, CLP01	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.31	J, CLP01, CLP10	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	7700	J, Q-3	ng/kg dry	50	8/10/18	8/15/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	320	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	420	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	91	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	31000		ng/kg dry	100	8/10/18	8/15/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	310		ng/kg dry	9.9	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	16	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	17		ng/kg dry	17	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	15		ng/kg dry	15	8/10/18	8/14/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060R_A
Station ID: SS1060

Lab ID: C183801-08
Matrix: Surface Soil

MD No:
D No: B2F1 FRONT

Date Collected: 7/25/18 17:50

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	62		ng/kg dry	62	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	3.9	J, Q-3	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	0.99	8/10/18	8/14/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060R_B
Station ID: SS1060

Lab ID: C183801-09
Matrix: Subsurface Soil

MD No:
D No: B2F0 FRONT

Date Collected: 7/25/18 17:55

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.5		%		8/10/18	8/14/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1900		ng/kg dry	25	8/10/18	8/15/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	220		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	15		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	16		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	6.6		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	51		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	10		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	37		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	5.4		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.85	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	13		ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.3	J, CLP01	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.28	J, CLP01	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.38	J, CLP01, CLP24	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	3200	J, Q-3	ng/kg dry	25	8/10/18	8/15/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	590	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	300	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	220	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	15000		ng/kg dry	50	8/10/18	8/15/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	610		ng/kg dry	10	8/10/18	8/14/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	26	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	51	J, Q-3	ng/kg dry	5.0	8/10/18	8/14/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	22		ng/kg dry	22	8/10/18	8/14/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	25		ng/kg dry	25	8/10/18	8/14/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0611
Project: 18-0611, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0611, American Creosote

Contract Lab Case: 47782

Sample ID: SS1060R_B
Station ID: SS1060

Lab ID: C183801-09
Matrix: Subsurface Soil

MD No:
D No: B2F0 FRONT

Date Collected: 7/25/18 17:55

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	46		ng/kg dry	46	8/10/18	8/14/18	CL HRSM01.2
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.4	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	1.0	8/10/18	8/14/18	CL HRSM01.2

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10775 Central Port Drive
Orlando FL, 32824
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Thursday, August 9, 2018
Black & Veatch Special Projects Corp. (BL009)
Attn: Amy Callaway
1120 Sanctuary Pkwy, Suite 200
Alpharetta, GA 30009

RE: Laboratory Results for
Project Number: 47782, Project Name/Desc: TCLP Debris
ENCO Workorder(s): AB05540

Dear Amy Callaway,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Tuesday, July 31, 2018.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

David Camacho For Kaitlin Dylnicki

Project Manager

Enclosure(s)

SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: Debris **Lab ID: AB05540-01** **Sampled: 07/25/18 15:20** **Received: 07/31/18 09:50**

Parameter	Preparation	Hold Date/Time(s)		Prep Date/Time(s)		Analysis Date/Time(s)
EPA 6010C	EPA 3010A	01/21/19	01/30/19	08/03/18	13:51	08/06/18 13:01
EPA 7470A	EPA 7470A	08/22/18	08/30/18	08/02/18	12:44	08/03/18 09:09
EPA 8260B	EPA 5030B_MS	08/08/18	08/21/18	08/07/18	00:00	08/07/18 15:02
EPA 8270D	EPA 3510C_MS	08/01/18	09/12/18	08/03/18	11:36	08/07/18 15:38

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

SAMPLE DETECTION SUMMARY

Client ID: Debris **Lab ID:** AB05540-01

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Barium - TCLP	0.301		0.0500	0.250	mg/L	EPA 6010C	

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ANALYTICAL RESULTS

Description: Debris | **Lab Sample ID:** AB05540-01 | **Received:** 07/31/18 09:50
Matrix: Soil | **Sampled:** 07/25/18 15:20 | **Work Order:** AB05540
Project: TCLP Debris | **Sampled By:** Randolph, Morgan | **% Solids:**

TCLP Volatile Organics by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,1-Dichloroethene [75-35-4]^	0.094	UD	mg/L	100	0.094	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
1,2-Dichloroethane [107-06-2]^	0.063	UD	mg/L	100	0.063	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
2-Butanone [78-93-3]^	0.45	UD	mg/L	100	0.45	0.50	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Benzene [71-43-2]^	0.071	UD	mg/L	100	0.071	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Carbon Tetrachloride [56-23-5]^	0.094	UD	mg/L	100	0.094	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Chlorobenzene [108-90-7]^	0.072	UD	mg/L	100	0.072	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Chloroform [67-66-3]^	0.080	UD	mg/L	100	0.080	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Tetrachloroethene [127-18-4]^	0.076	UD	mg/L	100	0.076	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Trichloroethene [79-01-6]^	0.089	UD	mg/L	100	0.089	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	
Vinyl chloride [75-01-4]^	0.071	UD	mg/L	100	0.071	0.10	8H07025	EPA 8260B	08/07/18 15:02	MJH	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*0.050*	*1*	*0.0500*	*99 %*	*41-142*	*8H07025*	*EPA 8260B*	*08/07/18 15:02*	*MJH*	
Dibromofluoromethane	*0.052*	*1*	*0.0500*	*104 %*	*53-146*	*8H07025*	*EPA 8260B*	*08/07/18 15:02*	*MJH*	
Toluene-d8	*0.052*	*1*	*0.0500*	*104 %*	*41-146*	*8H07025*	*EPA 8260B*	*08/07/18 15:02*	*MJH*	

TCLP Semivolatile Organics by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,4-Dichlorobenzene [106-46-7]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
2,4,5-Trichlorophenol [95-95-4]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
2,4,6-Trichlorophenol [88-06-2]^	0.03	UD	mg/L	5	0.03	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
2,4-Dinitrotoluene [121-14-2]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
2-Methylphenol [95-48-7]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
3 & 4-Methylphenol [108-39-4/106-44-5]^	0.04	UD	mg/L	5	0.04	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
Hexachlorobenzene [118-74-1]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
Hexachlorobutadiene [87-68-3]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
Hexachloroethane [67-72-1]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
Nitrobenzene [98-95-3]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
Pentachlorophenol [87-86-5]^	0.04	UD	mg/L	5	0.04	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	
Pyridine [110-86-1]^	0.02	UD	mg/L	5	0.02	0.05	8H03005	EPA 8270D	08/07/18 15:38	jfi	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
2,4,6-Tribromophenol	*0.18*	*5*	*0.250*	*71 %*	*33-145*	*8H03005*	*EPA 8270D*	*08/07/18 15:38*	*jfi*	
2-Fluorobiphenyl	*0.26*	*5*	*0.250*	*104 %*	*32-116*	*8H03005*	*EPA 8270D*	*08/07/18 15:38*	*jfi*	
2-Fluorophenol	*0.15*	*5*	*0.250*	*60 %*	*11-100*	*8H03005*	*EPA 8270D*	*08/07/18 15:38*	*jfi*	
Nitrobenzene-d5	*0.22*	*5*	*0.250*	*90 %*	*24-107*	*8H03005*	*EPA 8270D*	*08/07/18 15:38*	*jfi*	
Phenol-d5	*0.11*	*5*	*0.250*	*42 %*	*10-100*	*8H03005*	*EPA 8270D*	*08/07/18 15:38*	*jfi*	
Terphenyl-d14	*0.25*	*5*	*0.250*	*101 %*	*52-150*	*8H03005*	*EPA 8270D*	*08/07/18 15:38*	*jfi*	

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ANALYTICAL RESULTS

Description: Debris	**Lab Sample ID:** AB05540-01	**Received:** 07/31/18 09:50
Matrix: Soil	**Sampled:** 07/25/18 15:20	**Work Order:** AB05540
Project: TCLP Debris	**Sampled By:** Randolph, Morgan	**% Solids:**

TCLP Metals by 6000/7000 Series Methods

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Mercury [7439-97-6]^	0.000230	U	mg/L	1	0.000230	0.00200	8H02012	EPA 7470A	08/03/18 09:09	CRG	

TCLP Metals by 6000/7000 Series Methods

^ - ENCO Jacksonville certified analyte [NELAC E82277]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Arsenic [7440-38-2]^	0.200	U	mg/L	1	0.200	0.250	8H03003	EPA 6010C	08/06/18 13:01	ACV	
Barium [7440-39-3]^	**0.301**		mg/L	1	0.0500	0.250	8H03003	EPA 6010C	08/06/18 13:01	ACV	
Cadmium [7440-43-9]^	0.0112	U	mg/L	1	0.0112	0.0250	8H03003	EPA 6010C	08/06/18 13:01	ACV	
Chromium [7440-47-3]^	0.0450	U	mg/L	1	0.0450	0.250	8H03003	EPA 6010C	08/06/18 13:01	ACV	
Lead [7439-92-1]^	0.0950	U	mg/L	1	0.0950	0.250	8H03003	EPA 6010C	08/06/18 13:01	ACV	
Selenium [7782-49-2]^	0.250	U	mg/L	1	0.250	1.00	8H03003	EPA 6010C	08/06/18 13:01	ACV	
Silver [7440-22-4]^	0.0185	U	mg/L	1	0.0185	0.250	8H03003	EPA 6010C	08/06/18 13:01	ACV	

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QUALITY CONTROL DATA

TCLP Volatile Organics by GCMS - Quality Control

Batch 8H07025 - EPA 5030B_MS

Blank (8H07025-BLK1) Prepared: 08/07/2018 00:00 Analyzed: 08/07/2018 14:04

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	0.00094	U	0.0010	mg/L							
1,2-Dichloroethane	0.00063	U	0.0010	mg/L							
2-Butanone	0.0045	U	0.0050	mg/L							
Benzene	0.00071	U	0.0010	mg/L							
Carbon Tetrachloride	0.00094	U	0.0010	mg/L							
Chlorobenzene	0.00072	U	0.0010	mg/L							
Chloroform	0.00080	U	0.0010	mg/L							
Tetrachloroethene	0.00076	U	0.0010	mg/L							
Trichloroethene	0.00089	U	0.0010	mg/L							
Vinyl chloride	0.00071	U	0.0010	mg/L							
4-Bromofluorobenzene	*0.049*			*mg/L*	*0.0500*		*98*	*41-142*			
Dibromofluoromethane	*0.050*			*mg/L*	*0.0500*		*100*	*53-146*			
Toluene-d8	*0.050*			*mg/L*	*0.0500*		*101*	*41-146*			

Blank (8H07025-BLK2) Prepared: 08/07/2018 00:00 Analyzed: 08/07/2018 14:33

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	0.094	UD	0.10	mg/L							
1,2-Dichloroethane	0.063	UD	0.10	mg/L							
2-Butanone	0.45	UD	0.50	mg/L							
Benzene	0.071	UD	0.10	mg/L							
Carbon Tetrachloride	0.094	UD	0.10	mg/L							
Chlorobenzene	0.072	UD	0.10	mg/L							
Chloroform	0.080	UD	0.10	mg/L							
Tetrachloroethene	0.076	UD	0.10	mg/L							
Trichloroethene	0.089	UD	0.10	mg/L							
Vinyl chloride	0.071	UD	0.10	mg/L							
4-Bromofluorobenzene	*0.049*			*mg/L*	*0.0500*		*99*	*41-142*			
Dibromofluoromethane	*0.052*			*mg/L*	*0.0500*		*103*	*53-146*			
Toluene-d8	*0.051*			*mg/L*	*0.0500*		*102*	*41-146*			

LCS (8H07025-BS1) Prepared: 08/07/2018 00:00 Analyzed: 08/07/2018 12:35

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	0.023		0.0010	mg/L	0.0200		114	47-139			
Benzene	0.021		0.0010	mg/L	0.0200		107	56-136			
Chlorobenzene	0.020		0.0010	mg/L	0.0200		102	51-139			
Trichloroethene	0.020		0.0010	mg/L	0.0200		101	62-135			
4-Bromofluorobenzene	*0.049*			*mg/L*	*0.0500*		*98*	*41-142*			
Dibromofluoromethane	*0.050*			*mg/L*	*0.0500*		*101*	*53-146*			
Toluene-d8	*0.051*			*mg/L*	*0.0500*		*102*	*41-146*			

Matrix Spike (8H07025-MS1) Prepared: 08/07/2018 00:00 Analyzed: 08/07/2018 15:32

Source: AB05540-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	2.4		0.10	mg/L	2.00	0.094 U	121	47-139			
Benzene	2.3		0.10	mg/L	2.00	0.071 U	115	56-136			

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL DATA

TCLP Volatile Organics by GCMS - Quality Control

Batch 8H07025 - EPA 5030B_MS - Continued

Matrix Spike (8H07025-MS1) Continued Prepared: 08/07/2018 00:00 Analyzed: 08/07/2018 15:32

Source: AB05540-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chlorobenzene	2.2		0.10	mg/L	2.00	0.072 U	110	51-139			
Trichloroethene	2.2		0.10	mg/L	2.00	0.089 U	111	62-135			
4-Bromofluorobenzene	*4.9*			*mg/L*	*5.00*		*99*	*41-142*			
Dibromofluoromethane	*5.3*			*mg/L*	*5.00*		*105*	*53-146*			
Toluene-d8	*5.1*			*mg/L*	*5.00*		*103*	*41-146*			

Matrix Spike Dup (8H07025-MSD1) Prepared: 08/07/2018 00:00 Analyzed: 08/07/2018 16:01

Source: AB05540-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	2.4		0.10	mg/L	2.00	0.094 U	118	47-139	2	16	
Benzene	2.2		0.10	mg/L	2.00	0.071 U	112	56-136	2	14	
Chlorobenzene	2.1		0.10	mg/L	2.00	0.072 U	105	51-139	4	13	
Trichloroethene	2.2		0.10	mg/L	2.00	0.089 U	108	62-135	3	20	
4-Bromofluorobenzene	*4.9*			*mg/L*	*5.00*		*99*	*41-142*			
Dibromofluoromethane	*5.1*			*mg/L*	*5.00*		*103*	*53-146*			
Toluene-d8	*5.1*			*mg/L*	*5.00*		*103*	*41-146*			

TCLP Semivolatile Organics by GCMS - Quality Control

Batch 8H03005 - EPA 3510C_MS

Blank (8H03005-BLK1) Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 12:05

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	0.0006	U	0.002	mg/L							
2,4,5-Trichlorophenol	0.0008	U	0.002	mg/L							
2,4,6-Trichlorophenol	0.001	U	0.002	mg/L							
2,4-Dinitrotoluene	0.0006	U	0.002	mg/L							
2-Methylphenol	0.0007	U	0.002	mg/L							
3 & 4-Methylphenol	0.002	U	0.002	mg/L							
Hexachlorobenzene	0.0006	U	0.002	mg/L							
Hexachlorobutadiene	0.0008	U	0.002	mg/L							
Hexachloroethane	0.0006	U	0.002	mg/L							
Nitrobenzene	0.0006	U	0.002	mg/L							
Pentachlorophenol	0.002	U	0.002	mg/L							
Pyridine	0.0007	U	0.002	mg/L							
2,4,6-Tribromophenol	*0.041*			*mg/L*	*0.0500*		*83*	*33-145*			
2-Fluorobiphenyl	*0.043*			*mg/L*	*0.0500*		*86*	*32-116*			
2-Fluorophenol	*0.026*			*mg/L*	*0.0500*		*51*	*11-100*			
Nitrobenzene-d5	*0.037*			*mg/L*	*0.0500*		*74*	*24-107*			
Phenol-d5	*0.019*			*mg/L*	*0.0500*		*37*	*10-100*			
Terphenyl-d14	*0.050*			*mg/L*	*0.0500*		*99*	*52-150*			

Blank (8H03005-BLK2) Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 12:36

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	0.003	U	0.01	mg/L							
2,4,5-Trichlorophenol	0.004	U	0.01	mg/L							

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QUALITY CONTROL DATA

TCLP Semivolatile Organics by GCMS - Quality Control

Batch 8H03005 - EPA 3510C_MS - Continued

Blank (8H03005-BLK2) Continued Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 12:36

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
2,4,6-Trichlorophenol	0.006	U	0.01	mg/L							
2,4-Dinitrotoluene	0.003	U	0.01	mg/L							
2-Methylphenol	0.004	U	0.01	mg/L							
3 & 4-Methylphenol	0.008	U	0.01	mg/L							
Hexachlorobenzene	0.003	U	0.01	mg/L							
Hexachlorobutadiene	0.004	U	0.01	mg/L							
Hexachloroethane	0.003	U	0.01	mg/L							
Nitrobenzene	0.003	U	0.01	mg/L							
Pentachlorophenol	0.008	U	0.01	mg/L							
Pyridine	0.004	U	0.01	mg/L							
2,4,6-Tribromophenol	*0.22*			*mg/L*	*0.250*		*87*	*33-145*			
2-Fluorobiphenyl	*0.21*			*mg/L*	*0.250*		*85*	*32-116*			
2-Fluorophenol	*0.12*			*mg/L*	*0.250*		*47*	*11-100*			
Nitrobenzene-d5	*0.18*			*mg/L*	*0.250*		*71*	*24-107*			
Phenol-d5	*0.088*			*mg/L*	*0.250*		*35*	*10-100*			
Terphenyl-d14	*0.25*			*mg/L*	*0.250*		*101*	*52-150*			

Blank (8H03005-BLK3) Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 13:06

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	0.003	U	0.01	mg/L							
2,4,5-Trichlorophenol	0.004	U	0.01	mg/L							
2,4,6-Trichlorophenol	0.006	U	0.01	mg/L							
2,4-Dinitrotoluene	0.003	U	0.01	mg/L							
2-Methylphenol	0.004	U	0.01	mg/L							
3 & 4-Methylphenol	0.008	U	0.01	mg/L							
Hexachlorobenzene	0.003	U	0.01	mg/L							
Hexachlorobutadiene	0.004	U	0.01	mg/L							
Hexachloroethane	0.003	U	0.01	mg/L							
Nitrobenzene	0.003	U	0.01	mg/L							
Pentachlorophenol	0.008	U	0.01	mg/L							
Pyridine	0.004	U	0.01	mg/L							
2,4,6-Tribromophenol	*0.17*			*mg/L*	*0.250*		*68*	*33-145*			
2-Fluorobiphenyl	*0.17*			*mg/L*	*0.250*		*67*	*32-116*			
2-Fluorophenol	*0.10*			*mg/L*	*0.250*		*40*	*11-100*			
Nitrobenzene-d5	*0.15*			*mg/L*	*0.250*		*59*	*24-107*			
Phenol-d5	*0.075*			*mg/L*	*0.250*		*30*	*10-100*			
Terphenyl-d14	*0.22*			*mg/L*	*0.250*		*87*	*52-150*			

LCS (8H03005-BS1) Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 13:36

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	0.02		0.002	mg/L	0.0500		45	10-101			
Pentachlorophenol	0.04		0.002	mg/L	0.0500		78	5-139			
2,4,6-Tribromophenol	*0.033*			*mg/L*	*0.0500*		*67*	*33-145*			
2-Fluorobiphenyl	*0.035*			*mg/L*	*0.0500*		*70*	*32-116*			
2-Fluorophenol	*0.023*			*mg/L*	*0.0500*		*46*	*11-100*			
Nitrobenzene-d5	*0.033*			*mg/L*	*0.0500*		*67*	*24-107*			

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QUALITY CONTROL DATA

TCLP Semivolatile Organics by GCMS - Quality Control

Batch 8H03005 - EPA 3510C_MS - Continued

LCS (8H03005-BS1) Continued Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 13:36

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phenol-d5	*0.017*			*mg/L*	*0.0500*		*34*	*10-100*			
Terphenyl-d14	*0.042*			*mg/L*	*0.0500*		*83*	*52-150*			

Matrix Spike (8H03005-MS1) Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 14:07

Source: AB05401-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	0.10	D	0.05	mg/L	0.250	0.02 U	42	10-101			
Pentachlorophenol	0.15	D	0.05	mg/L	0.250	0.04 U	61	5-139			
2,4,6-Tribromophenol	*0.14*			*mg/L*	*0.250*		*56*	*33-145*			
2-Fluorobiphenyl	*0.17*			*mg/L*	*0.250*		*67*	*32-116*			
2-Fluorophenol	*0.098*			*mg/L*	*0.250*		*39*	*11-100*			
Nitrobenzene-d5	*0.15*			*mg/L*	*0.250*		*62*	*24-107*			
Phenol-d5	*0.073*			*mg/L*	*0.250*		*29*	*10-100*			
Terphenyl-d14	*0.20*			*mg/L*	*0.250*		*82*	*52-150*			

Matrix Spike Dup (8H03005-MSD1) Prepared: 08/03/2018 11:36 Analyzed: 08/07/2018 14:37

Source: AB05401-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	0.15	D	0.05	mg/L	0.250	0.02 U	62	10-101	38	18	QM-11
Pentachlorophenol	0.20	D	0.05	mg/L	0.250	0.04 U	80	5-139	27	23	QM-11
2,4,6-Tribromophenol	*0.19*			*mg/L*	*0.250*		*74*	*33-145*			
2-Fluorobiphenyl	*0.23*			*mg/L*	*0.250*		*91*	*32-116*			
2-Fluorophenol	*0.14*			*mg/L*	*0.250*		*57*	*11-100*			
Nitrobenzene-d5	*0.22*			*mg/L*	*0.250*		*88*	*24-107*			
Phenol-d5	*0.10*			*mg/L*	*0.250*		*42*	*10-100*			
Terphenyl-d14	*0.25*			*mg/L*	*0.250*		*101*	*52-150*			

TCLP Metals by 6000/7000 Series Methods - Quality Control

Batch 8H02012 - EPA 7470A

Blank (8H02012-BLK1) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 07:41

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	2.30E-5	U	0.000200	mg/L							

Blank (8H02012-BLK2) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 07:44

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.000230	U	0.00200	mg/L							

Blank (8H02012-BLK3) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 07:47

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.000230	U	0.00200	mg/L							

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL DATA

TCLP Metals by 6000/7000 Series Methods - Quality Control

Batch 8H02012 - EPA 7470A - Continued

Blank (8H02012-BLK4) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 07:50

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.000230	U	0.00200	mg/L							

LCS (8H02012-BS1) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 07:53

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.00522		0.000200	mg/L	0.00500		104	80-120			

Matrix Spike (8H02012-MS1) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 07:59

Source: AB05523-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.0507		0.00200	mg/L	0.0500	0.000230 U	101	75-125			

Matrix Spike Dup (8H02012-MSD1) Prepared: 08/02/2018 12:44 Analyzed: 08/03/2018 08:02

Source: AB05523-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.0505		0.00200	mg/L	0.0500	0.000230 U	101	75-125	0.4	20	

TCLP Metals by 6000/7000 Series Methods - Quality Control

Batch 8H03003 - EPA 3010A

Blank (8H03003-BLK1) Prepared: 08/03/2018 13:51 Analyzed: 08/06/2018 12:40

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.200	U	0.250	mg/L							
Barium	0.0500	U	0.250	mg/L							
Cadmium	0.0112	U	0.0250	mg/L							
Chromium	0.0450	U	0.250	mg/L							
Lead	0.0950	U	0.250	mg/L							
Selenium	0.250	U	1.00	mg/L							
Silver	0.0185	U	0.250	mg/L							

Blank (8H03003-BLK2) Prepared: 08/03/2018 13:51 Analyzed: 08/06/2018 12:41

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.200	U	0.250	mg/L							
Barium	0.0500	U	0.250	mg/L							
Cadmium	0.0112	U	0.0250	mg/L							
Chromium	0.0450	U	0.250	mg/L							
Lead	0.0950	U	0.250	mg/L							
Selenium	0.250	U	1.00	mg/L							
Silver	0.0185	U	0.250	mg/L							

LCS (8H03003-BS1) Prepared: 08/03/2018 13:51 Analyzed: 08/06/2018 12:43

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	12.4		0.250	mg/L	12.5		99	80-120			
Barium	12.6		0.250	mg/L	12.5		101	80-120			

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QUALITY CONTROL DATA

TCLP Metals by 6000/7000 Series Methods - Quality Control

Batch 8H03003 - EPA 3010A - Continued

LCS (8H03003-BS1) Continued Prepared: 08/03/2018 13:51 Analyzed: 08/06/2018 12:43

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cadmium	1.25		0.0250	mg/L	1.25		100	80-120			
Chromium	12.6		0.250	mg/L	12.5		101	80-120			
Lead	13.2		0.250	mg/L	12.5		105	80-120			
Selenium	12.2		1.00	mg/L	12.5		97	80-120			
Silver	2.57		0.250	mg/L	2.50		103	80-120			

Matrix Spike (8H03003-MS1) Prepared: 08/03/2018 13:51 Analyzed: 08/06/2018 12:45

Source: BB03462-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	12.5		0.250	mg/L	12.5	0.200 U	100	75-125			
Barium	12.6		0.250	mg/L	12.5	0.227	99	75-125			
Cadmium	1.25		0.0250	mg/L	1.25	0.0112 U	100	75-125			
Chromium	12.5		0.250	mg/L	12.5	0.0450 U	100	75-125			
Lead	13.0		0.250	mg/L	12.5	0.0950 U	104	75-125			
Selenium	12.2		1.00	mg/L	12.5	0.250 U	97	75-125			
Silver	2.55		0.250	mg/L	2.50	0.0185 U	102	75-125			

Matrix Spike Dup (8H03003-MSD1) Prepared: 08/03/2018 13:51 Analyzed: 08/06/2018 12:46

Source: BB03462-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	12.5		0.250	mg/L	12.5	0.200 U	100	75-125	0.6	20	
Barium	12.6		0.250	mg/L	12.5	0.227	99	75-125	0.2	20	
Cadmium	1.25		0.0250	mg/L	1.25	0.0112 U	100	75-125	0.009	20	
Chromium	12.4		0.250	mg/L	12.5	0.0450 U	100	75-125	0.2	20	
Lead	12.9		0.250	mg/L	12.5	0.0950 U	104	75-125	0.3	20	
Selenium	12.3		1.00	mg/L	12.5	0.250 U	98	75-125	0.8	20	
Silver	2.55		0.250	mg/L	2.50	0.0185 U	102	75-125	0.02	20	

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FLAGS/NOTES AND DEFINITIONS

B	The analyte was detected in the associated method blank.
D	The sample was analyzed at dilution.
J	The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
U	The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
MRL	Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.
PQL	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence (85% or greater confidence) to make a "tentative identification".
P	Greater than 25% concentration difference was observed between the primary and secondary GC column. The lower concentration is reported.
QM-11	Precision between duplicate matrix spikes of the same sample was outside acceptance limits.

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

AB05540

USEPA Region 4 COC (LAB COPY)

DateShipped: 7/30/2018
CarrierName: FedEx
AirbillNo: 772851252438

CHAIN OF CUSTODY RECORD

Project Number:
Case #: 47782

No: 07/30/18-0002

Lab: Environmental Conservation Lab
Lab Contact: Bill Scott
Lab Phone: 919-467-3090

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
Debris		Investigative Derived/ Randolph, Morgan	Grab	RCRA 8(14), SVOC(14), VOC(14)	A (Ice), B (Ice), C (Ice) (3)	#R4DART#	07/25/2018 15:20	

Special Instructions:

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: RCRA 8=TCLP RCRA 8, SVOC=TCLP SVOC, VOC=TCLP VOC

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Shipped	Morgan Randolph Black & Veatch	7/30/2018 16:00	[signature] ERCO	7/31/18 9:50	Med-red 5.7° acceptable

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
Laboratory Services and Applied Science Division
Applied Science Branch
980 College Station Road
Athens, Georgia 30605-2720

June 13, 2019

4LSASD-ASB

MEMORANDUM

SUBJECT: American Creosote Works Soil Sampling Report
Pensacola, Florida
LSASD Project #19-0205

FROM: Kevin Simmons, Life Scientist
Superfund Section

THRU: Hunter Johnson, Chief
Superfund Section

TO: Peter Thorpe, RPM
Superfund Division

Attached is the report for the American Creosote Works (ACW) 2019 soil sampling event for dioxin analysis conducted on March 27, 2019 in Pensacola, Florida during the annual groundwater sampling event. Please send questions or comments to Kevin Simmons at simmons.kevin@epa.gov or call 706.355.8730.

Attachment

Project ID: 19-0205

American Creosote Works 2019 Soil Sampling Report

Pensacola, Florida

Project Date: March 27, 2019

Report Date: June 13, 2019

Project Leader: Kevin Simmons
Superfund Section
Applied Science Branch
Laboratory Services & Applied Science Division
USEPA Region 4
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Note: Due to the Realignment of US EPA Region 4, the following organizational name changes became effective April 15, 2019 and are used in this report:

Former Name	Current Name
Science & Ecosystem Support Division - SESD	Laboratory Services & Applied Science Division - LSASD
Analytical Services Branch - ASB	Laboratory Services Branch – LSB
Field Services Branch – FSB	Applied Science Branch - ASB
Superfund & Air Section – SAS	Superfund Section - SFS

American Creosote Works 2019 Soil Sampling
LSASD Project ID Number: 19-0205
Conducted March 27, 2019

1. INTRODUCTION

Peter Thorpe, Remedial Project Manager (RPM), Region 4 Superfund Division requested that LSASD collect 13 soil samples for dioxin analysis in addition to the scheduled groundwater sampling at the American Creosote Works site. After the Region 4 Sample Control Coordinator determined that a laboratory could be arranged for the week of March 25 and the work would take a minimal amount of time, the LSASD project leader accepted the additional work.

The following personnel participated in the soil sample collection:

NAME	ORGANIZATION	DUTIES
Kevin Simmons	US EPA LSASD	Project Leader/Sampler/Sample Custodian
Kristin Trapp	US EPA LSASD	Field Chemist/Sampler

Due to the short notice for this sampling event, a formal Sampling and Analysis Plan (SAP) was not prepared. A memo was written to the RPM briefly describing the work to be conducted. The sampling was conducted in accordance with the Applied Science Branch (formerly Field Services Branch) Quality Assurance Project Plan February 2018 and applicable sampling procedures.

2. SUMMARY

The RPM, in consultation with Black and Veatch personnel, selected five locations where additional dioxin information was needed to fill a data gap and confirm previous analytical results. Four of the five locations required samples from three intervals: 0 to 6", 6-12" and 12-24" below ground surface (BGS). One location only required a sample from the 12 to 24" interval based on previous data. **Table 1** lists the sample coordinates and followed by **Table 2** with the sample IDs and depths.

The RPM and LSASD project leader scouted the proposed locations and marked them with survey stakes and flagging and logged the coordinates with a Trimble Geo7 GPS unit.

Table 1
Soil Sample Coordinates

Station ID	Latitude	Longitude
SS602	30.40358063	-87.23603753
SS1063	30.40120281	-87.23785601
SS1064	30.40069176	-87.2382954
SS1065	30.40456275	-87.23315783
SS1066	30.40303912	-87.23246725

Table 2
Soil Sample Identification

Station ID	Sample ID	Sample Date	Sample Time	Start Depth	Depth To	Depth Units
SS1063	SS1063-A	3/27/2019	13:05	0	6	inches
SS1063	SS1063-B	3/27/2019	13:10	6	12	inches
SS1063	SS1063-C	3/27/2019	13:15	12	24	inches
SS1064	SS1064-A	3/27/2019	12:30	0	6	inches
SS1064	SS1064-B	3/27/2019	12:35	6	12	inches
SS1064	SS1064-C	3/27/2019	12:40	12	24	inches
SS1065	SS1065-A	3/27/2019	10:10	0	6	inches
SS1065	SS1065-B	3/27/2019	10:20	6	10	inches
SS1065	SS1065-C	3/27/2019	10:45	12	24	inches
SS1066	SS1066-A	3/27/2019	13:40	0	6	inches
SS1066	SS1066-B	3/27/2019	13:45	6	12	inches
SS1066	SS1066-C	3/27/2019	13:50	12	24	inches
SS602	SS602-C	3/27/2019	9:45	12	24	inches
SS602	SS602D-C	3/27/2019	9:45	12	24	inches

All soil samples were analyzed by Analytical Resources Inc. for dioxin in accordance with CLP Statement of Work HRSM01.2.

Figure 1 titled “Soil Location Map” shows the soil sampling locations. **Appendix A** contains, in order, scanned pages of the field sample logbook, the chain of custody (COC) form, and the analytical data sheets.

3. SITE BACKGROUND

The 18-acre ACW site is located at 701 J Street in Pensacola, Florida. Previous reports list the address as 1800 W Gimble Street, but 701 J Street is the official address. It includes the area where a wood-treating facility operated from 1902 to 1981, when American Creosote Works filed for bankruptcy. Prior to 1950, the company used creosote exclusively to treat poles. Use of Pentachlorophenol (PCP) started in 1950 and steadily increased in later years of the facility’s operation. Dioxins at the site resulted from the use of PCP as a wood-treating chemical. Dioxins are a common impurity in commercial-grade PCP.

EPA placed the site on the Superfund program’s National Priorities List (NPL) in 1983 because of contaminated soil and groundwater resulting from facility operations. EPA and the Florida Department of Environmental Protection (FDEP) have investigated site conditions and taken steps to clean up the site to protect people and the environment from contamination. Site contamination does not currently threaten people living and working near the site.

The Sitewide Record of Decision (ROD) was signed in September 2017. This ROD includes remedies to encapsulate the main source area of creosote with a barrier wall and remove other areas of creosote with thermal extraction. It also includes excavation of all dioxin impacted soil within the exposure units and have it capped onsite.

Some offsite parcels have already been cleaned up and approximately 200,000 gallons of creosote have been removed to date. A Remedial Design (RD) is scheduled to be finished by December 2019. The remedial action (RA) is scheduled to be completed in 2022. The first scheduled action is to clean up residential properties.

The above information is taken in part from the EPA Superfund Site website:
https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0400572

The analytical results will be evaluated by the RPM, the Region 4 Scientific Support Section (SSS), and Black and Veatch personnel.

4. METHODOLOGY

Field activities were conducted in accordance with LSASD's Field Branches Management and Quality System Procedures and the following LSASD field measurement and sampling operating procedures as of March 18, 2019:

SESDPROC-110-R4, Global Positioning System
SESDPROC-202-R3, Investigation Derived Waste
SESDPROC-205-R3, Field Equipment Cleaning and Decontamination
SESDPROC-209-R3, Packaging, Marking, Labeling and Shipping of Environmental and Waste Samples
SESDPROC-300-R3, Soil Sampling

The specific soil sampling method for the first interval was to advance the bucket to approximately 6 inches BGS, remove the bucket from the hole and transfer the contents to the homogenization container for processing. For subsequent intervals, the auger hole was advanced one bucket at a time until the sample depth is achieved. When the sample depth is reached, the bucket used to advance the hole was removed and a clean bucket is attached. The clean auger bucket is then placed in the hole and filled with soil to make up the sample and removed.

All field measurement and sampling procedures were performed and/or overseen by LSASD Applied Science Branch personnel proficient in the pertinent procedures. Any person that was not proficient in any measurement or sampling procedure was teamed with someone who was proficient. Chain of custody documents were prepared and signed by Kevin Simmons.

Soil samples submitted to the Analytical Resources Inc. Laboratory were analyzed for dioxin in accordance with CLP Statement of Work HRSM01.2.

5. RESULTS/DISCUSSION

5.1 Dioxin Results

All soil samples contained numerous dioxin compounds which are summarized in **Table 4**. Several data qualifiers were also applied to the results which are explained in the Analytical Report Narrative Summary in Section 5.3. Additional laboratory information can be found on pages 24 to 26 of the Analytical Data Sheets in Appendix A.

5.2 Quality Control Results- Laboratory and Field

Analytical Report Narrative Summary

The following excerpts concerning the data qualifiers is taken from the report narrative contained in the attached analytical data sheets. The full narrative can be found in Appendix A.

Minimal Chlorodiphenyl Ether interferences with target congeners were observed for 2,3,4,6,7,8-HxCDF in sample C191901-06 and 2,3,7,8-TCDF in sample C191901-10. These results were qualified "U" (D-4) at the laboratory reported values.

The concentration of OCDD exceeded the calibration range in samples C191901-06, 08, and 09. These OCDD results were qualified "J" (CLP02). The SOW does not require the laboratory to perform dilutions for OCDD.

All results were reported from the 10X dilutions for samples C191901-03, 04, and 05 at higher reporting limits for the analytes not detected due to demonstrated nontarget analyte interferences when each were analyzed at 1X dilutions. The laboratory performed florisil, silica gel, and acid cleanup on all the samples.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non-2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL, the MDL or the EMPC as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value. Accordingly, the TEQ value reported for sample C191901-03, which required a 10X dilution as detailed above, was comprised of predominantly MDL proxy values and not actual detected results.

Results are reported as not detected at an elevated detection limit when method blank contamination is evident, or when one or more of the qualitative identification criteria have not been met. In the event of method blank contamination, detection limits may be raised as much as five times (10X for OCDD and OCDF) the level of contamination to discount false positive results. If qualitative identification criteria are not met for an analyte, an estimated maximum possible concentration (EMPC) value is reported, and is qualified as a non-detect "U" (CLP18).

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998. The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

Split Samples

A split sample was collected at location SS602-C which was designated SS602D-C. A generally accepted RPD is 50% for soil samples, so the results indicate good correlation. The absolute relative percent difference (RPDs) range for the sample pair are:

Sample Pair	RPD Range
SS602-C/ SS602D-C:	2.7% to 43.5%

The formula ($| V_1 - V_2 | / ((V_1 + V_2)/2)) * 100\%$ was used to calculate absolute percent difference. V_1 is the sample, and V_2 is the split (D) sample. Any qualifiers other than **U** listed in the analytical data sheets were removed from the table to allow percent difference calculations. RPDs were not calculated for **U** qualified results. See **Table 3** for split sample results.

Table 3
Split Sample Comparison

	Station ID	SS602	SS602	%
	Sample ID	SS602-C	SS602D-C	Difference
Analyte	**Units**		Split	
% Moisture	%	5.3	5.1	3.8%
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	ng/kg dry	74	63	16.1%
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg dry	13	11	16.7%
1,2,3,4,7,8-Hexachlorodibenzodioxin	ng/kg dry	0.52 J,O	< 5.0 U	**n/a**
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg dry	0.48	0.38	23.3%
1,2,3,6,7,8-Hexachlorodibenzodioxin	ng/kg dry	< 5.0 U	1.6 J,O	n/a
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg dry	0.20 J,O	< 5.0 U	**n/a**
1,2,3,7,8,9-Hexachlorodibenzodioxin	ng/kg dry	0.86	0.68	23.4%
1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg dry	1.2 J,O	< 5.0 U	**n/a**
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg dry	0.44	0.36	20.0%
Heptachlorodibenzodioxin (Total)	ng/kg dry	130	100	26.1%
Heptachlorodibenzofuran (Total)	ng/kg dry	45	41	9.3%
Hexachlorodibenzodioxin (Total)	ng/kg dry	9.6	7.2	28.6%
Hexachlorodibenzofuran (Total)	ng/kg dry	14	9.0	43.5%
Octachlorodibenzodioxin	ng/kg dry	800	700	13.3%
Octachlorodibenzofuran	ng/kg dry	37	38	2.7%
Pentachlorodibenzodioxin (Total)	ng/kg dry	0.35 J,O	< 5.0 U	**n/a**
Pentachlorodibenzofuran (Total)	ng/kg dry	1.2	0.89	29.7%
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	ng/kg dry	1.2	1.0	18.2%
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	ng/kg dry	1.2	1.0	18.2%
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	ng/kg dry	2.0	1.7	16.2%
Tetrachlorodibenzofuran (Total)	ng/kg dry	0.19	0.18	5.4%

% Difference	The formula ABS (V_1 - V_2 / ((V_1 + V_2)/2)) *100 was used to calculate absolute percent difference. V_1 is the sample, and V_2 is the split (D) sample.
U	The analyte was not detected at or above the reporting limit, MRL listed, RPD not calculated.
n/a	% difference not calculated due to U qualifier.
	Qualifiers were removed for % difference calculation

5.3 Investigation Derived Waste

After the sample containers were filled, any leftover soil was returned to the location it came from. Solid waste and PPE such as disposable gloves, plastic, and paper were brought back to LSASD and/or the Field Equipment Center for proper disposal or recycling.

6. CONCLUSION

The results from this soil sampling event are presented without comparison to a standard. The data will be evaluated by the RPM, SSS, and the contractor assigned to the site to determine the next course of action.

7. REFERENCES

USEPA SESD, “Field Branches Quality System and Technical Procedures”. Most recent versions: https://www.epa.gov/regionallabs/epa-region-4-analytical-support-branch-laboratory-operations-and-quality-assurance as of study date.

Memo, “Soil Sampling for American Creosote Works Groundwater Sampling”. To Pete Thorpe, RPM, May 7, 2019.

Table 4
Dioxin Results

	Station ID	SS1063	SS1063	SS1063	SS1064	SS1064	SS1064	SS1065	SS1065	SS1065	SS1066	SS1066	SS1066	SS602	SS602
	Sample ID	SS1063-A	SS1063-B	SS1063-C	SS1064-A	SS1064-B	SS1064-C	SS1065-A	SS1065-B	SS1065-C	SS1066-A	SS1066-B	SS1066-C	SS602-C	SS602D-C
	Sample Date	3/27/2019 13:05	3/27/2019 13:10	3/27/2019 13:15	3/27/2019 12:30	3/27/2019 12:35	3/27/2019 12:40	3/27/2019 10:10	3/27/2019 10:20	3/27/2019 10:45	3/27/2019 13:40	3/27/2019 13:45	3/27/2019 13:50	3/27/2019 9:45	3/27/2019 9:45
Analyte	**Units**														**Split**
% Moisture	%	6.3	7.4	11	7.2	8.0	8.0	3.8	5.4	11	2.6	7.4	6.8	5.3	5.1
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	ng/kg dry	100	85	33 J,CLP01	970	760	950	3800	6500	680	170	20	11	74	63
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg dry	19	14	12 J,CLP01	200	55	150	700	1200	120	52	6.8	3.1 J,CLP01	13	11
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg dry	0.89 J,CLP01	0.79 J,CLP01	< 50 U	10 J,CLP01	3.8 J,CLP01	7.6	47	84	8.3	2.9 J,CLP01	0.37 J,CLP01	< 5.0 U	< 5.0 U,CLP18	< 5.0 U,CLP18
1,2,3,4,7,8-Hexachlorodibenzodioxin	ng/kg dry	1.1 J,CLP01	0.91 J,CLP01	< 50 U	5.3 J,CLP01	4.5 J,CLP01	5.4	33	54	4.5 J,CLP01	2.0 J,CLP01	0.36 J,CLP01	< 5.0 U,CLP18	0.52 J,CLP01	< 5.0 U,CLP18
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg dry	0.58 J,CLP01	0.47 J,CLP01	< 50 U	< 50 U,CLP18	< 50 U,CLP18	9.8	20	29	3.2 J,CLP01	2.8 J,CLP01	0.71 J,CLP01	< 5.0 U,CLP18	0.48 J,CLP01	0.38 J,CLP01
1,2,3,6,7,8-Hexachlorodibenzodioxin	ng/kg dry	2.8 J,CLP01	2.4 J,CLP01	< 50 U	21 J,CLP01	17 J,CLP01	22	100	180	15	6.4	0.94 J,CLP01	< 5.0 U,CLP18	< 5.0 U,CLP18	1.6 J,CLP01
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg dry	0.55 J,CLP01	0.48 J,CLP01	< 50 U	7.5 J,CLP01	1.9 J,CLP01	3.5 J,CLP01	25	39	3.4 J,CLP01	12	1.2 J,CLP01	0.61 J,CLP01	0.20 J,CLP01	< 5.0 U,CLP18
1,2,3,7,8,9-Hexachlorodibenzodioxin	ng/kg dry	2.4 J,CLP01	1.7 J,CLP01	1.9 J,CLP01	16 J,CLP01	12 J,CLP01	12	67	110	9.1	4.0 J,CLP01	0.76 J,CLP01	0.41 J,CLP01	0.86 J,CLP01	0.68 J,CLP01
1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg dry	0.25 J,CLP01	< 5.0 U,CLP18	< 50 U	< 50 U	< 50 U	6.2	29	67	1.5 J,CLP01	3.3 J,CLP01	< 5.0 U,CLP18	0.44 J,CLP01	1.2 J,CLP01	< 5.0 U
1,2,3,7,8-Pentachlorodibenzodioxin	ng/kg dry	0.68 J,CLP01	0.47 J,CLP01	< 50 U	< 50 U	< 50 U	2.7 J,CLP01	14	20	1.5 J,CLP01	2.8 J,CLP01	0.66 J,CLP01	< 5.0 U,CLP18	< 5.0 U	< 5.0 U
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg dry	< 5.0 U	< 5.0 U	< 50 U	< 50 U	< 50 U	0.62 J,CLP01	2.2 J,CLP01	2.9 J,CLP01	0.40 J,CLP01	1.1 J,CLP01	1.1 J,CLP01	< 5.0 U	< 5.0 U	< 5.0 U
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg dry	0.91 J,CLP01	0.88 J,CLP01	< 50 U	7.8 J,CLP01	< 50 U,CLP18	< 5.0 U,D-4	38	66	5.1	30	2.1 J,CLP01	1.4 J,CLP01	0.44 J,CLP01	0.36 J,CLP01
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg dry	0.81 J,CLP01	< 5.0 U,CLP18	< 50 U	< 50 U	< 50 U	1.8 J,CLP01	< 5.0 U,CLP18	5.1	< 5.0 U,CLP18	10	2.0 J,CLP01	0.60 J,CLP01	< 5.0 U	< 5.0 U
2,3,7,8-Tetrachlorodibenzofuran	ng/kg dry	< 1.0 U,CLP18	< 0.99 U,CLP18	< 9.9 U	0.76 J,CLP01	< 10 U,CLP18	0.48 J,CLP01	0.47 J,CLP01	0.51 J,CLP01	< 0.99 U,CLP18	< 1.0 U,D-4	1.9	0.25 J,CLP01	< 1.0 U	< 0.99 U
Heptachlorodibenzodioxin (Total)	ng/kg dry	200 J,Q-3	170 J,Q-3	100 J,Q-3	2300 J,Q-3	1900 J,Q-3	2100 J,Q-3	6000 J,Q-3	10000 J,Q-3	1000 J,Q-3	330 J,Q-3	37 J,Q-3	22 J,Q-3	130 J,Q-3	100 J,Q-3
Heptachlorodibenzofuran (Total)	ng/kg dry	50 J,Q-3	37 J,Q-3	23 J,Q-3	520 J,Q-3	180 J,Q-3	420 J,Q-3	2200 J,Q-3	3400 J,Q-3	370 J,Q-3	140 J,Q-3	14 J,Q-3	7.2 J,Q-3	45 J,Q-3	41 J,Q-3
Hexachlorodibenzodioxin (Total)	ng/kg dry	34 J,Q-3	28 J,Q-3	66 J,Q-3	280 J,Q-3	230 J,Q-3	190 J,Q-3	600 J,Q-3	1000 J,Q-3	89 J,Q-3	61 J,Q-3	10 J,Q-3	5.1 J,Q-3	9.6 J,Q-3	7.2 J,Q-3
Hexachlorodibenzofuran (Total)	ng/kg dry	19 J,Q-3	17 J,Q-3	15 J,Q-3	150 J,Q-3	68 J,Q-3	180 J,Q-3	810 J,Q-3	1300 J,Q-3	110 J,Q-3	410 J,Q-3	27 J,Q-3	18 J,Q-3	14 J,Q-3	9.0 J,Q-3
Octachlorodibenzodioxin	ng/kg dry	1000	890	470	8200	6400	9600 J,CLP02	35000	60000 J,CLP02	6800 J,CLP02	1500	180	130	800	700
Octachlorodibenzofuran	ng/kg dry	47	33	12 J,CLP01	500	110	370	2100	3200	310	92	7.6 J,CLP01	4.9 J,CLP01	37	38
Pentachlorodibenzodioxin (Total)	ng/kg dry	4.8 J,Q-3	3.8 J,Q-3	11 J,Q-3	24 J,Q-3	24 J,Q-3	20 J,Q-3	53 J,Q-3	89 J,Q-3	13 J,Q-3	23 J,Q-3	5.6 J,Q-3	1.7 J,Q-3	0.35 J,Q-3	< 5.0 U,J,Q-3
Pentachlorodibenzofuran (Total)	ng/kg dry	7.5 J,Q-3	9.9 J,Q-3	16 J,Q-3	25 J,Q-3	14 J,Q-3	45 J,Q-3	170 J,Q-3	240 J,Q-3	24 J,Q-3	760 J,Q-3	59 J,Q-3	33 J,Q-3	1.2 J,Q-3	0.89 J,Q-3
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	ng/kg dry	2.8 J,D-5	2.8 J,D-5	6.6 J,D-5	14 J,D-5	10 J,D-5	13 J,D-5	56	88 J,D-5	8.0 J,D-5	21 J,D-5	5.6 J,D-5	1.7 J,D-5	1.2 J,D-5	1.0 J,D-5
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	ng/kg dry	2.5 J,D-5	2.3 J,D-5	5.6 J,D-5	13 J,D-5	9.5 J,D-5	13 J,D-5	62	99 J,D-5	8.6 J,D-5	15 J,D-5	2.8 J,D-5	1.2 J,D-5	1.2 J,D-5	1.0 J,D-5
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	ng/kg dry	3.5 J,D-5	3.0 J,D-5	5.4 J,D-5	25 J,D-5	18 J,D-5	24 J,D-5	100	170 J,D-5	16 J,D-5	15 J,D-5	2.7 J,D-5	1.2 J,D-5	2.0 J,D-5	1.7 J,D-5
Tetrachlorodibenzodioxin (Total)	ng/kg dry	2.0 J,Q-3	1.3 J,Q-3	8.9 J,Q-3	11 J,Q-3	8.4 J,Q-3	8.6 J,Q-3	10 J,Q-3	15 J,Q-3	14 J,Q-3	4.8 J,Q-3	5.3 J,Q-3	1.5 J,Q-3	< 1.0 U,J,Q-3	< 0.99 U,J,Q-3
Tetrachlorodibenzofuran (Total)	ng/kg dry	1.9 J,Q-3	2.4 J,Q-3	7.3 J,Q-3	6.5 J,Q-3	6.2 J,Q-3	15 J,Q-3	35 J,Q-3	47 J,Q-3	76 J,Q-3	250 J,Q-3	56 J,Q-3	17 J,Q-3	0.19 J,Q-3	0.18 J,Q-3

ANALYTICAL DATA QUALIFIERS

U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP18	Estmiated Maximum Possible Concentration (EMPC) reported, MRL reported, see data sheet for actual result.
D-4	MRL elevated due to interferences
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total
Q-3	Instrument not calibrated for all constituents of the total concentration result

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Figure 1
ACW Soil Sample Locations
March 2019

SESD Project ID# 19-0205
American Creosote Works Pensacola

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Appendix A

Field Sampling Logbook
Chain of Custody
Soil Sampling Memo
Analytical Data Sheets

United States Environmental Protection Agency
Region 4
Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

Project Name: American Creosote Works, Pensacola
Project Location: Pensacola, Florida
Project ID Number: 19-0205

Project Leader: Kevin Simmons

Soil Sampling Logbook

Book 1 of 1

Inclusive Dates: March 27 , 2019

List of personnel in logbook:

Name	Initials	Organization/Duties
Kevin Simmons	KS	SESD / Sampler
Kristen Trapp	KT	SESD / Sampler

The following procedures will be used unless otherwise stated in the field logbooks:

SESDPROC-1002-R0, Logbooks
SESDPROC-011-R5, Field Sampling Quality Control
SESDPROC-202-R3, Management of Investigation Derived Waste
SESDPROC-205-R3, Field Equipment Cleaning and Decontamination
SESDPROC-209-R3, Packing, Marking, Labeling & Shipping of Environmental & Waste Samples
SESDPROC-300-R3, Soil Sampling

Site Notes:

GPS unit used to record sample coordinates: Trimble Geo7X Unit #1, Property ID# A77111

Each sample location will consist of 3 discrete sample intervals:

0" - 6" – A
6" - 12" – B
12" - 24" – C

Date: 3/27/19 **Station ID:** SS602 **Sample ID:** SS602-C

Team Member: K Simmons **Duties:** Logbook, GPS

Team Member: K Tapp **Duties:** sample mixing, collection

Environmental conditions: Sunny, cool windy

Sample media description/notes/sketch:

0-6" - brown sandy soil with some gravel

6-24" - bright orange sand

Sample collected 12"-24" BLS

Sample time - 0945 & split @ 0945.

2 photos w/ GSI iPhone

Sample collected on W Pine St.

Coordinates (Lat/Long): 30.403580C3 -87.23603753

MS/MSD Y (N) **Field Split** (Y) N

Split Sample ID SS602D-C **Date/Time** 3/27/19 0945

Analyses	Container Type/ #	Collected	Preservation	Samples Iced?	Comments
Dioxin	8 oz glass jar - 1	X	Ice	X	—
					—

[X] All samples placed on ice [ ] Cooler(s) checked for ice/water

Date: 3/27/19 Station ID: SS1065 Sample ID: SS1065A, B, C

Team Member: K Simmons Duties: Logbook, augering, sampling

Team Member: K Trapp Duties: Augering, sampling

Environmental conditions: Sunny, windy, warm

Sample media description/notes/sketch:

0-6"-A Brown sandy soil w/ small gravel (few pieces)

SS1065A collected @ 1010

6-~~12"~~ 10"-B Refusal @ 10" Light brown sandy soil with gravel.
PS Collected 1020

12-24"-C Refusal @ 10-12" @ 5 different locations in the road. Evidence seen of asphalt in places. Attempting the C interval just off the road, ~25' south of center point of SS1065.

12-24"-C - Dark brown sandy, loamy soil
Collected 1045

Coordinates (Lat/Long): 30.40456275 -87.23315783

MS/MSD Y (N) Field Split Y (N)

Split Sample ID \ Date/Time \

Analyses	Container Type/ #	Collected	Preservation	Samples Iced?	Comments
Dioxin - A	8 oz glass jar - 1	K1	Ice	K1	—
Dioxin - B Dioxin - C	" "	K1 K1	"	K1	—

[ ] All samples placed on ice [ ] Cooler(s) checked for ice/water

Date: 3/27/19 Station ID: SS1064 Sample ID: SS1064-A, B, C

Team Member: L S [illegible] Duties: _____

Team Member: K Tapp Duties: _____

Environmental conditions: Sunny, breezy, warm

Sample media description/notes/sketch:

1064-A 0"-6" Light brown sand. Collected 1230

1064-B 6"-12" Light brown sand. Collected 1235

1064-C 12-24" Medium brown sand with darker clumps mixed throughout. Collected 1240

Coordinates (Lat/Long): 30.4206176 -87.2352954

MS/MSD Y / (N) Field Split Y / (N)

Split Sample ID _____ Date/Time _____

Analyses	Container Type/ #	Collected	Preservation	Samples Iced?	Comments
Dioxin – A	8 oz glass jar - 1	[X]	Ice	[X]	—
Dioxin – B	"	[X]	"	X	—
Dioxin C	"	[X]	"	X	

[ ] All samples placed on ice [ ] Cooler(s) checked for ice/water

Date: 3/27/19 Station ID: SS1063 Sample ID: SS1063-A, B, C

Team Member: K Simmons Duties: Logbook, sampling

Team Member: K Trapp Duties: Digging

Environmental conditions: Sunny, warm

Sample media description/notes/sketch:

1063-A 0"-6" Light brown sand intermixed with orange sand. Collected @ 1305

1063-B 6"-12" Orange sand Collected @ 1310

1063-C 12-24" Orange sand ~12-18", then dark brown sand. Collected @ 1315

West side of Zellica Grotto building.

Coordinates (Lat/Long): 30.4012051 -87.2375601

MS/MSD Y / (N) Field Split Y / (N)

Split Sample ID \ Date/Time \

Analyses	Container Type/ #	Collected	Preservation	Samples Iced?	Comments
Dioxin	8 oz glass jar - 1	1315	Ice	1315	—
Dioxin	"	1315	"	1315	—
Dioxin	"	1315	"	1315	

[ ] All samples placed on ice [ ] Cooler(s) checked for ice/water

Date: 3/27/19 Station ID: SS106b Sample ID: SS106b A, B, C

Team Member: K Simms Duties: Logbook, sampling

Team Member: D Peters Duties: Augering

Environmental conditions: Sunny, warm

Sample media description/notes/sketch:

106b-A 0"-6" Light brown sand interbedded with darker bits of sand.
Collected @ 1340

106b-B 6"-12" Dark brown sand.
Collected @ 1345

106b-C 12"-24" Dark, sandy, greyish soil.
Collected @ 1350

Yard @ 701 F St

Coordinates (Lat/Long): 30.40303712 -87.23246725

MS/MSD Y / (N) Field Split Y / (N)

Split Sample ID \ Date/Time \

Analyses	Container Type/#	Collected	Preservation	Samples Iced?	Comments
Dioxin	8 oz glass jar - 1	[X]	Ice	[X]	—
Dioxin	"	[X]	"	[X]	—
Dioxin	"	[X]	"	[X]	

[X] All samples placed on ice [X] Cooler(s) checked for ice/water

Date: _____ **Station ID:** _____ **Sample ID:** _____

Team Member: _____ **Duties:** _____

Team Member: _____ **Duties:** _____

Environmental conditions:

Sample media description/notes/sketch:

End of logbook

Coordinates (Lat/Long): _____ _____

MS/MSD Y / N **Field Split Y / N**

Split Sample ID _____ **Date/Time** _____

Analyses	Container Type/ #	Collected	Preservation	Samples Iced?	Comments
Dioxin	8 oz glass jar - 1	[ ]	Ice	[ ]	

[ ] All samples placed on ice [ ] Cooler(s) checked for ice/water

USEPA CLP High Res COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: 03/27/19-0009

DateShipped: 3/27/2019
CarrierName: UPS
AirbillNo:

Project Number: 19-0205
Case #: 48178

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1064-A	PDB6T2	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1001 (Ice) (1)	SS1064	03/27/2019 12:30	
SS1064-B	PDB6T3	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1002 (Ice) (1)	SS1064	03/27/2019 12:35	
SS1064-C	PDB6T4	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1003 (Ice) (1)	SS1064	03/27/2019 12:40	
SS1063-A	PDB6T5	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1004 (Ice) (1)	SS1063	03/27/2019 13:05	
SS1063-B	PDB6T6	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1005 (Ice) (1)	SS1063	03/27/2019 13:10	
SS1063-C	PDB6T7	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1006 (Ice) (1)	SS1063	03/27/2019 13:15	
SS1066-A	PDB6T8	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1007 (Ice) (1)	SS1066	03/27/2019 13:40	
SS1066-B	PDB6T9	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1008 (Ice) (1)	SS1066	03/27/2019 13:45	
SS1066-C	PDB6W0	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1009 (Ice) (1)	SS1066	03/27/2019 13:50	
SS1065-A	PDB6W1	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1010 (Ice) (1)	SS1065	03/27/2019 10:10	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: 03/27/19-0009

DateShipped: 3/27/2019
CarrierName: UPS
AirbillNo:

Project Number: 19-0205
Case #: 48178

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1065-B	PDB6W2	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1011 (Ice) (1)	SS1065	03/27/2019 10:20	
SS1065-C	PDB6W3	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1012 (Ice) (1)	SS1065	03/27/2019 10:45	
SS602-C	PDB6W4	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1013 (Ice) (1)	SS602	03/27/2019 09:45	
SS602D-C	PDB6W5	Surface Soil/ Simmons, Kevin	Grab	CDD/CDF(35)	1014 (Ice) (1)	SS602	03/27/2019 09:45	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
Laboratory Services and Applied Science Division
Applied Science Branch
980 College Station Road
Athens, Georgia 30605-2720

May 07, 2019

4LSASD-ASB

MEMORANDUM

SUBJECT: Soil Sampling for American Creosote Works Groundwater Sampling
Pensacola, Florida
LSASD Project #19-0205

FROM: Kevin Simmons, Life Scientist
Superfund Section

THRU: Hunter Johnson, Chief
Superfund Section

TO: Peter Thorpe, RPM
Superfund Division

This memo addresses a soil sampling request made by the RPM on March 12, 2019 just prior to mobilizing for the American Creosote Works groundwater sampling event. The details for the soil sampling were not included in the SAP for the groundwater sampling due to time constraints. However, LSASD was able to accommodate the sampling request and the Region 4 Sample Control Coordinator scheduled the laboratory analysis for dioxin.

The purpose of the request was to provide confirmation of dioxin at five specific locations at multiple depths around the ACW site. The sample locations, identification, and depths were determined by the RPM in consultation with Black and Veatch personnel. The request was for three samples to be collected from each of four locations at depths of 0" to 6", 6" to 12", and 12" to 24". A fifth location required only one sample from 12" to 24" for a total of 13 soil samples.

A separate report will be issued under LSASD Project #19-0250 detailing the soil sampling and dioxin analytical results.

Please send questions or comments to Kevin Simmons at simmons.kevin@epa.gov or call 706.355.8730.

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Laboratory Services and Applied Science Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 19-0029
Project: 19-0205, American Creosote - Reported by Nancy Seabolt

Septrbm6, 2

bTNENR:F E4ND

0 1 0 8 MEORA0

NADS1 UBJ FINAL Analytical Report
Project: 19-0205, American Creosote

CMB 0 J Nancy Seabolt
Quality Assurance Section, Chemist

B- MAJ Denisse Diaz, Chief
Quality Assurance Section

B8 J Kevin Simmons

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the associated contract Statement Of Work (SOW). In general, project data quality objectives have not been used to evaluate these data prior to release by the Quality Assurance Section. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report.

Analyses Included in this report:	Method Used:
Dioxin (DIO)	
Dioxin	Contract SOW (Soil)

M QHbaGi ooi avf t mWbrk Hbdn8 o3t oJrb, 2, 26, mEpi 5nl vJRy8

Site Name: American Creosote, Pensacola, FL
Case 48178, ELEMENT Sample Nos. C191901-01 through C191901-14,
C191902-01 and C191902-02 (PES)

Dioxin Analysis: Analytical Resources, Inc., Tukwila, WA

The ESAT Work Team reviewed data for the project cited above consisting of 14 soil samples analyzed per Statement of Work HRSM01.2 for dioxins and furans. The samples were collected on 3/27/19 and received by the laboratory on 3/28/19. The final data package was received by the EPA on 3/28/19. The analytical results were reported in one sample delivery group (SDG) by the laboratory. In addition to the field samples, the laboratory also analyzed two performance evaluation samples (PES) for evaluating the laboratory's performance with using the method.

A Stage 4 validation consisting of a manual review (S4VM) was performed on the dioxin samples submitted for this case. The data package presents acceptable technical performance with qualifications.

The laboratory satisfied all technical holding time requirements.

The laboratory scored within warning limits for all analytes in the PES blind spike. OCDD was scored as PES contaminant at less than the Contract Required Quantitation Limit (CRQL) in the soil blind blank, but all samples contained more than 10X this amount.

The laboratory stated in the case narrative that "an application specific column [RTX-Dioxin2 - 60 meters long, 0.25 mm ID, 0.24 µm film thickness] recently developed by Restek" was used instead of the SOW specified DB-5 (primary) and DB-225 (2,3,7,8-TCDF confirmation) columns in Exhibit D, Sections 6.8.1.1.3 and 6.8.1.1.4. An alternative resolution test mixture consisting of 2,3,4,8-TCDF, 2,3,7,8-TCDF, and 3,4,6,7-TCDF was used at the beginning and ending of each analytical sequence to demonstrate that the method minimum valley between isomers of 25% was satisfied. The laboratory's performance provides comparable resolution for 2,3,7,8-TCDF analyzed on this single column as required by the SOW for the DB-225 confirmation column. The results for 2,3,7,8-TCDF are as reliable as those reported by other laboratories for other projects which have been identified (CLP10) as being confirmed on the DB-225 confirmation column. Additionally, retention time windows specified by the SOW do not apply to this specialty column, but data quality was not adversely impacted. The laboratory stated that "the column literature [included in submittals] may be used as a guide to the elution order. ARI has compiled data establishing retention time windows."

Minimal Chlorodiphenyl Ether interferences with target congeners were observed for 2,3,4,6,7,8-HxCDF in sample C191901-06 and 2,3,7,8-TCDF in sample C191901-10. These results were qualified "U" (D-4) at the laboratory reported values.

The concentration of OCDD exceeded the calibration range in samples C191901-06, 08, and 09. These OCDD results were qualified "J" (CLP02). The SOW does not require the laboratory to perform dilutions for OCDD.

All results were reported from the 10X dilutions for samples C191901-03, 04, and 05 at higher reporting limits for the analytes not detected due to demonstrated nontarget analyte interferences when each were analyzed at 1X dilutions. The laboratory performed florisil, silica gel, and acid cleanup on all the samples.

The results for all "Total" congeners were estimated (J, Q-3) since the instrumentation is not calibrated for non 2,3,7,8- congeners.

For not detected results, the SOW requires use of the sample/analyte specific Estimated Detection Limit (EDL) or the laboratory established Method Detection Limit (MDL), whichever is greater, for reporting. MDLs and EDLs are adjusted based on the actual sample weight extracted, moisture contents, and any dilutions. Per the SOW any positive sample at a concentration less than the MDL is reported as not detected at the MDL. Toxic equivalent quantities (TEQs) for non-detected results are determined using the EDL, the MDL or the EMPC as a proxy value. Thus, a sample with non-detected results for all PCDD/PCDF congeners will still have a positive TEQ value. Accordingly, the TEQ value reported for sample C191901-03, which required a 10X dilution as detailed above, was comprised of predominantly MDL proxy values and not actual detected results.

Results are reported as not detected at an elevated detection limit when method blank contamination is evident, or when one or more of the qualitative identification criteria have not been met. In the event of method blank contamination, detection limits may be raised as much as five times (10X for OCDD and OCDF) the level of contamination to discount false positive results. If qualitative identification criteria are not met for an analyte, an estimated maximum possible concentration (EMPC) value is reported, and is qualified as a non-detect "U" (CLP18).

The reported toxic equivalent quantities (TEQ) have been derived from the most recent set of toxic equivalent factors (TEF). For mammalian TEQs, these factors were published in 2005 by the World Health Organization (WHO). The TEQs for birds and fish, the factors were published by WHO in 1998.

The mammalian, avian and fish TEQs are qualified as estimated, "J" (D-5) when the sum of the contributions from the individual PCDD/PCDF mammalian analytes that are themselves reported as either estimated ("J") or non-detect ("U") exceeds 10% of the mammalian TEQ total.

All data qualification factors are explained by the Region 4 - specific qualifier definitions which are included

elsewhere in this report. Further details are provided in the complete data review report, which is on file in the Region 4 SESD Records Center.

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cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Laboratory Services and Applied Science Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 19-0029
Project: 19-0205, American Creosote - Reported by Nancy Seabolt

NE0 4T1 NmyOUTAR1 RmyOrB- yNrM1 48 MB

4oHltsaJm,2:6 6PmEx tovsi prbJot H Hat **UHpaoi sanTi cmbJi l tJrbj , 7j**

Ni x Q5tmyR	Ti c Hoi aHonmyR	0 R#	R#	0 i aovI	Ri atmbJH5tsat 3
SS1063-A	C191901-01		B6T5	Surface Soil	3/27/19 13:05
SS1063-B	C191901-02		B6T6	Surface Soil	3/27/19 13:10
SS1063-C	C191901-03		B6T7	Surface Soil	3/27/19 13:15
SS1064-A	C191901-04		B6T2	Surface Soil	3/27/19 12:30
SS1064-B	C191901-05		B6T3	Surface Soil	3/27/19 12:35
SS1064-C	C191901-06		B6T4	Surface Soil	3/27/19 12:40
SS1065-A	C191901-07		B6W1	Surface Soil	3/27/19 10:10
SS1065-B	C191901-08		B6W2	Surface Soil	3/27/19 10:20
SS1065-C	C191901-09		B6W3	Surface Soil	3/27/19 10:45
SS1066-A	C191901-10		B6T8	Surface Soil	3/27/19 13:40
SS1066-B	C191901-11		B6T9	Surface Soil	3/27/19 13:45
SS1066-C	C191901-12		B6W0	Surface Soil	3/27/19 13:50
SS602-C	C191901-13		B6W4	Surface Soil	3/27/19 09:45
SS602D-C	C191901-14		B6W5	Surface Soil	3/27/19 09:45

REBEmf AETyCyl MfR1 CyOyBy8 ON

U	The analyte was not detected at or above the reporting limit.
CLP01	Concentration reported is less than the lowest standard on calibration curve
CLP02	Concentration reported is greater than the highest standard on calibration curve
CLP18	Estimated Maximum Possible Concentration (EMPC) Reported
D-4	MRL elevated due to interferences.
D-5	Estimated quantitation for one or more individual constituents comprising >10% of the total.
J	The identification of the analyte is acceptable; the reported value is an estimate.
Q-3	Instrument not calibrated for all constituents of the total concentration result.

EUM8 OY0 NfiORmfiDDM1 VyEBy8 ON

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Laboratory Services and Applied Science Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 19-0029
Project: 19-0205, American Creosote - Reported by Nancy Seabolt

RvHvp

4oHtsaJm2:6 6PmFx tovsi prb/otHHat | **UHpaoisamTi crb/i ltJrbj , 7j**

Ni x Q8tmyRJ NN, 6u/ :E
Nai avHpmyRJ NN, 6u/

Ti cmyRJmmU, 2, 26, :6,
0 iaovIJ NeoWstmNH5

0 RrGHIm
RrGHIrDuBPrF5My

Ri atrb/H5tsat3J /9 79, 2m/J6P

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.3		%		4/11/19	4/15/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	100		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	19		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.89	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.1	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.58	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.8	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.55	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.25	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.68	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.91	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.81	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.18	U, CLP18	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.11	U, CLP18	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	200	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	50	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	19	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1000		ng/kg dry	10	4/11/19	4/15/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	47		ng/kg dry	10	4/11/19	4/15/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	7.5	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	4/11/19	4/15/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.5	J, D-5	ng/kg dry	2.5	4/11/19	4/15/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.5	J, D-5	ng/kg dry	3.5	4/11/19	4/15/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi saTi c rhJi l tJrhj , 7j

Ni x Q5t mRJ NN, 6u/ :E

Ti c mRJmmU, 2, 26, :6,

0 RmOHJm

Nai avHpmRJ NN, 6u/

0 i aovI J NeoWstrNHv5

RmOHJrDuB PrEMy

Ri at rhJHS5t sat 3J / 9 79, 2m,/ J6P

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	2.0	J, Q-3	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	1.9	J, Q-3	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmFx tovsi prb/otHHat | **UHpaoisamTi crb/ilt.Jrbj, 7j**

Nix Q8tmyRJ NN, 6u/ :D
Nai avHpmyRJ NN, 6u/

Ti cmyRJmmU, 2, 26, :6
0 iaovIJ NeoWstmNH5

0 RrOHlm
RrOHlrDuBurb5My

Ri atrb/H5tsat3J /9 79, 2m/J, 6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.4		%		4/11/19	4/15/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	85		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	14		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.79	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.91	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.47	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.4	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.7	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.22	U, CLP18	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.47	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.88	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.3	U, CLP18	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.16	U, CLP18	ng/kg dry	0.99	4/11/19	4/15/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.10	U, CLP18	ng/kg dry	0.99	4/11/19	4/15/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	170	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	37	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	28	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	890		ng/kg dry	9.9	4/11/19	4/15/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	33		ng/kg dry	9.9	4/11/19	4/15/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	3.8	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	9.9	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	4/11/19	4/15/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.3	J, D-5	ng/kg dry	2.3	4/11/19	4/15/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	3.0	J, D-5	ng/kg dry	3.0	4/11/19	4/15/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhUot H Hat

UHpaoi saTi c rhUi l tJrhj , 7j

Ni x Q5t mRJ NN, 6u/ :D

Ti c mRJmmU, 2, 26, :6

0 RmOHJm

Nai avHpmRJ NN, 6u/

0 i aovI J NeoWstrNHv5

RmOHJrDuBurE My

Ri at rhUH5t sat 3J / 9 79, 2m,/ J, 6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.3	J, Q-3	ng/kg dry	0.99	4/11/19	4/15/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	2.4	J, Q-3	ng/kg dry	0.99	4/11/19	4/15/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat | **UHpaoi sanTi crb/i ltJrbj , 7j**

Ni x Q8tmyRJ NN, 6u/ :U
Nai avHpmyRJ NN, 6u/

Ti cmyRJmmU, 2, 26, :6/
0 i aovIJ NeoWstmNH5

0 RrOHlm
RrOHlrDuB7rE My

Ri atrb/H5tsat3J /9 79, 2m/ J, P

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		4/11/19	4/16/19	CLHRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	33	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	12	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.8	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	1.4	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.3	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.4	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.93	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.9	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.8	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.7	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.91	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	U	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	1.4	U	ng/kg dry	9.9	4/11/19	4/16/19	CLHRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.63	U	ng/kg dry	9.9	4/11/19	4/16/19	CLHRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	23	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	66	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
3268-87-9	Octachlorodibenzodioxin	470		ng/kg dry	100	4/11/19	4/16/19	CLHRSM01.2
39001-02-0	Octachlorodibenzofuran	12	J, CLP01	ng/kg dry	100	4/11/19	4/16/19	CLHRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	16	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CLHRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6.6	J, D-5	ng/kg dry	6.6	4/11/19	4/16/19	CLHRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.6	J, D-5	ng/kg dry	5.6	4/11/19	4/16/19	CLHRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	5.4	J, D-5	ng/kg dry	5.4	4/11/19	4/16/19	CLHRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi sanTi c rhJi l t Jrhj , 7j

Ni x Q5t mRJ NN, 6u/ :U

Ti c mRJmmU, 2, 26, :6/

0 RmOHJm

Nai avHpmRJ NN, 6u/

0 i aovI J NeoWstrNHv5

RmOHJmDuB7mEMy

Ri at rhJHS5t sat 3J / 9 79, 2m,/ J, P

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.9	J, Q-3	ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	7.3	J, Q-3	ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat

UHpaoisamTi crb/ilt.Jrbj, 7j

Nix Q8tmyRJNN, 6ub:E
NaiavHpmyRJNN, 6ub

Ti cmyRJmmU, 2, 26, :6b
0 iaovIJ NeoWstrnNH5

0 RrGHlm
RrGHlrDuB rE My

Ri atrb/H5tsat3J /9 79, 2m, J/ 6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.2		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	970		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	200		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	10	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	5.3	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.9	U, CLP18	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	21	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	7.5	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	16	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.8	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.7	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	7.8	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	1.4	U	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.76	J, CLP01	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2300	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	520	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	280	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	150	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8200		ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	500		ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	24	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	25	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	14	J, D-5	ng/kg dry	14	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	25	J, D-5	ng/kg dry	25	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prbUot HHat **UHpaoi saTi cmUi lt Jmbj , 7j**

Nix Q5t mRJ NN, 6ub:E **Ti cmRJmmU, 2, 26, :6b** **0 RmOHJm**

Nai avHpmRJ NN, 6ub **0 i aovI J NeoWstmNH5** **RmOHJmDuB mEMy**

Ri at mUH5tsat3J / 9 79, 2m, J/ 6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	11	J, Q-3	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	6.5	J, Q-3	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat

UHpaoi sanTi crb/i ltJrbj , 7j

Ni x Q8tmyRJ NN, 6ub:D
Nai avHpmyRJ NN, 6ub

Ti cmyRJmmU, 2, 26, :6P
0 i aovIJ NeoWstmNH5

0 RrO HIm
RrO HIrDuB/ rE My

Ri atrb/HEstsat3J / 9 79, 2m, J/ P

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.0		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	760		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	55		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.8	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.3	U, CLP18	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	17	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.9	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	12	J, CLP01	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.8	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.7	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.3	U, CLP18	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.6	U	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	1.4	U	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.76	U, CLP18	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	230	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	68	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	6400		ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	110		ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	24	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	10	J, D-5	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	9.5	J, D-5	ng/kg dry	9.5	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	18	J, D-5	ng/kg dry	18	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prbUot H Hat

UHpaoi sanTi c rbUi l tJrbj , 7j

Ni x Q5t mRJ NN, 6ub:D

Ti c mRJmmU, 2, 26, :6P

0 RmOHJm

Nai avHpmRJ NN, 6ub

0 i aovI J NeoWstrNHv5

RmOHJmDuB/ rEMy

Ri at rbUH5tsat3J / 9 79, 2m, J/ P

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.4	J, Q-3	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	6.2	J, Q-3	ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2

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RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat

UHpaoisamTi crb/i ltJrbj , 7j

Ni x Q8tmyRJ NN, 6ub:U
Nai avHpmyRJ NN, 6ub

Ti cmyRJmmU, 2, 26, :6u
0 i aovIJ NeoWstmNH5

0 RrGHm
RrGHIrDuBbrE My

Ri atrb/HEstsat3J / 9 79, 2m, Jb6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	8.0		%		4/11/19	4/15/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	950		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	150		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	7.6		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	5.4		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	9.8		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	22		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.5	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	12		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	6.2		ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.7	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.62	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.4	U, D-4	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.29	U, CLP18	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	2100	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	420	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	190	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	180	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9600	J, CLP02	ng/kg dry	10	4/11/19	4/15/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	370		ng/kg dry	10	4/11/19	4/15/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	20	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	45	J, Q-3	ng/kg dry	5.0	4/11/19	4/15/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	4/11/19	4/15/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	J, D-5	ng/kg dry	13	4/11/19	4/15/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	24	J, D-5	ng/kg dry	24	4/11/19	4/15/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhUot H Hat

UHpaoi saTi c rhUi l tJrhj , 7j

Ni x Q5t mRJ NN, 6ub:U

Ti c mRJmmU, 2, 26, :6u

0 RmOHJm

Nai avHpmRJ NN, 6ub

0 i aovI J NeoWstrNHv5

RmOHJmDuBbrE My

Ri at rhUH5t sat 3J / 9 79, 2m, Jb6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	8.6	J, Q-3	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	15	J, Q-3	ng/kg dry	1.0	4/11/19	4/15/19	CL HRSM01.2

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RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat

UHpaoi sanTi crb/i ltJrbj , 7j

Ni x Q8tmyRJ NN, 6uP:E
Nai avHpmyRJ NN, 6uP

Ti cmyRJmmU, 2, 26, :67
0 i aovIJ NeoWstmNH5

0 RrO HIm
RrO HIrDuk , rE My

Ri atrb/H5tsat3J / 9 79, 2m6J, 6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	3.8		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	3800		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	700		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	47		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	33		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	20		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	100		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	25		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	67		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	29		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	14		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.2	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	38		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	5.2	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.53	U, CLP18	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.47	J, CLP01	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	6000	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	2200	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	600	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	810	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	35000		ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	2100		ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	53	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	56		ng/kg dry	56	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	62		ng/kg dry	62	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	100		ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi sanTi c rhJi l t Jrhj , 7j

Ni x Q5t nyRJ NN, 6uP:E

Ti c nyRJmmU, 2, 26, :67

0 RmOHJm

Nai avHpnyRJ NN, 6uP

0 i aovI J NeoWstrNHv5

RmOHJrhDuk , rhEMy

Ri at rhJHS5t sat 3J / 9 79, 2m,6J, 6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat

UHpaoi sanTi crb/i ltJrbj , 7j

Ni x Q8tmyRJ NN, 6uP:D
Nai avHpmyRJ NN, 6uP

Ti cmyRJmmU, 2, 26, :6j
0 iaovIJ NeoWstmNH5

0 RrGHlm
RrGHlrDuk rEMy

Ri atrb/H5tsat3J /9 79, 2m,6J 6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.4		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	6500		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1200		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	84		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	54		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	29		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	180		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	39		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	110		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	67		ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	20		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	66		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	5.1		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.60	U, CLP18	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.51	J, CLP01	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	10000	J, Q-3	ng/kg dry	50	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	3400	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1000	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1300	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	60000	J, CLP02	ng/kg dry	100	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	3200		ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	89	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	240	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	88	J, D-5	ng/kg dry	88	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	99	J, D-5	ng/kg dry	99	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	170	J, D-5	ng/kg dry	170	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi sanTi c rhJi l tJrhj , 7j

Ni x Q5t nyRJ NN, 6uP:D

Ti c nyRJmmU, 2, 26, :6j

0 RmOHJm

Nai avHpnyRJ NN, 6uP

0 i aovI J NeoWstrNHv5

RmOHJrDuk rhMy

Ri at rhJHS5t sat 3J / 9 79, 2m,6J 6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	15	J, Q-3	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	47	J, Q-3	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2

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RvHvp

4oHtsaJm2:6 6PmFx tovsi prb/otHHat

UHpaoi sanTi crb/i ltJrbj , 7j

Ni x Q8tmyRJ NN, 6uP:U
Nai avHpmyRJ NN, 6uP

Ti cmyRJmmU, 2, 26, :62
0 i aovIJ NeoWstrnNH5

0 RrGHlm
RrGHlrDuk / rfiMy

Ri atrb/H5tsat3J / 9 79, 2m,6JbP

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	680		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	120		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	8.3		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	3.2	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	15		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.4	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	9.1		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.5	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	1.5	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.40	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.1		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.86	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.19	U, CLP18	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.10	U, CLP18	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1000	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	370	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	89	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	110	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	6800	J, CLP02	ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	310		ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	13	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	8.0	J, D-5	ng/kg dry	8.0	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	8.6	J, D-5	ng/kg dry	8.6	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	16	J, D-5	ng/kg dry	16	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot HHat

UHpaoi saTi cmUi lt Jmhj , 7j

Nix Q5t mRJ NN, 6uP:U

Ti cmRJmmU, 2, 26, :62

0 RmOHJm

Naiavhpmr RJ NN, 6uP

0 iaovI J NeoWstmNHv5

RmOHJmDuk / mEMy

Ri at mUH5tsat 3J / 9 79, 2m,6JbP

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	14	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	76	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2

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RvHvp

4oHtsaJm2:6 6PmFx tovsi prb/otHHat

UHpaoisamTi crb/ilt.Jrbj , 7j

Nix Q8tmyRJNN, 6uu:E
NaiavHpmyRJNN, 6uu

Ti cmyRJmmU, 2, 26, :, 6
0 iaovIJ NeoWstmNH5

0 RrOHlm
RrOHlrDuBjrd5My

Ri atrb/H5tsat3J /9 79, 2m/ Jb6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	2.6		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	170		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	52		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	2.8	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	6.4		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	12		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	4.0	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	3.3	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	2.8	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	30		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	10		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.5	U, D-4	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	330	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	140	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	61	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	410	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500		ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	92		ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	23	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	760	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	21	J, D-5	ng/kg dry	21	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	15	J, D-5	ng/kg dry	15	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	15	J, D-5	ng/kg dry	15	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi saTi c rhJi l t Jrhj , 7j

Ni x Q5t mRJ NN, 6uu:E

Ti c mRJmmU, 2, 26, :, 6

0 RmOHJm

Nai avHpmRJ NN, 6uu

0 i aovI J NeoWstrNHv5

RmOHJmDuBj rhEMy

Ri at rhJHS5t sat 3J / 9 79, 2m,/ Jb6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	4.8	J, Q-3	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	250	J, Q-3	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmFx tovsi prb/otHHat

UHpaoi sanTi crb/i ltJrbj , 7j

Ni x Q8tmyRJ NN, 6uu:D
Nai avHpmyRJ NN, 6uu

Ti cmyRJmmU, 2, 26, :, ,
0 i aovIJ NeoWstmNH5

0 RrOHlm
RrOHlrDuB2rf5My

Ri atrb/H5tsat3J / 9 79, 2m/ JbP

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	7.4		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	20		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	6.8		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.37	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.36	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.71	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.94	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.76	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.64	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.66	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.1	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2.1	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.0	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.24	U, CLP18	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.9		ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	37	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	10	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	27	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	180		ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	7.6	J, CLP01	ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.6	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	59	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	5.6	J, D-5	ng/kg dry	5.6	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.8	J, D-5	ng/kg dry	2.8	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.7	J, D-5	ng/kg dry	2.7	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi saTi c rhJi l t Jrhj , 7j

Ni x Q5t mRJ NN, 6uu:D

Ti c mRJmmU, 2, 26, :, ,

0 RmOHJm

Nai avHpmRJ NN, 6uu

0 i aovI J NeoWstrNHv5

RmOHJmDuB2rE My

Ri at rhJHS5t sat 3J / 9 79, 2m,/ JbP

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	5.3	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	56	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2

RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat **UHpaoi sanTi crb/i ltJrbj , 7j**

Ni x Q8tmyRJ NN, 6uu:U
Nai avHpmyRJ NN, 6uu

Ti cmyRJmmU, 2, 26, :,
0 iaovIJ NeoWstmNH5

0 RrGHlm
RrGHlrDuk 6rE My

Ri atrb/H5tsat3J /9 79, 2m/ JP6

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	6.8		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	11		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.1	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.18	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.22	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.20	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.50	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.61	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.41	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.44	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.28	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.4	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.60	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.25	J, CLP01	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	22	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	7.2	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	5.1	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	18	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	130		ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	4.9	J, CLP01	ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	1.7	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	33	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.7	J, D-5	ng/kg dry	1.7	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.2	J, D-5	ng/kg dry	1.2	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi sanTi c rhJi l t Jrhj , 7j

Ni x Q5t mRJ NN, 6uu:U

Ti c mRJmmU, 2, 26, :,

0 RmOHJm

Nai avHpmRJ NN, 6uu

0 i aovI J NeoWstrNHv5

RmOHJrDuk 6rEMy

Ri at rhJHS5t sat 3J / 9 79, 2m,/ JP6

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	1.5	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	17	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2

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RvHvp

4oHtsaJm2:6 6PmFix tovsi prb/otHHat **UHpaoi sanTi crb/i ltJrbj , 7j**

Nix Q8tmyRJNNu6 :U
Nai avHpmyRJNNu6

Ti cmyRJmmU, 2, 26, :, /
0 iaovIJ NeoWstmNH5

0 RrGHlm
RrGHlrDuk brFMy

Ri atrb/H5tsat3J /9 79, 2m2JbP

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.3		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	74		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	13		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.81	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.52	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.48	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.7	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.20	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.86	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.18	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.44	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.16	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.063	U	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	45	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	9.6	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	14	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	800		ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	37		ng/kg dry	10	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.35	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	1.2	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.2	J, D-5	ng/kg dry	1.2	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.0	J, D-5	ng/kg dry	2.0	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi sanTi c rhJi l t Jrhj , 7j

Ni x Q5t nyRJ NNu6 :U

Ti c nyRJmmU, 2, 26, :, /

0 RmOHJm

Nai avHpnyRJ NNu6

0 i aovI J NeoWstrNHv5

RmOHJrDuk brE My

Ri at rhJHS5t sat 3J / 9 79, 2m2JbP

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.14	U, J, Q-3	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	0.19	J, Q-3	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2

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RvHvp

4oHtsaJm2:6 6PmEx tovsi prb/otHHat | **UHpaoisanTi crb/ilt.Jrbj , 7j**

Nix Q8tmRJNNu6 R:U
Nai avHpmRJNNu6

Ti cmRJmmU, 2, 26, :, b
0 iaovIJ NeoWstmNH5

0 RrGHlm
RrGHlrDuk PrEMy

Ri atrb/H5tsat3J /9 79, 2m2JbP

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.1		%		4/11/19	4/16/19	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	63		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	11		ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.78	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.43	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.38	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	1.6	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.17	U, CLP18	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.68	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.21	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.18	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.17	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.36	J, CLP01	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.16	U	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.14	U	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.063	U	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	41	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	7.2	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	9.0	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	700		ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	38		ng/kg dry	9.9	4/11/19	4/16/19	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	0.18	U, J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	0.89	J, Q-3	ng/kg dry	5.0	4/11/19	4/16/19	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1.0	J, D-5	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1.0	J, D-5	ng/kg dry	1.0	4/11/19	4/16/19	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1.7	J, D-5	ng/kg dry	1.7	4/11/19	4/16/19	CL HRSM01.2

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RvHlvp

4oHltsaJm,2:6 6PmEx tovsi prhJot H Hat

UHpaoi sanTi c rhJi l tJrhj , 7j

Ni x Q5t nyRJ NNu6 R:U

Ti c nyRJmmU, 2, 26, :, b

0 RmOHJm

Nai avHpnyRJ NNu6

0 i aovI J NeoWstrNHv5

RmOHJrhDuk PrhEMy

Ri at rhJHS5t sat 3J / 9 79, 2m2JbP

CAS Number	*Analyte*	*Results*	*Qualifiers*	*Units*	*MRL*	*Prepared*	*Analyzed*	*Method*
41903-57-5	Tetrachlorodibenzodioxin (Total)	0.14	U, J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2
30402-14-3	Tetrachlorodibenzofuran (Total)	0.18	J, Q-3	ng/kg dry	0.99	4/11/19	4/16/19	CL HRSM01.2

End of Report

Appendix C4 - Data Validation Reports

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MEMORANDUM

EPA Region 4 Superfund Division
American Creosote Works Site

BVSPC Project No. 049089
10 October 2018

To: Peter Thorpe, EPA Task Order COR

From: Amy Callaway, Black & Veatch Task Order Manager

Reference: EPA Contract EP-S4-09-02, Task Order No. 089-RDRD-0445
DCN 49089-0125-07-A-02799R1

Subject: Data Validation Report for Sampling Event Beginning 20 February 2018
Laboratory Project Numbers EPA/CLP: 18-0191, 18-0192, and 18-0530

1.0 Overview

Black & Veatch Special Projects Corp. (Black & Veatch) has reviewed the data for the samples and analyses listed below. The EPA National Functional Guidelines (EPA, 2017a and EPA 2017b) or method specific QC data were used to evaluate the implementation of field and laboratory QC to ensure acceptable results with a Stage 4 Data Validation (EPA, 2009) by Black & Veatch. Where performance criteria are not met, the data is qualified to indicate the degree of confidence in the final result according to data quality indicators of precision, accuracy (bias), representativeness, completeness, comparability, and sensitivity.

The analytical data included for this project number are of sufficient quality and are deemed acceptable for their intended use except where noted below. Commonly used acronyms and abbreviations used during data validation are presented in Attachment 1.

2.0 Verification

The samples reported were collected in accordance with the Black & Veatch ACW Sampling and Analysis Plan Volume 1 Quality Assurance Project Plan (QAPP) Revision 0 (Black & Veatch 2017a) and Volume 2 Field Sampling Plan (FSP), Revision 0 (Black & Veatch 2017). Black & Veatch submitted samples from 114 locations (Table 2-1) comprised of 128 samples (Table 2-2) for analysis to the EPA Region 4 SESD or CLP laboratory as indicated in the Chains of Custody (Attachment 2). Types of samples and media include: 76 surface soil and groundwater samples and 14 QC samples (Table 2-1). The 14 QC samples submitted include: eight field duplicates of a surface soil matrix and six equipment blanks of a water matrix. Target analytes utilizing one analytical method in two different data packages include: Dioxins and Furans (Table 2-3). Forty samples were sent to Kemron Environmental Services (Table 2-1) but were kept on hold for Dioxin analysis pending results of samples sent to the EPA. Nineteen of the forty samples were subsequently sent to the EPA for analysis on 26-Jun-2018. Samples not analyzed will be disposed of if the analysis of collocated samples are not over the RGs.

3.0 Validation

3.1 Field QC

Sample Collection

Issues are noted with sample collection that may include sampling methods, preservation, temperature, handling, or hold time (Table 2-4).

Field Duplicate

The current National Functional Guidelines do not have standard acceptance criteria for the evaluation of field duplicates. Unless planning documents dictate otherwise, the evaluation of field duplicates are based on the *Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996*, the RPDs for aqueous samples must be less than or equal to 30% and for solid samples must be less than or equal to 50%. Analytes exceeding the performance criteria are J qualified in the primary and secondary samples of duplicate pairs. RPDs were calculated for all analytes with concentrations greater than the MRL in at least one sample. The MRL is used for calculation of the RPD of non-detections if the duplicate sample (primary or secondary) had a detection above the MRL.

Eight field duplicate sets including surface soil samples (SS1003A/SS91003A, SS1052B/SS91052B, SS1029A/SS91029A, SS1013B/SS91013B, SS1030A/SS91030A, SS1016B/SS91016B, SS1037C/SS91037C, SS1030C/SS91030C) were submitted for analysis (Table 2-1); two sets of which remained on hold and not analyzed immediately. Set 8 has been subsequently analyzed. Set 7 still remains on hold and will be disposed of if the analysis of collocated samples are not over the RGs. The applicable field duplicate detections for each of the sets that had RPDs which did not meet the acceptance criteria are compared in Table 3-1. Only analyte comparisons requiring a J qualifier are summarized below. Differences in soil moisture results were not qualified.

Set 1 - SS1003A/SS91003A, Surface Soil

1,2,3,7,8,9 - Hexachlorodibenzofuran		

Set 2 - SS1052B/SS91052B, Surface Soil

1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,4,7,8,9-Heptachlorodibenzofuran
Heptachlorodibenzodioxin (Total)	Heptachlorodibenzofuran (Total)	Hexachlorodibenzodioxin (Total)
Hexachlorodibenzofuran (Total)	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	

Set 5 - SS1016B/SS91016B, Surface Soil

1,2,3,7,8-Pentachlorodibenzofuran	2,3,4,7,8-Pentachlorodibenzofuran	2,3,7,8-Tetrachlorodibenzofuran
Pentachlorodibenzofuran (Total)	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)
Tetrachlorodibenzofuran (Total)		

Field Blanks

Field blanks with detections and any associated sample detections are summarized on Table 3-2. Related sample analyte detections below the adjusted RL received an additional final interpreted qualifier of U. Only blank detections and subsequent sample qualifications are summarized below.

Trip Blank

Trip blanks were not collected for this sampling event.

Equipment Rinsate Blank
Six equipment blanks (RB01_SS1042, RB02_SS1035, RB03_SS1047, RB04_SS1010, RB05_SS1041, RB06_SS1040) were collected for this sampling event with no detections.

Preservative Blank
Preservative blanks were not collected for this sampling event.

3.2 Laboratory QC
Analytical data from a CLP or EPA regional laboratory has received a Stage 4 data validation summarized below and amended with further validation criteria as noted. If applicable, the validation report will include Table 3-3a which summarizes validation qualifiers applied during EPA validation and presented in the data reports. Final interpreted qualifiers, results with detections but no qualifiers, and non-detections (U qualifier), and estimated results below the reporting limit (J qualifier) are not included in the table summary.

Laboratory QC data submitted from subcontracted laboratory will receive a Stage 2B data validation. During the Stage 2B validation the data has been compared to expected QC checks for the specified level of data validation in Section 1.0. If applicable, the Stage 2B validation will include Table 3-3b in which the sample analysis is cross-checked against the necessary validation criteria to identify where no QC check was expected (NA), a QC check is typically expected but there is no data to associate with the samples submitted (ND), QC data is available and does not exhibit any exceptions to acceptance criteria (OK), or QC data that has been submitted for an expected QC check point exhibits a potential conflict with either laboratory internal acceptance criteria, EPA guidelines, or professional judgement for data validation (QC).

3.2.1 DIO:CL HRSM01.2, Surface Soil (Dioxins and Furans)

U - The analyte was not detected at or above the reporting limit. No additional final interpreted qualifiers were added.

B-4 – Method blank detection impacts MRLs. A final interpreted qualifier of U was added for detections below the adjusted MRL.

CLP01 - Concentration reported is less than the lowest standard on calibration curve. A final interpreted qualifier of J was added to detections.

CLP02 – The concentration reported is greater than the highest standard on calibration curve. A final interpreted qualifier of J was added to detections.

CLP10 – The result for 2,3,7,8-TCDF confirmed by second column. No additional final interpreted qualifiers were required for detections.

CLP18 – The estimated maximum possible concentration (EMPC) was reported. A final interpreted qualifier of U was added to detections.

CLP33 - Poor Chromatography including split peaks and/or poor peak shape present. A final interpreted qualifier of J was added to detections.

D-4 – The MRL elevated due to interferences. A final interpreted qualifier of U was added to detections.

D-5 - Estimated quantitation for one or more individual constituents comprising >10% of the total. A final interpreted qualifier of J was added to calculate totals.

J - The identification of the analyte is acceptable; the reported value is an estimate. A final interpreted qualifier of J was added to detections.

Q-3 Instrument not calibrated for all constituents of the total concentration result. A final interpreted qualifier of J was added to total calculations.

QC-3 - Analyte calibration criteria not met. A final interpreted qualifier of J was added to total calculations.

QI-1 - Internal standard was outside of method control limits. A final interpreted qualifier of J was added to detections.

Tables

2-1 Sample Summary
2-2 Analysis Methods
2-3 Analysis Types
2-4 Analysis Batches
3-1 Field Duplicate Detections
3-2 Field Blank Detections
3-3a EPA Data Validation Qualifier Count Summary
3-3b Data Validation Check Sheet for Non-EPA/CLP Laboratories (Not applicable for this sampling event)

Attachments

1. Common Data Validation Definitions
2. Chain of Custody
3. Sample Data Sheets with Additional Interpreted Qualifiers
4. Support Documentation (Not applicable for this sampling event)

References

Black & Veatch, 2017. Black & Veatch Sampling and Analysis Plan ACW Site, Volume 1 Quality Assurance Project Plan. Revision 0. December 2017.

Black & Veatch, 2017. Black & Veatch Sampling and Analysis Plan ACW Site, Volume 2 Field Sampling Plan, Revision 0. December 2017.

EPA, 1996. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. December 1996.

EPA, 2009. EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005. 13 January 2009.

EPA, 2017a. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, OLEM 9355.0-136, EPA-540-R-2017-002. January 2017.

EPA, 2017b. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OLEM 9355.0-135, EPA-540-R-201 7-001. January 2017.

Tables

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TABLE 2-1 SAMPLE SUMMARY

SAMPLE ID[1]	SAMPLE DATE	SAMPLE TIME	MATRIX	FIELD QC	DELAYED ANALYSIS
SS1000A	20-Feb-18	9:20	SF	NA	
SS1000B	20-Feb-18	9:30	SF	NA	
SS1000C	20-Feb-18	9:40	SF	NA	Delayed
SS1001A	20-Feb-18	10:30	SF	NA	
SS1001B	20-Feb-18	10:40	SF	NA	
SS1001C	20-Feb-18	10:50	SF	NA	On Hold
SS1002A	20-Feb-18	13:00	SF	NA	
SS1002B	20-Feb-18	13:10	SF	NA	
SS1002C	20-Feb-18	13:20	SF	NA	Delayed
SS1003A	20-Feb-18	13:25	SF	FD1SET1	
SS91003A	20-Feb-18	13:25	SF	FD2SET1	
SS1003B	20-Feb-18	13:35	SF	NA	
SS1003C	20-Feb-18	13:45	SF	NA	Delayed
SS1042A	20-Feb-18	14:10	SF	NA	
SS1042B	20-Feb-18	14:20	SF	NA	
SS1042C	20-Feb-18	14:30	SF	NA	Delayed
RB01_SS1042	20-Feb-18	15:00	RW	EB	
SS1004A	20-Feb-18	15:10	SF	NA	
SS1004B	20-Feb-18	15:20	SF	NA	
SS1004C	20-Feb-18	15:30	SF	NA	Delayed
SS1037A	21-Feb-18	8:25	SF	NA	
SS1037B	21-Feb-18	8:35	SF	NA	
SS1037C	21-Feb-18	8:45	SF	FD1SET7	On Hold
SS91037C	21-Feb-18	8:45	SF	FD2SET7	On Hold
SS1036A	21-Feb-18	9:40	SF	NA	
SS1036B	21-Feb-18	9:50	SF	NA	
SS1036C	21-Feb-18	10:00	SF	NA	On Hold
SS1035A	21-Feb-18	10:10	SF	NA	
SS1035B	21-Feb-18	10:20	SF	NA	
SS1035C	21-Feb-18	10:30	SF	NA	On Hold
RB02_SS1035	21-Feb-18	10:45	RW	EB	
SS1038A	21-Feb-18	12:40	SF	NA	
SS1038B	21-Feb-18	12:50	SF	NA	
SS1038C	21-Feb-18	13:00	SF	NA	Delayed
SS1052A	21-Feb-18	13:40	SF	NA	
SS1052B	21-Feb-18	13:50	SF	FD1SET2	
SS91052B	21-Feb-18	13:50	SF	FD2SET2	
SS1052C	21-Feb-18	14:00	SF	NA	On Hold
SS1053A	21-Feb-18	14:20	SF	NA	
SS1053B	21-Feb-18	14:30	SF	NA	
SS1053C	21-Feb-18	14:40	SF	NA	Delayed
SS1005A	22-Feb-18	8:10	SF	NA	
SS1005B	22-Feb-18	8:20	SF	NA	
SS1005C	22-Feb-18	8:30	SF	NA	On Hold
SS1007A	22-Feb-18	8:55	SF	NA	
SS1007B	22-Feb-18	9:05	SF	NA	
SS1007C	22-Feb-18	9:15	SF	NA	On Hold
SS1020A	22-Feb-18	9:55	SF	NA	

TABLE 2-1 SAMPLE SUMMARY

SS1020B	22-Feb-18	10:05	SF	NA	
SS1020C	22-Feb-18	10:15	SF	NA	On Hold
SS1023A	22-Feb-18	10:25	SF	NA	
SS1023B	22-Feb-18	10:35	SF	NA	
SS1023C	22-Feb-18	10:45	SF	NA	On Hold
SS1031A	22-Feb-18	13:00	SF	NA	
SS1031B	22-Feb-18	13:10	SF	NA	
SS1031C	22-Feb-18	13:20	SF	NA	On Hold
SS1029A	22-Feb-18	13:25	SF	FD1SET3	
SS91029A	22-Feb-18	13:25	SF	FD2SET3	
SS1029B	22-Feb-18	13:35	SF	NA	
SS1029C	22-Feb-18	13:45	SF	NA	Delayed
SS1026A	22-Feb-18	14:10	SF	NA	
SS1026B	22-Feb-18	14:20	SF	NA	
SS1026C	22-Feb-18	14:30	SF	NA	On Hold
SS1047A	22-Feb-18	15:15	SF	NA	
SS1047B	22-Feb-18	15:25	SF	NA	
SS1047C	22-Feb-18	15:35	SF	NA	On Hold
RB03_SS1047	22-Feb-18	15:45	RW	EB	
SS1008A	23-Feb-18	7:40	SF	NA	
SS1008B	23-Feb-18	7:50	SF	NA	
SS1008C	23-Feb-18	8:00	SF	NA	Delayed
SS1012A	23-Feb-18	8:10	SF	NA	
SS1012B	23-Feb-18	8:20	SF	NA	
SS1012C	23-Feb-18	8:30	SF	NA	On Hold
SS1013A	23-Feb-18	8:55	SF	NA	
SS1013B	23-Feb-18	9:05	SF	FD1SET4	
SS91013B	23-Feb-18	9:05	SF	FD2SET4	
SS1013C	23-Feb-18	9:15	SF	NA	On Hold
SS1009A	23-Feb-18	9:40	SF	NA	
SS1009B	23-Feb-18	9:50	SF	NA	
SS1009C	23-Feb-18	10:00	SF	NA	Delayed
SS1011A	23-Feb-18	10:10	SF	NA	
SS1011B	23-Feb-18	10:20	SF	NA	
SS1011C	23-Feb-18	10:30	SF	NA	Delayed
SS1019A	23-Feb-18	12:05	SF	NA	
SS1019B	23-Feb-18	12:15	SF	NA	
SS1019C	23-Feb-18	12:25	SF	NA	On Hold
SS1018A	23-Feb-18	12:40	SF	NA	
SS1018B	23-Feb-18	12:50	SF	NA	
SS1018C	23-Feb-18	13:00	SF	NA	On Hold
SS1010A	23-Feb-18	13:10	SF	NA	
SS1010B	23-Feb-18	13:20	SF	NA	
SS1010C	23-Feb-18	13:30	SF	NA	Delayed
RB04_SS1010	23-Feb-18	13:45	EB	EB	
SS1043A	24-Feb-18	8:05	SF	NA	
SS1043B	24-Feb-18	8:15	SF	NA	
SS1043C	24-Feb-18	8:25	SF	NA	Delayed
SS1044A	24-Feb-18	8:30	SF	NA	
SS1044B	24-Feb-18	8:40	SF	NA	

TABLE 2-1 SAMPLE SUMMARY

SS1044C	24-Feb-18	8:50	SF	NA	On Hold
SS1045A	24-Feb-18	9:05	SF	NA	
SS1045B	24-Feb-18	9:15	SF	NA	
SS1045C	24-Feb-18	9:25	SF	NA	Delayed
SS1046A	24-Feb-18	10:00	SF	NA	
SS1046B	24-Feb-18	10:10	SF	NA	
SS1046C	24-Feb-18	10:20	SF	NA	Delayed
SS1030A	24-Feb-18	10:45	SF	FD1SET5	
SS91030A	24-Feb-18	10:45	SF	FD2SET5	
SS1030B	24-Feb-18	10:55	SF	NA	
SS1030C	24-Feb-18	11:05	SF	FD1SET8	Delayed
SS91030C	24-Feb-18	11:05	SF	FD2SET8	Delayed
SS1041A	24-Feb-18	13:10	SF	NA	
SS1041B	24-Feb-18	13:20	SF	NA	
SS1041C	24-Feb-18	13:30	SF	NA	On Hold
RB05_SS1041	24-Feb-18	13:45	EB	EB	
SS1017A	25-Feb-18	7:55	SF	NA	
SS1017B	25-Feb-18	8:05	SF	NA	
SS1017C	25-Feb-18	8:15	SF	NA	On Hold
SS1016A	25-Feb-18	8:20	SF	NA	
SS1016B	25-Feb-18	8:30	SF	FD1SET6	
SS91016B	25-Feb-18	8:30	SF	FD2SET6	
SS1016C	25-Feb-18	8:40	SF	NA	Delayed
SS1039A	25-Feb-18	8:55	SF	NA	
SS1039B	25-Feb-18	9:05	SF	NA	
SS1039C	25-Feb-18	9:15	SF	NA	Delayed
SS1040A	25-Feb-18	9:20	SF	NA	
SS1040B	25-Feb-18	9:30	SF	NA	
SS1040C	25-Feb-18	9:40	SF	NA	On Hold
RB06_SS1040	25-Feb-18	10:00	EB	EB	
QC Samples	14				
Sample Locations	114				
Grand Total	**128**				

Field QC Samples

1 - Samples ordered by date and time the sample was acquired

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID[1]	DIO:CL HRSM01.2	TOTAL	MATRIX	FIELD QC
RB01_SS1042	1	**1**	RW	EB
RB02_SS1035	1	**1**	RW	EB
RB03_SS1047	1	**1**	RW	EB
RB04_SS1010	1	**1**	EB	EB
RB05_SS1041	1	**1**	EB	EB
RB06_SS1040	1	**1**	EB	EB
SS1000A	1	**1**	SF	NA
SS1000B	1	**1**	SF	NA
SS1000C	1	**1**	SF	NA
SS1001A	1	**1**	SF	NA
SS1001B	1	**1**	SF	NA
SS1002A	1	**1**	SF	NA
SS1002B	1	**1**	SF	NA
SS1002C	1	**1**	SF	NA
SS1003A	1	**1**	SF	FD1SET1
SS1003B	1	**1**	SF	NA
SS1003C	1	**1**	SF	NA
SS1004A	1	**1**	SF	NA
SS1004B	1	**1**	SF	NA
SS1004C	1	**1**	SF	NA
SS1005A	1	**1**	SF	NA
SS1005B	1	**1**	SF	NA
SS1007A	1	**1**	SF	NA
SS1007B	1	**1**	SF	NA
SS1008A	1	**1**	SF	NA
SS1008B	1	**1**	SF	NA
SS1008C	1	**1**	SF	NA
SS1009A	1	**1**	SF	NA
SS1009B	1	**1**	SF	NA
SS1009C	1	**1**	SF	NA
SS1010A	1	**1**	SF	NA
SS1010B	1	**1**	SF	NA
SS1010C	1	**1**	SF	NA
SS1011A	1	**1**	SF	NA
SS1011B	1	**1**	SF	NA
SS1011C	1	**1**	SF	NA
SS1012A	1	**1**	SF	NA
SS1012B	1	**1**	SF	NA
SS1013A	1	**1**	SF	NA
SS1013B	1	**1**	SF	FD1SET4
SS1016A	1	**1**	SF	NA
SS1016B	1	**1**	SF	FD1SET6
SS1016C	1	**1**	SF	NA
SS1017A	1	**1**	SF	NA
SS1017B	1	**1**	SF	NA
SS1018A	1	**1**	SF	NA
SS1018B	1	**1**	SF	NA
SS1019A	1	**1**	SF	NA

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID[1]	DIO:CL HRSM01.2	TOTAL	MATRIX	FIELD QC
SS1019B	1	**1**	SF	NA
SS1020A	1	**1**	SF	NA
SS1020B	1	**1**	SF	NA
SS1023A	1	**1**	SF	NA
SS1023B	1	**1**	SF	NA
SS1026A	1	**1**	SF	NA
SS1026B	1	**1**	SF	NA
SS1029A	1	**1**	SF	FD1SET3
SS1029B	1	**1**	SF	NA
SS1029C	1	**1**	SF	NA
SS1030A	1	**1**	SF	FD1SET5
SS1030B	1	**1**	SF	NA
SS1030C	1	**1**	SF	FD1SET8
SS1031A	1	**1**	SF	NA
SS1031B	1	**1**	SF	NA
SS1035A	1	**1**	SF	NA
SS1035B	1	**1**	SF	NA
SS1036A	1	**1**	SF	NA
SS1036B	1	**1**	SF	NA
SS1037A	1	**1**	SF	NA
SS1037B	1	**1**	SF	NA
SS1038A	1	**1**	SF	NA
SS1038B	1	**1**	SF	NA
SS1038C	1	**1**	SF	NA
SS1039A	1	**1**	SF	NA
SS1039B	1	**1**	SF	NA
SS1039C	1	**1**	SF	NA
SS1040A	1	**1**	SF	NA
SS1040B	1	**1**	SF	NA
SS1041A	1	**1**	SF	NA
SS1041B	1	**1**	SF	NA
SS1042A	1	**1**	SF	NA
SS1042B	1	**1**	SF	NA
SS1042C	1	**1**	SF	NA
SS1043A	1	**1**	SF	NA
SS1043B	1	**1**	SF	NA
SS1043C	1	**1**	SF	NA
SS1044A	1	**1**	SF	NA
SS1044B	1	**1**	SF	NA
SS1045A	1	**1**	SF	NA
SS1045B	1	**1**	SF	NA
SS1045C	1	**1**	SF	NA
SS1046A	1	**1**	SF	NA
SS1046B	1	**1**	SF	NA
SS1046C	1	**1**	SF	NA
SS1047A	1	**1**	SF	NA
SS1047B	1	**1**	SF	NA
SS1052A	1	**1**	SF	NA

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID[1]	DIO:CL HRSM01.2	TOTAL	MATRIX	FIELD QC
SS1052B	1	**1**	SF	FD1SET2
SS1053A	1	**1**	SF	NA
SS1053B	1	**1**	SF	NA
SS1053C	1	**1**	SF	NA
SS91003A	1	**1**	SF	FD2SET1
SS91013B	1	**1**	SF	FD2SET4
SS91016B	1	**1**	SF	FD2SET6
SS91029A	1	**1**	SF	FD2SET3
SS91030A	1	**1**	SF	FD2SET5
SS91030C	1	**1**	SF	FD2SET8
SS91052B	1	**1**	SF	FD2SET2
GRAND TOTAL	**107**	**107**		**3**

- Field QC Samples

1 - Samples ordered by the Sample ID

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
Dioxins and Furans	**DIO:CL HRSM01.2**
	% Moisture
	1,2,3,4,6,7,8-Heptachlorodibenzodioxin
	1,2,3,4,6,7,8-Heptachlorodibenzofuran
	1,2,3,4,7,8,9-Heptachlorodibenzofuran
	1,2,3,4,7,8-Hexachlorodibenzodioxin
	1,2,3,4,7,8-Hexachlorodibenzofuran
	1,2,3,6,7,8-Hexachlorodibenzodioxin
	1,2,3,6,7,8-Hexachlorodibenzofuran
	1,2,3,7,8,9-Hexachlorodibenzodioxin
	1,2,3,7,8,9-Hexachlorodibenzofuran
	1,2,3,7,8-Pentachlorodibenzodioxin
	1,2,3,7,8-Pentachlorodibenzofuran
	2,3,4,6,7,8-Hexachlorodibenzofuran
	2,3,4,7,8-Pentachlorodibenzofuran
	2,3,7,8-Tetrachlorodibenzodioxin
	2,3,7,8-Tetrachlorodibenzofuran
	Heptachlorodibenzodioxin (Total)
	Heptachlorodibenzofuran (Total)
	Hexachlorodibenzodioxin (Total)
	Hexachlorodibenzofuran (Total)
	Octachlorodibenzodioxin
	Octachlorodibenzofuran
	Pentachlorodibenzodioxin (Total)
	Pentachlorodibenzofuran (Total)
	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)
	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)
	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)
	Tetrachlorodibenzodioxin (Total)
	Tetrachlorodibenzofuran (Total)

TABLE 2-4 ANALYSIS BATCHES

SAMPLE ID	METHOD BATCH LAB ID	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
	DIO:CL HRSM01.2	**23-Mar-18**	**0:00**					
	(blank)	**23-Mar-18**	**0:00**					
RB04_SS1010	R4-C181214-01	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	13:45	
RB05_SS1041	R4-C181214-02	24-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	13:45	
RB06_SS1040	R4-C181214-03	24-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	10:00	
SS1008A	R4-C181214-04	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	7:40	
SS1008B	R4-C181214-05	2-Apr-18	0:00	27-Feb-18	0:00	23-Feb-18	7:50	
SS1009A	R4-C181214-06	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	9:40	
SS1009B	R4-C181214-07	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	9:50	
SS1010A	R4-C181214-08	27-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	13:10	
SS1010B	R4-C181214-09	27-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	13:20	
SS1011A	R4-C181214-10	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	10:10	
SS1011B	R4-C181214-11	25-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	10:20	
SS1012A	R4-C181214-12	2-Apr-18	0:00	27-Feb-18	0:00	23-Feb-18	8:10	
SS1012B	R4-C181214-13	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	8:20	
SS1013A	R4-C181214-14	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	8:55	
SS1013B	R4-C181214-15	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	9:05	
SS91013B	R4-C181214-16	24-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	9:05	
SS1016A	R4-C181214-17	29-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	8:20	
SS1016B	R4-C181214-18	29-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	8:30	
SS91016B	R4-C181214-19	29-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	8:30	
SS1017A	R4-C181214-20	29-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	7:55	
SS1017B	R4-C181214-21	29-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	8:05	
SS1018A	R4-C181214-22	27-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	12:40	
SS1018B	R4-C181214-23	27-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	12:50	
SS1019A	R4-C181214-24	25-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	12:05	
SS1019B	R4-C181214-25	27-Mar-18	0:00	27-Feb-18	0:00	23-Feb-18	12:15	
SS1030A	R4-C181214-26	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	10:45	
SS1030B	R4-C181214-27	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	10:55	
SS91030A	R4-C181214-28	29-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	10:45	
SS1039A	R4-C181214-29	30-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	8:55	
SS1039B	R4-C181214-30	30-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	9:05	
SS1040A	R4-C181214-31	30-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	9:20	
SS1040B	R4-C181214-32	28-Mar-18	0:00	27-Feb-18	0:00	25-Feb-18	9:30	
SS1041A	R4-C181214-33	29-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	13:10	
SS1041B	R4-C181214-34	1-Apr-18	0:00	27-Feb-18	0:00	24-Feb-18	13:20	
SS1043A	R4-C181214-35	27-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	8:05	
SS1043B	R4-C181214-36	27-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	8:15	
SS1044A	R4-C181214-37	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	8:30	
SS1044B	R4-C181214-38	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	8:40	
SS1045A	R4-C181214-39	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	9:05	
SS1045B	R4-C181214-40	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	9:15	
SS1046A	R4-C181214-41	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	10:00	
SS1046B	R4-C181214-42	28-Mar-18	0:00	27-Feb-18	0:00	24-Feb-18	10:10	
RB01_SS1042	R4-C181002-01	2-Apr-18	0:00	23-Feb-18	0:00	20-Feb-18	15:00	
RB02_SS1035	R4-C181002-02	2-Apr-18	0:00	23-Feb-18	0:00	21-Feb-18	10:45	
RB03_SS1047	R4-C181002-03	2-Apr-18	0:00	23-Feb-18	0:00	22-Feb-18	15:45	
SS1000A	R4-C181002-04	4-May-18	0:00	23-Feb-18	0:00	20-Feb-18	9:20	
SS1000B	R4-C181002-05	4-May-18	0:00	23-Feb-18	0:00	20-Feb-18	9:30	
SS1001A	R4-C181002-06	3-May-18	0:00	23-Feb-18	0:00	20-Feb-18	10:30	
SS1001B	R4-C181002-07	3-May-18	0:00	23-Feb-18	0:00	20-Feb-18	10:40	
SS1002A	R4-C181002-08	3-May-18	0:00	23-Feb-18	0:00	20-Feb-18	13:00	
SS1002B	R4-C181002-09	3-May-18	0:00	23-Feb-18	0:00	20-Feb-18	13:10	T
SS1003A	R4-C181002-10	3-May-18	0:00	23-Feb-18	0:00	20-Feb-18	13:25	
SS1003B	R4-C181002-11	3-May-18	0:00	23-Feb-18	0:00	20-Feb-18	13:35	
SS91003A	R4-C181002-12	4-May-18	0:00	23-Feb-18	0:00	20-Feb-18	13:25	
SS1004A	R4-C181002-13	5-May-18	0:00	23-Feb-18	0:00	20-Feb-18	15:10	
SS1004B	R4-C181002-14	4-May-18	0:00	23-Feb-18	0:00	20-Feb-18	15:20	
SS1005A	R4-C181002-15	8-May-18	0:00	23-Feb-18	0:00	22-Feb-18	8:10	
SS1005B	R4-C181002-16	8-May-18	0:00	23-Feb-18	0:00	22-Feb-18	8:20	

TABLE 2-4 ANALYSIS BATCHES

SAMPLE ID	METHOD BATCH LAB ID	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
SS1007A	R4-C181002-17	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	8:55	
SS1007B	R4-C181002-18	8-May-18	0:00	23-Feb-18	0:00	22-Feb-18	9:05	
SS1020A	R4-C181002-19	8-May-18	0:00	23-Feb-18	0:00	22-Feb-18	9:55	
SS1020B	R4-C181002-20	8-May-18	0:00	23-Feb-18	0:00	22-Feb-18	10:05	
SS1023A	R4-C181002-21	8-May-18	0:00	23-Feb-18	0:00	22-Feb-18	10:25	
SS1023B	R4-C181002-22	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	10:35	T
SS1026A	R4-C181002-23	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	14:10	
SS1026B	R4-C181002-24	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	14:20	
SS1029A	R4-C181002-25	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	13:25	
SS1029B	R4-C181002-26	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	13:35	
SS91029A	R4-C181002-27	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	13:25	
SS1031A	R4-C181002-28	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	13:00	
SS1031B	R4-C181002-29	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	13:10	
SS1035A	R4-C181002-30	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	10:10	
SS1035B	R4-C181002-31	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	10:20	
SS1036A	R4-C181002-32	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	9:40	
SS1036B	R4-C181002-33	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	9:50	
SS1037A	R4-C181002-34	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	8:25	
SS1037B	R4-C181002-35	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	8:35	
SS1038A	R4-C181002-36	4-May-18	0:00	23-Feb-18	0:00	21-Feb-18	12:40	
SS1038B	R4-C181002-37	23-Mar-18	0:00	23-Feb-18	0:00	21-Feb-18	12:50	
SS1042A	R4-C181002-38	4-May-18	0:00	23-Feb-18	0:00	20-Feb-18	14:10	
SS1042B	R4-C181002-39	4-May-18	0:00	23-Feb-18	0:00	20-Feb-18	14:20	
SS1047A	R4-C181002-40	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	15:15	
SS1047B	R4-C181002-41	9-May-18	0:00	23-Feb-18	0:00	22-Feb-18	15:25	
SS1052A	R4-C181002-42	23-Mar-18	0:00	23-Feb-18	0:00	21-Feb-18	13:40	
SS1052B	R4-C181002-43	23-Mar-18	0:00	23-Feb-18	0:00	21-Feb-18	13:50	
SS91052B	R4-C181002-44	23-Mar-18	0:00	23-Feb-18	0:00	21-Feb-18	13:50	
SS1053A	R4-C181002-45	24-Mar-18	0:00	23-Feb-18	0:00	21-Feb-18	14:20	
SS1053B	R4-C181002-46	24-Mar-18	0:00	23-Feb-18	0:00	21-Feb-18	14:30	
SS1000C	R4-C183005-01	10-Jul-18	0:00	26-Jun-18	0:00	20-Feb-18	9:40	
SS1002C	R4-C183005-02	10-Jul-18	0:00	26-Jun-18	0:00	20-Feb-18	13:20	
SS1003C	R4-C183005-03	11-Jul-18	0:00	26-Jun-18	0:00	20-Feb-18	13:45	
SS1004C	R4-C183005-04	10-Jul-18	0:00	26-Jun-18	0:00	20-Feb-18	15:30	
SS1008C	R4-C183005-05	10-Jul-18	0:00	26-Jun-18	0:00	23-Feb-18	8:00	
SS1009C	R4-C183005-06	10-Jul-18	0:00	26-Jun-18	0:00	23-Feb-18	10:00	
SS1010C	R4-C183005-07	11-Jul-18	0:00	26-Jun-18	0:00	23-Feb-18	13:30	
SS1011C	R4-C183005-08	13-Jul-18	0:00	26-Jun-18	0:00	23-Feb-18	10:30	
SS1016C	R4-C183005-09	11-Jul-18	0:00	26-Jun-18	0:00	25-Feb-18	8:40	
SS1029C	R4-C183005-10	13-Jul-18	0:00	26-Jun-18	0:00	22-Feb-18	13:45	
SS1030C	R4-C183005-11	11-Jul-18	0:00	26-Jun-18	0:00	24-Feb-18	11:05	
SS91030C	R4-C183005-12	11-Jul-18	0:00	26-Jun-18	0:00	24-Feb-18	11:05	
SS1038C	R4-C183005-13	10-Jul-18	0:00	26-Jun-18	0:00	21-Feb-18	13:00	
SS1039C	R4-C183005-14	11-Jul-18	0:00	26-Jun-18	0:00	25-Feb-18	9:15	
SS1042C	R4-C183005-15	11-Jul-18	0:00	26-Jun-18	0:00	20-Feb-18	14:30	
SS1043C	R4-C183005-16	11-Jul-18	0:00	26-Jun-18	0:00	24-Feb-18	8:25	
SS1045C	R4-C183005-17	11-Jul-18	0:00	26-Jun-18	0:00	24-Feb-18	9:25	
SS1046C	R4-C183005-18	11-Jul-18	0:00	26-Jun-18	0:00	24-Feb-18	10:20	
SS1053C	R4-C183005-19	10-Jul-18	0:00	26-Jun-18	0:00	21-Feb-18	14:40	

1 - Data packages from an EPA or CLP laboratory will not have a batch ID available and will display "(blank)"
C - Chain of Custody issue.
H - Hold time has been exceeded.
QC - Quality Control criteria may require review.
S - Sample acquisition, handling, or shipping issue
T - Temperature issue.

TABLE 3-1 FIELD DUPLICATE DETECTIONS

	Set 1						Set 2					
METHOD ANALYTE	**PRIMARY**		**SECONDARY**		**RPD**	**QC**	**PRIMARY**		**SECONDARY**		**RPD**	**QC**
	SS1003A		**SS91003A**		**50.0**		**SS1052B**		**SS91052B**		**50.0**	
	Result	MRL	Result	MRL			Result	MRL	Result	MRL		
DIO:CL HRSM01.2												
% Moisture	11		16		37.0	N/A	5.3		9.8		59.6	**J**
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	9200	50	11000	50	17.8	N/A	ND	52	180	5	110.3	**J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1200	5	1400	5	15.4	N/A	14	3	25	5	56.4	**J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	100	5	120	5	18.2	N/A	ND		ND		N/A	NA
1,2,3,4,7,8-Hexachlorodibenzodioxin	73	5	86	5	16.4	N/A	ND		ND		N/A	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	52	5	62	5	17.5	N/A	ND		ND		N/A	NA
1,2,3,6,7,8-Hexachlorodibenzodioxin	230	5	270	5	16.0	N/A	2	5	3.7	5	N/A	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	44	5	51	5	14.7	N/A	ND	5	0.99	5	N/A	NA
1,2,3,7,8,9-Hexachlorodibenzodioxin	140	5	160	5	13.3	N/A	1.4	5	2.3	5	N/A	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	38	5	88	5	79.4	**J**	ND		ND		N/A	NA
1,2,3,7,8-Pentachlorodibenzodioxin	27	5	32	5	16.9	N/A	ND		ND		N/A	NA
1,2,3,7,8-Pentachlorodibenzofuran	4.8	5	ND	5	N/A	NA	ND		ND		N/A	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	74	5	90	5	19.5	N/A	ND		1.8	5	N/A	NA
2,3,4,7,8-Pentachlorodibenzofuran	6.2	5	8.2	5	27.8	N/A	0.87	5	1.2	5	31.9	N/A
2,3,7,8-Tetrachlorodibenzodioxin	6.1	1	4.9	1	21.8	N/A	ND		ND		N/A	NA
2,3,7,8-Tetrachlorodibenzofuran	1.5	1	1.6	1	6.5	N/A	ND		ND		N/A	NA
Heptachlorodibenzodioxin (Total)	24000	50	28000	50	15.4	N/A	100	5	360	5	113.0	**J**
Heptachlorodibenzofuran (Total)	4100	5	4800	5	15.7	N/A	31	5	62	5	66.7	**J**
Hexachlorodibenzodioxin (Total)	1700	5	2000	5	16.2	N/A	21	5	38	5	57.6	**J**
Hexachlorodibenzofuran (Total)	1700	5	2000	5	16.2	N/A	20	5	34	5	51.9	**J**
Octachlorodibenzodioxin	87000	100	99000	100	12.9	N/A	ND		ND		N/A	NA
Octachlorodibenzofuran	4500	100	5100	100	12.5	N/A	ND		ND		N/A	NA
Pentachlorodibenzodioxin (Total)	130	5	150	5	14.3	N/A	5.2	5	7.5	5	36.2	N/A
Pentachlorodibenzofuran (Total)	270	5	330	5	20.0	N/A	24	5	35	5	37.3	N/A
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	110	110	140	140	24.0	N/A	2.7	2.7	3.8	3.8	33.8	N/A
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	130	130	150	150	14.3	N/A	2.1	2.1	3	3	35.3	N/A
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	230	230	280	280	19.6	N/A	2.6	2.6	4.9	4.9	61.3	**J**
Tetrachlorodibenzodioxin (Total)	19	1	22	1	14.6	N/A	2.7	1	3.1	0.99	13.8	N/A
Tetrachlorodibenzofuran (Total)	67	1	66	1	1.5	N/A	9.7	1	12	0.99	21.2	N/A

TABLE 3-1 FIELD DUPLICATE DETECTIONS

	Set 3						Set 4					
METHOD ANALYTE	**PRIMARY**		**SECONDARY**		**RPD**	**QC**	**PRIMARY**		**SECONDARY**		**RPD**	**QC**
	SS1029A		**SS91029A**		**50.0**		**SS1013B**		**SS91013B**		**50.0**	
	Result	MRL	Result	MRL			Result	MRL	Result	MRL		
DIO:CL HRSM01.2												
% Moisture	5.2		5		3.9	N/A	25		9.5		89.9	J
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	320	5	310	5	3.2	N/A	150	5	93	5	46.9	N/A
1,2,3,4,6,7,8-Heptachlorodibenzofuran	55	5	51	5	7.5	N/A	33	5	22	5	40.0	N/A
1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.3	5	3	5	N/A	NA	2.2	5	1.4	5	N/A	NA
1,2,3,4,7,8-Hexachlorodibenzodioxin	2.6	5	2.7	5	N/A	NA	2	5	1.2	5	N/A	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	1.7	5	ND		N/A	NA	ND		ND		N/A	NA
1,2,3,6,7,8-Hexachlorodibenzodioxin	8.7	5	8.2	5	5.9	N/A	6	5	3.4	5	18.2	N/A
1,2,3,6,7,8-Hexachlorodibenzofuran	1.8	5	1.7	5	N/A	NA	2.5	5	2.4	5	N/A	NA
1,2,3,7,8,9-Hexachlorodibenzodioxin	5.4	5	4.9	5	7.7	N/A	3.5	5	2.4	5	N/A	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	0.72	5	ND		N/A	NA	0.86	5	0.82	5	N/A	NA
1,2,3,7,8-Pentachlorodibenzodioxin	1.3	5	1.4	5	N/A	NA	0.7	5	0.59	5	N/A	NA
1,2,3,7,8-Pentachlorodibenzofuran	ND		ND		N/A	NA	0.68	5	0.58	5	N/A	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	2.8	5	2.8	5	N/A	NA	4.4	5	4.5	5	N/A	NA
2,3,4,7,8-Pentachlorodibenzofuran	0.98	5	1.1	5	N/A	NA	5.6	5	6.2	5	10.2	N/A
2,3,7,8-Tetrachlorodibenzodioxin	ND		ND		N/A	NA	ND		ND		N/A	NA
2,3,7,8-Tetrachlorodibenzofuran	0.75	0.99	0.92	1	N/A	NA	0.44	1	0.39	1	N/A	NA
Heptachlorodibenzodioxin (Total)	620	5	600	5	3.3	N/A	290	5	180	5	46.8	N/A
Heptachlorodibenzofuran (Total)	170	5	160	5	6.1	N/A	84	5	56	5	40.0	N/A
Hexachlorodibenzodioxin (Total)	64	5	66	5	3.1	N/A	47	5	34	5	32.1	N/A
Hexachlorodibenzofuran (Total)	55	5	57	5	3.6	N/A	63	5	62	5	1.6	N/A
Octachlorodibenzodioxin	3200	9.9	3000	10	6.5	N/A	1200	10	750	10	46.2	N/A
Octachlorodibenzofuran	180	9.9	170	10	5.7	N/A	80	10	51	10	44.3	N/A
Pentachlorodibenzodioxin (Total)	11	5	14	5	24.0	N/A	13	5	11	5	16.7	N/A
Pentachlorodibenzofuran (Total)	22	5	30	5	30.8	N/A	61	5	75	5	20.6	N/A
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	6	6	6.3	6.3	4.9	N/A	9	9	9	9	0.0	N/A
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	5.4	5.4	5.6	5.6	3.6	N/A	6.4	6.4	5.8	5.8	9.8	N/A
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	9.1	9.1	9	9	1.1	N/A	6.9	6.9	5.7	5.6	19.0	N/A
Tetrachlorodibenzodioxin (Total)	3.9	0.99	6.1	1	44.0	N/A	6.8	1	6.5	1	4.5	N/A
Tetrachlorodibenzofuran (Total)	14	0.99	21	1	40.0	N/A	28	1	32	1	13.3	N/A

TABLE 3-1 FIELD DUPLICATE DETECTIONS

	Set 5						Set 6					
METHOD ANALYTE	**PRIMARY**		**SECONDARY**		**RPD**	**QC**	**PRIMARY**		**SECONDARY**		**RPD**	**QC**
	SS1030A		**SS91030A**		**50.0**		**SS1016B**		**SS91016B**		**50.0**	
	Result	MRL	Result	MRL			Result	MRL	Result	MRL		
DIO:CL HRSM01.2												
% Moisture	9.7		9.6		1.0	N/A	6.1		12		65.2	J
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1000	5	920	5	8.3	N/A	4500	5	6600	75	37.8	N/A
1,2,3,4,6,7,8-Heptachlorodibenzofuran	230	5	260	5	12.2	N/A	860	5	1300	5	40.7	N/A
1,2,3,4,7,8,9-Heptachlorodibenzofuran	14	5	15	5	6.9	N/A	74	5	110	5	39.1	N/A
1,2,3,4,7,8-Hexachlorodibenzodioxin	9.9	5	9.6	5	3.1	N/A	47	5	68	5	36.5	N/A
1,2,3,4,7,8-Hexachlorodibenzofuran	11	5	15	5	30.8	N/A	27	5	41	5	41.2	N/A
1,2,3,6,7,8-Hexachlorodibenzodioxin	34	5	31	5	9.2	N/A	110	5	160	5	37.0	N/A
1,2,3,6,7,8-Hexachlorodibenzofuran	9.9	5	16	5	47.1	N/A	29	5	43	5	38.9	N/A
1,2,3,7,8,9-Hexachlorodibenzodioxin	18	5	18	5	0.0	N/A	94	5	130	5	32.1	N/A
1,2,3,7,8,9-Hexachlorodibenzofuran	2.9	5	4.9	5	N/A	NA	13	5	17	5	26.7	N/A
1,2,3,7,8-Pentachlorodibenzodioxin	3.9	5	4.5	5	N/A	NA	15	5	22	5	37.8	N/A
1,2,3,7,8-Pentachlorodibenzofuran	6.1	5	20	5	106.5	J	2.2	5	3.4	5	N/A	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	14	5	20	5	35.3	N/A	48	5	69	5	35.9	N/A
2,3,4,7,8-Pentachlorodibenzofuran	27	5	95	5	111.5	J	13	5	16	5	20.7	N/A
2,3,7,8-Tetrachlorodibenzodioxin	ND		ND		N/A	NA	ND		ND		N/A	NA
2,3,7,8-Tetrachlorodibenzofuran	2.5	1	4.4	1	55.1	J	0.88	1	0.86	1	N/A	NA
Heptachlorodibenzodioxin (Total)	1900	5	1700	5	11.1	N/A	7100	50	10000	75	33.9	N/A
Heptachlorodibenzofuran (Total)	630	5	660	5	4.7	N/A	2400	5	3600	5	40.0	N/A
Hexachlorodibenzodioxin (Total)	210	5	210	5	0.0	N/A	690	5	1000	5	36.7	N/A
Hexachlorodibenzofuran (Total)	230	5	280	5	19.6	N/A	770	5	1100	5	35.3	N/A
Octachlorodibenzodioxin	9600	10	8500	10	12.2	N/A	37000	10	52000	150	33.7	N/A
Octachlorodibenzofuran	600	10	530	10	12.4	N/A	2800	10	4200	10	40.0	N/A
Pentachlorodibenzodioxin (Total)	34	5	40	5	16.2	N/A	97	5	130	5	29.1	N/A
Pentachlorodibenzofuran (Total)	170	5	440	5	88.5	J	190	5	260	5	31.1	N/A
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	45	45	120	120	90.9	J	72	72	100	100	32.6	N/A
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	32	32	69	69	73.3	J	78	78	110	110	34.0	N/A
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	38	38	61	61	46.5	N/A	120	120	180	180	40.0	N/A
Tetrachlorodibenzodioxin (Total)	12	1	16	1	28.6	N/A	23	1	27	1	16.0	N/A
Tetrachlorodibenzofuran (Total)	120	1	380	1	104.0	J	54	1	71	1	27.2	N/A

TABLE 3-1 FIELD DUPLCIATES

Notes

- detection < MRL. Analyte pairs in which one is a detect and the other is non-detect or below the reporting limit will use the reporting limit as a subtituion for the calculation. Analyte pairs in which both are below the reporting limit will not be calculated.

- RPD > matrix acceptance criteria

NA - Not analyzed

ND - Not detected

N/A - Not applicable. RPD lower than acceptance criteria, both results lower than the MRL, or TICs.

TABLE 3-2 FIELD BLANK DETECTIONS

BLANK SAMPLE	Blank Detection	N/A		
RELATED DETECTIONS		Result	MRL	QC
RB01_SS1042	NO	N/A		
None				
RB02_SS1035	NO	N/A		
None				
RB03_SS1047	NO	N/A		
None				
RB04_SS1010	NO	N/A		
None				
RB05_SS1041	NO	N/A		
None				
RB06_SS1040	NO	N/A		
None				

QC - Quality Control criteria may require review.
N/A - Not applicable. QC measures are not necessary either due to lack of a detection or a detection above the Blank MRL.
NA - Not analyzed.
- Detection > MRL
- Detection < adjusted MRL

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category	Count of Occurrence by Category																																			
Method																																						
Qualifier	RB01_	RB02_	RB03_	RB04_	RB05_	RB06_	SS1000	SS1000	SS1001	SS1001	SS1002	SS1002	SS1003	SS1003	SS1004	SS1004	SS1005	SS1005	SS1007	SS1007	SS1008	SS1008	SS1009	SS1009	SS1010	SS1010	SS1011	SS1011	SS1012	SS1012	SS1013	SS1013	SS1016	SS1016
Analyte	SS1042	SS1035	SS1047	SS1010	SS1041	SS1040	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
DIO:CL HRSM01.2																																				
CLP10																																				
2,3,7,8-Tetrachlorodibenzofuran																													1					1		
J,CLP01																																				
1,2,3,4,6,7,8-Heptachlorodibenzofuran								1																												
1,2,3,4,7,8,9-Heptachlorodibenzofuran									1						1				1			1	1		1	1	1	1		1		1			
1,2,3,4,7,8-Hexachlorodibenzodioxin							1		1						1	1	1					1	1		1	1	1	1		1		1			
1,2,3,4,7,8-Hexachlorodibenzofuran							1		1						1		1		1			1			1	1		1							
1,2,3,6,7,8-Hexachlorodibenzodioxin							1	1	1	1								1	1	1			1				1								
1,2,3,6,7,8-Hexachlorodibenzofuran							1						1	1	1	1	1			1		1	1	1	1	1	1	1		1		1			
1,2,3,7,8,9-Hexachlorodibenzodioxin							1	1	1						1				1	1			1		1	1	1	1		1		1			
1,2,3,7,8,9-Hexachlorodibenzofuran							1				1	1				1	1				1	1	1	1	1	1		1	1	1	1	1			
1,2,3,7,8-Pentachlorodibenzodioxin							1					1			1	1	1		1	1		1	1	1	1	1		1			1		1			
1,2,3,7,8-Pentachlorodibenzofuran							1				1	1	1									1	1	1	1	1		1	1		1	1			1
2,3,4,6,7,8-Hexachlorodibenzofuran							1								1		1		1			1								1		1			
2,3,4,7,8-Pentachlorodibenzofuran											1	1					1		1			1	1	1			1			1					
2,3,7,8-Tetrachlorodibenzodioxin																																				
2,3,7,8-Tetrachlorodibenzofuran											1	1							1	1																
Octachlorodibenzofuran								1																												
J,CLP01,CLP10																																				
2,3,7,8-Tetrachlorodibenzofuran																					1			1								1	1			1
J,CLP02																																				
Octachlorodibenzodioxin												1	1	1		1	1					1		1					1		1		1		
J,CLP10,CLP01																																				
2,3,7,8-Tetrachlorodibenzofuran																							1		1	1		1								
J,CLP33																																				
1,2,3,4,7,8-Hexachlorodibenzodioxin																					1															
1,2,3,4,7,8-Hexachlorodibenzofuran																					1															
1,2,3,6,7,8-Hexachlorodibenzodioxin																					1															
1,2,3,6,7,8-Hexachlorodibenzofuran																					1															
1,2,3,7,8,9-Hexachlorodibenzodioxin																					1															
1,2,3,7,8-Pentachlorodibenzodioxin																					1															
1,2,3,7,8-Pentachlorodibenzofuran																					1															
2,3,4,6,7,8-Hexachlorodibenzofuran																					1															
2,3,4,7,8-Pentachlorodibenzofuran																					1															
J,D-5																																				
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)							1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1		1			
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)							1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1		1			
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)							1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1		1			
J,Q-3																																				
Heptachlorodibenzodioxin (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Heptachlorodibenzofuran (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Hexachlorodibenzodioxin (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Hexachlorodibenzofuran (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Pentachlorodibenzodioxin (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Pentachlorodibenzofuran (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Tetrachlorodibenzodioxin (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Tetrachlorodibenzofuran (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
J,QC-3																																				
Pentachlorodibenzodioxin (Total)																																				
U,B-4																																				
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																																				
2,3,7,8-Tetrachlorodibenzodioxin																																				
Octachlorodibenzodioxin																																				
Octachlorodibenzofuran																																				
U,CLP01																																				
1,2,3,7,8,9-Hexachlorodibenzofuran																																				
U,CLP18																																				
1,2,3,4,7,8,9-Heptachlorodibenzofuran							1	1										1																		
1,2,3,4,7,8-Hexachlorodibenzodioxin								1										1	1																	
1,2,3,4,7,8-Hexachlorodibenzofuran																																				
1,2,3,6,7,8-Hexachlorodibenzodioxin																																				
1,2,3,6,7,8-Hexachlorodibenzofuran									1	1									1																	
1,2,3,7,8,9-Hexachlorodibenzodioxin																																				
1,2,3,7,8,9-Hexachlorodibenzofuran															1					1																
1,2,3,7,8-Pentachlorodibenzodioxin																		1		1																
1,2,3,7,8-Pentachlorodibenzofuran															1																					
2,3,4,6,7,8-Hexachlorodibenzofuran																			1																	
2,3,4,7,8-Pentachlorodibenzofuran									1						1	1																				
2,3,7,8-Tetrachlorodibenzodioxin							1			1	1	1				1	1	1		1																
2,3,7,8-Tetrachlorodibenzofuran									1																											
U,D-4																																				
1,2,3,4,7,8-Hexachlorodibenzofuran																1																				

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category	Count of Occurrence by Category																																					
Method																																							
Qualifier	RB01_	RB02_	RB03_	RB04_	RB05_	RB06_	SS1000	SS1000	SS1001	SS1001	SS1002	SS1002	SS1003	SS1003	SS1004	SS1004	SS1005	SS1005	SS1007	SS1007	SS1008	SS1008	SS1009	SS1009	SS1010	SS1010	SS1011	SS1011	SS1012	SS1012	SS1013	SS1013	SS1016	SS1016
Analyte	SS1042	SS1035	SS1047	SS1010	SS1041	SS1040	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1,2,3,7,8-Pentachlorodibenzofuran																																						
2,3,7,8-Tetrachlorodibenzofuran																																						
U,J,D-5																																						
TEQ (Avian Toxic. Equiv. Value, WHO T	1	1	1	1	1	1																																
TEQ (Fish Toxic. Equiv. Value, WHO TE	1	1	1	1	1	1																																
TEQ (Mammalian Toxic. Equiv. Value, W	1	1	1	1	1	1																																
U,J,Q-3																																						
Heptachlorodibenzodioxin (Total)	1	1	1	1	1	1																																
Heptachlorodibenzofuran (Total)	1	1	1	1	1	1																																
Hexachlorodibenzodioxin (Total)	1	1	1	1	1	1																																
Hexachlorodibenzofuran (Total)	1	1	1	1	1	1																																
Pentachlorodibenzodioxin (Total)	1	1	1	1	1	1																																
Pentachlorodibenzofuran (Total)	1	1	1	1	1	1																																
Tetrachlorodibenzodioxin (Total)	1	1	1	1	1	1																					1											
Tetrachlorodibenzofuran (Total)	1	1	1	1	1	1																																
J,CLP01,QI-1																																						
1,2,3,7,8,9-Hexachlorodibenzofuran																																						
CLP02																																						
Octachlorodibenzodioxin																																						

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category																																									
Method																																										
Qualifier	SS1017	SS1017	SS1018	SS1018	SS1019	SS1019	SS1020	SS1020	SS1023	SS1023	SS1026	SS1026	SS1029	SS1029	SS1030	SS1030	SS1031	SS1031	SS1035	SS1035	SS1036	SS1036	SS1037	SS1037	SS1038	SS1038	SS1039	SS1039	SS1040	SS1040	SS1041	SS1041	SS1042	SS1042							
Analyte	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B							
DIO:CL HRSM01.2																																									
CLP10																																									
2,3,7,8-Tetrachlorodibenzofuran				1												1		1												1											
J,CLP01																																									
1,2,3,4,6,7,8-Heptachlorodibenzofuran																																1									
1,2,3,4,7,8,9-Heptachlorodibenzofuran		1		1		1				1		1	1	1		1							1		1	1	1			1	1									
1,2,3,4,7,8-Hexachlorodibenzodioxin		1		1		1			1		1	1	1			1	1						1		1	1	1	1		1	1	1								
1,2,3,4,7,8-Hexachlorodibenzofuran					1		1		1			1	1			1	1						1		1	1	1	1												
1,2,3,6,7,8-Hexachlorodibenzodioxin				1		1				1								1		1		1						1		1	1	1								
1,2,3,6,7,8-Hexachlorodibenzofuran		1		1	1	1	1		1	1	1	1	1				1	1		1					1	1	1			1	1	1								
1,2,3,7,8,9-Hexachlorodibenzodioxin		1		1		1				1		1		1		1				1		1				1	1	1		1	1	1								
1,2,3,7,8,9-Hexachlorodibenzofuran	1	1	1	1	1	1	1		1		1		1		1	1	1					1		1			1	1	1	1		1	1	1							
1,2,3,7,8-Pentachlorodibenzodioxin	1	1	1	1	1	1	1		1		1		1		1	1	1					1		1			1	1	1	1		1								
1,2,3,7,8-Pentachlorodibenzofuran	1	1	1	1	1																	1		1					1	1		1	1	1						
2,3,4,6,7,8-Hexachlorodibenzofuran		1				1	1		1	1		1	1	1									1		1							1								
2,3,4,7,8-Pentachlorodibenzofuran	1	1		1	1	1	1			1	1		1	1			1	1	1											1	1	1	1							
2,3,7,8-Tetrachlorodibenzodioxin																																								
2,3,7,8-Tetrachlorodibenzofuran													1	1					1				1											1						
Octachlorodibenzofuran																																1								
J,CLP01,CLP10																																									
2,3,7,8-Tetrachlorodibenzofuran				1		1																					1	1				1								
J,CLP02																																									
Octachlorodibenzodioxin	1		1				1		1		1				1		1		1		1		1							1										1
J,CLP10,CLP01																																									
2,3,7,8-Tetrachlorodibenzofuran		1			1																										1	1							
J,CLP33																																									
1,2,3,4,7,8-Hexachlorodibenzodioxin																																									
1,2,3,4,7,8-Hexachlorodibenzofuran																																									
1,2,3,6,7,8-Hexachlorodibenzodioxin																																									
1,2,3,6,7,8-Hexachlorodibenzofuran																																									
1,2,3,7,8,9-Hexachlorodibenzodioxin																																									
1,2,3,7,8,9-Pentachlorodibenzodioxin																																									
2,3,4,6,7,8-Hexachlorodibenzofuran																																									
2,3,4,7,8-Pentachlorodibenzofuran																																									
J,D-5																																									
TEQ (Avian Toxic. Equiv. Value, WHO T	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
TEQ (Fish Toxic. Equiv. Value, WHO TE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
TEQ (Mammalian Toxic. Equiv. Value, W	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
J,Q-3																																									
Heptachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Heptachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Hexachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Hexachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Pentachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Pentachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Tetrachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
Tetrachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1
J,QC-3																																									
Pentachlorodibenzodioxin (Total)																																									
U,B-4																																									
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																																									
2,3,7,8-Tetrachlorodibenzodioxin																																									
Octachlorodibenzodioxin																										1															
Octachlorodibenzofuran																										1															
U,CLP01																																									
1,2,3,7,8,9-Hexachlorodibenzofuran																			1																						
U,CLP18																																									
1,2,3,4,7,8,9-Heptachlorodibenzofuran																																									
1,2,3,4,7,8-Hexachlorodibenzodioxin																																									
1,2,3,4,7,8-Hexachlorodibenzofuran																																									
1,2,3,6,7,8-Hexachlorodibenzodioxin								1																																	
1,2,3,6,7,8-Hexachlorodibenzofuran								1														1		1															
1,2,3,7,8,9-Hexachlorodibenzodioxin																		1																						
1,2,3,7,8,9-Hexachlorodibenzofuran										1		1						1				1		1															
1,2,3,7,8-Pentachlorodibenzodioxin								1												1		1																	
1,2,3,7,8-Pentachlorodibenzofuran										1								1		1				1	1														
2,3,4,6,7,8-Hexachlorodibenzofuran																				1																			
2,3,4,7,8-Pentachlorodibenzofuran									1			1										1	1	1		1											1		
2,3,7,8-Tetrachlorodibenzodioxin							1	1			1	1	1				1		1		1		1	1	1										1	1	
2,3,7,8-Tetrachlorodibenzofuran										1										1																		
U,D-4																																									
1,2,3,4,7,8-Hexachlorodibenzofuran																																									

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category																																							
Method																																								
Qualifier	SS1017	SS1017	SS1018	SS1018	SS1019	SS1019	SS1020	SS1020	SS1023	SS1023	SS1026	SS1026	SS1029	SS1029	SS1030	SS1030	SS1031	SS1031	SS1035	SS1035	SS1036	SS1036	SS1037	SS1037	SS1038	SS1038	SS1039	SS1039	SS1040	SS1040	SS1041	SS1041	SS1042	SS1042
Analyte	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1,2,3,7,8-Pentachlorodibenzofuran																																							
2,3,7,8-Tetrachlorodibenzofuran																									1	1														
U,J,D-5																																							
TEQ (Avian Toxic. Equiv. Value, WHO T																																							
TEQ (Fish Toxic. Equiv. Value, WHO TE																																							
TEQ (Mammalian Toxic. Equiv. Value, W																																							
U,J,Q-3																																							
Heptachlorodibenzodioxin (Total)																																							
Heptachlorodibenzofuran (Total)																																							
Hexachlorodibenzodioxin (Total)																																							
Hexachlorodibenzofuran (Total)																																							
Pentachlorodibenzodioxin (Total)																																							
Pentachlorodibenzofuran (Total)																																							
Tetrachlorodibenzodioxin (Total)																																							
Tetrachlorodibenzofuran (Total)																																							
J,CLP01,QI-1																																							
1,2,3,7,8,9-Hexachlorodibenzofuran																																							
CLP02																																							
Octachlorodibenzodioxin																																							

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category																																					
Method																																						
Qualifier	SS1043	SS1043	SS1044	SS1044	SS1045	SS1045	SS1046	SS1046	SS1047	SS1047	SS1052	SS1052	SS1053	SS1053	SS9100	SS9101	SS9101	SS9102	SS9103	SS9105	SS1000	SS1002	SS1003	SS1004	SS1008	SS1009	SS1010	SS1011	SS1016	SS1029	SS1030	SS9103	SS1038	SS1039
Analyte	A	B	A	B	A	B	A	B	A	B	A	B	A	B	3A	3B	6B	9A	0A	2B	C	C	C	C	C	C	C	C	C	C	C	0C	C	C
DIO:CL HRSM01.2																																					
CLP10																																					
2,3,7,8-Tetrachlorodibenzofuran					1	1			1										1																		
J,CLP01																																					
1,2,3,4,6,7,8-Heptachlorodibenzofuran			1	1																																	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	1	1	1							1		1			1		1		1			1			1	1		1	1			1	1	1	1	1	1
1,2,3,4,7,8-Hexachlorodibenzodioxin	1	1	1						1	1		1			1		1		1			1				1	1	1	1			1	1	1	1	1	1
1,2,3,4,7,8-Hexachlorodibenzofuran	1									1		1			1							1			1	1	1	1	1			1	1	1	1	1	1
1,2,3,6,7,8-Hexachlorodibenzodioxin	1	1	1	1							1		1				1					1			1	1	1	1				1	1	1			1
1,2,3,6,7,8-Hexachlorodibenzofuran	1	1	1				1	1	1	1	1			1			1		1		1	1		1	1	1					1		1	1	1	1
1,2,3,7,8,9-Hexachlorodibenzodioxin	1	1	1	1						1		1					1		1		1	1			1	1	1	1	1				1	1	1	1	1
1,2,3,7,8,9-Hexachlorodibenzofuran	1	1	1				1	1	1		1		1				1			1				1			1					1				1
1,2,3,7,8-Pentachlorodibenzodioxin	1	1	1				1	1	1		1		1	1			1		1		1	1	1		1		1				1	1	1	1	1	1
1,2,3,7,8-Pentachlorodibenzofuran	1	1	1	1	1	1	1	1									1	1				1						1	1					1	1
2,3,4,6,7,8-Hexachlorodibenzofuran										1	1						1		1					1	1	1					1	1		1	1
2,3,4,7,8-Pentachlorodibenzofuran			1	1					1	1	1	1							1		1	1				1			1				1	1	1
2,3,7,8-Tetrachlorodibenzodioxin																													1							
2,3,7,8-Tetrachlorodibenzofuran									1										1			1				1								1	1
Octachlorodibenzofuran			1	1																																
J,CLP01,CLP10																																					
2,3,7,8-Tetrachlorodibenzofuran				1												1	1																			
J,CLP02																																					
Octachlorodibenzodioxin							1	1	1				1		1				1			1															
J,CLP10,CLP01																																					
2,3,7,8-Tetrachlorodibenzofuran	1	1	1				1																														
J,CLP33																																					
1,2,3,4,7,8-Hexachlorodibenzodioxin																																					
1,2,3,4,7,8-Hexachlorodibenzofuran																																					
1,2,3,6,7,8-Hexachlorodibenzodioxin																																					
1,2,3,6,7,8-Hexachlorodibenzofuran																																					
1,2,3,7,8,9-Hexachlorodibenzodioxin																																					
1,2,3,7,8-Pentachlorodibenzodioxin																																					
1,2,3,7,8-Pentachlorodibenzofuran																																					
2,3,4,6,7,8-Hexachlorodibenzofuran																																					
2,3,4,7,8-Pentachlorodibenzofuran																																					
J,D-5																																					
TEQ (Avian Toxic. Equiv. Value, WHO T	1	1	1	1			1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1
TEQ (Fish Toxic. Equiv. Value, WHO TE	1	1	1	1			1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1
TEQ (Mammalian Toxic. Equiv. Value, W	1	1	1	1			1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1
J,Q-3																																					
Heptachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Heptachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hexachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hexachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pentachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pentachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tetrachlorodibenzodioxin (Total)	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tetrachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
J,QC-3																																					
Pentachlorodibenzodioxin (Total)												1																									
U,B-4																																					
1,2,3,4,6,7,8-Heptachlorodibenzodioxin												1																									
2,3,7,8-Tetrachlorodibenzodioxin																	1																			
Octachlorodibenzodioxin												1		1						1																
Octachlorodibenzofuran												1		1						1																
U,CLP01																																					
1,2,3,7,8,9-Hexachlorodibenzofuran																																					
U,CLP18																																					
1,2,3,4,7,8,9-Heptachlorodibenzofuran																										1										
1,2,3,4,7,8-Hexachlorodibenzodioxin																								1												
1,2,3,4,7,8-Hexachlorodibenzofuran									1																											
1,2,3,6,7,8-Hexachlorodibenzodioxin																																					
1,2,3,6,7,8-Hexachlorodibenzofuran																															1					
1,2,3,7,8,9-Hexachlorodibenzodioxin																														1						
1,2,3,7,8,9-Hexachlorodibenzofuran																		1			1					1			1	1			1	1		
1,2,3,7,8-Pentachlorodibenzodioxin																								1		1		1								
1,2,3,7,8-Pentachlorodibenzofuran									1												1		1			1	1				1				
2,3,4,6,7,8-Hexachlorodibenzofuran											1										1		1									1			
2,3,4,7,8-Pentachlorodibenzofuran																									1						1	1				
2,3,7,8-Tetrachlorodibenzodioxin									1	1	1		1	1				1			1	1		1	1		1	1			1		1	1	1
2,3,7,8-Tetrachlorodibenzofuran										1				1						1									1	1	1	1			
U,D-4																																					
1,2,3,4,7,8-Hexachlorodibenzofuran																																					

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category																																					
Method																																					
Qualifier	SS1043	SS1043	SS1044	SS1044	SS1045	SS1045	SS1046	SS1046	SS1047	SS1047	SS1052	SS1052	SS1053	SS1053	SS9100	SS9101	SS9101	SS9102	SS9103	SS9105	SS1000	SS1002	SS1003	SS1004	SS1008	SS1009	SS1010	SS1011	SS1016	SS1029	SS1030	SS9103	SS1038	SS1039
Analyte	A	B	A	B	A	B	A	B	A	B	A	B	A	B	3A	3B	6B	9A	0A	2B	C	C	C	C	C	C	C	C	C	C	C	0C	C	C
1,2,3,7,8-Pentachlorodibenzofuran											1		1	1	1																			
2,3,7,8-Tetrachlorodibenzofuran											1		1														1							
U,J,D-5																																		
TEQ (Avian Toxic. Equiv. Value, WHO T																																		
TEQ (Fish Toxic. Equiv. Value, WHO TE																																		
TEQ (Mammalian Toxic. Equiv. Value, W																																		
U,J,Q-3																																		
Heptachlorodibenzodioxin (Total)																																		
Heptachlorodibenzofuran (Total)																																		
Hexachlorodibenzodioxin (Total)																																		
Hexachlorodibenzofuran (Total)																																		
Pentachlorodibenzodioxin (Total)																																		
Pentachlorodibenzofuran (Total)																																		
Tetrachlorodibenzodioxin (Total)				1																														
Tetrachlorodibenzofuran (Total)																																		
J,CLP01,QI-1																																		
1,2,3,7,8,9-Hexachlorodibenzofuran																						1						1						
CLP02																																		
Octachlorodibenzodioxin																							1											

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category						
Method Qualifier Analyte	SS1042C	SS1043C	SS1045C	SS1046C	SS1053C	Grand Total
DIO:CL HRSM01.2						
CLP10						
2,3,7,8-Tetrachlorodibenzofuran						10
J,CLP01						
1,2,3,4,6,7,8-Heptachlorodibenzofuran						4
1,2,3,4,7,8,9-Heptachlorodibenzofuran		1		1	1	46
1,2,3,4,7,8-Hexachlorodibenzodioxin		1		1	1	52
1,2,3,4,7,8-Hexachlorodibenzofuran		1		1	1	39
1,2,3,6,7,8-Hexachlorodibenzodioxin		1		1	1	39
1,2,3,6,7,8-Hexachlorodibenzofuran		1		1	1	58
1,2,3,7,8,9-Hexachlorodibenzodioxin		1		1	1	51
1,2,3,7,8,9-Hexachlorodibenzofuran		1		1	1	56
1,2,3,7,8-Pentachlorodibenzodioxin		1		1		58
1,2,3,7,8-Pentachlorodibenzofuran	1	1	1	1		45
2,3,4,6,7,8-Hexachlorodibenzofuran		1		1	1	33
2,3,4,7,8-Pentachlorodibenzofuran	1	1			1	44
2,3,7,8-Tetrachlorodibenzodioxin						1
2,3,7,8-Tetrachlorodibenzofuran	1	1		1		18
Octachlorodibenzofuran						4
J,CLP01,CLP10						
2,3,7,8-Tetrachlorodibenzofuran						13
J,CLP02						
Octachlorodibenzodioxin	1		1			31
J,CLP10,CLP01						
2,3,7,8-Tetrachlorodibenzofuran						12
J,CLP33						
1,2,3,4,7,8-Hexachlorodibenzodioxin						1
1,2,3,4,7,8-Hexachlorodibenzofuran						1
1,2,3,6,7,8-Hexachlorodibenzodioxin						1
1,2,3,6,7,8-Hexachlorodibenzofuran						1
1,2,3,7,8,9-Hexachlorodibenzodioxin						1
1,2,3,7,8-Pentachlorodibenzodioxin						1
1,2,3,7,8-Pentachlorodibenzofuran						1
2,3,4,6,7,8-Hexachlorodibenzofuran						1
2,3,4,7,8-Pentachlorodibenzofuran						1
J,D-5						
TEQ (Avian Toxic. Equiv. Value, WHO T	1	1	1	1	1	90
TEQ (Fish Toxic. Equiv. Value, WHO TE	1	1	1	1	1	90
TEQ (Mammalian Toxic. Equiv. Value, W	1	1	1	1	1	90
J,Q-3						
Heptachlorodibenzodioxin (Total)	1	1	1	1	1	101
Heptachlorodibenzofuran (Total)	1	1	1	1	1	101
Hexachlorodibenzodioxin (Total)	1	1	1	1	1	101
Hexachlorodibenzofuran (Total)	1	1	1	1	1	101
Pentachlorodibenzodioxin (Total)	1	1	1	1	1	100
Pentachlorodibenzofuran (Total)	1	1	1	1	1	101
Tetrachlorodibenzodioxin (Total)	1	1	1	1	1	99
Tetrachlorodibenzofuran (Total)	1	1	1	1	1	101
J,QC-3						
Pentachlorodibenzodioxin (Total)						1
U,B-4						
1,2,3,4,6,7,8-Heptachlorodibenzodioxin						1
2,3,7,8-Tetrachlorodibenzodioxin						1
Octachlorodibenzodioxin						4
Octachlorodibenzofuran						4
U,CLP01						
1,2,3,7,8,9-Hexachlorodibenzofuran						1
U,CLP18						
1,2,3,4,7,8,9-Heptachlorodibenzofuran						4
1,2,3,4,7,8-Hexachlorodibenzodioxin						4
1,2,3,4,7,8-Hexachlorodibenzofuran						1
1,2,3,6,7,8-Hexachlorodibenzodioxin						1
1,2,3,6,7,8-Hexachlorodibenzofuran						7
1,2,3,7,8,9-Hexachlorodibenzodioxin						2
1,2,3,7,8,9-Hexachlorodibenzofuran						15
1,2,3,7,8-Pentachlorodibenzodioxin					1	9
1,2,3,7,8-Pentachlorodibenzofuran						12
2,3,4,6,7,8-Hexachlorodibenzofuran						6
2,3,4,7,8-Pentachlorodibenzofuran				1		14
2,3,7,8-Tetrachlorodibenzodioxin	1	1	1		1	41
2,3,7,8-Tetrachlorodibenzofuran						10
U,D-4						
1,2,3,4,7,8-Hexachlorodibenzofuran						1

TABLE 3-3a EPA DATA VALIDATION QUALIFIER COUNT SUMMARY

Category						
Method						
Qualifier	SS1042C	SS1043C	SS1045C	SS1046C	SS1053C	Grand Total
Analyte						
1,2,3,7,8-Pentachlorodibenzofuran					1	5
2,3,7,8-Tetrachlorodibenzofuran			1			6
U,J,D-5						
TEQ (Avian Toxic. Equiv. Value, WHO T						6
TEQ (Fish Toxic. Equiv. Value, WHO TE						6
TEQ (Mammalian Toxic. Equiv. Value, W						6
U,J,Q-3						
Heptachlorodibenzodioxin (Total)						6
Heptachlorodibenzofuran (Total)						6
Hexachlorodibenzodioxin (Total)						6
Hexachlorodibenzofuran (Total)						6
Pentachlorodibenzodioxin (Total)						6
Pentachlorodibenzofuran (Total)						6
Tetrachlorodibenzodioxin (Total)						8
Tetrachlorodibenzofuran (Total)						6
J,CLP01,QI-1						
1,2,3,7,8,9-Hexachlorodibenzofuran						2
CLP02						
Octachlorodibenzodioxin						1

Attachment 1
Common Data Validation Definitions

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Common Data Validation Definitions

%D	percent difference
%R	percent recovery
%RSD	percent relative standard deviation
°C	degrees Celcius
CCV	continuing calibration verification
CLP	Contract Laboratory Program
DMC	deuterated monitoring compound
EPA	United States Environmental Protection Agency
EB	equipment rinsate blank
H^2SO^4	sufuric acid
HNO^3	nitric acid
ICAL	initial calibration
ICV	initial calibration verification
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
MDL	minimum detection limit
mg/k	milligrams per kilogram
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
NaOH	sodium hydroxide
PE	performance evaluation
PB	preservative blank
QA	quality assurance
QC	quality control
RG	remedial goal
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
SESD	Science and Ecosystem Support Division
SVOC	semi-volatile organic compounds
SU	standard units
TB	trip blank
TIC	tentatively identified compound
ug/L	micrograms per kilogram
ug/L	micrograms per liter
VOC	volatile organic compounds

EQuIS Database Environmental Matrix

AA	ambient air
GW	groundwater
ID	investigative derived waste
SB	subsurface soil
SD	sediment
SF	surface soil
SG	soil gas
SW	surface water

Data Qualifiers

Inorganics

J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J-	The result is an estimated quantity, but the result may be biased low.
J+	The result is an estimated quantity, but the result may be biased high.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Organics

C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was not detected above the level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

Attachment 2
Chain of Custody

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WORK ORDER

Printed: 3/6/2018 2:20:47PM

C181002

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0191**	**Contract Lab Case:**	**47458**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Project Leader:	**Thorpe, Peter**	**Date Due:**	**05/05/18 (70 day TAT)**
Received By:	Graham, Robert	Date Received:	02/24/18 00:00
Logged In By:	Graham, Robert	Date Logged In:	03/06/18 14:18

D.A.R.T. Project ID: 18-0191
Program/Activity: RD
Site/Waterbody: AMERICAN CREOSOTE WORKS INC (110002527025)

Analysis	Due	TAT	Comments
C181002-01 RB01_SS1042 / [Water / Rinse Water Blank] Sampled 02/20/18 15:00			
MD No:	D No: AKT0 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-02 RB02_SS1035 / [Water / Rinse Water Blank] Sampled 02/21/18 10:45			
MD No:	D No: AKW1 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-03 RB03_SS1047 / [Water / Rinse Water Blank] Sampled 02/22/18 15:45			
MD No:	D No: AKZ7 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-04 SS1000A / SS1000 [Soil / Surface Soil] Sampled 02/20/18 09:20			
MD No:	D No: AKR1 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-05 SS1000B / SS1000 [Soil / Surface Soil] Sampled 02/20/18 09:30			
MD No:	D No: AKR2 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-06 SS1001A / SS1001 [Soil / Surface Soil] Sampled 02/20/18 10:30			
MD No:	D No: AKR4 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-07 SS1001B / SS1001 [Soil / Surface Soil] Sampled 02/20/18 10:40			
MD No:	D No: AKR5 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-08 SS1002A / SS1002 [Soil / Surface Soil] Sampled 02/20/18 13:00			
MD No:	D No: AKR7 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	

C181002

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0191**	**Contract Lab Case:**	**47458**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181002-09 SS1002B / SS1002 [Soil / Surface Soil] Sampled 02/20/18 13:10			
MD No:	D No: AKR8 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-10 SS1003A / SS1003 [Soil / Surface Soil] Sampled 02/20/18 13:25			
MD No:	D No: AKS0 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-11 SS1003B / SS1003 [Soil / Surface Soil] Sampled 02/20/18 13:35			
MD No:	D No: AKS1 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-12 SS91003A / SS1003 [Soil / Surface Soil] Sampled 02/20/18 13:25			
MD No:	D No: AKS3 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-13 SS1004A / SS1004 [Soil / Surface Soil] Sampled 02/20/18 15:10			
MD No:	D No: AKS7 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-14 SS1004B / SS1004 [Soil / Surface Soil] Sampled 02/20/18 15:20			
MD No:	D No: AKS8 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-15 SS1005A / SS1005 [Soil / Surface Soil] Sampled 02/22/18 08:10			
MD No:	D No: AKX2 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-16 SS1005B / SS1005 [Soil / Surface Soil] Sampled 02/22/18 08:20			
MD No:	D No: AKX3 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-17 SS1007A / SS1007 [Soil / Surface Soil] Sampled 02/22/18 08:55			
MD No:	D No: AKX5 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-18 SS1007B / SS1007 [Soil / Surface Soil] Sampled 02/22/18 09:05			
MD No:	D No: AKX6 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	

C181002

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0191**	**Contract Lab Case:**	**47458**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181002-19 SS1020A / SS1020 [Soil / Surface Soil] Sampled 02/22/18 09:55			
MD No:	D No: AKX8 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-20 SS1020B / SS1020 [Soil / Surface Soil] Sampled 02/22/18 10:05			
MD No:	D No: AKX9 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-21 SS1023A / SS1023 [Soil / Surface Soil] Sampled 02/22/18 10:25			
MD No:	D No: AKY1 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-22 SS1023B / SS1023 [Soil / Surface Soil] Sampled 02/22/18 10:35			
MD No:	D No: AKY2 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-23 SS1026A / SS1026 [Soil / Surface Soil] Sampled 02/22/18 14:10			
MD No:	D No: AKZ1 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-24 SS1026B / SS1026 [Soil / Surface Soil] Sampled 02/22/18 14:20			
MD No:	D No: AKZ2 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-25 SS1029A / SS1029 [Soil / Surface Soil] Sampled 02/22/18 13:25			
MD No:	D No: AKY7 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-26 SS1029B / SS1029 [Soil / Surface Soil] Sampled 02/22/18 13:35			
MD No:	D No: AKY8 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-27 SS91029A / SS1029 [Soil / Surface Soil] Sampled 02/22/18 13:25			
MD No:	D No: AKZ0 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-28 SS1031A / SS1031 [Soil / Surface Soil] Sampled 02/22/18 13:00			
MD No:	D No: AKY4 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	

C181002

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0191**	**Contract Lab Case:**	**47458**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181002-29 SS1031B / SS1031 [Soil / Surface Soil] Sampled 02/22/18 13:10			
MD No:	D No: AKY5 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-30 SS1035A / SS1035 [Soil / Surface Soil] Sampled 02/21/18 10:10			
MD No:	D No: AKT8 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-31 SS1035B / SS1035 [Soil / Surface Soil] Sampled 02/21/18 10:20			
MD No:	D No: AKT9 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-32 SS1036A / SS1036 [Soil / Surface Soil] Sampled 02/21/18 09:40			
MD No:	D No: AKT5 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-33 SS1036B / SS1036 [Soil / Surface Soil] Sampled 02/21/18 09:50			
MD No:	D No: AKT6 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-34 SS1037A / SS1037 [Soil / Surface Soil] Sampled 02/21/18 08:25			
MD No:	D No: AKT1 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-35 SS1037B / SS1037 [Soil / Surface Soil] Sampled 02/21/18 08:35			
MD No:	D No: AKT2 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-36 SS1038A / SS1038 [Soil / Surface Soil] Sampled 02/21/18 12:40			
MD No:	D No: AKW2 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-37 SS1038B / SS1038 [Soil / Surface Soil] Sampled 02/21/18 12:50			
MD No:	D No: AKW3 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-38 SS1042A / SS1042 [Soil / Surface Soil] Sampled 02/20/18 14:10			
MD No:	D No: AKS4 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	

C181002

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0191**	**Contract Lab Case:**	**47458**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181002-39 SS1042B / SS1042 [Soil / Surface Soil] Sampled 02/20/18 14:20			
MD No: D No: AKS5 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-40 SS1047A / SS1047 [Soil / Surface Soil] Sampled 02/22/18 15:15			
MD No: D No: AKZ4 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-41 SS1047B / SS1047 [Soil / Surface Soil] Sampled 02/22/18 15:25			
MD No: D No: AKZ5 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-42 SS1052A / SS1052 [Soil / Surface Soil] Sampled 02/21/18 13:40			
MD No: D No: AKW5 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-43 SS1052B / SS1052 [Soil / Surface Soil] Sampled 02/21/18 13:50			
MD No: D No: AKW6 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-44 SS91052B / SS1052 [Soil / Surface Soil] Sampled 02/21/18 13:50			
MD No: D No: AKW8 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-45 SS1053A / SS1053 [Soil / Surface Soil] Sampled 02/21/18 14:20			
MD No: D No: AKW9 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181002-46 SS1053B / SS1053 [Soil / Surface Soil] Sampled 02/21/18 14:30			
MD No: D No: AKX0 ARI			
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	

Analysis packages included in this work order

CL Dioxin

CL x Dioxin Scan CL x Dioxin % Moisture

WORK ORDER

Printed: 3/6/2018 2:23:03PM

C181003

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0191**	**Contract Lab Case: 47458**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**	

Project Leader:	**Thorpe, Peter**	**Date Due:**	**05/05/18 (70 day TAT)**
Received By:	Graham, Robert	Date Received:	02/24/18 00:00
Logged In By:	Graham, Robert	Date Logged In:	03/06/18 14:21

D.A.R.T. Project ID: 18-0191
Program/Activity: RD
Site/Waterbody: AMERICAN CREOSOTE WORKS INC (110002527025)

Analysis	Due	TAT	Comments
C181003-01 QA-018-PES / [Soil / Soil] Sampled 02/20/18 16:00			
MD No:	D No: AKQ9 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	
C181003-02 QA-019-PES / [Soil / Soil] Sampled 02/20/18 16:00			
MD No:	D No: AKR0 ARI		
A = Contract Lab Sample			
CL Dioxin	04/25/18 00:00	60	

Analysis packages included in this work order

CL Dioxin

CL x Dioxin Scan CL x Dioxin % Moisture

WORK ORDER

Printed: 3/21/2018 4:23:54PM

C181214

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0192**	**Contract Lab Case: 47459**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**	

Project Leader:	**Thorpe, Peter**	**Date Due:**	**05/08/18 (70 day TAT)**
Received By:	Graham, Robert	Date Received:	02/27/18 00:00
Logged In By:	Graham, Robert	Date Logged In:	03/21/18 16:22

. ATADA AProjectIP. gP 18-019R
rojacm/ iTtlyvMg D.
WlciKmlcobjdMg TECD:NTOPNDCSWS CPKSD(WP:ONPP
211000R5R70R5)

Analysis	Due	TAT	Comments
C181214-01 RB04_SS1010 / [Water / Equipment Rinse Blank] Sampled 02/23/18 13:45			
MD No:	D No: ALS7 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-02 RB05_SS1041 / [Water / Equipment Rinse Blank] Sampled 02/24/18 13:45			
MD No:	D No: ALW8 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-03 RB06_SS1040 / [Water / Equipment Rinse Blank] Sampled 02/25/18 10:00			
MD No:	D No: ALY2 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-04 SS1008A / SS1008 [Soil / Surface Soil] Sampled 02/23/18 07:40			
MD No:	D No: ALQ2 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-05 SS1008B / SS1008 [Soil / Surface Soil] Sampled 02/23/18 07:50			
MD No:	D No: ALQ3 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-06 SS1009A / SS1009 [Soil / Surface Soil] Sampled 02/23/18 09:40			
MD No:	D No: ALR2 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-07 SS1009B / SS1009 [Soil / Surface Soil] Sampled 02/23/18 09:50			
MD No:	D No: ALR3 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-08 SS1010A / SS1010 [Soil / Surface Soil] Sampled 02/23/18 13:10			
MD No:	D No: ALS4 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	

C181214

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0192**	**Contract Lab Case:**	**47459**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181214-09 SS1010B / SS1010 [Soil / Surface Soil] Sampled 02/23/18 13:20			
MD No:	D No: ALS5 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-10 SS1011A / SS1011 [Soil / Surface Soil] Sampled 02/23/18 10:10			
MD No:	D No: ALR5 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-11 SS1011B / SS1011 [Soil / Surface Soil] Sampled 02/23/18 10:20			
MD No:	D No: ALR6 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-12 SS1012A / SS1012 [Soil / Surface Soil] Sampled 02/23/18 08:10			
MD No:	D No: ALQ5 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-13 SS1012B / SS1012 [Soil / Surface Soil] Sampled 02/23/18 08:20			
MD No:	D No: ALQ6 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-14 SS1013A / SS1013 [Soil / Surface Soil] Sampled 02/23/18 08:55			
MD No:	D No: ALQ8 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-15 SS1013B / SS1013 [Soil / Surface Soil] Sampled 02/23/18 09:05			
MD No:	D No: ALQ9 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-16 SS91013B / SS1013 [Soil / Surface Soil] Sampled 02/23/18 09:05			
MD No:	D No: ALR1 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-17 SS1016A / SS1016 [Soil / Surface Soil] Sampled 02/25/18 08:20			
MD No:	D No: ALX2 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-18 SS1016B / SS1016 [Soil / Surface Soil] Sampled 02/25/18 08:30			
MD No:	D No: ALX3 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	

C181214

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0192**	**Contract Lab Case:**	**47459**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181214-19 SS91016B / SS1016 [Soil / Surface Soil] Sampled 02/25/18 08:30			
MD No:	D No: ALX5 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-20 SS1017A / SS1017 [Soil / Surface Soil] Sampled 02/25/18 07:55			
MD No:	D No: ALW9 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-21 SS1017B / SS1017 [Soil / Surface Soil] Sampled 02/25/18 08:05			
MD No:	D No: ALX0 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-22 SS1018A / SS1018 [Soil / Surface Soil] Sampled 02/23/18 12:40			
MD No:	D No: ALS1 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-23 SS1018B / SS1018 [Soil / Surface Soil] Sampled 02/23/18 12:50			
MD No:	D No: ALS2 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-24 SS1019A / SS1019 [Soil / Surface Soil] Sampled 02/23/18 12:05			
MD No:	D No: ALR8 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-25 SS1019B / SS1019 [Soil / Surface Soil] Sampled 02/23/18 12:15			
MD No:	D No: ALR9 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-26 SS1030A / SS1030 [Soil / Surface Soil] Sampled 02/24/18 10:45			
MD No:	D No: ALW0 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-27 SS1030B / SS1030 [Soil / Surface Soil] Sampled 02/24/18 10:55			
MD No:	D No: ALW1 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-28 SS91030A / SS1030 [Soil / Surface Soil] Sampled 02/24/18 10:45			
MD No:	D No: ALW3 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	

C181214

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0192**	**Contract Lab Case:**	**47459**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181214-29 SS1039A / SS1039 [Soil / Surface Soil] Sampled 02/25/18 08:55			
MD No:	D No: ALX6 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-30 SS1039B / SS1039 [Soil / Surface Soil] Sampled 02/25/18 09:05			
MD No:	D No: ALX7 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-31 SS1040A / SS1040 [Soil / Surface Soil] Sampled 02/25/18 09:20			
MD No:	D No: ALX9 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-32 SS1040B / SS1040 [Soil / Surface Soil] Sampled 02/25/18 09:30			
MD No:	D No: ALY0 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-33 SS1041A / SS1041 [Soil / Surface Soil] Sampled 02/24/18 13:10			
MD No:	D No: ALW5 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-34 SS1041B / SS1041 [Soil / Surface Soil] Sampled 02/24/18 13:20			
MD No:	D No: ALW6 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-35 SS1043A / SS1043 [Soil / Surface Soil] Sampled 02/24/18 08:05			
MD No:	D No: ALS8 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-36 SS1043B / SS1043 [Soil / Surface Soil] Sampled 02/24/18 08:15			
MD No:	D No: ALS9 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-37 SS1044A / SS1044 [Soil / Surface Soil] Sampled 02/24/18 08:30			
MD No:	D No: ALT1 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-38 SS1044B / SS1044 [Soil / Surface Soil] Sampled 02/24/18 08:40			
MD No:	D No: ALT2 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	

C181214

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0192**	**Contract Lab Case:**	**47459**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C181214-39 SS1045A / SS1045 [Soil / Surface Soil] Sampled 02/24/18 09:05			
MD No:	D No: ALT4 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-40 SS1045B / SS1045 [Soil / Surface Soil] Sampled 02/24/18 09:15			
MD No:	D No: ALT5 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-41 SS1046A / SS1046 [Soil / Surface Soil] Sampled 02/24/18 10:00			
MD No:	D No: ALT7 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181214-42 SS1046B / SS1046 [Soil / Surface Soil] Sampled 02/24/18 10:10			
MD No:	D No: ALT8 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	

Analysis packages included in this work order

CL Dioxin

CL x Dioxin Scan CL x Dioxin % Moisture

WORK ORDER

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C181013

US-EPA, Region 4, SESD, QAS

Cdent#	**Superfun6 Reme6iad(290DD0, 292DD0, 999DD0)**	**Pro:ect Number#**	**18-91j 0**	**Contract l ab Case#4F43j**
Pro:ect#	**American Creosote - PTHORPE**	**Acct / Ll ocation#**	**999DD09443l A92 Pensacoda Escambia 5l**	

Pro:ect l ea6er#	**Tyorpe, Peter**	**Date Due#**	**93I98I18 (F9 6a7 TAT)**
Received By:	Graham, Robert	Date Received:	02/27/18 00:00
Logged In By:	Graham, Robert	Date Logged In:	03/21/18 16:24

. ATADA APr oj ect IP. gP 18-019R
r oj aom/ iTt lvyvMg D.
WlciK mlcobj dMg TE CD:NTOPNDCSWS CPK SD(WP:ONPP
2I1000R5R70R5)

Anad7sis	Due	TAT	Comments
C181013-91 QA-918-PES L hSoidLSoid[Sampde6 90I0FI18 1] #99			
MD No:	D No: ALQ0 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	
C181013-90 QA-91j -PES L hSoidLSoid[Sampde6 90I0FI18 1] #99			
MD No:	D No: ALQ1 FRONT		
A = Contract Lab Sample			
CL Dioxin	04/28/18 00:00	60	

Anad7sis packages incdu6e6 in tyis work or6er

CL Dioxin

CL x Dioxin Scan CL x Dioxin % Moisture

USEPA CLP High Res COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: ARI-2/21/18_Ship1

DateShipped: 2/21/2018
CarrierName: FedEx
AirbillNo: 771537433040

Project Number: 18-0191
Case #: 47458

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1000A	PDAKR1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1000 (Ice) (1)	SS1000	02/20/2018 09:20	
SS1000B	PDAKR2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1001 (Ice) (1)	SS1000	02/20/2018 09:30	
SS1001A	PDAKR4	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1003 (Ice) (1)	SS1001	02/20/2018 10:30	
SS1001B	PDAKR5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1004 (Ice) (1)	SS1001	02/20/2018 10:40	
SS1002A	PDAKR7	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1006 (Ice) (1)	SS1002	02/20/2018 13:00	
SS1002B	PDAKR8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1007 (Ice) (1)	SS1002	02/20/2018 13:10	
SS1003A	PDAKS0	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1009 (Ice) (1)	SS1003	02/20/2018 13:25	
SS1003B	PDAKS1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1010 (Ice) (1)	SS1003	02/20/2018 13:35	
SS91003A	PDAKS3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1012 (Ice) (1)	SS1003	02/20/2018 13:25	
SS1042A	PDAKS4	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1013 (Ice) (1)	SS1042	02/20/2018 14:10	
SS1042B	PDAKS5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1014 (Ice) (1)	SS1042	02/20/2018 14:20	

Special Instructions:	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

DateShipped: 2/21/2018
CarrierName: FedEx
AirbillNo: 771537433040

CHAIN OF CUSTODY RECORD

Project Number: 18-0191
Case #: 47458

No: ARI-2/21/18_Ship1

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1004A	PDAKS7	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1016 (Ice) (1)	SS1004	02/20/2018 15:10	
SS1004B	PDAKS8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1017 (Ice) (1)	SS1004	02/20/2018 15:20	
SS1037A	PDAKT1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1021 (Ice) (1)	SS1037	02/21/2018 08:25	
SS1037B	PDAKT2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1022 (Ice) (1)	SS1037	02/21/2018 08:35	
SS1036A	PDAKT5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1025 (Ice) (1)	SS1036	02/21/2018 09:40	
SS1036B	PDAKT6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1026 (Ice) (1)	SS1036	02/21/2018 09:50	
SS1035A	PDAKT8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1028 (Ice) (1)	SS1035	02/21/2018 10:10	
SS1035B	PDAKT9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1029 (Ice) (1)	SS1035	02/21/2018 10:20	
SS1038A	PDAKW2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1032 (Ice) (1)	SS1038	02/21/2018 12:40	
SS1038B	PDAKW3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1033 (Ice) (1)	SS1038	02/21/2018 12:50	
SS1052A	PDAKW5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1035 (Ice) (1)	SS1052	02/21/2018 13:40	

Sample(s) to be used for Lab QC: SS1004B Tag 1017, SS1038B Tag 1033	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

DateShipped: 2/21/2018
CarrierName: FedEx
AirbillNo: 771537433040

CHAIN OF CUSTODY RECORD

Project Number: 18-0191
Case #: 47458

No: ARI-2/21/18_Ship1

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1052B	PDAKW6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1036 (Ice) (1)	SS1052	02/21/2018 13:50	
SS91052B	PDAKW8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1038 (Ice) (1)	SS1052	02/21/2018 13:50	
SS1053A	PDAKW9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1039 (Ice) (1)	SS1053	02/21/2018 14:20	
SS1053B	PDAKX0	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1040 (Ice) (1)	SS1053	02/21/2018 14:30	

Special Instructions:

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key: CDD/CDF=CLP Dioxins/Furans

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: ARI-2/23/18_Ship2

DateShipped: 2/23/2018
CarrierName: FedEx
AirbillNo: 771556677072

Project Number: 18-0191
Case #: 47458

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
RB01_SS1042	PDAKT0	Rinse Water Blank/ H. Yost	Grab	CDD/CDF(21)	1020 (Ice) (2)	#R4DART#	02/20/2018 15:00	
RB02_SS1035	PDAKW1	Rinse Water Blank/ H. Yost	Grab	CDD/CDF(21)	1031 (Ice) (2)	#R4DART#	02/21/2018 10:45	
SS1005A	PDAKX2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1042 (Ice) (1)	SS1005	02/22/2018 08:10	
SS1005B	PDAKX3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1043 (Ice) (1)	SS1005	02/22/2018 08:20	
SS1007A	PDAKX5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1045 (Ice) (1)	SS1007	02/22/2018 08:55	
SS1007B	PDAKX6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1046 (Ice) (1)	SS1007	02/22/2018 09:05	
SS1020A	PDAKX8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1048 (Ice) (1)	SS1020	02/22/2018 09:55	
SS1020B	PDAKX9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1049 (Ice) (1)	SS1020	02/22/2018 10:05	
SS1023A	PDAKY1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1051 (Ice) (1)	SS1023	02/22/2018 10:25	
SS1023B	PDAKY2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1052 (Ice) (1)	SS1023	02/22/2018 10:35	
SS1031A	PDAKY4	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1054 (Ice) (1)	SS1031	02/22/2018 13:00	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: ARI-2/23/18_Ship2

DateShipped: 2/23/2018
CarrierName: FedEx
AirbillNo: 771556677072

Project Number: 18-0191
Case #: 47458

Lab: Analytical Resources, Inc.
Lab Contact: Susan D. Dunnihoo
Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1031B	PDAKY5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1055 (Ice) (1)	SS1031	02/22/2018 13:10	
SS1029A	PDAKY7	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1057 (Ice) (1)	SS1029	02/22/2018 13:25	
SS1029B	PDAKY8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1058 (Ice) (1)	SS1029	02/22/2018 13:35	
SS91029A	PDAKZ0	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1060 (Ice) (1)	SS1029	02/22/2018 13:25	
SS1026A	PDAKZ1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1061 (Ice) (1)	SS1026	02/22/2018 14:10	
SS1026B	PDAKZ2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1062 (Ice) (1)	SS1026	02/22/2018 14:20	
SS1047A	PDAKZ4	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1064 (Ice) (1)	SS1047	02/22/2018 15:15	
SS1047B	PDAKZ5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1065 (Ice) (1)	SS1047	02/22/2018 15:25	
RB03_SS1047	PDAKZ7	Rinse Water Blank/ H. Yost	Grab	CDD/CDF(21)	1067 (Ice) (2)	#R4DART#	02/22/2018 15:45	

Sample(s) to be used for Lab QC: SS1026A Tag 1061	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

DateShipped: 2/26/2018
CarrierName: FedEx
AirbillNo: 771566325939

CHAIN OF CUSTODY RECORD

Project Number: 18-0192
Case #: 47459

No: Frontier022618_Ship1

Lab: Frontier Analytical Laboratory
Lab Contact: Brad Silverbush
Lab Phone: 916-934-0900

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1008A	PDALQ2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1068 (Ice) (1)	SS1008	02/23/2018 07:40	
SS1008B	PDALQ3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1069 (Ice) (1)	SS1008	02/23/2018 07:50	
SS1012A	PDALQ5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1071 (Ice) (1)	SS1012	02/23/2018 08:10	
SS1012B	PDALQ6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1072 (Ice) (1)	SS1012	02/23/2018 08:20	
SS1013A	PDALQ8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1074 (Ice) (1)	SS1013	02/23/2018 08:55	
SS1013B	PDALQ9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1075 (Ice) (1)	SS1013	02/23/2018 09:05	
SS91013B	PDALR1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1077 (Ice) (1)	SS1013	02/23/2018 09:05	
SS1009A	PDALR2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1078 (Ice) (1)	SS1009	02/23/2018 09:40	
SS1009B	PDALR3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1079 (Ice) (1)	SS1009	02/23/2018 09:50	
SS1011A	PDALR5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1081 (Ice) (1)	SS1011	02/23/2018 10:10	
SS1011B	PDALR6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1082 (Ice) (1)	SS1011	02/23/2018 10:20	

Sample(s) to be used for Lab QC: SS1012B Tag 1072

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: CDD/CDF=CLP Dioxins/Furans

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

DateShipped: 2/26/2018
CarrierName: FedEx
AirbillNo: 771566325939

CHAIN OF CUSTODY RECORD

Project Number: 18-0192
Case #: 47459

No: Frontier022618_Ship1

Lab: Frontier Analytical Laboratory
Lab Contact: Brad Silverbush
Lab Phone: 916-934-0900

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1019A	PDALR8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1084 (Ice) (1)	SS1019	02/23/2018 12:05	
SS1019B	PDALR9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1085 (Ice) (1)	SS1019	02/23/2018 12:15	
SS1018A	PDALS1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1087 (Ice) (1)	SS1018	02/23/2018 12:40	
SS1018B	PDALS2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1088 (Ice) (1)	SS1018	02/23/2018 12:50	
SS1010A	PDALS4	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1090 (Ice) (1)	SS1010	02/23/2018 13:10	
SS1010B	PDALS5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1091 (Ice) (1)	SS1010	02/23/2018 13:20	
RB04_SS1010	PDALS7	Rinse Water Blank/ H. Yost	Grab	CDD/CDF(21)	1093 (Ice) (2)	#R4DART#	02/23/2018 13:45	
SS1043A	PDALS8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1094 (Ice) (1)	SS1043	02/24/2018 08:05	
SS1043B	PDALS9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1095 (Ice) (1)	SS1043	02/24/2018 08:15	
SS1044A	PDALT1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1097 (Ice) (1)	SS1044	02/24/2018 08:30	
SS1044B	PDALT2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1098 (Ice) (1)	SS1044	02/24/2018 08:40	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

DateShipped: 2/26/2018
CarrierName: FedEx
AirbillNo: 771566325939

CHAIN OF CUSTODY RECORD

Project Number: 18-0192
Case #: 47459

No: Frontier022618_Ship1

Lab: Frontier Analytical Laboratory
Lab Contact: Brad Silverbush
Lab Phone: 916-934-0900

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1045A	PDALT4	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1100 (Ice) (1)	SS1045	02/24/2018 09:05	
SS1045B	PDALT5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1101 (Ice) (1)	SS1045	02/24/2018 09:15	
SS1046A	PDALT7	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1103 (Ice) (1)	SS1046	02/24/2018 10:00	
SS1046B	PDALT8	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1104 (Ice) (1)	SS1046	02/24/2018 10:10	
SS1030A	PDALW0	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1106 (Ice) (1)	SS1030	02/24/2018 10:45	
SS1030B	PDALW1	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1107 (Ice) (1)	SS1030	02/24/2018 10:55	
SS91030A	PDALW3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1109 (Ice) (1)	SS1030	02/24/2018 10:45	
SS1041A	PDALW5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1111 (Ice) (1)	SS1041	02/24/2018 13:10	
SS1041B	PDALW6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1112 (Ice) (1)	SS1041	02/24/2018 13:20	
RB05_SS1041	PDALW8	Rinse Water Blank/ H. Yost	Grab	CDD/CDF(21)	1114 (Ice) (2)	#R4DART#	02/24/2018 13:45	
SS1017A	PDALW9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1115 (Ice) (1)	SS1017	02/25/2018 07:55	

Sample(s) to be used for Lab QC: SS1046B Tag 1104, SS1017B Tag 1116

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: CDD/CDF=CLP Dioxins/Furans

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA CLP High Res COC (LAB COPY)

DateShipped: 2/26/2018
CarrierName: FedEx
AirbillNo: 771566325939

CHAIN OF CUSTODY RECORD

Project Number: 18-0192
Case #: 47459

No: Frontier022618_Ship1

Lab: Frontier Analytical Laboratory
Lab Contact: Brad Silverbush
Lab Phone: 916-934-0900

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1017B	PDALX0	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1116 (Ice) (1)	SS1017	02/25/2018 08:05	
SS1016A	PDALX2	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1118 (Ice) (1)	SS1016	02/25/2018 08:20	
SS1016B	PDALX3	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1119 (Ice) (1)	SS1016	02/25/2018 08:30	
SS91016B	PDALX5	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1121 (Ice) (1)	SS1016	02/25/2018 08:30	
SS1039A	PDALX6	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1122 (Ice) (1)	SS1039	02/25/2018 08:55	
SS1039B	PDALX7	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1123 (Ice) (1)	SS1039	02/25/2018 09:05	
SS1040A	PDALX9	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1125 (Ice) (1)	SS1040	02/25/2018 09:20	
SS1040B	PDALY0	Surface Soil/ H. Yost	Comp.	CDD/CDF(21)	1126 (Ice) (1)	SS1040	02/25/2018 09:30	
RB06_SS1040	PDALY2	Rinse Water Blank/ H. Yost	Grab	CDD/CDF(21)	1128 (Ice) (2)	#R4DART#	02/25/2018 10:00	

Sample(s) to be used for Lab QC: SS1017B Tag 1116	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

WORK ORDER

Printed: 4/11/2018 1:44:54PM

E181503

US-EPA, Region 4, SESD

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0318**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**

Project Leader:	**Thorpe, Peter**	**Date Due:**	**05/16/18 (35 day TAT)**
Received By:	Beall, Mike	Date Received:	04/11/18 10:35
Logged In By:	Beall, Mike	Date Logged In:	04/11/18 12:53

Samples Received at:	1.3°C	Placed in Cooler after Ice Removed:		D.A.R.T. Project ID:	18-0318
Custody Seals: Yes		Sample Containers Intact: Yes		Program/Activity:	RD
Custody Seals Intact: Yes		Samples & COC Match: Yes		Site/Waterbody:	AMERICAN CREOSOTE WORKS INC (110002527025)
COC Present: Yes		COC/Labels Agree: Yes			
Ice in Cooler: Yes		All Analyses on COC: Yes			

Analysis	Due	TAT	Expires	Comments
E181503-01 TB001 / [Water / Trip Blank - Water] Sampled 04/10/18 16:45				
A = 40mL Clear Vial	*B = 40mL Clear Vial*	*C = 40mL Clear Vial*		
VOA Scan (Routine)	05/16/18 00:00	35	04/24/18 16:45	
E181503-02 ACW-MW1 / ACW-MW1 [Water / Groundwater] Sampled 04/10/18 15:25				
A = 500mL Plastic	*B = 500mL Plastic*			
Phosphorus, Dissolved	05/16/18 00:00	35	05/08/18 15:25	
TKN	05/16/18 00:00	35	05/08/18 15:25	
E181503-03 ACW-MW3D / ACW-MW3D [Water / Groundwater] Sampled 04/10/18 14:00				
A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*	
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*	
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*	
Sulfate (Routine) by Ion Chromatography	05/16/18 00:00	35	05/08/18 14:00	
VOA Scan (Routine)	05/16/18 00:00	35	04/24/18 14:00	
Total Organic Carbon (Routine)	05/16/18 00:00	35	05/08/18 14:00	
Phosphorus (Routine)	05/16/18 00:00	35	05/08/18 14:00	
Nitrate and/or Nitrite (Routine)	05/16/18 00:00	35	05/08/18 14:00	
Ammonia, Undistilled	05/16/18 00:00	35	05/08/18 14:00	
Alkalinity, Total (as CaCO3)	05/16/18 00:00	35	04/24/18 14:00	
SV (Routine) Extractables	05/16/18 00:00	35	04/17/18 14:00	
E181503-04 MW7A / MW7A [Water / Groundwater] Sampled 04/10/18 10:30				
A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*	
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*	
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*	
Sulfate (Routine) by Ion Chromatography	05/16/18 00:00	35	05/08/18 10:30	
Phosphorus (Routine)	05/16/18 00:00	35	05/08/18 10:30	
Total Organic Carbon (Routine)	05/16/18 00:00	35	05/08/18 10:30	
Nitrate and/or Nitrite (Routine)	05/16/18 00:00	35	05/08/18 10:30	
Alkalinity, Total (as CaCO3)	05/16/18 00:00	35	04/24/18 10:30	
SV (Routine) Extractables	05/16/18 00:00	35	04/17/18 10:30	
Ammonia, Undistilled	05/16/18 00:00	35	05/08/18 10:30	
VOA Scan (Routine)	05/16/18 00:00	35	04/24/18 10:30	

E181503

US-EPA, Region 4, SESD

Client: Superfund Remedial (302DD2, 303DD2, 000DD2) **Project Number:** 18-0318

Project: American Creosote - PTHORPE **Acct # / Location:** 000DD20445LA03 Pensacola Escambia FL

Analysis	Due	TAT	Expires	Comments

E181503-05 MW7B / MW7B [Water / Groundwater] Sampled 04/10/18 12:05

A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*
E = 1000mL Amber Glass	*F = 1000mL Amber Glass*	*G = 1000mL Amber Glass*	*H = 1000mL Amber Glass*
I = 40mL Clear Vial	*J = 40mL Clear Vial*	*K = 40mL Clear Vial*	*L = 40mL Clear Vial*
M = 40mL Clear Vial	*N = 40mL Clear Vial*	*O = 500mL Plastic*	*P = 500mL Plastic*
Q = 500mL Plastic	*R = 500mL Plastic*	*S = 500mL Plastic*	

Total Organic Carbon (Routine)	05/16/18 00:00	35	05/08/18 12:05	
Alkalinity, Total (as CaCO3)	05/16/18 00:00	35	04/24/18 12:05	
VOA Scan (Routine)	05/16/18 00:00	35	04/24/18 12:05	
Phosphorus (Routine)	05/16/18 00:00	35	05/08/18 12:05	
Nitrate and/or Nitrite (Routine)	05/16/18 00:00	35	05/08/18 12:05	
SV (Routine) Extractables	05/16/18 00:00	35	04/17/18 12:05	
Ammonia, Undistilled	05/16/18 00:00	35	05/08/18 12:05	
Sulfate (Routine) by Ion Chromatography	05/16/18 00:00	35	05/08/18 12:05	

E181503-06 PW1 / PW1 [Water / Potable Water] Sampled 04/10/18 10:00

A = 500mL Plastic	*B = 500mL Plastic*	*C = 500mL Plastic*	*D = 500mL Plastic*

Phosphorus, Dissolved	05/16/18 00:00	35	05/08/18 10:00	
Magnesium, Total Routine	05/16/18 00:00	35	10/07/18 10:00	
Manganese, Total Routine	05/16/18 00:00	35	10/07/18 10:00	
Hardness, as CaCO3 (Calc)	05/16/18 00:00	35	10/07/18 10:00	
TKN	05/16/18 00:00	35	05/08/18 10:00	
Chloride (Routine) by Ion Chromatography	05/16/18 00:00	35	05/08/18 10:00	
Calcium, Total Routine	05/16/18 00:00	35	10/07/18 10:00	

E181503-07 PW91 / PW1 [Water / Potable Water] Sampled 04/10/18 10:00

A = 500mL Plastic	*B = 500mL Plastic*	*C = 500mL Plastic*	*D = 500mL Plastic*

Phosphorus, Dissolved	05/16/18 00:00	35	05/08/18 10:00	
Magnesium, Total Routine	05/16/18 00:00	35	10/07/18 10:00	
TKN	05/16/18 00:00	35	05/08/18 10:00	
Manganese, Total Routine	05/16/18 00:00	35	10/07/18 10:00	
Hardness, as CaCO3 (Calc)	05/16/18 00:00	35	10/07/18 10:00	
Chloride (Routine) by Ion Chromatography	05/16/18 00:00	35	05/08/18 10:00	
Calcium, Total Routine	05/16/18 00:00	35	10/07/18 10:00	

Analysis packages included in this work order

SV (Routine) Extractables

v SV Extractables v SV TICS

VOA Scan (Routine)

v VOA Scan-2 v VOA TICS-2

E181503

USEPA Region 4 COC (REGION COPY)

DateShipped: 4/10/2018

CarrierName: FedEx

AirbillNo: 7719 6524 8493

CHAIN OF CUSTODY RECORD

ACW April 2018/FL

Project Number: 18-0318

Case #:

No: SESD-Ship1

Lab: Region 4 Lab

Lab Contact: Mike Beall

Lab Phone: 706-355-8856

	Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
-02	ACW-MW1		Groundwater/ M. Wood	Grab	TKN(35), OP(35)	A (H2SO4 pH<2), B (Filter + H2SO4 pH<2) (2)	ACW-MW1	04/10/2018 15:25	Field Sample
-03	ACW-MW3D		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	ACW-MW3D	04/10/2018 14:00	Field Sample
-04	MW7A		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW7A	04/10/2018 10:30	Field Sample
-05	MW7B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (19)	MW7B	04/10/2018 12:05	Field Sample
-06	PW1		Potable Water/ H. Yost	Grab	HARD(35), TKN(35), Cl(35), OP(35)	A (HNO3 pH<2), B (H2SO4 pH<2), C (Ice), D (Filter + H2SO4 pH<2) (4)	PW1	04/10/2018 10:00	Field Sample
-07	PW91		Potable Water/ H. Yost	Grab	HARD(35), TKN(35), Cl(35), OP(35)	A (HNO3 pH<2), B (H2SO4 pH<2), C (Ice), D (Filter + H2SO4 pH<2) (4)	PW1	04/10/2018 10:00	Field Sample
-01	TB001		Trip Blank Water/ M. Wood	Grab	VOA(35)	A (HCl pH <2) (3)	#R4DART#	04/10/2018 16:45	Trip Blank

Sample(s) to be used for Lab QC: MW7B Tag A, MW7B Tag B, MW7B Tag C, MW7B Tag D, MW7B Tag E, MW7B Tag F, MW7B Tag G

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: TKN=(CNA) Total Kjeldahl Nitrogen, OP=(CNA) Orthophosphate, SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), VOA=(VOA) Volatile Organics, TOC=(CNA) Total Organic Carbon, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3), NNN=(CNA) Nitrate/Nitrite/Nitrogen, HARD=(TMTL) Hardness (as CaCO3) Ca,Mn,Mg, Cl=(CNA) Chloride

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
samples for analysis	B+V	4/10/18 1800	RnBeall EPA SESD ASB	4-11-18 1035	1 cooler Above 6°C

E181503

Beall, Mike

From: Wellborn, Floyd
Sent: Wednesday, April 11, 2018 1:21 PM
To: R4SampleCustody
Subject: FW: American Creosote, Project 18-0318 - Question on SVOA/SVSIM
Attachments: American Creosote Works target list.xlsx

Mike,

Per the email string below, please do not include the SV SIM analysis to the ACW project.

Thanks,
Floyd

From: Beall, Mike **On Behalf Of** R4SampleCustody
Sent: Wednesday, April 11, 2018 12:54 PM
To: Wellborn, Floyd <Wellborn.Floyd@epa.gov>
Cc: Turner, Nardina <Turner.Nardina@epa.gov>
Subject: FW: American Creosote, Project 18-0318 - Question on SVOA/SVSIM

Floyd,
This email from Nardina should be sufficient to cover not entering SV-SIM on the work order even though the analysis request is on the COC.

Thanks,
Mike

From: Turner, Nardina
Sent: Wednesday, April 11, 2018 12:45 PM
To: R4SampleCustody <R4SampleCustody@epa.gov>
Cc: Burdette, Diana <Burdette.Diana@epa.gov>
Subject: FW: American Creosote, Project 18-0318 - Question on SVOA/SVSIM

The site is agreeable to using the Regional laboratory's usual approach which Diana shared in the attached for the SVOA/SVSIM request. I will update 18-0318 to reflect that SIM technique is not needed to achieve this and to reference the ACW list for SVOA. I am checking to confirm that the same answer applies for the VOA short list and will pass that along as soon as confirmed.

From: Callaway, Amy M. [mailto:CallawayAM@bv.com]
Sent: Wednesday, April 11, 2018 11:22 AM
To: Turner, Nardina <Turner.Nardina@epa.gov>; Richardson, Jaime L. <richardsonj@bv.com>
Cc: Thorpe, Peter <Thorpe.Peter@epa.gov>
Subject: RE: American Creosote, Project 18-0318 - Question on SVOA/SVSIM

Nardina,

Peter would like for us to run the "usual ACW" target list.

Thank You,

Amy

E181503

From: Turner, Nardina [mailto:Turner.Nardina@epa.gov]
Sent: Wednesday, April 11, 2018 10:59 AM
To: Richardson, Jaime L. <RichardsonJ@bv.com>; Callaway, Amy M. <CallawayAM@bv.com>
Cc: Thorpe, Peter <Thorpe.Peter@epa.gov>
Subject: FW: American Creosote, Project 18-0318 - Question on SVOA/SVSIM

As you probably know, SESD's field group also has done work for ACW from time to time and sent samples to the Regional lab. For the samples arriving this week, we had scheduled them according to the generic choices for SVOA and SVSIM. The Regional laboratory noticed this is different than their usual approach for ACW in both target list and reporting levels. It is possible that what you are doing has different requirements, and we also recognize that there are actually two sets of samples combined into this week that may differ in needs. Can you look over the attached "usual ACW" spreadsheet and the below questions? Let us know if the usual ACW approach is sufficient (shorter list and no TICs, higher reporting levels for some compounds) or if not, what levels are of interest to help fine-tune the effort? Thanks. - Nardina

From: Burdette, Diana
Sent: Wednesday, April 11, 2018 10:52 AM
To: Turner, Nardina <Turner.Nardina@epa.gov>
Subject: American Creosote, Project 18-0318

Good Morning.

We wanted to clarify your intentions for American Creosote, Project Number 18-0318. You have requested SV Extractables and SV SIM.

Attached are the Project Specific Analysis Objectives that we here at the lab use for American Creosote water samples. Please check the attached list we have gotten from our Field Service Branch for the American Creosote Project Specific Analysis Objectives. If the attached is your intention then we will proceed as we normally do with Projects from American Creosote.

Also, is the list of compounds you want reported on the attached list or did you want the full SV Extractable list? We normally only report the compounds on the attached list.

If you want the full SV list, we will report the reporting limits found on the attached for the compounds on that list. For all other compounds we will report routine levels.

Please let us know how we can meet your Specific Objectives for this project.

Thanks,

WORK ORDER

Printed: 4/13/2018 1:23:16PM

E181507

US-EPA, Region 4, SESD

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0318**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**

Project Leader:	**Thorpe, Peter**	**Date Due:**	**05/18/18 (35 day TAT)**
Received By:	Beall, Mike	Date Received:	04/13/18 10:20
Logged In By:	Beall, Mike	Date Logged In:	04/13/18 13:16

Samples Received at:	**5.8°C**	Placed in Cooler after Ice Removed: Yes	D.A.R.T. Project ID:	18-0318
Custody Seals: Yes		Sample Containers Intact: Yes	Program/Activity:	RD
Custody Seals Intact: Yes		Samples & COC Match: Yes	Site/Waterbody:	AMERICAN CREOSOTE WORKS INC (110002527025)
COC Present: Yes		COC/Labels Agree: Yes		
Ice in Cooler: Yes		All Analyses on COC: Yes		

Analysis	Due	TAT	Expires	Comments
E181507-01 RB001 / [Water / Rinse Water Blank] Sampled 04/11/18 15:15				
A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*	
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*		
SV (Routine) Extractables	05/18/18 00:00	35	04/18/18 15:15	
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 15:15	
E181507-02 TB002 / [Water / Trip Blank - Water] Sampled 04/11/18 15:00				
A = 40mL Clear Vial	*B = 40mL Clear Vial*	*C = 40mL Clear Vial*		
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 15:00	
E181507-03 ACW-MW2B / ACW-MW2B [Water / Groundwater] Sampled 04/11/18 15:10				
A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*	
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*	
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*	
Ammonia, Undistilled	05/18/18 00:00	35	05/09/18 15:10	
Phosphorus (Routine)	05/18/18 00:00	35	05/09/18 15:10	
Nitrate and/or Nitrite (Routine)	05/18/18 00:00	35	05/09/18 15:10	
Total Organic Carbon (Routine)	05/18/18 00:00	35	05/09/18 15:10	
Sulfate (Routine) by Ion Chromatography	05/18/18 00:00	35	05/09/18 15:10	
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 15:10	
SV (Routine) Extractables	05/18/18 00:00	35	04/18/18 15:10	
Alkalinity, Total (as CaCO3)	05/18/18 00:00	35	04/25/18 15:10	
E181507-04 ACW-MW92B / ACW-MW2B [Water / Groundwater] Sampled 04/11/18 15:10				
A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*	
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*	
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*	
Phosphorus (Routine)	05/18/18 00:00	35	05/09/18 15:10	
SV (Routine) Extractables	05/18/18 00:00	35	04/18/18 15:10	
Total Organic Carbon (Routine)	05/18/18 00:00	35	05/09/18 15:10	
Nitrate and/or Nitrite (Routine)	05/18/18 00:00	35	05/09/18 15:10	
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 15:10	
Sulfate (Routine) by Ion Chromatography	05/18/18 00:00	35	05/09/18 15:10	
Ammonia, Undistilled	05/18/18 00:00	35	05/09/18 15:10	
Alkalinity, Total (as CaCO3)	05/18/18 00:00	35	04/25/18 15:10	

E181507

US-EPA, Region 4, SESD

Client: Superfund Remedial (302DD2, 303DD2, 000DD2) **Project Number:** 18-0318

Project: American Creosote - PTHORPE **Acct # / Location:** 000DD20445LA03 Pensacola Escambia FL

Analysis	Due	TAT	Expires	Comments

E181507-05 MW10A / MW10A [Water / Groundwater] Sampled 04/11/18 10:50

A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*

Sulfate (Routine) by Ion Chromatography	05/18/18 00:00	35	05/09/18 10:50	
Phosphorus (Routine)	05/18/18 00:00	35	05/09/18 10:50	
Nitrate and/or Nitrite (Routine)	05/18/18 00:00	35	05/09/18 10:50	
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 10:50	
Total Organic Carbon (Routine)	05/18/18 00:00	35	05/09/18 10:50	
SV (Routine) Extractables	05/18/18 00:00	35	04/18/18 10:50	
Alkalinity, Total (as CaCO3)	05/18/18 00:00	35	04/25/18 10:50	
Ammonia, Undistilled	05/18/18 00:00	35	05/09/18 10:50	

E181507-06 MW10B / MW10B [Water / Groundwater] Sampled 04/11/18 09:28

A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*

Phosphorus (Routine)	05/18/18 00:00	35	05/09/18 09:28	
Alkalinity, Total (as CaCO3)	05/18/18 00:00	35	04/25/18 09:28	
Nitrate and/or Nitrite (Routine)	05/18/18 00:00	35	05/09/18 09:28	
Sulfate (Routine) by Ion Chromatography	05/18/18 00:00	35	05/09/18 09:28	
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 09:28	
Ammonia, Undistilled	05/18/18 00:00	35	05/09/18 09:28	
Total Organic Carbon (Routine)	05/18/18 00:00	35	05/09/18 09:28	
SV (Routine) Extractables	05/18/18 00:00	35	04/18/18 09:28	

E181507-07 MW9A / MW9A [Water / Groundwater] Sampled 04/11/18 14:00

A = 1000mL Amber Glass	*B = 1000mL Amber Glass*	*C = 1000mL Amber Glass*	*D = 1000mL Amber Glass*
E = 40mL Clear Vial	*F = 40mL Clear Vial*	*G = 40mL Clear Vial*	*H = 500mL Plastic*
I = 500mL Plastic	*J = 500mL Plastic*	*K = 500mL Plastic*	*L = 500mL Plastic*

Ammonia, Undistilled	05/18/18 00:00	35	05/09/18 14:00	
Total Organic Carbon (Routine)	05/18/18 00:00	35	05/09/18 14:00	
VOA Scan (Routine)	05/18/18 00:00	35	04/25/18 14:00	
Sulfate (Routine) by Ion Chromatography	05/18/18 00:00	35	05/09/18 14:00	
Alkalinity, Total (as CaCO3)	05/18/18 00:00	35	04/25/18 14:00	
Nitrate and/or Nitrite (Routine)	05/18/18 00:00	35	05/09/18 14:00	
Phosphorus (Routine)	05/18/18 00:00	35	05/09/18 14:00	
SV (Routine) Extractables	05/18/18 00:00	35	04/18/18 14:00	

Analysis packages included in this work order

SV (Routine) Extractables

v SV Extractables v SV TICS

VOA Scan (Routine)

v VOA Scan-2 v VOA TICS-2

E181507

USEPA Region 4 COC (LAB COPY)

DateShipped: 4/12/2018
CarrierName: FedEx
AirbillNo: 771967188924

CHAIN OF CUSTODY RECORD

Project Number: 18-0318
Case #:

No: 04/12/18-0007

Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

	Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
-03	ACW-MW2B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	ACW-MW2B	04/11/2018 15:10	
-04	ACW-MW92B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	ACW-MW2B	04/11/2018 15:10	
-05	MW10A		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW10A	04/11/2018 10:50	
-06	MW10B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW10B	04/11/2018 09:28	
-07	MW9A		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW9A	04/11/2018 14:00	
-01	RB001		Rinse Water Blank/ M. Wood	Grab	SVOA-SIM(35), SVOA(35), VOA(35)	A (Ice), B (Ice), C (HCl pH <2) (7)	#R4DART#	04/11/2018 15:15	

Special Instructions:

Shipment for Case Complete? Y
Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), VOA=(VOA) Volatile Organics, TOC=(CNA) Total Organic Carbon, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3), NNN=(CNA) Nitrate/Nitrite/Nitrogen

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
4 Coolers	BW	4/12/18 11:...	RnBeall EPA SESD ASB	4-13-18 1020	OKAY

E181507

USEPA Region 4 COC (LAB COPY)
DateShipped: 4/12/2018
CarrierName: FedEx
AirbillNo: 771967188924

CHAIN OF CUSTODY RECORD

Project Number: 18-0318
Case #:

No: 04/12/18-0007
Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
-02 TB002		Trip Blank Water/ M. Wood	Grab	VOA(35)	A (HCl pH <2) (3)	#R4DART#	04/11/2018 15:00	

Shipment for Case Complete? Y
Samples Transferred From Chain of Custody #

Special Instructions:

Analysis Key: SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), VOA=(VOA) Volatile Organics, TOC=(CNA) Total Organic Carbon, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3), NNN=(CNA) Nitrate/Nitrite/Nitrogen

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			MBeall EPA SESD ASB	4-13-18 1020	OKAY

USEPA Region 4 COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: Kemron-HOLD

DateShipped: 2/26/2018
CarrierName: Hand Delivered
AirbillNo: NA

Project Number: 18-0191/92
Cooler #: 1

Lab: Kemron Environmental Services
Lab Contact: Sample Receiving
Lab Phone: 404-636-0928

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1000C	PDAKR3	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1002 (Ice) (1)	SS1000	02/20/2018 09:40	
SS1001C	PDAKR6	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1005 (Ice) (1)	SS1001	02/20/2018 10:50	
SS1002C	PDAKR9	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1008 (Ice) (1)	SS1002	02/20/2018 13:20	
SS1003C	PDAKS2	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1011 (Ice) (1)	SS1003	02/20/2018 13:45	
SS1042C	PDAKS6	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1015 (Ice) (1)	SS1042	02/20/2018 14:30	
SS1004C	PDAKS9	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1018 (Ice) (1)	SS1004	02/20/2018 15:30	
SS1037C	PDAKT3	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1023 (Ice) (1)	SS1037	02/21/2018 08:45	
SS91037C	PDAKT4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1024 (Ice) (1)	SS1037	02/21/2018 08:45	
SS1036C	PDAKT7	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1027 (Ice) (1)	SS1036	02/21/2018 10:00	
SS1035C	PDAKW0	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1030 (Ice) (1)	SS1035	02/21/2018 10:30	
SS1038C	PDAKW4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1034 (Ice) (1)	SS1038	02/21/2018 13:00	

Sample(s) to be used for Lab QC: SS1004C Tag 1018 - Special Instructions: CLP nos. from Case 47458/47459	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: Kemron-HOLD

DateShipped: 2/26/2018
CarrierName: Hand Delivered
AirbillNo: NA

Project Number: 18-0191/92
Cooler #: 1

Lab: Kemron Environmental Services
Lab Contact: Sample Receiving
Lab Phone: 404-636-0928

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1052C	PDAKW7	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1037 (Ice) (1)	SS1052	02/21/2018 14:00	
SS1053C	PDAKX1	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1041 (Ice) (1)	SS1053	02/21/2018 14:40	
SS1005C	PDAKX4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1044 (Ice) (1)	SS1005	02/22/2018 08:30	
SS1007C	PDAKX7	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1047 (Ice) (1)	SS1007	02/22/2018 09:15	
SS1020C	PDAKY0	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1050 (Ice) (1)	SS1020	02/22/2018 10:15	
SS1023C	PDAKY3	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1053 (Ice) (1)	SS1023	02/22/2018 10:45	
SS1031C	PDAKY6	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1056 (Ice) (1)	SS1031	02/22/2018 13:20	
SS1029C	PDAKY9	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1059 (Ice) (1)	SS1029	02/22/2018 13:45	
SS1026C	PDAKZ3	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1063 (Ice) (1)	SS1026	02/22/2018 14:30	
SS1047C	PDAKZ6	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1066 (Ice) (1)	SS1047	02/22/2018 15:35	
SS1008C	PDALQ4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1070 (Ice) (1)	SS1008	02/23/2018 08:00	

Sample(s) to be used for Lab QC: SS1012C Tag 1073 - Special Instructions: CLP nos. from Case 47458/47459	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: Kemron-HOLD

DateShipped: 2/26/2018
CarrierName: Hand Delivered
AirbillNo: NA

Project Number: 18-0191/92
Cooler #: 1

Lab: Kemron Environmental Services
Lab Contact: Sample Receiving
Lab Phone: 404-636-0928

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1012C	PDALQ7	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1073 (Ice) (1)	SS1012	02/23/2018 08:30	
SS1013C	PDALR0	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1076 (Ice) (1)	SS1013	02/23/2018 09:15	
SS1009C	PDALR4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1080 (Ice) (1)	SS1009	02/23/2018 10:00	
SS1011C	PDALR7	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1083 (Ice) (1)	SS1011	02/23/2018 10:30	
SS1019C	PDALS0	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1086 (Ice) (1)	SS1019	02/23/2018 12:25	
SS1018C	PDALS3	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1089 (Ice) (1)	SS1018	02/23/2018 13:00	
SS1010C	PDALS6	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1092 (Ice) (1)	SS1010	02/23/2018 13:30	
SS1043C	PDALT0	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1096 (Ice) (1)	SS1043	02/24/2018 08:25	
SS1044C	PDALT3	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1099 (Ice) (1)	SS1044	02/24/2018 08:50	
SS1045C	PDALT6	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1102 (Ice) (1)	SS1045	02/24/2018 09:25	
SS1046C	PDALT9	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1105 (Ice) (1)	SS1046	02/24/2018 10:20	

Sample(s) to be used for Lab QC: SS1012C Tag 1073 - Special Instructions: CLP nos. from Case 47458/47459

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: CDD/CDF=CLP Dioxins/Furans

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

DateShipped: 2/26/2018

CarrierName: Hand Delivered

AirbillNo: NA

CHAIN OF CUSTODY RECORD

Project Number: 18-0191/92

Cooler #: 1

No: Kemron-HOLD

Lab: Kemron Environmental Services

Lab Contact: Sample Receiving

Lab Phone: 404-636-0928

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1030C	PDALW2	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1108 (Ice) (1)	SS1030	02/24/2018 11:05	
SS91030C	PDALW4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1110 (Ice) (1)	SS1030	02/24/2018 11:05	
SS1041C	PDALW7	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1113 (Ice) (1)	SS1041	02/24/2018 13:30	
SS1017C	PDALX1	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1117 (Ice) (1)	SS1017	02/25/2018 08:15	
SS1016C	PDALX4	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1120 (Ice) (1)	SS1016	02/25/2018 08:40	
SS1039C	PDALX8	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1124 (Ice) (1)	SS1039	02/25/2018 09:15	
SS1040C	PDALY1	Subsurface Soil/ H. Yost	Comp.	CDD/CDF(21)	1127 (Ice) (1)	SS1040	02/25/2018 09:40	

Special Instructions: CLP nos. from Case 47458/47459

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: CDD/CDF=CLP Dioxins/Furans

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: 04/12/18-0007

DateShipped: 4/12/2018
CarrierName: FedEx
AirbillNo: 771967188924

Project Number: 18-0318
Case #:

Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
ACW-MW2B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	ACW-MW2B	04/11/2018 15:10	
ACW-MW92B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	ACW-MW2B	04/11/2018 15:10	
MW10A		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW10A	04/11/2018 10:50	
MW10B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW10B	04/11/2018 09:28	
MW9A		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW9A	04/11/2018 14:00	
RB001		Rinse Water Blank/ M. Wood	Grab	SVOA-SIM(35), SVOA(35), VOA(35)	A (Ice), B (Ice), C (HCl pH <2) (7)	#R4DART#	04/11/2018 15:15	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), VOA=(VOA) Volatile Organics, TOC=(CNA) Total Organic Carbon, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3), NNN=(CNA) Nitrate/Nitrite/Nitrogen

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

DateShipped: 4/12/2018

CarrierName: FedEx

AirbillNo: 771967188924

CHAIN OF CUSTODY RECORD

Project Number: 18-0318

Case #:

No: 04/12/18-0007

Lab: Region 4 Lab

Lab Contact: Mike Beall

Lab Phone: 706-355-8856

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
TB002		Trip Blank Water/ M. Wood	Grab	VOA(35)	A (HCl pH <2) (3)	#R4DART#	04/11/2018 15:00	

Special Instructions:

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), VOA=(VOA) Volatile Organics, TOC=(CNA) Total Organic Carbon, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3), NNN=(CNA) Nitrate/Nitrite/Nitrogen

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (REGION COPY)

DateShipped: 4/10/2018
CarrierName: FedEx
AirbillNo: 771965248492

CHAIN OF CUSTODY RECORD

ACW April 2018/FL
Project Number: 18-0318
Case #:

No: SESD-Ship1

Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
ACW-MW1		Groundwater/ M. Wood	Grab	TKN(35), OP(35)	A (H2SO4 pH<2), B (Filter + H2SO4 pH<2) (2)	ACW-MW1	04/10/2018 15:25	Field Sample
ACW-MW3D		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	ACW-MW3D	04/10/2018 14:00	Field Sample
MW7A		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (12)	MW7A	04/10/2018 10:30	Field Sample
MW7B		Groundwater/ M. Wood	Grab	SVOA(35), SVOA-SIM(35), VOA(35), TOC(35), NH3+P(35), SA(35), NNN(35)	A (Ice), B (Ice), C (Ice + HCl pH <2), D (H2SO4 pH<2), E (H2SO4 pH<2), F (Ice), G (1 unpres, 1 H2SO4) (19)	MW7B	04/10/2018 12:05	Field Sample
PW1		Potable Water/ H. Yost	Grab	HARD(35), TKN(35), Cl(35), OP(35)	A (HNO3 pH<2), B (H2SO4 pH<2), C (Ice), D (Filter + H2SO4 pH<2) (4)	PW1	04/10/2018 10:00	Field Sample
PW91		Potable Water/ H. Yost	Grab	HARD(35), TKN(35), Cl(35), OP(35)	A (HNO3 pH<2), B (H2SO4 pH<2), C (Ice), D (Filter + H2SO4 pH<2) (4)	PW1	04/10/2018 10:00	Field Sample
TB001		Trip Blank Water/ M. Wood	Grab	VOA(35)	A (HCl pH <2) (3)	#R4DART#	04/10/2018 16:45	Trip Blank

Sample(s) to be used for Lab QC: MW7B Tag A, MW7B Tag B, MW7B Tag C, MW7B Tag D, MW7B Tag E, MW7B Tag F, MW7B Tag G

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: TKN=(CNA) Total Kjeldahl Nitrogen, OP=(CNA) Orthophosphate, SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), VOA=(VOA) Volatile Organics, TOC=(CNA) Total Organic Carbon, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3), NNN=(CNA) Nitrate/Nitrite/Nitrogen, HARD=(TMTL) Hardness (as CaCO3) Ca,Mn,Mg, Cl=(CNA) Chloride

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

Attachment 3
Sample Data Sheets with Additional Interpreted Qualifiers

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1003A
Station ID: SS1003

Lab ID: C181002-10
Matrix: Surface Soil

MD No:
D No: AKS0 ARI

Date Collected: 2/20/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	11		%		4/16/18	5/03/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	9200		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1200		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	100		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	73		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	52		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	230		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	44		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	140		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	38	J	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	27		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	4.8	J, CLP01	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	74		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	6.2		ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	6.1		ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.5		ng/kg dry	1.0	4/16/18	5/03/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	24000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	4100	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	1700	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	87000	J, CLP02	ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	4500		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	130	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	270	J, Q-3	ng/kg dry	5.0	4/16/18	5/03/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	110	J, D-5	ng/kg dry	110	4/16/18	5/03/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	130	J, D-5	ng/kg dry	130	4/16/18	5/03/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	230	J, D-5	ng/kg dry	230	4/16/18	5/03/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91003A
Station ID: SS1003
Lab ID: C181002-12
Matrix: Surface Soil
MD No:
D No: AKS3 ARI

Date Collected: 2/20/18 13:25

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	16		%		4/16/18	5/04/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	11000		ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1400		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	120		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	86		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	62		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	270		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	51		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	160		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	88	J	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	32		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	4.9	U, D-4	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	90		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	8.2		ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	4.9		ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.6		ng/kg dry	1.0	4/16/18	5/04/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	28000	J, Q-3	ng/kg dry	50	4/16/18	5/04/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	4800	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	2000	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	2000	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	99000	J, CLP02	ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	5100		ng/kg dry	100	4/16/18	5/04/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	150	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	330	J, Q-3	ng/kg dry	5.0	4/16/18	5/04/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	140	J, D-5	ng/kg dry	140	4/16/18	5/04/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	150	J, D-5	ng/kg dry	150	4/16/18	5/04/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	280	J, D-5	ng/kg dry	280	4/16/18	5/04/18	CL HRSM01.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS1052B
Station ID: SS1052

Lab ID: C181002-43
Matrix: Surface Soil

MD No:
D No: AKW6 ARI

Date Collected: 2/21/18 13:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	5.3		%		3/12/18	3/23/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	52	U, B-4 J	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	14	J	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.88	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.70	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.81	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	2.0	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.66	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	1.4	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.59	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.50	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.69	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.2	U, CLP18	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.87	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.34	U	ng/kg dry	1.0	3/12/18	3/23/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	100	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	31	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	21	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	20	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	510	U, B-4	ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	26	U, B-4	ng/kg dry	10	3/12/18	3/23/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	5.2	J, QC-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	24	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	2.7	J, D-5	ng/kg dry	2.7	3/12/18	3/23/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	2.1	J, D-5	ng/kg dry	2.1	3/12/18	3/23/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	2.6	J, D-5	ng/kg dry	2.6	3/12/18	3/23/18	CL HRSM01.2

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D.A.R.T. Id: 18-0191
Project: 18-0191, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0191, American Creosote

Contract Lab Case: 47458

Sample ID: SS91052B
Station ID: SS1052
Lab ID: C181002-44
Matrix: Surface Soil
MD No:
D No: AKW8 ARI

Date Collected: 2/21/18 13:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.8	J	%		3/12/18	3/23/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	180		ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	25	J	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.90	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.75	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.93	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	3.7	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.99	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	2.3	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.59	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	0.68	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.69	U	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.8	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.2	J, CLP01	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.17	U	ng/kg dry	0.99	3/12/18	3/23/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.40	U, CLP18	ng/kg dry	0.99	3/12/18	3/23/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	360	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	62	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	38	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	34	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	1500	U, B-4	ng/kg dry	9.9	3/12/18	3/23/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	45	U, B-4	ng/kg dry	9.9	3/12/18	3/23/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	7.5	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	35	J, Q-3	ng/kg dry	5.0	3/12/18	3/23/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	3.8	J, D-5	ng/kg dry	3.8	3/12/18	3/23/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	3.0	J, D-5	ng/kg dry	3.0	3/12/18	3/23/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	4.9	J, D-5	ng/kg dry	4.9	3/12/18	3/23/18	CL HRSM01.2

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS1030A
Station ID: SS1030

Lab ID: C181214-26
Matrix: Surface Soil

MD No:
D No: ALW0 FRONT

Date Collected: 2/24/18 10:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.7		%		3/27/18	3/28/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1000		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	230		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	14		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	9.9		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	11		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	34		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	9.9		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	2.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	3.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	6.1	J	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	14		ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	27	J	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.42	U	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2.5	CLP10 J	ng/kg dry	1.0	3/27/18	3/28/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1900	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	630	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	230	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	9600	J, CLP02	ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	600		ng/kg dry	10	3/27/18	3/28/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	34	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	170	J, Q-3	ng/kg dry	5.0	3/27/18	3/28/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	45	J, D-5	ng/kg dry	45	3/27/18	3/28/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	32	J, D-5	ng/kg dry	32	3/27/18	3/28/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	38	J, D-5	ng/kg dry	38	3/27/18	3/28/18	CL HRSM01.2

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D.A.R.T. Id: 18-0192
Project: 18-0192, American Creosote - Reported by Nancy Seabolt

Dioxin

Project: 18-0192, American Creosote

Contract Lab Case: 47459

Sample ID: SS91030A
Station ID: SS1030

Lab ID: C181214-28
Matrix: Surface Soil

MD No:
D No: ALW3 FRONT

Date Collected: 2/24/18 10:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1644012	% Moisture	9.6		%		3/27/18	3/29/18	CL HRSM01.2
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	920		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	260		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	15		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzodioxin	9.6		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	15		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzodioxin	31		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	16		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzodioxin	18		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	4.9	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
40321-76-4	1,2,3,7,8-Pentachlorodibenzodioxin	4.5	J, CLP01	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	20	J	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	20		ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	95	J	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
1746-01-6	2,3,7,8-Tetrachlorodibenzodioxin	0.55	U	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	4.4	CLP10 J	ng/kg dry	1.0	3/27/18	3/29/18	CL HRSM01.2
37871-00-4	Heptachlorodibenzodioxin (Total)	1700	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
38998-75-3	Heptachlorodibenzofuran (Total)	660	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
34465-46-8	Hexachlorodibenzodioxin (Total)	210	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
55684-94-1	Hexachlorodibenzofuran (Total)	280	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
3268-87-9	Octachlorodibenzodioxin	8500	J, CLP02	ng/kg dry	10	3/27/18	3/29/18	CL HRSM01.2
39001-02-0	Octachlorodibenzofuran	530		ng/kg dry	10	3/27/18	3/29/18	CL HRSM01.2
36088-22-9	Pentachlorodibenzodioxin (Total)	40	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
30402-15-4	Pentachlorodibenzofuran (Total)	440	J, Q-3	ng/kg dry	5.0	3/27/18	3/29/18	CL HRSM01.2
R4-0428	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	120	J, D-5	ng/kg dry	120	3/27/18	3/29/18	CL HRSM01.2
R4-0429	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	69	J, D-5	ng/kg dry	69	3/27/18	3/29/18	CL HRSM01.2
R4-0430	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	61	J, D-5	ng/kg dry	61	3/27/18	3/29/18	CL HRSM01.2

Attachment 4
QC Support Documentation

Not applicable for this sampling event

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MEMORANDUM

EPA Region 4 Superfund Division
American Creosote Works Site

BVSPC Project No. 049089
28 August 2018

To: Peter Thorpe, EPA Task Order COR

From: Amy Callaway, Black & Veatch Task Order Manager

Reference: EPA Contract EP-S4-09-02, Task Order No. 089-RDRD-0445
DCN 49089-0125-07-B-03036R0

Subject: Data Validation Report for Sampling Event Beginning 08 April 2018
SESD EPA Region 4 Laboratory Project Numbers 18-0318 and 18-0335

1.0 Overview

Black & Veatch Special Projects Corp. (Black & Veatch) has reviewed the data for the samples and analyses listed below. The EPA National Functional Guidelines (EPA, 2017a and EPA 2017b) or method specific QC data were used to evaluate the implementation of field and laboratory QC to ensure acceptable results with a Stage 4 Data Validation (EPA, 2009) by Black & Veatch. Where performance criteria are not met, the data is qualified to indicate the degree of confidence in the final result according to data quality indicators of precision, accuracy (bias), representativeness, completeness, comparability, and sensitivity.

The analytical data included for this project number are of sufficient quality and are deemed acceptable for their intended use except where noted below. Commonly used acronyms and abbreviations used during data validation are presented in Attachment 1.

2.0 Verification

The samples reported were collected in accordance with the Black & Veatch American Creosote Works Site Sampling and Analysis Plan Volume 1 Quality Assurance Project Plan Revision 0 (Black & Veatch 2017a) and Volume 2 Field Sampling Plan, Revision 0 (Black & Veatch 2017b). Black & Veatch submitted samples from 33 locations (Table 2-1) comprised of 102 samples (Table 2-2) for analysis to the EPA Region 4 SESD or CLP laboratory as indicated in the Chains of Custody (Attachment 2). Types of samples and media include: 19 surface soil, nine groundwater, and six field QC samples (Table 2-1). The six QC samples submitted include: two field duplicates of water and one of soil; two trip blanks of a water matrix, and one equipment blank. Target analytes utilizing 13 different analytical methods in two data packages include: Chloride, Sulfate as SO4, Ammonia as N, Total Kjeldahl Nitrogen, Nitrate/Nitrite as N, Total Phosphorus, Total Alkalinity (as CaCO3), Hardness as CaCO3, Total Organic Carbon, Total dissolved Phosphorus, Dioxins and Furans, SVOCs, Metals, and VOCs according to the analytical methods on Table 2-3. Ten samples were sent to Kemron Environmental Services (Table 2-1) but were kept on hold for Dioxin analysis pending results of samples sent to the EPA

3.0 Validation

3.1 Field QC

Sample Collection

Exceptions to issues with sampling methods, preservation/temperature, handling, and hold time are noted below.

Chain of Custody
Analysis for SVOCs was changed to accommodate a project specific target analyte list and reporting levels that do not require SVOA SIM analysis as requested on the COC

Temperature
One cooler was received above 6 C. The samples the cooler were received within 24 hours of collection. Other contemporaneous coolers were received within acceptable temperature parameters.

Preservation
Some samples submitted for Total Kjeldahl Nitrogen and Total Organic Carbon were not preserved with H2SO4 to a pH < 2. Samples were shipped and received within 24 hours of collection.

Field Duplicates
The current National Functional Guidelines do not have standard acceptance criteria for the evaluation of field duplicates. Unless planning documents dictate otherwise, the evaluation of field duplicates are based on the *Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996*, the RPDs for aqueous samples must be less than or equal to 30% and for solid samples must be less than or equal to 50%. Based on professional judgement a RPD of 30% was used for evaluation of precision for these ambient air matrix samples. Analytes exceeding the performance criteria are J qualified in the primary and secondary samples of duplicate pairs. RPDs were calculated for all analytes with concentrations greater than the MRL in at least one sample. The MRL is used for calculation of the RPD of non-detections if the duplicate sample (primary or secondary) had a detection.

Three field duplicate sets of both soil and water matrices were submitted for analysis (Table 2-1b). The applicable field duplicate detections for each of the sets that had RPDs which did not meet the acceptance criteria are compared in Table 3-1. None of the RPDs were found to exceed acceptance criteria.

Field Blanks
Field blanks with detections and any associated sample detections are summarized on Table 3-2. Related sample analyte detections below the adjusted RL received an additional final interpreted qualifier of U. Only blank detections and subsequent sample qualifications are summarized below.

Trip Blank
Two trip blanks were submitted with these analyses (Table 2-1). There were no detections.

Equipment Rinsate Blank
One equipment blank was submitted for this sampling event. There were detections, however, all were below the reporting limit. The equipment blank was collected at the end of the sampling event and so cannot be tied to a specific sample location. No additional qualifiers were deemed necessary.

Preservative Blank
Preservative blanks were not collected for this sampling event.

3.2 Laboratory QC

Analytical data from a CLP or EPA regional laboratory has received a Stage 4 data validation summarized below and amended with further validation criteria as noted. If applicable, the validation report will include Table 3-3a which summarizes validation qualifiers applied during EPA validation and presented in the data reports. Final interpreted qualifiers, results with detections but no qualifiers, and non-detections, and estimated results below the reporting limit are not included in the table summary.

Laboratory QC data submitted from subcontracted laboratory will receive a Stage 2B data validation. During the Stage 2B validation the data has been compared to expected QC checks for the specified level of data validation in Section 1.0. If applicable, the Stage 2B validation will include Table 3-3b in which the sample analysis is cross-checked against the necessary validation criteria to identify where no QC check was expected (NA), a QC check is typically expected but there is no data to associate with the samples submitted (ND), QC data is available and does not exhibit any exceptions to acceptance criteria (OK), or QC data that has been submitted for an expected QC check point exhibits a potential conflict with either laboratory internal acceptance criteria, EPA guidelines, or professional judgement for data validation (QC).

3.2.1 CNA:EPA 350.1 (Ammonia as N, Water)

T-1 - Samples were received in cooler with temperature blank greater than 6 degrees C. Samples were shipped and received within 24 hours of collection. No additional final interpreted qualifier was deemed necessary.

3.2.2 CNA:EPA 351.2 (Total Kjeldahl Nitrogen, Water)

P-4 Samples received at pH > 2. No additional final interpreted qualifier was deemed necessary.

3.2.3 CNA:EPA 353.2 (Nitrate/Nitrite as N, Water)

T-1 – Samples were received in cooler with temperature blank greater than 6 degrees C. Samples were shipped and received within 24 hours of collection. No additional final interpreted qualifier was deemed necessary.

3.2.4 CNA:EPA 365.1 (Total Phosphorus, Water)

T-1 – Samples were received in cooler with temperature blank greater than 6 degrees C. Samples were shipped and received within 24 hours of collection. No additional final interpreted qualifier was deemed necessary.

3.2.5 CNA:SM 2320B (Alkalinity, Total (as CaCO3), Water)

T-1 – Samples were received in cooler with temperature blank greater than 6 degrees C. Samples were shipped and received within 24 hours of collection. No additional final interpreted qualifier was deemed necessary.

3.2.6 CNA:SM 5310B (Total Organic Carbon, Water)

P-4 Samples received at pH > 2. No additional final interpreted qualifier was deemed necessary.

T-1 – Samples were received in cooler with temperature blank greater than 6 degrees C. Samples were shipped and received within 24 hours of collection. No additional final interpreted qualifier was deemed necessary.

3.2.7 DCNA:EPA 365.1 (Total Dissolved Phosphorus, Water)

T-1 – Samples were received in cooler with temperature blank greater than 6 degrees C. Samples were shipped and received within 24 hours of collection. No additional final interpreted qualifier was deemed necessary.

3.2.8 DIO:CL HRSM01.2, Surface Soil (Dioxins and Furans)

CLP01 - Concentration reported is less than the lowest standard on calibration curve. An additional final interpreted qualifier of J was added to calculations
.
CLP10 - 2,3,7,8-TCDF confirmed by second column. No additional final interpreted qualifier was deemed necessary.
D-5 - Estimated quantitation for one or more individual constituents comprising >10% of the total. An additional final interpreted qualifier of J was added to detections

Q-3 Instrument not calibrated for all constituents of the total concentration result. An additional final interpreted qualifier of J was added to calculations.

QC-2 – The analyte concentration was high in continuing calibration verification standard. An additional final interpreted qualifier of J was added to a detection

QI-1 – The internal standard was outside of method control limits. An additional final interpreted qualifier of J was added to detects and non-detects.

3.2.9 SVOA:EPA 8270D (VOCs, Water)

Q-2 – The result is greater than MDL but less than MRL. An additional final interpreted qualifier of J was added to a detection.

3.2.10 VOA:EPA 8260C (VOCs, Water)

C-6 Sample aliquot taken from VOA vial with headspace (air bubble greater than 5-6 mm diameter). No additional final interpreted qualifier was deemed necessary.

Q-2 – The result is greater than MDL but less than MRL. An additional final interpreted qualifier of J was added to detections.

QR-2 - MRL verification recovery greater than upper control limits. An additional final interpreted qualifier of J was added to detections.

Tables

2-1 Sample Summary
2-2 Analysis Methods
2-3 Analysis Types
2-4 Analysis Batches
3-1 Field Duplicate Detections
3-2 Field Blank Detections
3-3a EPA Data Validation Qualifier Count Summary
3-3b Data Validation Check Sheet for Non-EPA/CLP Laboratories (not required for this event)

Attachments

1. Common Data Validation Definitions
2. Chain of Custody
3. Sample Data Sheets with Additional Interpreted Qualifiers (not required for this event)
4. Support Documentation (not required for this event)

References

Black & Veatch, 2017a. Black & Veatch Sampling and Analysis Plan American Creosote Works Site, Volume 1 Quality Assurance Project Plan. Revision 0, November 2017.

Black & Veatch, 2017b. Black & Veatch Sampling and Analysis Plan American Creosote Works Site, Volume 2 Field Sampling Plan, Revision 0. November 2017.

EPA, 2009. EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005. January 13, 2009.

EPA, 1996. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. December 1996.

EPA, 2017a. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, OLEM 9355.0-136, EPA-540-R-2017-002. January 2017.

EPA, 2017b. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OLEM 9355.0-135, EPA-540-R-201 7-001. January 2017.

Tables

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Attachment 1
Common Data Validation Definitions

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Attachment 2
Chain of Custody

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Attachment 3
Sample Data Sheets with Additional Interpreted Qualifiers

No additional support necessary for this sample data group

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Attachment 4
QC Support Documentation

No additional support necessary for this sample data group

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MEMORANDUM

EPA Region 4 Superfund Division
American Creosote Works Site

BVSPC Project No. 049089
05 August 2018

To: Peter Thorpe, EPA Task Order COR

From: Amy Callaway, Black & Veatch Task Order Manager

Reference: EPA Contract EP-S4-09-02, Task Order No. 089-RDRD-0445
DCN 49089-0125-07-D-01897R0

Subject: Data Validation Report for Sampling Event Beginning 16 May 2018
Laboratory Project Numbers SESD EPA Region 4 18-0421 and Shealy TE22045

1.0 Overview

Black & Veatch Special Projects Corp. (Black & Veatch) has reviewed the data for the samples and analyses listed below. The EPA National Functional Guidelines (EPA, 2017a and EPA 2017b) or method specific QC data were used to evaluate the implementation of field and laboratory QC to ensure acceptable results with a Stage 4 Data Validation (EPA, 2009) by Black & Veatch. Where performance criteria are not met, the data is qualified to indicate the degree of confidence in the final result according to data quality indicators of precision, accuracy (bias), representativeness, completeness, comparability, and sensitivity.

The analytical data included for this project number are of sufficient quality and are deemed acceptable for their intended use except where noted below. Commonly used acronyms and abbreviations used during data validation are presented in Attachment 1.

2.0 Verification

The samples reported were collected in accordance with the Black & Veatch American Creosote Works Site Sampling and Analysis Plan Volume 1 Quality Assurance Project Plan Revision 0 (Black & Veatch 2017a) and Volume 2 Field Sampling Plan, Revision 0 (Black & Veatch 2017b). Black & Veatch submitted samples from three locations (Table 2-1) comprised of eight samples (Table 2-2) for analysis to the EPA Region 4 SESD or CLP laboratory as indicated in the Chains of Custody (Attachment 2). Types of samples and media include: three groundwater, and three field QC samples (Table 2-1). The three QC samples submitted include: two field duplicates of groundwater and one trip blank of a water matrix. Target analytes utilizing two different analytical methods in three data packages include SVOCs and VOCs according to the analytical methods on Table 2-3.

3.0 Validation

3.1 Field QC

Sample Collection

Exceptions to issues with sampling methods, preservation/temperature, handling, and hold time are noted below.

Temperature

One cooler was received above 6° C at 7.4° C. The samples were received within 24 hours of collection.

Field Duplicates

The current National Functional Guidelines do not have standard acceptance criteria for the evaluation of field duplicates. Unless planning documents dictate otherwise, the evaluation of field duplicates are based on the *Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996*, the RPDs for aqueous samples must be less than or equal to 30% and for solid samples must be less than or equal to 50%. Analytes exceeding the performance criteria are J qualified in the primary and secondary samples of duplicate pairs. RPDs were calculated for all analytes with concentrations greater than the MRL in at least one sample. The MRL is used for calculation of the RPD of non-detections if the duplicate sample (primary or secondary) had a detection above the MRL.

The two field duplicate sets of a water matrix were submitted for analysis (Table 2-1b). The applicable field duplicate detections for each of the sets that had RPDs which did not meet the acceptance criteria are compared in Table 3-1. Only the analytes which exceeded the RPD acceptance criteria are noted below.

Set 2 - BW16GW65/BW916GW65

Anthracene	Carbazole	

Field Blanks

Field blanks with detections and any associated sample detections are summarized on Table 3-2. Related sample analyte detections below the adjusted RL received an additional final interpreted qualifier of U. Only blank detections and subsequent sample qualifications are summarized below.

Trip Blank

One trip blank was submitted with these analyses (Table 2-1). There were no detections.

Equipment Rinsate Blank

Equipment blanks were not collected for this sampling event.

Preservative Blank

Preservative blanks were not collected for this sampling event.

3.2 Laboratory QC

Analytical data from a CLP or EPA regional laboratory has received a Stage 4 data validation summarized below and amended with further validation criteria as noted. If applicable, the validation report will include Table 3-3a which summarizes validation qualifiers applied during EPA validation and presented in the data reports. Final interpreted qualifiers, results with detections but no qualifiers, and non-detections (U qualifier), and estimated results below the reporting limit (J qualifier) are not included in the table summary.

Laboratory QC data submitted from subcontracted laboratory will receive a Stage 2B data validation. During the Stage 2B validation the data has been compared to expected QC checks for the specified level of data validation in Section 1.0. If applicable, the Stage 2B validation will include Table 3-3b in which the sample analysis is cross-checked against the necessary validation criteria to identify where no QC check was expected (NA), a QC check is typically expected but there is no data to associate with the

samples submitted (ND), QC data is available and does not exhibit any exceptions to acceptance criteria (OK), or QC data that has been submitted for an expected QC check point exhibits a potential conflict with either laboratory internal acceptance criteria, EPA guidelines, or professional judgement for data validation (QC).

3.2.1 SVOA:EPA 8270D (SVOCs, Water)

Calibration Batch 72993
The %D was higher than the acceptance criteria for three analytes. There were no detections in associated samples. A final additional qualifier was not deemed necessary.

bis(2-Chloroethyl)ether	bis (2-Chloro-1-methylethyl) ether	Nitrobenzene

Surrogate/DMC Batch 72993, Sample BW16GW12
The DMC 2,4,6-Tribromophenol %R was less than acceptance criteria. The sample was diluted therefore a final interpreted qualifier was not deemed necessary for associated analytes.

3.2.4 SVOA:EPA 8270D (SVOCs, Water)

QS-4 Surrogate recovery less than 10%. A final interpreted qualifier of J was added to detections and non-detections in associated analytes.

3.2.5 VOA:EPA 8260C (VOCs, Water)

T-6 – Sample storage temperature criteria not met. Samples were analyzed within five days of collection and no other issues were noted with preservation prior to the laboratory receipt. The samples did not exhibit any detections. No additional final interpreted qualifier was deemed necessary.

Tables

2-1 Sample Summary
2-2 Analysis Methods
2-3 Analysis Types
2-4 Analysis Batches
3-1 Field Duplicate Detections
3-2 Field Blank Detections
3-3a EPA Data Validation Qualifier Count Summary
3-3b Data Validation Check Sheet for Non-EPA/CLP Laboratories

Attachments

1. Common Data Validation Definitions
2. Chain of Custody
3. Sample Data Sheets with Additional Interpreted Qualifiers
4. Support Documentation

References

Black & Veatch, 2017a. Black & Veatch Sampling and Analysis Plan American Creosote Works Site, Volume 1 Quality Assurance Project Plan. Revision 0, November 2017.

Black & Veatch, 2017b. Black & Veatch Sampling and Analysis Plan American Creosote Works Site, Volume 2 Field Sampling Plan, Revision 0. November 2017.

EPA, 2009. EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005. January 13, 2009.

EPA, 1996. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. December 1996.

EPA, 2017a. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, OLEM 9355.0-136, EPA-540-R-2017-002. January 2017.

EPA, 2017b. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OLEM 9355.0-135, EPA-540-R-201 7-001. January 2017.

Tables

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TABLE 2-1 SAMPLE SUMMARY

SAMPLE ID1	SAMPLE DATE	SAMPLE TIME	MATRIX	FIELD QC
MW8B	16-May-18	9:35	GW	FD1SET1
MW98B	16-May-18	9:35	GW	FD2SET1
TB001	16-May-18	9:45	TW	TB
BW16GW12	18-May-18	8:55	GW	NA
BW16GW65	18-May-18	11:30	GW	FD1SET2
BW916GW65	18-May-18	11:30	GW	FD2SET2
QC Samples	3			
Sample Locations	3			
Grand Total	**6**			

Notes:

Field QC Samples

1 - Samples ordered by date and time the sample was acquired

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID[1]	SVOA:EPA 8270D	VOA:EPA 8260C	TOTAL	MATRIX	FIELD QC
MW8B	1	1	**2**	GW	FD1SET1
MW98B	1	1	**2**	GW	FD2SET1
TB001		1	**1**	TW	TB
BW16GW65	1		**1**	GW	FD1SET2
BW916GW65	1		**1**	GW	FD2SET2
BW16GW12	1		**1**	GW	NA
GRAND TOTAL	**5**	**3**	**8**		**3**

Notes:

- Field QC Samples

1 - Samples ordered by the Sample ID

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
SVOCs	**SVOA:EPA 8270D**
	(3-and/or 4-)Methylphenol
	1,1'-Biphenyl
	1,1-Biphenyl
	2,4,5-Trichlorophenol
	2,4,6-Trichlorophenol
	2,4-Dichlorophenol
	2,4-Dimethylphenol
	2,4-Dinitrophenol
	2,4-Dinitrotoluene
	2,6-Dinitrotoluene
	2-Chloronaphthalene
	2-Chlorophenol
	2-Methyl naphthalene
	2-Methylphenol
	2-Nitroaniline
	2-Nitrophenol
	3,3'-Dichlorobenzidine
	3+4-Methylphenol
	3-Nitroaniline
	4,6-Dinitro-2-methylphenol
	4-Bromophenyl phenyl ether
	4-Chloro-3-methyl phenol
	4-Chloroaniline
	4-Chlorophenyl phenyl ether
	4-Nitroaniline
	4-Nitrophenol
	Acenaphthene
	Acenaphthylene
	Acetophenone
	Anthracene
	Atrazine
	Benzaldehyde
	Benzo(a)anthracene
	Benzo(a)pyrene
	Benzo(b)fluoranthene
	Benzo(g,h,i)perylene
	Benzo(k)fluoranthene
	bis (2-Chloro-1-methylethyl) ether
	bis(2-Chloroethoxy)methane
	bis(2-Chloroethyl)ether
	bis(2-Ethylhexyl)phthalate
	Butyl benzyl phthalate
	Caprolactam
	Carbazole

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
	Chrysene
	Dibenz(a,h)anthracene
	Dibenzo(a,h)anthracene
	Dibenzofuran
	Diethylphthalate
	Dimethyl phthalate
	Di-n-butyl phthalate
	Di-n-octylphthalate
	Fluoranthene
	Fluorene
	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachlorocyclopentadiene
	Hexachloroethane
	Indeno (1,2,3-cd) pyrene
	Indeno(1,2,3-c,d)pyrene
	Isophorone
	Naphthalene
	Nitrobenzene
	N-Nitrosodi-n-propylamine
	N-Nitrosodiphenylamine (Diphenylamine)
	Pentachlorophenol
	Phenanthrene
	Phenol
	Pyrene
VOCs	**VOA:EPA 8260C**
	(m- and/or p-)Xylene
	1,2,4-Trichlorobenzene
	2,3-Benzofuran
	Acetone
	Benzene
	Chlorobenzene
	Ethyl Benzene
	Methyl Ethyl Ketone
	o-Xylene
	Styrene
	Toluene
	Vinyl chloride

TABLE 2-4 ANALYSIS BATCHES

SAMPLE ID	METHOD BATCH[1] LAB ID	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
	SVOA:EPA 8270D	**29-May-18**	**15:04**					
	(blank)	**30-May-18**	**15:04**					
MW8B	R4-E182004-02	30-May-18	15:04	17-May-18	10:10	16-May-18	9:35	
MW98B	R4-E182004-03	30-May-18	15:34	17-May-18	10:10	16-May-18	9:35	
	72993	**29-May-18**	**20:26**					
BW16GW65	SHEALY-TE22045-001	29-May-18	20:26	22-May-18	8:50	18-May-18	11:30	
BW916GW65	SHEALY-TE22045-002	29-May-18	20:50	22-May-18	8:50	18-May-18	11:30	
BW16GW12	SHEALY-TE22045-003	29-May-18	21:15	22-May-18	8:50	18-May-18	8:55	
	VOA:EPA 8260C	**21-May-18**	**17:31**					
	(blank)	**21-May-18**	**17:31**					
MW8B	R4-E182004-02	21-May-18	21:28	17-May-18	10:10	16-May-18	9:35	
MW98B	R4-E182004-03	21-May-18	21:54	17-May-18	10:10	16-May-18	9:35	
TB001	R4-E182004-01	21-May-18	17:31	17-May-18	10:10	16-May-18	9:45	

Notes:

1 - Data packages from an EPA or CLP laboratory will not have a batch ID available and will display "(blank)".

C - Chain of Custody issue.

H - Hold time has been exceeded.

QC - Quality Control criteria may require review.

S - Sample acquisition, handling, or shipping issue

P - Temperature or othe preservation issue.

TABLE 3-1 FIELD DUPLICATES

	FD1SET1		FD2SET1				FD1SET2		FD2SET2			
METHOD ANALYTE	**MW8B**		**MW98B**		**RPD**	**QC**	**BW16GW65**		**BW916GW65**		**RPD**	**QC**
	Primary		**Secondary**		**30.0**		**Primary**		**Secondary**		**30.0**	
	Result	MRL	Result	MRL			Result	MRL	Result	MRL		
SVOA:EPA 8270D												
1,1'-Biphenyl	ND		ND		N/A	NA	9.6	20	9.4	20	2.1	N/A
2,4-Dimethylphenol	ND		ND		N/A	NA	35	20	33	20	5.9	N/A
Acenaphthene	ND		ND		N/A	NA	38	4	40	4	5.1	N/A
Anthracene	ND		ND		N/A	NA	5.5	4	2.8	4	31.6	J
Benzo(a)anthracene	ND		ND		N/A	NA	1.6	4	ND	4	N/A	NA
Carbazole	ND		ND		N/A	NA	40	20	ND	20	66.7	J
Dibenzofuran	ND		ND		N/A	NA	14	20	16	20	13.3	N/A
Fluoranthene	ND		ND		N/A	NA	17	4	18	4	5.7	N/A
Fluorene	ND		ND		N/A	NA	22	4	22	4	0.0	N/A
Pentachlorophenol	ND		ND		N/A	NA	190	100	200	100	5.1	N/A
Pyrene	ND		ND		N/A	NA	8.8	4	9.1	4	3.4	N/A

Notes:

- detection < MRL

- RPD > matrix acceptance criteria

NA - Not analyzed

ND - Not detected

NJ - Tentatively identified compound.

N/A - Not applicable. RPD lower than acceptance criteria, both results lower than the MRL, or TICs.

TABLE 3-1 FIELD DUPLCIATES

Notes

- detection < MRL. Analyte pairs in which one is a detect and the other is non-detect or below the reporting limit will use the reporting limit as a subtituion for the calculation. Analyte pairs in which both are below the reporting limit will not be calculated.

- RPD > matrix acceptance criteria

NA - Not analyzed

ND - Not detected

NJ - Tentatively identified compound.

N/A - Not applicable. RPD lower than acceptance criteria, both results lower than the MRL, or TICs.

TABLE 3-2 FIELD BLANKS

BLANK SAMPLE		None		
RELATED DETECTIONS	Blank Detection	Result	MRL	QC
TB01	NO	N/A	N/A	N/A
None				

Notes:

QC - Quality Control criteria may require review.

N/A - Not applicable. QC measures not necessary due to lack of detection or detection above the Blank MRL.

NA - Not analyzed.

- Detection > MRL

- Detection < adjusted MRL

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS	COUNT OF CATEGORY			
	TB001	MW8B	MW98B	Grand Total
SVOA:EPA 8270D				
U,J,QS-4				
Anthracene		1	1	2
Pyrene		1	1	2
Dibenzofuran		1	1	2
Benzo(g,h,i)perylene		1	1	2
Indeno (1,2,3-cd) pyrene		1	1	2
Benzo(b)fluoranthene		1	1	2
Fluoranthene		1	1	2
Benzo(k)fluoranthene		1	1	2
Chrysene		1	1	2
Benzo(a)pyrene		1	1	2
Dibenz(a,h)anthracene		1	1	2
Benzo(a)anthracene		1	1	2
Acenaphthene		1	1	2
Phenanthrene		1	1	2
Fluorene		1	1	2
Carbazole		1	1	2
Naphthalene		1	1	2
1,1-Biphenyl		1	1	2
VOA:EPA 8260C				
U,T-6				
Benzene	1	1	1	3
Ethyl Benzene	1	1	1	3
Styrene	1	1	1	3
Toluene	1	1	1	3
Chlorobenzene	1	1	1	3
1,2,4-Trichlorobenzene	1	1	1	3
Acetone	1	1	1	3
Vinyl chloride	1	1	1	3
Methyl Ethyl Ketone	1	1	1	3
o-Xylene	1	1	1	3
(m- and/or p-)Xylene	1	1	1	3
2,3-Benzofuran	1	1	1	3

TABLE 3-3b DATA VALIDATION CHECK SHEET FOR NON EPA/CLP ANALYSIS METHODS

Analytical Method Batch	Analysis Date	Analysis Time	Field QC	Tuning	Calibration - Initial	Calibration - Continuing	Instrument Blank	Lab Blank	LCS	Lab Duplicate	Serial Dilution	MS/MSD	DMC/Surrogate	Internal Standard	PE Sample
SVOA:EPA 8270D															
72993	**29-May-18**	**20:26**	N/A	OK	OK	**QC**	N/A	OK	OK	N/A	N/A	ND	**QC**	N/A	N/A

1 - Typical data validation stages defined in "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use", OSWER No. 9200.1-85, EPA 540-R-08-005. 13 January 2009

N/A - Not Applicable. Data not required or expected for the analysis and a typical Stage 2B Validation[1].

ND - No Data. Typical QC data expected for Stage 2B Validation[1] is not available.

OK - Data available and meets acceptance criteria.

QC - Quality Control. Performance criteria not met and further evaluation or qualification of associated sample data is necessary.

Attachment 1
Common Data Validation Definitions

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Common Data Validation Definitions

%D	percent difference
%R	percent recovery
%RSD	percent relative standard deviation
°C	degrees Celcius
CCV	continuing calibration verification
CLP	Contract Laboratory Program
DMC	deuterated monitoring compound
EPA	United States Environmental Protection Agency
EB	equipment rinsate blank
H^2SO^4	sufuric acid
HNO^3	nitric acid
ICAL	initial calibration
ICV	initial calibration verification
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
MDL	minimum detection limit
mg/k	milligrams per kilogram
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
NaOH	sodium hydroxide
PE	performance evaluation
PB	preservative blank
QA	quality assurance
QC	quality control
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
SESD	Science and Ecosystem Support Division
SVOC	semi-volatile organic compounds
SU	standard units
TB	trip blank
TIC	tentatively identified compound
ug/L	micrograms per kilogram
ug/L	micrograms per liter
VOC	volatile organic compounds

EQuIS Database Environmental Matrix

AA	ambient air
GW	groundwater
ID	investigative derived waste
SB	subsurface soil
SD	sediment
SF	surface soil
SG	soil gas
SW	surface water

Data Qualifiers

Inorganics

J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J-	The result is an estimated quantity, but the result may be biased low.
J+	The result is an estimated quantity, but the result may be biased high.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Organics

C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was not detected above the level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

Attachment 2
Chain of Custody

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USEPA Region 4 COC (LAB COPY)

DateShipped: 5/21/2018
CarrierName: FedEx
AirbillNo: 772278831447

CHAIN OF CUSTODY RECORD

Project Number:
Cooler #: 1

21131

No: Shealy_SVOCs

Lab: Shealy
Lab Contact: Nisreen Saikaly
Lab Phone:

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
BW16GW65		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 11:30	
BW916GW65		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 11:30	
BW16GW12		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 08:55	

TE22045

NMS

Special Instructions:

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
samples for analysis	B+V	5/21/18 1800			
			Lindsey Hahn SESI/EQI	5-22-18 0850	OK

T= 7.4°C

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

SHEALY ENVIRONMENTAL SERVICES, INC.

QC

Shealy Environmental Services, Inc.
Document Number: ME0018C-13

Page 1 of 1
Effective Date: 4/5/2018

Sample Receipt Checklist (SRC)

Client: USEPA Region 4 Cooler Inspected by/date: LKH/ 5-22-18 Lot #: TE22045

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☐ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: _____ Chlorine Strip ID: _____

Cooler ID / Original temperature upon receipt / Derived (Corrected) temperature upon receipt:

17.4 /17.4 °C _____/_____/_____ °C _____/_____/_____ °C _____/_____/_____ °C

Method: ☐ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number used taken from the container label?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ (H2SO4, HNO3, HCl, NaOH) using SR # _____.
Time of preservation _____.

Sample(s) _____ were received with bubbles >6 mm in diameter.

Samples(s) _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: _____.

SR barcode labels applied by: LKH Date: 5-22-18

Comments:

WORK ORDER

E185004

US-EPA, Region 4, SESD

a /iens3	SMuenhMnL Re7 eLic/ pf 05DD5, f 0f DD5, 000DD5(	Pnoleers 6 M7 Nem3	18-0451
Pnoleers3	A7 emircn a neoCose - Pt TORPE	Arrs j : # orcsion3	000DD5044l # A0f PenCcro/c EGcc7 Nic) #

Pnoleers # ecLem3	t homue, Pesem	Dcse DMt3	0F:51:18 pf1 Lcy t At (
Received By:	Beall, Mike	Date Received:	05/17/18 10:10
Logged In By:	Beall, Mike	Date Logged In:	05/17/18 13:44

Samples Received at:	5.f°a	Placed in Cooler after Ice Removed: Yes	D.A.R.T. Project ID:	18-0421
Custody Seals: Yes		Sample Containers Intact: Yes	Program/Activity:	RD
Custody Seals Intact: Yes		Samples & COC Match: Yes	Site/Waterbody:	AMERICAN CREOSOTE WORKS INC (110002527025)
COC Present: Yes		COC/Labels Agree: Yes		
Ice in Cooler: Yes		All Analyses on COC: Yes		

Anc/yGC	DMt	t At	ExuimeC	a o7 7 ensC

E185004-01 t B001 : [Wcsem: t miu B/cnk - Wcsem] Sc7 u/eL 0l :1F:18 0G34l

A = 40mL Clear Vial *B = 40mL Clear Vial* *C = 40mL Clear Vial*

VOA Scan (Routine)	06/21/18 00:00	35	05/30/18 09:45

E185004-05 2 W8B : 2 W8B [Wcsem: wmoMnL9 csem] Sc7 u/eL 0l :1F:18 0G3f1

A = 1000mL Amber Glass *B = 1000mL Amber Glass* *C = 40mL Clear Vial* *D = 40mL Clear Vial*
E = 40mL Clear Vial

VOA Scan (Routine)	06/21/18 00:00	35	05/30/18 09:35
SV (Routine) Extractables	06/21/18 00:00	35	05/23/18 09:35

E185004-0f 2 WC8B : 2 W8B [Wcsem: wmoMnL9 csem] Sc7 u/eL 0l :1F:18 0G3f1

A = 1000mL Amber Glass *B = 1000mL Amber Glass* *C = 40mL Clear Vial* *D = 40mL Clear Vial*
E = 40mL Clear Vial

VOA Scan (Routine)	06/21/18 00:00	35	05/30/18 09:35
SV (Routine) Extractables	06/21/18 00:00	35	05/23/18 09:35

Anc/yGCucrkcgeCinr/MLeL in shiC9 onk onLem

SV (Routine) Extractables

v SV Extractables v SV TICS

VOA Scan (Routine)

v VOA Scan-2 v VOA TICS-2

E182004

USEPA Region 4 COC (REGION COPY)
DateShipped: 5/16/2018
CarrierName: FedEx
AirbillNo: 772244083753

CHAIN OF CUSTODY RECORD
ACW - May 18
Project Number: 18-0421
Cooler #: 1

No: SESD_MWinstall
Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

	Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
-03	MW98B		Groundwater/ H. Yost	Grab	SVOA(35), VOA(35)	A (Ice), B (HCl pH<2) (5) ✓	MW8B	05/16/2018 09:35	Field Duplicate
-01	TB001		Trip Blank Water/ H. Yost	Grab	VOA(35)	B (HCl pH<2) (3) ✓	#R4DART#	05/16/2018 09:45	Trip Blank
-02	MW8B		Groundwater/ H. Yost	Grab	SVOA(35), VOA(35)	A (Ice), B (HCl pH<2) (5) ✓	MW8B	05/16/2018 09:35	Field Sample

Special Instructions:

Shipment for Case Complete? Y
Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles, VOA=(VOA) Volatile Organics

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Samples for analysis	B+N	5/16/18 1800	RMBeall EPA SESD ASB	5-17-18 1010	Good

USEPA Region 4 COC (REGION COPY)

DateShipped: 5/16/2018
CarrierName: FedEx
AirbillNo: 772244083753

CHAIN OF CUSTODY RECORD

ACW - May 18
Project Number: 18-0421
Cooler #: 1

No: SESD_MWinstall

Lab: Region 4 Lab
Lab Contact: Mike Beall
Lab Phone: 706-355-8856

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
MW98B		Groundwater/ H. Yost	Grab	SVOA(35), VOA(35)	A (Ice), B (HCl pH<2) (5)	MW8B	05/16/2018 09:35	Field Duplicate
TB001		Trip Blank Water/ H. Yost	Grab	VOA(35)	B (HCl pH<2) (3)	#R4DART#	05/16/2018 09:45	Trip Blank
MW8B		Groundwater/ H. Yost	Grab	SVOA(35), VOA(35)	A (Ice), B (HCl pH<2) (5)	MW8B	05/16/2018 09:35	Field Sample

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: SVOA=(SVOA) Semivolatiles, VOA=(VOA) Volatile Organics	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY) **CHAIN OF CUSTODY RECORD** **No: Shealy_SVOCs**

DateShipped: 5/21/2018 Lab: Shealy

CarrierName: FedEx Project Number: Lab Contact: Nisreen Saikaly

AirbillNo: 772278831447 Cooler #: 1 Lab Phone:

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
BW16GW12		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 08:55	
BW16GW65		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 11:30	
BW916GW65		Groundwater/ H. Yost	Grab	SVOA(35)	A (Ice) (2)	BW16	05/18/2018 11:30	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: SVOA=(SVOA) Semivolatiles	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

Attachment 3
Sample Data Sheets with Additional Interpreted Qualifiers

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Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW16GW65
Date Sampled: 05/18/2018 1130
Date Received: 05/22/2018

Laboratory ID: TE22045-001
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2026	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	9.6	J	20	2.5	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	20	U	20	2.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	20	U	20	2.5	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	40	U	40	5.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	35		20	5.0	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	100	U	100	5.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	40	U	40	2.5	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	40	U	40	2.5	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	20	U	20	2.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	20	U	20	2.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	4.0	U	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	20	U	20	5.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	40	U	40	2.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	20	U	20	5.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	20	U	20	8.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	20	U	20	7.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	40	U	40	5.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	100	U	100	5.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	20	U	20	2.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	20	U	20	2.5	ug/L	1
4-Chloroaniline	106-47-8	8270D	40	U	40	2.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	20	U	20	2.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	40	U	40	7.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	100	U	100	10	ug/L	1
Acenaphthene	83-32-9	8270D	38		4.0	1.0	ug/L	1
Acenaphthylene	208-96-8	8270D	4.0	U	4.0	1.0	ug/L	1
Acetophenone	98-86-2	8270D	20	U	20	2.5	ug/L	1
Anthracene	120-12-7	8270D	5.5	J	4.0	1.0	ug/L	1
Atrazine	1912-24-9	8270D	20	U	20	2.5	ug/L	1
Benzaldehyde	100-52-7	8270D	40	U	40	2.5	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	1.6	J	4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	4.0	U	4.0	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	20	U	20	2.5	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	20	U	20	2.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	20	U	20	2.5	ug/L	1
Caprolactam	105-60-2	8270D	40	U	40	5.0	ug/L	1
Carbazole	86-74-8	8270D	40	J	20	2.5	ug/L	1
Chrysene	218-01-9	8270D	4.0	U	4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	4.0	U	4.0	1.0	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Black and Veatch
Description: BW916GW65
Date Sampled: 05/18/2018 1130
Date Received: 05/22/2018

Laboratory ID: TE22045-002
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	05/29/2018 2050	CMP2	05/23/2018 1913	72993

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	9.4	J	20	2.5	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	20	U	20	2.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	20	U	20	2.5	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	40	U	40	5.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	33		20	5.0	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	100	U	100	5.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	40	U	40	2.5	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	40	U	40	2.5	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	20	U	20	2.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	20	U	20	2.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	4.0	U	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	20	U	20	5.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	40	U	40	2.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	20	U	20	5.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	20	U	20	8.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	20	U	20	7.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	40	U	40	5.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	100	U	100	5.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	20	U	20	2.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	20	U	20	2.5	ug/L	1
4-Chloroaniline	106-47-8	8270D	40	U	40	2.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	20	U	20	2.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	40	U	40	7.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	100	U	100	10	ug/L	1
Acenaphthene	83-32-9	8270D	40		4.0	1.0	ug/L	1
Acenaphthylene	208-96-8	8270D	4.0	U	4.0	1.0	ug/L	1
Acetophenone	98-86-2	8270D	20	U	20	2.5	ug/L	1
Anthracene	120-12-7	8270D	2.8	J	4.0	1.0	ug/L	1
Atrazine	1912-24-9	8270D	20	U	20	2.5	ug/L	1
Benzaldehyde	100-52-7	8270D	40	U	40	2.5	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	4.0	U	4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	4.0	U	4.0	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	20	U	20	2.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	20	U	20	2.5	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	20	U	20	2.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	20	U	20	2.5	ug/L	1
Caprolactam	105-60-2	8270D	40	U	40	5.0	ug/L	1
Carbazole	86-74-8	8270D	20	U J	20	2.5	ug/L	1
Chrysene	218-01-9	8270D	4.0	U	4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	4.0	U	4.0	1.0	ug/L	1

LOQ = Limit of Quantitation
U = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Attachment 4
QC Support Documentation

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QC

Shealy Environmental Services, Inc.
Document Number: ME0018C-13

Page 1 of 1
Effective Date: 4/5/2018

Sample Receipt Checklist (SRC)

Client: USEPA Region 4 Cooler Inspected by/date: LKH/ 5-22-18 Lot #: TE22045

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☐ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: _____ Chlorine Strip ID: _____

Cooler ID / Original temperature upon receipt / Derived (Corrected) temperature upon receipt:

17.4 / 17.4 °C _____ / _____ / _____ °C _____ / _____ / _____ °C _____ / _____ / _____ °C

Method: ☐ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number used taken from the container label?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ (H2SO4, HNO3, HCl, NaOH) using SR # _____.
Time of preservation _____.

Sample(s) _____ were received with bubbles >6 mm in diameter.

Samples(s) _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: _____.

SR barcode labels applied by: LKH Date: 5-22-18

Comments:

FORM 2
DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: Shealy Environmental Services, Inc.   Lot No.: TE22045

Project No.: 49089

AnalyticalMethod: SVOA   Matrix: Water

QC

CLIENT SAMPLE ID	DMC1	DMC2	DMC3	DMC4	DMC5	DMC6			TOT OUT
BW16GW65	71	73	84	81	62	57			0
BW916GW65	70	70	82	81	53	55			0
BW16GW12	50	64	92	93	12	18 D			0
SBLK93	62	65	79	71	85	54			0
SLCS92	73	85	93	88	87	68			0

		QC LIMITS
DMC1	= 2-Fluorobiphenyl	37-129
DMC2	= 2-Fluorophenol	24-127
DMC3	= Nitrobenzene-d5	38-127
DMC4	= Phenol-d5	28-128
DMC5	= Terphenyl-d14	10-148
DMC6	= 2,4,6-Tribromophenol	35-144

* Values outside of contract required QC limits
D DMC diluted out

Shealy Environmental Services
Continuing Calibration Verification Report

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C03.D
Lab Sample ID: SVMS 3455 Client Sample ID: 1STD010CV
Injection Date: 29-May-2018 11:23:30 Dil. Factor: 1.0
Operator: CMP2 Inst. ID: msd10.i
Sample Info: 10052918C.b, SVMS 3455
Misc. Info: 1STD010
Method: \\Organics\hh\chem\msd10.i\10052918C.b\8270DLVI-10.m
Method Date: 30-May-2018 08:25:30 Quant Method: ISTD
Calib Date: 23-May-2018 04:25:30 Calib File: 100522D27.D
Sample Type: CCV ALS Bottle: 97
Cpnd Sublist: 1STD.sub
Matrix/Level: Water/Low
Target 4.14 Integrator: falcon

QC

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
1 pyridine	0.708147		0.946843	0.05	* 33.7	20	134
193 1,4-Dioxane	0.232117		0.282804	0.05	* 21.8	20	122
2 N-Nitrosodimethylamine	0.5356		0.588259	0.05	9.8	20	110
$ 6 2-Fluorophenol	1.500418		1.792343	0.05	19.5	20	119
$ 9 Phenol-d5	1.925263		2.279055	0.05	18.4	20	118
10 Phenol	2.043619		2.306831	0.8	12.9	20	113
11 Aniline	0.198689		0.310964	0.05	* 56.5	20	157
12 bis(2-Chloroethyl)ether	1.102808		1.409671	0.5	* 27.8	20	128
13 2-Chlorophenol	1.550251		1.70707	0.8	10.1	20	110
14 1,3-Dichlorobenzene	1.596353		1.675898	0.05	5	20	105
17 1,4-Dichlorobenzene	1.669347		1.740446	0.05	4.3	20	104
18 Benzyl alcohol			* ND				
19 1,2-Dichlorobenzene	1.550253		1.656911	0.05	6.9	20	107
20 o-Cresol	1.46351		1.730759	0.7	18.3	20	118
21 bis(2Chloro1methylethyl)	2.007403		2.641895	0.05	* 31.6	20	132
23 m+p-Cresol	1.618877		1.926702	0.6	19	20	119
24 Acetophenone	2.079614		2.289706	0.01	10.1	20	110
26 n-Nitroso-di-n-propylami	1.052997		1.244822	0.5	18.2	20	118
28 Hexachloroethane	0.567841		0.616422	0.3	8.6	20	109
$ 29 Nitrobenzene-d5	0.355708		0.421351	0.05	18.5	20	118
30 Nitrobenzene	0.36874		0.445236	0.2	* 20.7	20	121
32 Isophorone	0.621452		0.743949	0.4	19.7	20	120
33 2-Nitrophenol	10	10.103	0.196693	0.1	1	20	101
34 2,4-Dimethylphenol	0.250104		0.261481	0.1	4.5	20	105
35 bis(2-Chloroethoxy)metha	0.398379		0.457598	0.3	14.9	20	115
36 Benzoic acid	20	22.398	0.247802	0.05	12	20	112
38 2,4-Dichlorophenol	0.279623		0.28498	0.2	1.9	20	102
40 1,2,4-Trichlorobenzene	0.300544		0.306877	0.05	2.1	20	102
43 Naphthalene	1.054953		1.08255	0.7	2.6	20	103
45 2,6-Dichlorophenol	0.28548		0.279277	0.05	-2.2	20	98
47 Hexachlorobutadiene	0.163839		0.163165	0.01	-0.4	20	100
49 4-Chloro-3-methylphenol	0.29778		0.329133	0.1	10.5	20	111
51 2-Methylnaphthalene	0.710906		0.728529	0.4	2.5	20	102
52 1,2,4,5-Tetrachlorobenze	0.551553		0.512073	0.01	-7.2	20	93

Report Date: 30-May-2018 08:28:40 AIM Revision: 1.0 20-Sep-2017 14:04:40

Data File: \\Organics\hh\chem\msd10.i\10052918C.b\100529C03.D

QC

Compound	Standard RRF/Amt	Ccal Amt	Ccal RF	Min. RRF	%D	Max. %D	%Rec
53 Hexachlorocyclopentadien	0.305832		0.308058	0.05	0.7	20	101
54 2,4,6-Trichlorophenol	0.343439		0.347693	0.1	1.2	20	101
55 2,4,5-Trichlorophenol	0.370432		0.376347	0.1	1.6	20	102
$ 56 2-Fluorobiphenyl	1.489403		1.485772	0.05	-0.2	20	100
58 2-Chloronaphthalene	1.21965		1.281973	0.8	5.1	20	105
62 Dimethylphthalate	1.309235		1.372618	0.01	4.8	20	105
64 Acenaphthylene	1.739612		1.91153	0.9	9.9	20	110
65 2,6-Dinitrotoluene	0.310876		0.331837	0.1	6.7	20	107
68 Acenaphthene	1.276142		1.313592	0.9	2.9	20	103
69 2,4-Dinitrophenol	20	20.193	0.174559	0.01	1	20	101
70 4-Nitrophenol	20	19.977	0.150229	0.01	-0.1	20	100
71 Dibenzofuran	1.675063		1.702241	0.8	1.6	20	102
73 2,4-Dinitrotoluene	10	10.261	0.429461	0.1	2.6	20	103
76 2,3,4,6-Tetrachloropheno	10	8.5615	0.231746	0.01	-14.4	20	86
78 Diethylphthalate	1.22955		1.311464	0.01	6.7	20	107
79 Fluorene	1.451735		1.470224	0.9	1.3	20	101
80 4-Chlorophenylphenylethe	0.644493		0.634463	0.4	-1.6	20	98
84 4,6-Dinitro-2-methylphen	10	11.132	0.134158	0.01	11.3	20	111
86 n-Nitrosodiphenylamine	0.571073		0.623513	0.01	9.2	20	109
87 Azobenzene	0.843118		1.038982	0.05	* 23.2	20	123
$ 88 2,4,6-Tribromophenol	0.089563		0.079603	0.05	-11.1	20	89
94 4-Bromophenylphenylether	0.199834		0.198043	0.1	-0.9	20	99
96 Hexachlorobenzene	0.201801		0.1963	0.1	-2.7	20	97
99 Pentachlorophenol	20	17.891	0.123155	0.05	-10.5	20	89
103 Phenanthrene	1.143836		1.177846	0.7	3	20	103
104 Anthracene	1.04404		1.149908	0.7	10.1	20	110
106 Carbazole	0.976794		1.086304	0.01	11.2	20	111
109 Di-n-butylphthalate	1.141696		1.323062	0.01	15.9	20	116
114 Fluoranthene	1.079567		1.15929	0.6	7.4	20	107
116 Pyrene	1.220417		1.377402	0.6	12.9	20	113
$ 117 Terphenyl-d14	0.868911		0.903874	0.05	4	20	104
122 Butylbenzylphthalate	10	10.994	0.623414	0.01	9.9	20	110
127 Benzo(a)Anthracene	1.111523		1.19018	0.8	7.1	20	107
129 Chrysene	1.144767		1.204603	0.7	5.2	20	105
130 bis(2-Ethylhexyl)phthala	10	11.418	0.898889	0.01	14.2	20	114
131 Di-n-octylphthalate	10	10.454	1.390091	0.01	4.5	20	105
132 Benzo(b)fluoranthene	1.063498		1.110678	0.5	4.4	20	104
134 Benzo(k)fluoranthene	1.138462		1.196558	0.5	5.1	20	105
135 Benzo(a)pyrene	0.909026		0.995208	0.5	9.5	20	109
138 Indeno(1,2,3-c,d)pyrene	1.159099		1.259678	0.5	8.7	20	109
139 Dibenzo(a,h)anthracene	1.049339		1.130853	0.4	7.8	20	108
140 Benzo(g,h,i)perylene	0.941884		1.0561	0.5	12.1	20	112
184 Biphenyl	1.656318		1.732833	0.01	4.6	20	105
201 n-Decane	1.571049		1.878504	0.05	19.6	20	120
202 Octadecane	0.520381		0.705116	0.05	* 35.5	20	135
204 1-Methylnaphthalene	0.697699		0.709409	0.05	1.7	20	102

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MEMORANDUM

EPA Region 4 Superfund Division
American Creosote Works Site

BVSPC Project No. 049089
06 August 2018

To: Peter Thorpe, EPA Task Order COR

From: Amy Callaway, Black & Veatch Task Order Manager

Reference: EPA Contract EP-S4-09-02, Task Order No. 089-RDRD-0445
DCN 49089-0125-07-D-01898R0

Subject: Data Validation Report for Sampling Event Beginning 04 June 2018
Laboratory Project Numbers: SESD EPA Region 4 18-0449 and CLP Laboratory 18-0458

1.0 Overview

Black & Veatch Special Projects Corp. (Black & Veatch) has reviewed the data for the samples and analyses listed below. The EPA National Functional Guidelines (EPA, 2017a and EPA 2017b) or method specific QC data were used to evaluate the implementation of field and laboratory QC to ensure acceptable results with a Stage 4 Data Validation (EPA, 2009) by Black & Veatch. Where performance criteria are not met, the data is qualified to indicate the degree of confidence in the final result according to data quality indicators of precision, accuracy (bias), representativeness, completeness, comparability, and sensitivity.

The analytical data included for this project number are of sufficient quality and are deemed acceptable for their intended use except where noted below. Commonly used acronyms and abbreviations used during data validation are presented in Attachment 1.

2.0 Verification

The samples reported were collected in accordance with the Black & Veatch American Creosote Works Site Sampling and Analysis Plan Volume 1 Quality Assurance Project Plan Revision 0 (Black & Veatch 2017a) and Volume 2 Field Sampling Plan, Revision 0 (Black & Veatch 2017b). Black & Veatch submitted samples from 47 locations (Table 2-1) comprised of 61 samples (Table 2-2) for analysis to the EPA Region 4 SESD and CLP laboratories as indicated in the Chains of Custody (Attachment 2). Types of samples and media include: three groundwater, 44 surface soil, and six field QC samples (Table 2-1). The six QC samples submitted include: three field duplicates of soil, one field duplicate of water, one trip blank of a water matrix, and one equipment blank. Target analytes utilizing three different analytical methods in three data packages include Dioxins, SVOCs, and VOCs according to the analytical methods on Table 2-3.

3.0 Validation

3.1 Field QC

Sample Collection

Exceptions to issues with sampling methods, preservation/temperature, handling, and hold time are noted below.

Chain of Custody

Sample SS1034RB001 was labeled as a trip blank and corrected to equipment blank in the electronic data.

Sample Collection
Sample MW08B for VOA:EPA 8260C analysis was received with headspace or an air bubble greater than 5-6 mm diameter (Section 3.2.4).

Field Duplicates
The current National Functional Guidelines do not have standard acceptance criteria for the evaluation of field duplicates. Unless planning documents dictate otherwise, the evaluation of field duplicates are based on the *Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996*, the RPDs for aqueous samples must be less than or equal to 30% and for solid samples must be less than or equal to 50%. Analytes exceeding the performance criteria are J qualified in the primary and secondary samples of duplicate pairs. RPDs were calculated for all analytes with concentrations greater than the MRL in at least one sample. The MRL is used for calculation of the RPD of non-detections if the duplicate sample (primary or secondary) had a detection above the MRL.

Four field duplicate sets of (3 of soil and 1 of water) were submitted for analysis (Table 2-1b). The applicable field duplicate detections for each of the sets that had RPDs which did not meet the acceptance criteria are compared in Table 3-1. None of the analyte comparisons exceeded the RPD acceptance criteria.

Field Blanks
Field blanks with detections and any associated sample detections are summarized on Table 3-2. Related sample analyte detections below the adjusted RL received an additional final interpreted qualifier of U. Only blank detections and subsequent sample qualifications are summarized below.

Trip Blank
One trip blank was submitted with these analyses (Table 2-1). There were no detections.

Equipment Rinsate Blank
One equipment blank was collected for this sampling event. There were detections of two analytes (and an additional reported result for "Total" congeners) in the equipment blank. The associated sample detections were well above the MRL and the equipment blank detections were below the MRL. The MRL was not raised and no additional final interpreted qualifier was deemed necessary.

Octachlorodibenzodioxin	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	Heptachlorodibenzodioxin (Total)

Preservative Blank
Preservative blanks were not collected for this sampling event.

3.2 Laboratory QC
Analytical data from a CLP or EPA regional laboratory has received a Stage 4 data validation summarized below and amended with further validation criteria as noted. If applicable, the validation report will include Table 3-3a which summarizes validation qualifiers applied during EPA validation and presented in the data reports. Final interpreted qualifiers, results with detections but no qualifiers, and non-detections

(U qualifier), and estimated results below the reporting limit (J qualifier) are not included in the table summary.

Laboratory QC data submitted from subcontracted laboratory will receive a Stage 2B data validation. During the Stage 2B validation the data has been compared to expected QC checks for the specified level of data validation in Section 1.0. If applicable, the Stage 2B validation will include Table 3-3b in which the sample analysis is cross-checked against the necessary validation criteria to identify where no QC check was expected (NA), a QC check is typically expected but there is no data to associate with the samples submitted (ND), QC data is available and does not exhibit any exceptions to acceptance criteria (OK), or QC data that has been submitted for an expected QC check point exhibits a potential conflict with either laboratory internal acceptance criteria, EPA guidelines, or professional judgement for data validation (QC).

3.2.1 DIO:CL HRSM01.2 (Dioxins, Soil)

CLP01 - Concentration reported is less than the lowest standard on calibration curve. A final interpreted qualifier of J was added to detections.

CLP02 - Concentration reported is greater than the highest standard on calibration curve. A final interpreted qualifier of J was added to detections.

CLP18 - Estimated Maximum Possible Concentration (EMPC) Reported. No additional qualifiers were deemed necessary.

CLP28 - PE sample recovery scored as action high. A final interpreted qualifier of J was added to detections.

D-4 - MRL elevated due to interferences. A final interpreted qualifier of U was added to detections below the new MRL

D-5 - Estimated quantitation for one or more individual constituents comprising >10% of the total. A final interpreted qualifier of J was added to calculated values.

Q-3 - Instrument not calibrated for all constituents of the total concentration result. A final interpreted qualifier of J was added to detections.

QC-3 - Analyte calibration criteria not met. A final interpreted qualifier of J was added to detections.

3.2.2 DIO:CL HRSM01.2 (Dioxins, Water)

CLP01 - Concentration reported is less than the lowest standard on calibration curve. A final interpreted qualifier of J was added to detections.

CLP18 - Estimated Maximum Possible Concentration (EMPC) Reported. No additional qualifiers were deemed necessary.

D-5 - Estimated quantitation for one or more individual constituents comprising >10% of the total. A final interpreted qualifier of J was added to calculated values.

QC-3 - Analyte calibration criteria not met. A final interpreted qualifier of J was added to detections.

3.2.3 SVOA:EPA 8270D (SVOCs, Water)

Q-2 Result greater than MDL but less than MRL. A final interpreted qualifier of J was added to detections.

3.2.4 VOA:EPA 8260C (VOCs, Water)

C-6 - Sample aliquot taken from VOA vial with headspace (air bubble greater than 5-6 mm diameter). No other issues were noted with hold time, shipping, or preservation. No additional qualifiers were deemed necessary.

Q-2 Result greater than MDL but less than MRL. A final interpreted qualifier of J was added to detections.

Tables

2-1 Sample Summary
2-2 Analysis Methods
2-3 Analysis Types
2-4 Analysis Batches
3-1 Field Duplicate Detections
3-2 Field Blank Detections
3-3a EPA Data Validation Qualifier Count Summary
3-3b Data Validation Check Sheet for Non-EPA/CLP Laboratories (not required for this event)

Attachments

1. Common Data Validation Definitions
2. Chain of Custody
3. Sample Data Sheets with Additional Interpreted Qualifiers (not required for this event)
4. Support Documentation (not required for this event)

References

Black & Veatch, 2017a. Black & Veatch Sampling and Analysis Plan American Creosote Works Site, Volume 1 Quality Assurance Project Plan. Revision 0, November 2017.

Black & Veatch, 2017b. Black & Veatch Sampling and Analysis Plan American Creosote Works Site, Volume 2 Field Sampling Plan, Revision 0. November 2017.

EPA, 2009. EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005. January 13, 2009.

EPA, 1996. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. December 1996.

EPA, 2017a. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, OLEM 9355.0-136, EPA-540-R-2017-002. January 2017.

EPA, 2017b. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OLEM 9355.0-135, EPA-540-R-201 7-001. January 2017.

Tables

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TABLE 2-1 SAMPLE SUMMARY

SAMPLE ID1	SAMPLE DATE	SAMPLE TIME	MATRIX	FIELD QC
SS1054F_A	4-Jun-18	10:55	SF	NA
SS1054F_B	4-Jun-18	10:57	SF	NA
SS1054R_A	4-Jun-18	11:00	SF	NA
SS1054R_B	4-Jun-18	11:05	SF	NA
SS1022F_A	4-Jun-18	11:33	SF	NA
SS1022F_B	4-Jun-18	11:35	SF	NA
SS1022R_A	4-Jun-18	11:40	SF	NA
SS1022R_B	4-Jun-18	11:45	SF	NA
SS1033F_A	4-Jun-18	13:45	SF	FD1SET1
SS91033F_A	4-Jun-18	13:45	SF	FD2SET1
SS1033F_B	4-Jun-18	13:48	SF	NA
SS1033R_A	4-Jun-18	13:52	SF	NA
SS1033R_B	4-Jun-18	13:56	SF	NA
SS1024R_A	4-Jun-18	15:08	SF	NA
SS1024R_B	4-Jun-18	15:12	SF	NA
SS1024F_A	4-Jun-18	15:15	SF	NA
SS1024F_B	4-Jun-18	15:20	SF	NA
SS1006R_A	4-Jun-18	16:02	SF	NA
SS1006R_B	4-Jun-18	16:08	SF	NA
SS1006F_A	4-Jun-18	16:10	SF	NA
SS1006F_B	4-Jun-18	16:13	SF	NA
SS1028F_A	6-Jun-18	8:05	SF	NA
SS1028F_B	6-Jun-18	8:10	SF	NA
SS1028R_A	6-Jun-18	8:20	SF	NA
SS1028R_B	6-Jun-18	8:25	SF	NA
SS1014F_A	6-Jun-18	8:53	SF	NA
SS1014F_B	6-Jun-18	8:58	SF	NA
SS1014R_A	6-Jun-18	9:05	SF	FD1SET2
SS91014R_A	6-Jun-18	9:05	SF	FD2SET2
SS1014R_B	6-Jun-18	9:10	SF	NA
SS1048F_A	6-Jun-18	9:45	SF	NA
SS1048F_B	6-Jun-18	9:50	SF	NA
SS1048R_A	6-Jun-18	9:52	SF	NA
SS1048R_B	6-Jun-18	9:58	SF	NA
SS1015F_A	6-Jun-18	10:15	SF	FD1SET3
SS91015F_A	6-Jun-18	10:15	SF	FD2SET3
SS1015F_B	6-Jun-18	10:20	SF	NA
SS1015R_A	6-Jun-18	10:23	SF	NA
SS1015R_B	6-Jun-18	10:25	SF	NA
SS1049F_A	6-Jun-18	11:10	SF	NA
SS1049F_B	6-Jun-18	11:15	SF	NA
SS1049R_A	6-Jun-18	11:19	SF	NA
SS1049R_B	6-Jun-18	11:22	SF	NA
TB001	7-Jun-18	8:00	TW	TB
MW08A	7-Jun-18	9:50	GW	FD1SET4

TABLE 2-1 SAMPLE SUMMARY

MW908A	7-Jun-18	9:50	GW	FD2SET4
MW08B	7-Jun-18	10:15	GW	NA
MW08C	7-Jun-18	14:30	GW	NA
SS1034RB001	8-Jun-18	8:15	EB	EB
SS1034F_A	8-Jun-18	9:05	SF	NA
SS1034F_B	8-Jun-18	9:10	SF	NA
SS1034R_A	8-Jun-18	9:18	SF	NA
SS1034R_B	8-Jun-18	9:22	SF	NA
QC Samples	6			
Sample Locations	47			
Grand Total	**53**			

Notes:

Field QC Samples

1 - Samples ordered by date and time the sample was acquired

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID[1]	DIO:CL HRSM01.2	SVOA:EPA 8270D	VOA:EPA 8260C	TOTAL	MATRIX	FIELD QC
MW08A	1	1	1	**3**	GW	FD1SET4
MW08B	1	1	1	**3**	GW	NA
MW08C	1	1	1	**3**	GW	NA
MW908A	1	1	1	**3**	GW	FD2SET4
SS1006F_A	1			**1**	SF	NA
SS1006F_B	1			**1**	SF	NA
SS1006R_A	1			**1**	SF	NA
SS1006R_B	1			**1**	SF	NA
SS1014F_A	1			**1**	SF	NA
SS1014F_B	1			**1**	SF	NA
SS1014R_A	1			**1**	SF	FD1SET2
SS1014R_B	1			**1**	SF	NA
SS1015F_A	1			**1**	SF	FD1SET3
SS1015F_B	1			**1**	SF	NA
SS1015R_A	1			**1**	SF	NA
SS1015R_B	1			**1**	SF	NA
SS1022F_A	1			**1**	SF	NA
SS1022F_B	1			**1**	SF	NA
SS1022R_A	1			**1**	SF	NA
SS1022R_B	1			**1**	SF	NA
SS1024F_A	1			**1**	SF	NA
SS1024F_B	1			**1**	SF	NA
SS1024R_A	1			**1**	SF	NA
SS1024R_B	1			**1**	SF	NA
SS1028F_A	1			**1**	SF	NA
SS1028F_B	1			**1**	SF	NA
SS1028R_A	1			**1**	SF	NA
SS1028R_B	1			**1**	SF	NA
SS1033F_A	1			**1**	SF	FD1SET1
SS1033F_B	1			**1**	SF	NA
SS1033R_A	1			**1**	SF	NA
SS1033R_B	1			**1**	SF	NA
SS1034F_A	1			**1**	SF	NA
SS1034F_B	1			**1**	SF	NA
SS1034R_A	1			**1**	SF	NA
SS1034R_B	1			**1**	SF	NA
SS1034RB001	1			**1**	EB	EB
SS1048F_A	1			**1**	SF	NA
SS1048F_B	1			**1**	SF	NA
SS1048R_A	1			**1**	SF	NA
SS1048R_B	1			**1**	SF	NA
SS1049F_A	1			**1**	SF	NA
SS1049F_B	1			**1**	SF	NA
SS1049R_A	1			**1**	SF	NA
SS1049R_B	1			**1**	SF	NA

TABLE 2-2 ANALYSIS METHODS

SAMPLE ID[1]	DIO:CL HRSM01.2	SVOA:EPA 8270D	VOA:EPA 8260C	TOTAL	MATRIX	FIELD QC
SS1054F_A	1			**1**	SF	NA
SS1054F_B	1			**1**	SF	NA
SS1054R_A	1			**1**	SF	NA
SS1054R_B	1			**1**	SF	NA
SS91014R_A	1			**1**	SF	FD2SET2
SS91015F_A	1			**1**	SF	FD2SET3
SS91033F_A	1			**1**	SF	FD2SET1
TB001			1	**1**	TW	TB
GRAND TOTAL	**52**	**4**	**5**	**61**		**6**

Notes:

- Field QC Samples

1 - Samples ordered by the Sample ID

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
Dioxins and Furans	**DIO:CL HRSM01.2**
	% Moisture
	1,2,3,4,6,7,8-Heptachlorodibenzodioxin
	1,2,3,4,6,7,8-Heptachlorodibenzofuran
	1,2,3,4,7,8,9-Heptachlorodibenzofuran
	1,2,3,4,7,8-Hexachlorodibenzodioxin
	1,2,3,4,7,8-Hexachlorodibenzofuran
	1,2,3,6,7,8-Hexachlorodibenzodioxin
	1,2,3,6,7,8-Hexachlorodibenzofuran
	1,2,3,7,8,9-Hexachlorodibenzodioxin
	1,2,3,7,8,9-Hexachlorodibenzofuran
	1,2,3,7,8-Pentachlorodibenzodioxin
	1,2,3,7,8-Pentachlorodibenzofuran
	2,3,4,6,7,8-Hexachlorodibenzofuran
	2,3,4,7,8-Pentachlorodibenzofuran
	2,3,7,8-Tetrachlorodibenzodioxin
	2,3,7,8-Tetrachlorodibenzofuran
	Heptachlorodibenzodioxin (Total)
	Heptachlorodibenzofuran (Total)
	Hexachlorodibenzodioxin (Total)
	Hexachlorodibenzofuran (Total)
	Octachlorodibenzodioxin
	Octachlorodibenzofuran
	Pentachlorodibenzodioxin (Total)
	Pentachlorodibenzofuran (Total)
	TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)
	TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)
	TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)
	Tetrachlorodibenzodioxin (Total)
	Tetrachlorodibenzofuran (Total)
SVOCs	**SVOA:EPA 8270D**
	(3-and/or 4-)Methylphenol
	1,1-Biphenyl
	2,4-Dimethylphenol
	2-Methylphenol
	Acenaphthene
	Anthracene
	Benzo(a)anthracene
	Benzo(a)pyrene
	Benzo(b)fluoranthene
	Benzo(g,h,i)perylene
	Benzo(k)fluoranthene
	Carbazole
	Chrysene
	Dibenz(a,h)anthracene
	Dibenzofuran

TABLE 2-3 ANALYSIS TYPES

ANALYSIS TYPE	ANALYSIS METHOD TARGET ANALYTES
	Fluoranthene
	Fluorene
	Indeno (1,2,3-cd) pyrene
	Naphthalene
	Pentachlorophenol
	Phenanthrene
	Phenol
	Pyrene
VOCs	**VOA:EPA 8260C**
	(m- and/or p-)Xylene
	1,2,4-Trichlorobenzene
	2,3-Benzofuran
	Acetone
	Benzene
	Chlorobenzene
	Ethyl Benzene
	Methyl Ethyl Ketone
	o-Xylene
	Styrene
	Toluene
	Vinyl chloride

TABLE 2-4 ANALYSIS BATCHES

SAMPLE ID	METHOD BATCH[1] LAB ID	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
	DIO:CL HRSM01.2	**4-May-18**	**0:00**					
	(blank)	**4-May-18**	**0:00**					
SS1034RB001	R4-C182506-01	26-Jun-18	0:00	8-Jun-18	0:00	8-Jun-18	8:15	C
MW08A	R4-C182506-02	22-Jun-18	0:00	8-Jun-18	0:00	7-Jun-18	9:50	
MW908A	R4-C182506-03	22-Jun-18	0:00	8-Jun-18	0:00	7-Jun-18	9:50	
MW08B	R4-C182506-04	22-Jun-18	0:00	8-Jun-18	0:00	7-Jun-18	10:15	
MW08C	R4-C182506-05	22-Jun-18	0:00	8-Jun-18	0:00	7-Jun-18	14:30	
SS1006F_A	R4-C182506-06	26-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	16:10	
SS1006F_B	R4-C182506-07	26-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	16:13	
SS1006R_A	R4-C182506-08	4-May-18	0:00	8-Jun-18	0:00	4-Jun-18	16:02	
SS1006R_B	R4-C182506-09	27-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	16:08	
SS1014F_A	R4-C182506-10	4-May-18	0:00	8-Jun-18	0:00	6-Jun-18	8:53	
SS1014F_B	R4-C182506-11	4-May-18	0:00	8-Jun-18	0:00	6-Jun-18	8:58	
SS1014R_A	R4-C182506-12	20-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:05	
SS1014R_B	R4-C182506-13	20-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:10	
SS91014R_A	R4-C182506-14	27-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:05	
SS1015F_A	R4-C182506-15	20-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	10:15	
SS1015F_B	R4-C182506-16	20-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	10:20	
SS91015F_A	R4-C182506-17	27-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	10:15	
SS1015R_A	R4-C182506-18	20-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	10:23	
SS1015R_B	R4-C182506-19	21-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	10:25	
SS1022F_A	R4-C182506-20	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	11:33	
SS1022F_B	R4-C182506-21	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	11:35	
SS1022R_A	R4-C182506-22	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	11:40	
SS1022R_B	R4-C182506-23	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	11:45	
SS1024F_A	R4-C182506-24	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	15:15	
SS1024F_B	R4-C182506-25	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	15:20	
SS1024R_A	R4-C182506-26	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	15:08	
SS1024R_B	R4-C182506-27	21-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	15:12	
SS1028F_A	R4-C182506-28	21-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	8:05	
SS1028F_B	R4-C182506-29	21-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	8:10	

TABLE 2-4 ANALYSIS BATCHES

SAMPLE ID	METHOD BATCH[1] LAB ID	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
SS1028R_A	R4-C182506-30	25-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	8:20	
SS1028R_B	R4-C182506-31	25-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	8:25	
SS1033F_A	R4-C182506-32	25-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	13:45	
SS1033F_B	R4-C182506-33	25-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	13:48	
SS91033F_A	R4-C182506-34	27-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	13:45	
SS1033R_A	R4-C182506-35	25-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	13:52	
SS1033R_B	R4-C182506-36	25-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	13:56	
SS1034F_A	R4-C182506-37	27-Jun-18	0:00	8-Jun-18	0:00	8-Jun-18	9:05	
SS1034F_B	R4-C182506-38	27-Jun-18	0:00	8-Jun-18	0:00	8-Jun-18	9:10	
SS1034R_A	R4-C182506-39	27-Jun-18	0:00	8-Jun-18	0:00	8-Jun-18	9:18	
SS1034R_B	R4-C182506-40	27-Jun-18	0:00	8-Jun-18	0:00	8-Jun-18	9:22	
SS1048F_A	R4-C182506-41	25-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:45	
SS1048F_B	R4-C182506-42	25-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:50	
SS1048R_A	R4-C182506-43	25-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:52	
SS1048R_B	R4-C182506-44	26-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	9:58	
SS1049F_A	R4-C182506-45	26-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	11:10	
SS1049F_B	R4-C182506-46	26-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	11:15	
SS1049R_A	R4-C182506-47	26-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	11:19	
SS1049R_B	R4-C182506-48	26-Jun-18	0:00	8-Jun-18	0:00	6-Jun-18	11:22	
SS1054F_A	R4-C182506-49	26-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	10:55	
SS1054F_B	R4-C182506-50	26-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	10:57	
SS1054R_A	R4-C182506-51	26-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	11:00	
SS1054R_B	R4-C182506-52	26-Jun-18	0:00	8-Jun-18	0:00	4-Jun-18	11:05	
	SVOA:EPA 8270D	**18-Jun-18**	**12:19**					
	(blank)	**18-Jun-18**	**12:19**					
MW08A	R4-E182305-02	18-Jun-18	12:19	8-Jun-18	10:05	7-Jun-18	9:50	
MW908A	R4-E182305-03	18-Jun-18	12:48	8-Jun-18	10:05	7-Jun-18	9:50	
MW08B	R4-E182305-04	18-Jun-18	13:18	8-Jun-18	10:05	7-Jun-18	10:15	
MW08C	R4-E182305-05	18-Jun-18	13:48	8-Jun-18	10:05	7-Jun-18	14:30	

TABLE 2-4 ANALYSIS BATCHES

SAMPLE ID	METHOD BATCH[1] LAB ID	ANALYSIS DATE	ANALYSIS TIME	RECEIPT DATE	RECEIPT TIME	SAMPLE DATE	SAMPLE TIME	QC
	VOA:EPA 8260C	**11-Jun-18**	**17:27**					
	(blank)	**11-Jun-18**	**17:27**					
MW08A	R4-E182305-02	11-Jun-18	19:39	8-Jun-18	10:05	7-Jun-18	9:50	
MW908A	R4-E182305-03	11-Jun-18	20:05	8-Jun-18	10:05	7-Jun-18	9:50	
MW08B	R4-E182305-04	11-Jun-18	20:32	8-Jun-18	10:05	7-Jun-18	10:15	S
MW08C	R4-E182305-05	11-Jun-18	17:54	8-Jun-18	10:05	7-Jun-18	14:30	
TB001	R4-E182305-01	11-Jun-18	17:27	8-Jun-18	10:05	7-Jun-18	8:00	

Notes:

1 - Data packages from an EPA or CLP laboratory will not have a batch ID available and will display "(blank)".

C - Chain of Custody issue.

H - Hold time has been exceeded.

QC - Quality Control criteria may require review.

S - Sample acquisition, handling, or shipping issue

P - Temperature or preservation issue.

TABLE 3-1 FIELD DUPLICATES

	FD1SET1		FD2SET1				FD1SET2		FD2SET2			
METHOD ANALYTE	SS1033F_A		SS91033F_A		RPD	QC	SS1014R_A		SS91014R_A		RPD	QC
	Primary		Secondary		50.0		Primary		Secondary		50.0	
	Result	MRL	Result	MRL			Result	MRL	Result	MRL		
DIO:CL HRSM01.2												
1,2,3,7,8,9-Hexachlorodibenzodioxin	12	5	12	5	0.0	N/A	19	5	21	5	10.0	N/A
Tetrachlorodibenzofuran (Total)	5.6	1	5.2	1	7.4	N/A	8.3	0.99	10	1	18.6	N/A
Pentachlorodibenzofuran (Total)	17	5	17	5	0.0	N/A	30	5	33	5	9.5	N/A
Octachlorodibenzodioxin	12000	10	12000	10	0.0	N/A	8200	9.9	8900	10	8.2	N/A
Hexachlorodibenzodioxin (Total)	150	5	150	5	0.0	N/A	200	5	220	5	9.5	N/A
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1100	5	1100	5	0.0	N/A	1000	5	1100	5	9.5	N/A
Pentachlorodibenzodioxin (Total)	11	5	12	5	8.7	N/A	20	5	22	5	9.5	N/A
Heptachlorodibenzodioxin (Total)	1900	5	2000	5	5.1	N/A	1700	5	1900	5	11.1	N/A
Heptachlorodibenzofuran (Total)	580	5	590	5	1.7	N/A	630	5	690	5	9.1	N/A
Octachlorodibenzofuran	570	10	590	10	3.4	N/A	680	9.9	740	10	8.5	N/A
1,2,3,4,7,8-Hexachlorodibenzodioxin	7.4	5	7.1	5	4.1	N/A	8.2	5	9.1	5	10.4	N/A
1,2,3,7,8-Pentachlorodibenzodioxin	ND		2.5	5	N/A	NA	4	5	4.1	5	N/A	NA
Tetrachlorodibenzodioxin (Total)	2.6	1	2.9	1	10.9	N/A	4.5	0.99	5	1	10.5	N/A
1,2,3,4,7,8,9-Heptachlorodibenzofuran	9.3	5	9.9	5	6.3	N/A	8.8	5	9.3	5	5.5	N/A
Hexachlorodibenzofuran (Total)	130	5	130	5	0.0	N/A	190	5	210	5	10.0	N/A
2,3,4,7,8-Pentachlorodibenzofuran	1	5	ND		N/A	NA	1.1	5	1.4	5	N/A	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	2.9	5	3	5	N/A	NA	4.2	5	5	5	17.4	N/A
1,2,3,6,7,8-Hexachlorodibenzodioxin	25	5	24	5	4.1	N/A	27	5	31	5	13.8	N/A
2,3,4,6,7,8-Hexachlorodibenzofuran	4.9	5	5.1	5	4.0	N/A	4.5	5	4.3	5	N/A	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	180	5	180	5	0.0	N/A	220	5	240	5	8.7	N/A
1,2,3,4,7,8-Hexachlorodibenzofuran	4.2	5	4.7	5	N/A	NA	4	5	4.6	5	N/A	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	1.1	5	1.4	5	N/A	NA	1.1	5	2.7	5	N/A	NA
% Moisture	3.4		3.3		3.0	N/A	8		8.2		2.5	N/A
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-9	12	12	12	12	0.0	N/A	14	14	15	15	6.9	N/A
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	13	13	13	13	0.0	N/A	15	15	16	16	6.5	N/A
TEQ (Mammalian Toxic. Equiv. Value, WHO	26	26	26	26	0.0	N/A	27	27	29	29	7.1	N/A
1,2,3,7,8-Pentachlorodibenzofuran	0.48	5	0.52	5	N/A	NA	ND		0.57	5	N/A	NA
2,3,7,8-Tetrachlorodibenzofuran	0.27	1	ND	1	N/A	NA	ND		ND		N/A	NA
VOA:EPA 8260C												
Benzene	NA		NA				NA		NA			
Toluene	NA		NA				NA		NA			

TABLE 3-1 FIELD DUPLICATES

	FD1SET3		FD2SET3				FD1SET4		FD2SET4			
METHOD **ANALYTE**	SS1015F_A		SS91015F_A		RPD	QC	MW08A		MW908A		RPD	QC
	Primary		Secondary		50.0		Primary		Secondary		30.0	
	Result	MRL	Result	MRL			Result	MRL	Result	MRL		
DIO:CL HRSM01.2												
1,2,3,7,8,9-Hexachlorodibenzodioxin	16	5	16	5	0.0	N/A	ND		ND		N/A	NA
Tetrachlorodibenzofuran (Total)	22	0.99	23	1	4.4	N/A	ND		ND		N/A	NA
Pentachlorodibenzofuran (Total)	55	5	64	5	15.1	N/A	ND		ND		N/A	NA
Octachlorodibenzodioxin	17000	9.9	17000	10	0.0	N/A	0.011	0.097	0.0086	0.097	N/A	NA
Hexachlorodibenzodioxin (Total)	210	5	220	5	4.7	N/A	ND		ND		N/A	NA
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1700	5	1800	5	5.7	N/A	ND		ND		N/A	NA
Pentachlorodibenzodioxin (Total)	17	5	19	5	11.1	N/A	ND		ND		N/A	NA
Heptachlorodibenzodioxin (Total)	2800	5	2900	5	3.5	N/A	0.0023	0.049	ND		N/A	NA
Heptachlorodibenzofuran (Total)	1900	5	2000	5	5.1	N/A	ND		ND		N/A	NA
Octachlorodibenzofuran	1900	9.9	1900	10	0.0	N/A	ND		ND		N/A	NA
1,2,3,4,7,8-Hexachlorodibenzodioxin	8.1	5	8	5	1.2	N/A	ND		ND		N/A	NA
1,2,3,7,8-Pentachlorodibenzodioxin	3.4	5	3.5	5	N/A	NA	ND		ND		N/A	NA
Tetrachlorodibenzodioxin (Total)	6.2	0.99	6.7	1	7.8	N/A	ND		ND		N/A	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	32	5	32	5	0.0	N/A	ND		ND		N/A	NA
Hexachlorodibenzofuran (Total)	380	5	410	5	7.6	N/A	ND		ND		N/A	NA
2,3,4,7,8-Pentachlorodibenzofuran	2	5	2.7	5	N/A	NA	ND		ND		N/A	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	5.7	5	6.2	5	8.4	N/A	ND		ND		N/A	NA
1,2,3,6,7,8-Hexachlorodibenzodioxin	47	5	49	5	4.2	N/A	ND		ND		N/A	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	10	5	10	5	0.0	N/A	ND		ND		N/A	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	470	5	470	5	0.0	N/A	ND		ND		N/A	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	12	5	12	5	0.0	N/A	ND		ND		N/A	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	2.1	5	2.8	5	N/A	NA	ND		ND		N/A	NA
% Moisture	9.3		7.4		22.8	N/A	ND		ND		N/A	NA
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-9	21	21	22	22	4.7	N/A	0.0053	0.0053	0.0053	0.0053	0.0	N/A
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	21	21	22	22	4.7	N/A	0.0047	0.0047	0.0047	0.0047	0.0	N/A
TEQ (Mammalian Toxic. Equiv. Value, WHO	42	42	44	44	4.7	N/A	0.0041	0.0041	0.0041	0.0041	0.0	N/A
1,2,3,7,8-Pentachlorodibenzofuran	ND		ND		N/A	NA	ND		ND		N/A	NA
2,3,7,8-Tetrachlorodibenzofuran	0.68	0.99	0.74	1	N/A	NA	ND		ND		N/A	NA
VOA:EPA 8260C												
Benzene	NA		NA				0.08	0.5	0.08	0.5	0.0	N/A
Toluene	NA		NA				0.17	0.5	0.16	0.5	6.1	N/A

TABLE 3-1 FIELD DUPLCIATES

Notes

- detection < MRL. Analyte pairs in which one is a detect and the other is non-detect or below the reporting limit will use the reporting limit as a subtituion for the calculation. Analyte pairs in which both are below the reporting limit will not be calculated.

- RPD > matrix acceptance criteria

NA - Not analyzed

ND - Not detected

N/A - Not applicable. RPD lower than acceptance criteria, both results lower than the MRL, or TICs.

TABLE 3-2 FIELD BLANKS

BLANK SAMPLE		Octachlorodibenzodioxin			1,2,3,4,6,7,8-Heptachlorodibenzodioxin		
RELATED DETECTIONS	Blank Detection	Result	MRL	QC			
EB	YES	0.022	0.099		0.0031	0.049	
SS1034F_A		740	5	N/A	29000	100	N/A
TB001	NO						

Notes:
QC - Quality Control criteria may require review.
N/A - Not applicable. QC measures not necessary due to lack of detection or detection above the Blank MRL.
NA - Not analyzed.
- Detection > MRL
- Detection < adjusted MRL

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS	COUNT OF CATEGORY																		
	TB001	MW08A	MW908A	MW08B	MW08C	SS1034RB001	SS1006F_A	SS1006F_B	SS1006R_A	SS1006R_B	SS1014F_A	SS1014F_B	SS1014R_A	SS1014R_B	SS91014R_A	SS1015F_A	SS1015F_B	SS91015F_A	SS1015R_A
DIO:CL HRSM01.2																			
U,J,Q-3																			
Tetrachlorodibenzofuran (Total)		1	1	1	1	1				1									
Pentachlorodibenzofuran (Total)		1	1	1	1	1				1									
Hexachlorodibenzodioxin (Total)		1	1			1													
Pentachlorodibenzodioxin (Total)		1	1	1	1	1													
Heptachlorodibenzodioxin (Total)			1																
Heptachlorodibenzofuran (Total)		1	1	1	1	1													
Tetrachlorodibenzodioxin (Total)		1	1	1	1	1				1									
Hexachlorodibenzofuran (Total)		1	1	1	1	1													
J,CLP01																			
1,2,3,7,8,9-Hexachlorodibenzodioxin				1			1	1	1			1		1					
Octachlorodibenzodioxin		1	1		1	1													
1,2,3,4,6,7,8-Heptachlorodibenzodioxin				1	1	1													
1,2,3,4,7,8-Hexachlorodibenzodioxin							1	1				1		1			1		
1,2,3,7,8-Pentachlorodibenzodioxin							1	1		1	1		1		1	1		1	
2,3,7,8-Tetrachlorodibenzofuran																1		1	1
1,2,3,4,7,8,9-Heptachlorodibenzofuran							1	1				1		1			1		
2,3,4,7,8-Pentachlorodibenzofuran							1	1				1	1	1	1	1		1	
1,2,3,7,8-Pentachlorodibenzofuran															1				
1,2,3,6,7,8-Hexachlorodibenzofuran							1				1	1	1	1			1		
1,2,3,6,7,8-Hexachlorodibenzodioxin							1							1			1		
2,3,4,6,7,8-Hexachlorodibenzofuran											1		1	1	1		1		
1,2,3,4,6,7,8-Heptachlorodibenzofuran									1										
1,2,3,4,7,8-Hexachlorodibenzofuran							1	1				1	1		1		1		
1,2,3,7,8,9-Hexachlorodibenzofuran							1	1			1		1	1	1	1	1	1	1
J,Q-3																			
Tetrachlorodibenzofuran (Total)							1	1	1		1	1	1	1	1	1	1	1	1
Pentachlorodibenzofuran (Total)							1	1	1		1	1	1	1	1	1	1	1	1
Hexachlorodibenzodioxin (Total)				1	1		1	1	1	1	1	1	1	1	1	1	1	1	1
Pentachlorodibenzodioxin (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1
Heptachlorodibenzodioxin (Total)		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Heptachlorodibenzofuran (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS	COUNT OF CATEGORY																		
	TB001	MW08A	MW908A	MW08B	MW08C	SS1034RB001	SS1006F_A	SS1006F_B	SS1006R_A	SS1006R_B	SS1014F_A	SS1014F_B	SS1014R_A	SS1014R_B	SS91014R_A	SS1015F_A	SS1015F_B	SS91015F_A	SS1015R_A
Tetrachlorodibenzodioxin (Total)							1	1	1		1	1	1	1	1	1	1	1	1
Hexachlorodibenzofuran (Total)							1	1	1	1	1	1	1	1	1	1	1	1	1
J,D-5																			
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
U,CLP18																			
2,3,7,8-Tetrachlorodibenzodioxin								1	1		1		1		1	1	1	1	1
1,2,3,7,8,9-Hexachlorodibenzodioxin										1							1		
1,2,3,4,6,7,8-Heptachlorodibenzodioxin		1																	
1,2,3,4,7,8-Hexachlorodibenzodioxin									1										
1,2,3,7,8-Pentachlorodibenzodioxin									1			1		1					
2,3,7,8-Tetrachlorodibenzofuran											1	1	1		1				
1,2,3,4,7,8,9-Heptachlorodibenzofuran																			
2,3,4,7,8-Pentachlorodibenzofuran											1								1
1,2,3,7,8-Pentachlorodibenzofuran							1	1											1
1,2,3,6,7,8-Hexachlorodibenzofuran																			
1,2,3,6,7,8-Hexachlorodibenzodioxin									1	1									
2,3,4,6,7,8-Hexachlorodibenzofuran												1							
1,2,3,4,6,7,8-Heptachlorodibenzofuran										1									
1,2,3,4,7,8-Hexachlorodibenzofuran																			
1,2,3,7,8,9-Hexachlorodibenzofuran												1							
J,CLP28																			
Octachlorodibenzodioxin							1	1	1	1		1		1			1		1
1,2,3,4,6,7,8-Heptachlorodibenzodioxin							1	1	1	1	1	1	1	1	1	1	1	1	1
Octachlorodibenzofuran							1	1			1	1	1	1	1	1	1	1	1
U,D-4																			
2,3,7,8-Tetrachlorodibenzofuran							1												
2,3,4,7,8-Pentachlorodibenzofuran																			
1,2,3,7,8-Pentachlorodibenzofuran																1		1	
J,CLP01,CLP28																			
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																			
Octachlorodibenzofuran									1	1									
J,CLP02,CLP28																			
Octachlorodibenzodioxin											1		1		1	1			
J,CLP28,CLP02																			
Octachlorodibenzodioxin																		1	

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS	COUNT OF CATEGORY																			
	TB001	MW08A	MW908A	MW08B	MW08C	SS1034RB001	SS1006F_A	SS1006F_B	SS1006R_A	SS1006R_B	SS1014F_A	SS1014F_B	SS1014R_A	SS1014R_B	SS91014R_A	SS1015F_A	SS1015F_B	SS91015F_A	SS1015R_A
U,CLP01																			
2,3,4,6,7,8-Hexachlorodibenzofuran																			
J,CLP18																			
2,3,7,8-Tetrachlorodibenzodioxin																			
J,QC-3																			
Pentachlorodibenzodioxin (Total)																			
SVOA:EPA 8270D																			
J,Q-2																			
Dibenzofuran				1															
VOA:EPA 8260C																			
J,Q-2																			
Benzene		1	1		1														
Ethyl Benzene					1														
Toluene		1	1		1														
o-Xylene					1														
(m- and/or p-)Xylene					1														
J,C-6																			
Ethyl Benzene				1															
Acetone				1															
o-Xylene				1															
U,J,C-6																			
Benzene				1															
Styrene				1															
Chlorobenzene				1															
1,2,4-Trichlorobenzene				1															
Vinyl chloride				1															
Methyl Ethyl Ketone				1															
2,3-Benzofuran				1															
J,Q-2,C-6																			
Toluene				1															
(m- and/or p-)Xylene				1															

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS																			
	SS1015R_B	SS1022F_A	SS1022F_B	SS1022R_A	SS1022R_B	SS1024F_A	SS1024F_B	SS1024R_A	SS1024R_B	SS1028F_A	SS1028F_B	SS1028R_A	SS1028R_B	SS1033F_A	SS1033F_B	SS91033F_A	SS1033R_A	SS1033R_B	SS1034F_A
DIO:CL HRSM01.2																			
U,J,Q-3																			
Tetrachlorodibenzofuran (Total)																			
Pentachlorodibenzofuran (Total)																			
Hexachlorodibenzodioxin (Total)																			
Pentachlorodibenzodioxin (Total)			1																
Heptachlorodibenzodioxin (Total)																			
Heptachlorodibenzofuran (Total)																			
Tetrachlorodibenzodioxin (Total)																			
Hexachlorodibenzofuran (Total)																			
J,CLP01																			
1,2,3,7,8,9-Hexachlorodibenzodioxin		1		1			1		1			1						1	
Octachlorodibenzodioxin																			
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																			
1,2,3,4,7,8-Hexachlorodibenzodioxin	1			1			1		1	1	1	1	1		1		1		
1,2,3,7,8-Pentachlorodibenzodioxin	1			1		1	1	1		1		1	1		1	1	1		1
2,3,7,8-Tetrachlorodibenzofuran	1			1	1					1	1	1		1			1	1	1
1,2,3,4,7,8,9-Heptachlorodibenzofuran				1			1		1	1					1				
2,3,4,7,8-Pentachlorodibenzofuran				1		1	1	1	1	1	1	1	1	1	1				
1,2,3,7,8-Pentachlorodibenzofuran						1						1		1		1	1		1
1,2,3,6,7,8-Hexachlorodibenzofuran				1		1	1	1	1	1	1	1		1	1	1	1	1	
1,2,3,6,7,8-Hexachlorodibenzodioxin		1			1				1			1	1						
2,3,4,6,7,8-Hexachlorodibenzofuran	1						1		1	1	1	1		1	1		1	1	
1,2,3,4,6,7,8-Heptachlorodibenzofuran		1	1																
1,2,3,4,7,8-Hexachlorodibenzofuran	1			1		1	1	1		1		1		1	1	1	1	1	
1,2,3,7,8,9-Hexachlorodibenzofuran				1		1	1					1	1	1	1	1	1	1	
J,Q-3																			
Tetrachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pentachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hexachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pentachlorodibenzodioxin (Total)	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Heptachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Heptachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS																			
	SS1015R_B	SS1022F_A	SS1022F_B	SS1022R_A	SS1022R_B	SS1024F_A	SS1024F_B	SS1024R_A	SS1024R_B	SS1028F_A	SS1028F_B	SS1028R_A	SS1028R_B	SS1033F_A	SS1033F_B	SS91033F_A	SS1033R_A	SS1033R_B	SS1034F_A
Tetrachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hexachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
J,D-5																			
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
U,CLP18																			
2,3,7,8-Tetrachlorodibenzodioxin	1		1	1		1		1				1	1	1	1	1	1	1	1
1,2,3,7,8,9-Hexachlorodibenzodioxin					1						1		1						
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																			
1,2,3,4,7,8-Hexachlorodibenzodioxin		1			1													1	
1,2,3,7,8-Pentachlorodibenzodioxin											1			1				1	
2,3,7,8-Tetrachlorodibenzofuran						1		1	1				1		1	1			
1,2,3,4,7,8,9-Heptachlorodibenzofuran					1							1						1	
2,3,4,7,8-Pentachlorodibenzofuran	1				1											1	1	1	
1,2,3,7,8-Pentachlorodibenzofuran	1	1			1			1						1					
1,2,3,6,7,8-Hexachlorodibenzofuran	1	1			1								1						
1,2,3,6,7,8-Hexachlorodibenzodioxin			1								1							1	
2,3,4,6,7,8-Hexachlorodibenzofuran		1											1						
1,2,3,4,6,7,8-Heptachlorodibenzofuran																			
1,2,3,4,7,8-Hexachlorodibenzofuran													1						
1,2,3,7,8,9-Hexachlorodibenzofuran	1				1			1		1									
J,CLP28																			
Octachlorodibenzodioxin	1	1	1	1	1		1		1	1	1	1	1					1	1
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Octachlorodibenzofuran	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
U,D-4																			
2,3,7,8-Tetrachlorodibenzofuran																			
2,3,4,7,8-Pentachlorodibenzofuran																			
1,2,3,7,8-Pentachlorodibenzofuran							1											1	
J,CLP01,CLP28																			
1,2,3,4,6,7,8-Heptachlorodibenzodioxin			1																
Octachlorodibenzofuran			1																
J,CLP02,CLP28																			
Octachlorodibenzodioxin						1		1						1	1	1	1		
J,CLP28,CLP02																			
Octachlorodibenzodioxin																			

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS																			
	SS1015R_B	SS1022F_A	SS1022F_B	SS1022R_A	SS1022R_B	SS1024F_A	SS1024F_B	SS1024R_A	SS1024R_B	SS1028F_A	SS1028F_B	SS1028R_A	SS1028R_B	SS1033F_A	SS1033F_B	SS91033F_A	SS1033R_A	SS1033R_B	SS1034F_A
U,CLP01																			
2,3,4,6,7,8-Hexachlorodibenzofuran					1														
J,CLP18																			
2,3,7,8-Tetrachlorodibenzodioxin							1												
J,QC-3																			
Pentachlorodibenzodioxin (Total)																			
SVOA:EPA 8270D																			
J,Q-2																			
Dibenzofuran																			
VOA:EPA 8260C																			
J,Q-2																			
Benzene																			
Ethyl Benzene																			
Toluene																			
o-Xylene																			
(m- and/or p-)Xylene																			
J,C-6																			
Ethyl Benzene																			
Acetone																			
o-Xylene																			
U,J,C-6																			
Benzene																			
Styrene																			
Chlorobenzene																			
1,2,4-Trichlorobenzene																			
Vinyl chloride																			
Methyl Ethyl Ketone																			
2,3-Benzofuran																			
J,Q-2,C-6																			
Toluene																			
(m- and/or p-)Xylene																			

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS																
	SS1034F_B	SS1034R_A	SS1034R_B	SS1048F_A	SS1048F_B	SS1048R_A	SS1048R_B	SS1049F_A	SS1049F_B	SS1049R_A	SS1049R_B	SS1054F_A	SS1054F_B	SS1054R_A	SS1054R_B	Grand Total
DIO:CL HRSM01.2																
U,J,Q-3																
Tetrachlorodibenzofuran (Total)																6
Pentachlorodibenzofuran (Total)																6
Hexachlorodibenzodioxin (Total)																3
Pentachlorodibenzodioxin (Total)																6
Heptachlorodibenzodioxin (Total)																1
Heptachlorodibenzofuran (Total)																5
Tetrachlorodibenzodioxin (Total)																6
Hexachlorodibenzofuran (Total)																5
J,CLP01																
1,2,3,7,8,9-Hexachlorodibenzodioxin	1		1		1		1					1	1	1	1	20
Octachlorodibenzodioxin																4
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																3
1,2,3,4,7,8-Hexachlorodibenzodioxin		1		1	1	1	1	1	1	1	1	1	1	1	1	28
1,2,3,7,8-Pentachlorodibenzodioxin	1	1		1	1		1		1	1	1	1	1	1	1	32
2,3,7,8-Tetrachlorodibenzofuran		1							1	1		1	1		1	19
1,2,3,4,7,8,9-Heptachlorodibenzofuran			1		1	1	1			1	1	1	1	1	1	20
2,3,4,7,8-Pentachlorodibenzofuran	1					1	1	1	1			1		1	1	27
1,2,3,7,8-Pentachlorodibenzofuran		1				1			1			1				11
1,2,3,6,7,8-Hexachlorodibenzofuran	1	1			1		1	1	1	1	1	1	1	1	1	31
1,2,3,6,7,8-Hexachlorodibenzodioxin			1				1					1	1	1		13
2,3,4,6,7,8-Hexachlorodibenzofuran			1			1	1	1	1	1		1	1		1	24
1,2,3,4,6,7,8-Heptachlorodibenzofuran																3
1,2,3,4,7,8-Hexachlorodibenzofuran		1			1	1	1	1	1	1	1	1	1	1	1	30
1,2,3,7,8,9-Hexachlorodibenzofuran	1			1	1	1	1	1	1	1	1	1	1	1	1	33
J,Q-3																
Tetrachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	46
Pentachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	46
Hexachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	49
Pentachlorodibenzodioxin (Total)	1	1	1	1	1		1	1	1	1	1	1	1	1	1	45
Heptachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	51
Heptachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	47

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS																
	SS1034F_B	SS1034R_A	SS1034R_B	SS1048F_A	SS1048F_B	SS1048R_A	SS1048R_B	SS1049F_A	SS1049F_B	SS1049R_A	SS1049R_B	SS1054F_A	SS1054F_B	SS1054R_A	SS1054R_B	Grand Total
Tetrachlorodibenzodioxin (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	46
Hexachlorodibenzofuran (Total)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	47
J,D-5																
TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	52
TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	52
TEQ (Mammalian Toxic. Equiv. Value, WHO TEQ-2005)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	52
U,CLP18																
2,3,7,8-Tetrachlorodibenzodioxin		1	1	1	1		1	1	1	1	1			1	1	33
1,2,3,7,8,9-Hexachlorodibenzodioxin																5
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																1
1,2,3,4,7,8-Hexachlorodibenzodioxin	1		1													6
1,2,3,7,8-Pentachlorodibenzodioxin			1			1		1								9
2,3,7,8-Tetrachlorodibenzofuran						1	1	1						1		14
1,2,3,4,7,8,9-Heptachlorodibenzofuran																3
2,3,4,7,8-Pentachlorodibenzofuran		1			1								1			10
1,2,3,7,8-Pentachlorodibenzofuran	1			1	1		1	1		1				1	1	16
1,2,3,6,7,8-Hexachlorodibenzofuran			1			1										6
1,2,3,6,7,8-Hexachlorodibenzodioxin																5
2,3,4,6,7,8-Hexachlorodibenzofuran					1									1		5
1,2,3,4,6,7,8-Heptachlorodibenzofuran																1
1,2,3,4,7,8-Hexachlorodibenzofuran			1													2
1,2,3,7,8,9-Hexachlorodibenzofuran		1														6
J,CLP28																
Octachlorodibenzodioxin			1		1	1	1	1		1	1	1	1	1	1	32
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	46
Octachlorodibenzofuran	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	44
U,D-4																
2,3,7,8-Tetrachlorodibenzofuran					1											2
2,3,4,7,8-Pentachlorodibenzofuran										1						1
1,2,3,7,8-Pentachlorodibenzofuran											1					5
J,CLP01,CLP28																
1,2,3,4,6,7,8-Heptachlorodibenzodioxin																1
Octachlorodibenzofuran																3
J,CLP02,CLP28																
Octachlorodibenzodioxin	1	1		1					1							14
J,CLP28,CLP02																
Octachlorodibenzodioxin																1

TABLE 3-3a EPA DATA VALIDATION SUMMARY

CATEGORY LABELS																
	SS1034F_B	SS1034R_A	SS1034R_B	SS1048F_A	SS1048F_B	SS1048R_A	SS1048R_B	SS1049F_A	SS1049F_B	SS1049R_A	SS1049R_B	SS1054F_A	SS1054F_B	SS1054R_A	SS1054R_B	Grand Total
U,CLP01																
2,3,4,6,7,8-Hexachlorodibenzofuran																1
J,CLP18																
2,3,7,8-Tetrachlorodibenzodioxin																1
J,QC-3																
Pentachlorodibenzodioxin (Total)						1										1
SVOA:EPA 8270D																
J,Q-2																
Dibenzofuran																1
VOA:EPA 8260C																
J,Q-2																
Benzene																3
Ethyl Benzene																1
Toluene																3
o-Xylene																1
(m- and/or p-)Xylene																1
J,C-6																
Ethyl Benzene																1
Acetone																1
o-Xylene																1
U,J,C-6																
Benzene																1
Styrene																1
Chlorobenzene																1
1,2,4-Trichlorobenzene																1
Vinyl chloride																1
Methyl Ethyl Ketone																1
2,3-Benzofuran																1
J,Q-2,C-6																
Toluene																1
(m- and/or p-)Xylene																1

Attachment 1
Common Data Validation Definitions

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Common Data Validation Definitions

%D	percent difference
%R	percent recovery
%RSD	percent relative standard deviation
°C	degrees Celcius
CCV	continuing calibration verification
CLP	Contract Laboratory Program
DMC	deuterated monitoring compound
EPA	United States Environmental Protection Agency
EB	equipment rinsate blank
H^2SO^4	sufuric acid
HNO^3	nitric acid
ICAL	initial calibration
ICV	initial calibration verification
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
MDL	minimum detection limit
mg/k	milligrams per kilogram
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
NaOH	sodium hydroxide
PE	performance evaluation
PB	preservative blank
QA	quality assurance
QC	quality control
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
SESD	Science and Ecosystem Support Division
SVOC	semi-volatile organic compounds
SU	standard units
TB	trip blank
TIC	tentatively identified compound
ug/L	micrograms per kilogram
ug/L	micrograms per liter
VOC	volatile organic compounds

EQuIS Database Environmental Matrix

AA	ambient air
GW	groundwater
ID	investigative derived waste
SB	subsurface soil
SD	sediment
SF	surface soil
SG	soil gas
SW	surface water

Data Qualifiers

Inorganics

J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J-	The result is an estimated quantity, but the result may be biased low.
J+	The result is an estimated quantity, but the result may be biased high.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Organics

C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control (QC) criteria. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was not detected above the level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

Attachment 2
Chain of Custody

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WORK ORDER

Printed: 6/21/2018 1:20:25PM

C182506

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0458**	**Contract Lab Case: 47674**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**	

Project Leader:	**Thorpe, Peter**	**Date Due:**	**08/18/18 (70 day TAT)**
Received By:	Graham, Robert	Date Received:	06/09/18 00:00
Logged In By:	Graham, Robert	Date Logged In:	06/21/18 13:12

D.A.R.T. Project ID: 18-0449
Program/Activity: RD
Site/Waterbody: AMERICAN CREOSOTE WORKS INC (110002527025)

Analysis	Due	TAT	Comments

C182506-01 SS1034RB001 / [Water / Trip Blank - Water] Sampled 06/08/18 08:15
MD No: D No: AX27 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-02 MW08A / MW08A [Water / Groundwater] Sampled 06/07/18 09:50
MD No: D No: AX23 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-03 MW908A / MW08A [Water / Groundwater] Sampled 06/07/18 09:50
MD No: D No: AX26 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-04 MW08B / MW08B [Water / Groundwater] Sampled 06/07/18 10:15
MD No: D No: AX24 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-05 MW08C / MW08C [Water / Groundwater] Sampled 06/07/18 14:30
MD No: D No: AX25 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-06 SS1006F_A / SS1006F [Soil / Surface Soil] Sampled 06/04/18 16:10
MD No: D No: AX40 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-07 SS1006F_B / SS1006F [Soil / Surface Soil] Sampled 06/04/18 16:13
MD No: D No: AX41 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506-08 SS1006R_A / SS1006R [Soil / Surface Soil] Sampled 06/04/18 16:02
MD No: D No: AX42 ARI
A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60	

C182506

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0458**	**Contract Lab Case:**	**47674**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C182506-09 SS1006R_B / SS1006R [Soil / Surface Soil] Sampled 06/04/18 16:08			
MD No:	D No: AX43 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-10 SS1014F_A / SS1014F [Soil / Surface Soil] Sampled 06/06/18 08:53			
MD No:	D No: AWW7 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-11 SS1014F_B / SS1014F [Soil / Surface Soil] Sampled 06/06/18 08:58			
MD No:	D No: AWW8 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-12 SS1014R_A / SS1014R [Soil / Surface Soil] Sampled 06/06/18 09:05			
MD No:	D No: AWW9 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-13 SS1014R_B / SS1014R [Soil / Surface Soil] Sampled 06/06/18 09:10			
MD No:	D No: AWX0 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-14 SS91014R_A / SS1014R [Soil / Surface Soil] Sampled 06/06/18 09:05			
MD No:	D No: AX46 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-15 SS1015F_A / SS1015F [Soil / Surface Soil] Sampled 06/06/18 10:15			
MD No:	D No: AWX1 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-16 SS1015F_B / SS1015F [Soil / Surface Soil] Sampled 06/06/18 10:20			
MD No:	D No: AWX2 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-17 SS91015F_A / SS1015F [Soil / Surface Soil] Sampled 06/06/18 10:15			
MD No:	D No: AX45 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-18 SS1015R_A / SS1015R [Soil / Surface Soil] Sampled 06/06/18 10:23			
MD No:	D No: AWX3 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	

C182506

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0458**	**Contract Lab Case:**	**47674**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C182506-19 SS1015R_B / SS1015R [Soil / Surface Soil] Sampled 06/06/18 10:25			
MD No:	D No: AWX4 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-20 SS1022F_A / SS1022F [Soil / Surface Soil] Sampled 06/04/18 11:33			
MD No:	D No: AWX5 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-21 SS1022F_B / SS1022F [Soil / Surface Soil] Sampled 06/04/18 11:35			
MD No:	D No: AWX6 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-22 SS1022R_A / SS1022R [Soil / Surface Soil] Sampled 06/04/18 11:40			
MD No:	D No: AWX7 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-23 SS1022R_B / SS1022R [Soil / Surface Soil] Sampled 06/04/18 11:45			
MD No:	D No: AWX8 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-24 SS1024F_A / SS1024F [Soil / Surface Soil] Sampled 06/04/18 15:15			
MD No:	D No: AWX9 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-25 SS1024F_B / SS1024F [Soil / Surface Soil] Sampled 06/04/18 15:20			
MD No:	D No: AWY0 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-26 SS1024R_A / SS1024R [Soil / Surface Soil] Sampled 06/04/18 15:08			
MD No:	D No: AWY1 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-27 SS1024R_B / SS1024R [Soil / Surface Soil] Sampled 06/04/18 15:12			
MD No:	D No: AWY2 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-28 SS1028F_A / SS1028F [Soil / Surface Soil] Sampled 06/06/18 08:05			
MD No:	D No: AWZ1 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	

C182506

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0458**	**Contract Lab Case:**	**47674**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C182506-29 SS1028F_B / SS1028F [Soil / Surface Soil] Sampled 06/06/18 08:10			
MD No:	D No: AWZ2 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-30 SS1028R_A / SS1028R [Soil / Surface Soil] Sampled 06/06/18 08:20			
MD No:	D No: AWZ3 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-31 SS1028R_B / SS1028R [Soil / Surface Soil] Sampled 06/06/18 08:25			
MD No:	D No: AWZ4 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-32 SS1033F_A / SS1033F [Soil / Surface Soil] Sampled 06/04/18 13:45			
MD No:	D No: AWZ9 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-33 SS1033F_B / SS1033F [Soil / Surface Soil] Sampled 06/04/18 13:48			
MD No:	D No: AX00 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-34 SS91033F_A / SS1033F [Soil / Surface Soil] Sampled 06/04/18 13:45			
MD No:	D No: AX44 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-35 SS1033R_A / SS1033R [Soil / Surface Soil] Sampled 06/04/18 13:52			
MD No:	D No: AX01 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-36 SS1033R_B / SS1033R [Soil / Surface Soil] Sampled 06/04/18 13:56			
MD No:	D No: AX02 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-37 SS1034F_A / SS1034F [Soil / Surface Soil] Sampled 06/08/18 09:05			
MD No:	D No: AX03 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-38 SS1034F_B / SS1034F [Soil / Surface Soil] Sampled 06/08/18 09:10			
MD No:	D No: AX04 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	

C182506

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0458**	**Contract Lab Case:**	**47674**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C182506-39 SS1034R_A / SS1034R [Soil / Surface Soil] Sampled 06/08/18 09:18			
MD No:	D No: AX05 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-40 SS1034R_B / SS1034R [Soil / Surface Soil] Sampled 06/08/18 09:22			
MD No:	D No: AX06 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-41 SS1048F_A / SS1048F [Soil / Surface Soil] Sampled 06/06/18 09:45			
MD No:	D No: AX07 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-42 SS1048F_B / SS1048F [Soil / Surface Soil] Sampled 06/06/18 09:50			
MD No:	D No: AX08 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-43 SS1048R_A / SS1048R [Soil / Surface Soil] Sampled 06/06/18 09:52			
MD No:	D No: AX09 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-44 SS1048R_B / SS1048R [Soil / Surface Soil] Sampled 06/06/18 09:58			
MD No:	D No: AX10 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-45 SS1049F_A / SS1049F [Soil / Surface Soil] Sampled 06/06/18 11:10			
MD No:	D No: AX11 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-46 SS1049F_B / SS1049F [Soil / Surface Soil] Sampled 06/06/18 11:15			
MD No:	D No: AX12 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-47 SS1049R_A / SS1049R [Soil / Surface Soil] Sampled 06/06/18 11:19			
MD No:	D No: AX13 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-48 SS1049R_B / SS1049R [Soil / Surface Soil] Sampled 06/06/18 11:22			
MD No:	D No: AX14 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	

C182506

US-EPA, Region 4, SESD, QAS

Client:	**Superfund Remedial (302DD2, 303DD2, 000DD2)**	**Project Number:**	**18-0458**	**Contract Lab Case:**	**47674**
Project:	**American Creosote - PTHORPE**	**Acct # / Location:**	**000DD20445LA03 Pensacola Escambia FL**		

Analysis	Due	TAT	Comments
C182506-49 SS1054F_A / SS1054F [Soil / Surface Soil] Sampled 06/04/18 10:55			
MD No:	D No: AX19 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-50 SS1054F_B / SS1054F [Soil / Surface Soil] Sampled 06/04/18 10:57			
MD No:	D No: AX20 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-51 SS1054R_A / SS1054R [Soil / Surface Soil] Sampled 06/04/18 11:00			
MD No:	D No: AX21 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	
C182506-52 SS1054R_B / SS1054R [Soil / Surface Soil] Sampled 06/04/18 11:05			
MD No:	D No: AX22 ARI		
A = Contract Lab Sample			
CL Dioxin	08/08/18 00:00	60	

Analysis packages included in this work order

CL Dioxin

CL x Dioxin Scan CL x Dioxin % Moisture

WORK ORDER

PainHe6#2I01I0m18 1#03#M3PN

C1803mr

US-EPA, Region 4, SESD, QAS

CdenH#	Sbfea(bn6 Rec e6it d)Mn0DD0, MnMDD0, mmDD05	Pao:esHu bc pea#	18-m438 ConHatsHl tp CtTe#4r2r4
Pao:esH#	Ac eaist n CaeoToHe - P9j ORPE	AssH/ Ll ost Hon#	mmDD0m443l AmM PenTt sod ETst c pit Fl

Pao:esHl et 6ea#	9 yoaf e, PeHea	Dt He Dbe#	n8I18I18)rm6t 7 9A9 5
Received By:	Graham, Robert	Date Received:	06/09/18 00:00
Logged In By:	Graham, Robert	Date Logged In:	06/21/18 13:24

D.A.R.T. Project ID: 18-0449
Program/Activity: RD
Site/Waterbody: AMERICAN CREOSOTE WORKS INC (110002527025)

Ant d7TiT	Dbe	9A9	Coc c enHT

C1803mr-m1 QA-m18-PES L hSoidLSoid[St c f de6 m2Im2I18 12#mm

MD No: D No: AWW5 ARI

A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60

C1803mr-m0 QA-m1]-PES L hSoidLSoid[St c f de6 m2Im2I18 12#mm

MD No: D No: AWW6 ARI

A = Contract Lab Sample

CL Dioxin	08/08/18 00:00	60

Ant d7TiTf t skt geTinsdb6e6 in HyiTwoak oa6ea

CL Dioxin

CL x Dioxin Scan CL x Dioxin % Moisture

USEPA Region 4 COC (LAB COPY)

DateShipped: 6/6/2018

CarrierName: FedEx

AirbillNo: 7724 1277 9716

CHAIN OF CUSTODY RECORD

Case # 47674

EPA Project Number: 18-0458

No: 06/06/18-0001

Lab: Analytical Resources, Inc.

Lab Contact: Susan D. Dunnihoo

Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1014F_A	DAWW7	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1012 (Ice) (1)	SS1014F	06/06/2018 08:53	
SS1014F_B	DAWW8	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1013 (Ice) (1)	SS1014F	06/06/2018 08:58	
SS1014R_A	DAWW9	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1015 (Ice) (1)	SS1014R	06/06/2018 09:05	
SS1014R_B	DAWX0	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1017 (Ice) (1)	SS1014R	06/06/2018 09:10	
SS1015F_A	DAWX1	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1025 (Ice) (1)	SS1015F	06/06/2018 10:15	
SS1015F_B	DAWX2	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1026 (Ice) (1)	SS1015F	06/06/2018 10:20	
SS1015R_A	DAWX3	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1028 (Ice) (1)	SS1015R	06/06/2018 10:23	
SS1015R_B	DAWX4	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1029 (Ice) (1)	SS1015R	06/06/2018 10:25	
SS1022F_A	DAWX5	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1019 (Ice) (1)	SS1022F	06/04/2018 11:33	
SS1022F_B	DAWX6	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1020 (Ice) (1)	SS1022F	06/04/2018 11:35	

Special Instructions:	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

DateShipped: 6/6/2018

CarrierName: FedEx

AirbillNo: 7724 1277 9716

CHAIN OF CUSTODY RECORD

Case # 47674

EPA Project Number: 18-0458

No: 06/06/18-0001

Lab: Analytical Resources, Inc.

Lab Contact: Susan D. Dunnihoo

Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1022R_A	DAWX7	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1022 (Ice) (1)	SS1022R	06/04/2018 11:40	
SS1022R_B	DAWX8	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1023 (Ice) (1)	SS1022R	06/04/2018 11:45	
SS1024F_A	DAWX9	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1011 (Ice) (1)	SS1024F	06/04/2018 15:15	
SS1024F_B	DAWY0	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1012 (Ice) (1)	SS1024F	06/04/2018 15:20	
SS1024R_A	DAWY1	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1013 (Ice) (1)	SS1024R	06/04/2018 15:08	
SS1024R_B	DAWY2	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1014 (Ice) (1)	SS1024R	06/04/2018 15:12	
SS1028F_A	DAWZ1	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1015 (Ice) (1)	SS1028F	06/06/2018 08:05	
SS1028F_B	DAWZ2	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1016 (Ice) (1)	SS1028F	06/06/2018 08:10	
SS1028R_A	DAWZ3	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1017 (Ice) (1)	SS1028R	06/06/2018 08:20	
SS1028R_B	DAWZ4	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1018 (Ice) (1)	SS1028R	06/06/2018 08:25	

Sample(s) to be used for Lab QC: SS1022R_B Tag 1023	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

DateShipped: 6/6/2018

CarrierName: FedEx

AirbillNo: 7724 1277 9716

CHAIN OF CUSTODY RECORD

Case # 47674

EPA Project Number: 18-0458

No: 06/06/18-0001

Lab: Analytical Resources, Inc.

Lab Contact: Susan D. Dunnihoo

Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1033F_A	DAWZ9	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1031 (Ice) (1)	SS1033F	06/04/2018 13:45	
SS1033F_B	DAX00	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1032 (Ice) (1)	SS1033F	06/04/2018 13:48	
SS1033R_A	DAX01	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1033 (Ice) (1)	SS1033R	06/04/2018 13:52	
SS1033R_B	DAX02	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1034 (Ice) (1)	SS1033R	06/04/2018 13:56	
SS1048F_A	DAX07	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1043 (Ice) (1)	SS1048F	06/06/2018 09:45	
SS1048F_B	DAX08	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1044 (Ice) (1)	SS1048F	06/06/2018 09:50	
SS1048R_A	DAX09	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1045 (Ice) (1)	SS1048R	06/06/2018 09:52	
SS1048R_B	DAX10	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1046 (Ice) (1)	SS1048R	06/06/2018 09:58	
SS1049F_A	DAX11	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1039 (Ice) (1)	SS1049F	06/06/2018 11:10	
SS1049F_B	DAX12	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1040 (Ice) (1)	SS1049F	06/06/2018 11:15	

Sample(s) to be used for Lab QC: SS1033R_B Tag 1034	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

DateShipped: 6/6/2018

CarrierName: FedEx

AirbillNo: 7724 1277 9716

CHAIN OF CUSTODY RECORD

Case # 47674

EPA Project Number: 18-0458

No: 06/06/18-0001

Lab: Analytical Resources, Inc.

Lab Contact: Susan D. Dunnihoo

Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1049R_A	DAX13	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1041 (Ice) (1)	SS1049R	06/06/2018 11:19	
SS1049R_B	DAX14	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1042 (Ice) (1)	SS1049R	06/06/2018 11:22	
SS1054F_A	DAX19	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1047 (Ice) (1)	SS1054F	06/04/2018 10:55	
SS1054F_B	DAX20	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1048 (Ice) (1)	SS1054F	06/04/2018 10:57	
SS1054R_A	DAX21	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1049 (Ice) (1)	SS1054R	06/04/2018 11:00	
SS1054R_B	DAX22	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1050 (Ice) (1)	SS1054R	06/04/2018 11:05	
SS1006F_A	DAX40	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1056 (Ice) (1)	SS1006F	06/04/2018 16:10	
SS1006F_B	DAX41	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1057 (Ice) (1)	SS1006F	06/04/2018 16:13	
SS1006R_A	DAX42	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1058 (Ice) (1)	SS1006R	06/04/2018 16:02	
SS1006R_B	DAX43	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1059 (Ice) (1)	SS1006R	06/04/2018 16:08	

Special Instructions:	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA Region 4 COC (LAB COPY)

DateShipped: 6/6/2018

CarrierName: FedEx

AirbillNo: 7724 1277 9716

CHAIN OF CUSTODY RECORD

Case # 47674

EPA Project Number: 18-0458

No: 06/06/18-0001

Lab: Analytical Resources, Inc.

Lab Contact: Susan D. Dunnihoo

Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS91033F_A	DAX44	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1055 (Ice) (1)	SS1033F	06/04/2018 13:45	
SS91015F_A	DAX45	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1054 (Ice) (1)	SS1015F	06/06/2018 10:15	
SS91014R_A	DAX46	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1016 (Ice) (1)	SS1014R	06/06/2018 09:05	

Special Instructions:

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key: CDD/CDF=CLP Dioxins/Furans

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

WORK ORDER

E18507m

US-EPA, Region 4, SESD

s denT#	**Sbf ec(bn2 Rer e2iCd)075DD5, 070DD5, 777DD5F**	**Pco:eaTu br pec#**	**18-744j**
Pco:eaT#	**Ar eciaCn s ceotoTe - PH3 ORPE**	**AaaT/ Ll oaCtion#**	**777DD5744ml A70 PentCaodC EtaGr piC y1**

Pco:eaTl eC2ec#	**HBocf e, PeTec**	**DCTe Dbe#**	**7Ml10l18)0m2C HAHF**
Received By:	Beall, Mike	Date Received:	06/08/18 10:05
Logged In By:	Beall, Mike	Date Logged In:	06/08/18 11:38

Samples Received at:	19xs	Placed in Cooler after Ice Removed:	D.A.R.T. Project ID: 18-0449
Custody Seals: Yes		Sample Containers Intact: Yes	Program/Activity: RD
Custody Seals Intact: Yes		Samples & COC Match: Yes	Site/Waterbody: AMERICAN CREOSOTE WORKS INC (110002527025)
COC Present: Yes		COC/Labels Agree: Yes	
Ice in Cooler: Yes		All Analyses on COC: Yes	

AnGd tit	**Dbe**	**HAH**	**Ehf icet**	**s or r enT**

E18507m-71 H[771 L kWCTec LHcif [dCn] - WCTec GSGr f dc2 76l7Ml18 78#77

A = 40mL Clear Vial *B = 40mL Clear Vial* *C = 40mL Clear Vial*

VOA Scan (Routine)	07/13/18 00:00	35	06/21/18 08:00	

E18507m-75 N W78A LN W78A kWCTec Lwcobn29 CTec GSGr f dc2 76l7Ml18 7j#n7

A = 1000mL Amber Glass *B = 1000mL Amber Glass* *C = 1000mL Plastic* *D = 40mL Clear Vial*
E = 40mL Clear Vial *F = 40mL Clear Vial* *G = 500mL Plastic* *H = 500mL Plastic*

Sulfate (Routine) by Ion Chromatography	07/13/18 00:00	35	07/05/18 09:50	
Total Organic Carbon (Routine)	07/13/18 00:00	35	07/05/18 09:50	
VOA Scan (Routine)	07/13/18 00:00	35	06/21/18 09:50	
SV (Routine) Extractables	07/13/18 00:00	35	06/14/18 09:50	
SV SIM	07/13/18 00:00	35	06/14/18 09:50	
Phosphorus (Routine)	07/13/18 00:00	35	07/05/18 09:50	
Alkalinity, Total (as CaCO3)	07/13/18 00:00	35	06/21/18 09:50	
Ammonia, Undistilled	07/13/18 00:00	35	07/05/18 09:50	
Nitrate and/or Nitrite (Routine)	07/13/18 00:00	35	07/05/18 09:50	

E18507m-70 N Wj 78A LN W78A kWCTec Lwcobn29 CTec GSGr f dc2 76l7Ml18 7j#n7

A = 1000mL Amber Glass *B = 1000mL Amber Glass* *C = 1000mL Plastic* *D = 40mL Clear Vial*
E = 40mL Clear Vial *F = 40mL Clear Vial* *G = 500mL Plastic* *H = 500mL Plastic*

VOA Scan (Routine)	07/13/18 00:00	35	06/21/18 09:50	
Total Organic Carbon (Routine)	07/13/18 00:00	35	07/05/18 09:50	
Nitrate and/or Nitrite (Routine)	07/13/18 00:00	35	07/05/18 09:50	
SV (Routine) Extractables	07/13/18 00:00	35	06/14/18 09:50	
Phosphorus (Routine)	07/13/18 00:00	35	07/05/18 09:50	
SV SIM	07/13/18 00:00	35	06/14/18 09:50	
Alkalinity, Total (as CaCO3)	07/13/18 00:00	35	06/21/18 09:50	
Ammonia, Undistilled	07/13/18 00:00	35	07/05/18 09:50	
Sulfate (Routine) by Ion Chromatography	07/13/18 00:00	35	07/05/18 09:50	

US-EPA, Region 4, SESD

s denT#	Sbfec(bn2 Rer e2iCd)075DD5, 070DD5, 777DD5F	Pco:eaTubr pec#	18-744j
Pco:eaT#	Ar eciaCh s ceotoTe - PH3 ORPE	AaaT/ Ll oaCfion#	777DD5744ml A70 PentCaodC EtaCr piC y1

AnCdtit	Dbe	HAH	Ehficet	s or r enTf

E18507m-74 N W78[LN W78[kWCfec Lwcobn29 CEec GSCr fde2 76l7M18 17#1m

A = 1000mL Amber Glass *B = 1000mL Amber Glass* *C = 1000mL Plastic* *D = 40mL Clear Vial*
E = 40mL Clear Vial *F = 40mL Clear Vial* *G = 500mL Plastic* *H = 500mL Plastic*

Phosphorus (Routine)	07/13/18 00:00	35	07/05/18 10:15
Ammonia, Undistilled	07/13/18 00:00	35	07/05/18 10:15
Sulfate (Routine) by Ion Chromatography	07/13/18 00:00	35	07/05/18 10:15
Alkalinity, Total (as CaCO3)	07/13/18 00:00	35	06/21/18 10:15
SV SIM	07/13/18 00:00	35	06/14/18 10:15
Nitrate and/or Nitrite (Routine)	07/13/18 00:00	35	07/05/18 10:15
Total Organic Carbon (Routine)	07/13/18 00:00	35	07/05/18 10:15
VOA Scan (Routine)	07/13/18 00:00	35	06/21/18 10:15
SV (Routine) Extractables	07/13/18 00:00	35	06/14/18 10:15

E18507m-7m N W78s LN W78s kWCfec Lwcobn29 CEec GSCr fde2 76l7M18 14#07

A = 1000mL Amber Glass *B = 1000mL Amber Glass* *C = 1000mL Amber Glass* *D = 1000mL Amber Glass*
E = 1000mL Plastic *F = 40mL Clear Vial* *G = 40mL Clear Vial* *H = 40mL Clear Vial*
I = 40mL Clear Vial *J = 40mL Clear Vial* *K = 40mL Clear Vial* *L = 500mL Plastic*
M = 500mL Plastic

Phosphorus (Routine)	07/13/18 00:00	35	07/05/18 14:30
Sulfate (Routine) by Ion Chromatography	07/13/18 00:00	35	07/05/18 14:30
Total Organic Carbon (Routine)	07/13/18 00:00	35	07/05/18 14:30
Ammonia, Undistilled	07/13/18 00:00	35	07/05/18 14:30
Nitrate and/or Nitrite (Routine)	07/13/18 00:00	35	07/05/18 14:30
SV (Routine) Extractables	07/13/18 00:00	35	06/14/18 14:30
SV SIM	07/13/18 00:00	35	06/14/18 14:30
Alkalinity, Total (as CaCO3)	07/13/18 00:00	35	06/21/18 14:30
VOA Scan (Routine)	07/13/18 00:00	35	06/21/18 14:30

AnCdtit fCa] Cget inadb2e2 in TBit 9 oc] oc2ec

SV (Routine) Extractables

v SV Extractables v SV TICS

VOA Scan (Routine)

v VOA Scan-2 v VOA TICS-2

E182305

Page 1 of 1

USEPA Region 4 COC (REGION COPY)
DateShipped: 6/7/2018
CarrierName: FedEx
AirbillNo: 7724 2553 8239

CHAIN OF CUSTODY RECORD
ACW_June 2018 - SESD/FL

EPA Project Number: 18-0449

No: 06/07/18-0003
Lab: Region 4 Lab
Lab Contact:
Lab Phone: 706-355-8856

	Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
-02	MW08A		Groundwater/ Cole, Phillip	Grab	SVOA(35), SVOA-SIM(35), NNNTOC(35), VOA(35), NH3+P(35), SA(35)	B (Ice), C (Ice), D (Ice +H2SO4 pH<2), E (Ice + HCl pH <2), G (H2SO4 pH<2), H (Ice) (8) ✓	MW08A	06/07/2018 09:50	Field Sample
-04	MW08B		Groundwater/ Cole, Phillip	Grab	SVOA(35), SVOA-SIM(35), NNNTOC(35), VOA(35), NH3+P(35), SA(35)	B (Ice), C (Ice), D (Ice +H2SO4 pH<2), E (Ice + HCl pH <2), G (H2SO4 pH<2), H (Ice) (8) ✓	MW08B	06/07/2018 10:15	Field Sample
-05	MW08C		Groundwater/ Cole, Phillip	Grab	SVOA(35), SVOA-SIM(35), NNNTOC(35), VOA(35), NH3+P(35), SA(35)	B (Ice), C (Ice), D (Ice +H2SO4 pH<2), E (Ice + HCl pH <2), G (H2SO4 pH<2), H (Ice) (13) ✓	MW08C	06/07/2018 14:30	Field Sample
-03	MW908A		Groundwater/ Cole, Phillip	Grab	SVOA(35), SVOA-SIM(35), NNNTOC(35), VOA(35), NH3+P(35), SA(35)	B (Ice), C (Ice), D (Ice +H2SO4 pH<2), E (Ice + HCl pH <2), G (H2SO4 pH<2), H (Ice) (8) ✓	MW08A	06/07/2018 09:50	Field Duplicate
-01	TB001		Trip Blank Water/ Cole, Phillip	Grab	VOA(35)	A (HCl pH <2) (3) ✓	#R4DART#	06/07/2018 08:00	Trip Blank

Sample(s) to be used for Lab QC: MW08C Tag B, MW08C Tag C, MW08C Tag D, MW08C Tag E, MW08C Tag G, MW08C Tag H

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: SVOA=(SVOA) Semivolatiles, SVOA-SIM=(SVOA) Semivolatiles (SIM), NNNTOC=Nitrate-Nitrite Nitrogen/TOC, VOA=(VOA) Volatile Organics, NH3+P=(CNA) Ammonia (NH3) + Phosphorous, SA=(CNA) Sulfate/Alkalinity (as CaCO3)

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Ph. II/Cole	Rev 2 / Black & Veatch	06-07-18/1830	FED EX		
			RnBall EPA SESD ASB	6-8-18 1005	LABELS SMEARED

USEPA CLP High Res COC (LAB COPY)

DateShipped: 6/8/2018

CarrierName: FedEx

AirbillNo: 7724 2892 4791

CHAIN OF CUSTODY RECORD

Project Number: 18-0458

Case #: 47674

No: 06/08/18-0003

Lab: Analytical Resources, Inc.

Lab Contact:

Lab Phone: 206-695-6207

Sample Identifier	CLP Sample No.	Media/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
SS1034F_A	DAX03	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1023 (Ice) (1)	SS1034F	06/08/2018 09:05	
SS1034F_B	DAX04	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1024 (Ice) (1)	SS1034F	06/08/2018 09:10	
SS1034R_A	DAX05	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1025 (Ice) (1)	SS1034R	06/08/2018 09:18	
SS1034R_B	DAX06	Surface Soil/ Cole, Phillip	Grab	CDD/CDF(21)	1026 (Ice) (1)	SS1034R	06/08/2018 09:22	
SS1034RB001	PDAX27	Rinse Water Blank/ Cole, Phillip	Grab	CDD/CDF(21)	1000 (Ice), 1001 (Ice) (2)	#R4DART#	06/08/2018 08:15	

Special Instructions:	**Shipment for Case Complete? Y**
	Samples Transferred From Chain of Custody #
Analysis Key: CDD/CDF=CLP Dioxins/Furans	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

Attachment 3
Sample Data Sheets with Additional Interpreted Qualifiers

No additional support necessary for this sample data group

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Attachment 4
QC Support Documentation

No additional support necessary for this sample data group

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Appendix D. Treatability Testing Results

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American Creosote Works
Barrier Wall Bench Scale Treatability Study
SH0682
Final Report

Prepared For:

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July 25, 2019

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1.0 INTRODUCTION

KEMRON Environmental Services, Inc. (KEMRON) is pleased to present Black and Veatch Special Projects Corp (B&V), with this final report of the Barrier Wall Bench Scale Treatability Study performed on material sampled from the American Creosote Works Site (Site) located in Pensacola Bay, Florida. This Report provides the methodology and protocols used, as well as the results of testing performed on the untreated and treated soil materials. This study was performed in general accordance with the Statement of Work (SOW) for Barrier Wall Mix Design and Compatibility Testing Treatability Study and numerous communications between B&V and KEMRON. A copy of the SOW is included in **Appendix A**.

The objective of the Study was to evaluate potential readily available reagents and addition rates capable of producing an effective soil-cement-bentonite (SCB) mixture design for a barrier wall at the Site. The objective was also to determine the ability of the mixtures to meet the performance criteria for the Site, which is a minimum unconfined compressive strength of 25 pounds per square inch (psi) after 28 days of curing and a hydraulic conductivity of 1×10^{-7} centimeters per second (cm/s), or less, after 28 days of curing.

2.0 MATERIAL RECEIPT, HOMOGENIZATION, AND CHARACTERIZATION

On March 9, 2018, KEMRON received four Shelby tubes and ten 5-gallon buckets of soil material from the site. The four Shelby tube samples were labeled as below:

- BW03 110-112’
- BW05 110-112’
- BW08 110-112’
- BW13 110-112’

The ten 5-gallon buckets were labeled as below:

- ACW BW04 Coarse Sand
- ACW BW05 Coarse Sand
- ACW BW06 Coarse Sand
- ACW BW11 Fine Sand
- ACW BW13 Fine Sand
- ACW BW12 Off Set Fine Sand
- ACW BW12 Off Set Fine Sand
- ACW BW13 NAPL
- ACW BW14 NAPL
- ACW BW14 NOD Sample

Immediately following sample receipt, KEMRON logged the materials into a sample tracking database and placed the soil in a 4 degree-Celsius (°C) walk-in cooler for storage.

Prior to conducting any testing on the untreated site materials, KEMRON was instructed by B&V to prepare several composite materials by combining various buckets of soils. These composite soils were prepared and homogenized to ensure uniform materials for testing. The following is a description of the composite materials prepared by KEMRON;

The Coarse Sand composite (Soil 1) material was formed by combining the following buckets:

- ACW BW04 Coarse Sand
- ACW BW05 Coarse Sand
- ACW BW06 Coarse Sand
- ACW BW12 Off Set Fine Sand

The Fine Sand composite material (Soil 2) was formed by combining the following buckets:

- ACW BW11 Fine Sand
- ACW BW12 Off Set Fine Sand
- ACW BW13 Fine Sand

The NAPL composite material (Soil 3) was formed by combining the following buckets:

- ACW BW13 NAPL
- ACW BW14 NAPL

Compositing/homogenization was performed by placing the contents of each bucket into a pre-cleaned plastic mixing pan and gently blending by hand using a stainless steel spoon until visually homogenous. Any particles measuring greater than 0.5 inches in diameter were broken into sizes that are more manageable or were removed in order to facilitate bench-scale treatment and adhere to particle-size limits outlined in certain ASTM and EPA test methods. There were no particles greater than 0.5 inches in diameter that were removed from any of the buckets of material.

In order to assist in the selection of potential appropriate reagent(s) and addition rates, as well as to provide geotechnical information, KEMRON evaluated selected physical properties of the homogenized composite materials by conducting the following testing, in triplicate, in accordance with the referenced test methods:

PARAMETER	**METHOD**
Particle Size (w/ Hydrometer)	ASTM D422
Soil Classification	ASTM D2487
Atterberg Limits	ASTM D4317
Moisture Content	ASTM D2216
Loss on Ignition (Organic Content)	ASTM D2974

A summary of the results of the physical properties testing is provided in **Table 1**, and physical properties data sheets for the untreated materials are included in **Appendix B**.

KEMRON also evaluated physical properties testing on the four Shelby tube samples in accordance with the below reference test method:

PARAMETER	**METHOD**
Hydraulic Conductivity	ASTM D5084

A summary of the results of the hydraulic conductivity testing is provided in **Table 2**, and the data

sheets are included in **Appendix B**.

The results of untreated material characterization testing presented in **Table 1** indicate that the Coarse Sand and Fine Sand materials are classified as poorly graded sand with silt. The NAPL material is classified as a poorly graded sand. The results also indicate that the Coarse sand material exhibited a moisture content ranging from 8.77 to 15.54%. The Fine Sand material exhibited a moisture content ranging from 18.80 to 19.48%. And the NAPL material exhibited a moisture content ranging from 18.11 to 18.35%. The results also indicate that the NAPL material exhibited a slightly higher Loss on Ignition at a range of 3.23 to 3.37% than the Coarse Sand and Fine Sand materials at a range of 0.06 to 0.15% and 0.06 to 0.29%, respectively.

The results of **Table 2** indicate the Shelby tube samples, noted as Basal Clay Layer, exhibited hydraulic conductivity values ranging from 2.0×10^{-9} to 1.1×10^{-9}.

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TABLE 1

Untreated Physical Properties Testing

Testing Parameter	Test Method	Unit	Untreated Material								
			Coarse Sand A	Coarse Sand B	Coarse Sand C	Fine Sand A	Fine Sand B	Fine Sand C	NAPL A	NAPL B	NAPL C
Particle Size Distribution	ASTM D422										
Gravel		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sand		%	93.9	94.2	95.2	92.6	92.7	89.1	97.1	97.3	96.3
Silt		%	5.4	4.9	3.9	6.3	4.9	9.8	2.5	1.2	2.0
Clay		%	0.7	0.9	0.9	1.1	2.4	1.1	0.4	1.5	1.7
Sample Description	ASTM D2487		Light brown poorly graded sand with silt	Light brown poorly graded sand with silt	Light brown poorly graded sand	Tan poorly graded sand with silt	Tan poorly graded sand with silt	Tan poorly graded sand with silt	Black poorly graded sand	Black poorly graded sand	Black poorly graded sand
Atterburg Limits	ASTM D4317										
LL			NA	NA	NV	NA	NA	NA	NA	NA	NA
PL			NP	NP	NP	NP	NP	NP	NP	NP	NP
PI			NP	NP	NP	NP	NP	NP	NP	NP	NP
USCS Classification	ASTM D2487		SP-SM	SP-SM	SP	SP-SM	SP-SM	SP-SM	SP	SP	SP
Moisture Content	ASTM D2216										
Average ASTM Moisture Content		%	14.54	9.33	8.77	19.48	18.80	19.02	19.26	19.10	19.47
Average Percent Solids		%	87.35	91.47	91.94	83.70	84.18	84.02	83.85	83.96	83.71
Loss on Ignition	ASTM D2974										
ASTM Moisture Content		%	12.09	11.88	12.25	19.55	19.21	19.74	18.11	18.35	18.31
Average Loss on Ignition @ 440°C		%	0.06	0.12	0.15	0.09	0.06	0.29	3.37	3.23	3.28

Notes:
Sample descriptions based on the Unified Classification System.
Sample color determined by the Munsell Soil Color Charts.
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
NV = Non viscous
NP = Non plastic
NT = Not tested
%= Percent

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TABLE 2

Basal Clay Layer Hydraulic Conductivity

Sample ID	Depth (Feet)	Description	Sample Type	Hydraulic Conductivity ASTM D5084			
				Moisture Content %	Dry Density (pcf)	Wet Density (pcf)	K (cm/sec)
BW 03	111	Moist greyish brown clay	UD	37.2	82.0	113	1.1×10^{-9}
BW 05	111	Moist greyish brown clay	UD	38.7	81.0	112	2.0×10^{-9}
BW 08	111.8	Moist greyish brown clay	UD	37.5	83.0	114	1.4×10^{-9}
BW 13	111	Moist greyish brown clay	UD	35.3	82.4	112	1.5×10^{-9}

Notes:
UD= Undisturbed Sample (Shelby Tube)
% = Percent
pcf = pounds per cubic foot
cm/sec = centemeter per sec

3.0 BARRIER WALL MIX DESIGN AND COMPATABILITY TESTING

KEMRON understands that the goals of treatment include the development of an economical and effective SCB capable of a minimum 28-day Unconfined Compressive Strength (UCS) value of 25 pounds per square inch (psi) and a Hydraulic Conductivity of $1x10^{-7}$ or less centimeters per second (cm/sec) at a 28 day cure interval.

According to the SOW, the barrier wall mix design and compatibility testing study consists of mix design evaluations where mixes of soil, hydrant water, bentonite and cement are prepared and tested by permeation and compression loading. The testing program also consists of a DNAPL compatibility evaluations where effective mix designs are prepared with DNAPL and tested for changes in geotechnical properties and a thermal compatibility evaluation where the resultant mix design is subjected to thermal stress and tested for changes in strength and hydraulic conductivity.

The following sections outline the methodology and protocols performed by KEMRON to complete the barrier wall mix design and compatibility testing.

3.1 Tier 1 – Soil 1 Admixture Testing

KEMRON prepared five mixtures utilizing the Coarse Sand material for the Soil 1 Admixture testing phase of the study. The reagents used included:

REAGENT	**SOURCE**
Type I Portland Cement	Local Hardware Store
Wyo-Ben Hydrogel	WyoBen, Billings, MO

All reagent materials were introduced into the untreated material as a pumpable slurry using potable tap water. Each mixture was prepared using a bench bowl mixer (e.g., Hobart-type kitchen mixer) with a paddle-type mixing arm. Mixtures were prepared by placing an aliquot of the untreated material into the mixing chamber. The appropriate reagents were then added as a slurry to the untreated material while mixing. Each mixture was blended for a period of approximately 60 to 90 seconds at a rate of approximately 60 revolutions per minute (rpm). Treatment utilizing this mixer is intended to simulate potential full-scale remediation options, to the extent possible on the bench-scale.

All mixtures were developed on a by weight basis. The reagent addition rates were based on the initial weight of the untreated material being treated and the water utilized in preparing the reagent slurry was based on the total weight of reagents being used in the mixture. The Wyo-Ben Hydrogel used in each mixture was hydrated overnight with potable tap water at a 3:1 water to bentonite ratio.

The below outline gives an example of how the mixtures were prepared on a by weight basis:

- For a mixture including a 5% addition rate of Type I Portland cement, a 2% addition of Wyo-Ben Hydrogel and a 300% water to reagent addition, for every 100 grams of untreated soil being treated 2 grams of Wyo-Ben Hydrogel was slurried with 6 grams of potable tap water and allowed to hydrate overnight.

- On the next day, 5 grams of Portland cement was slurried with 15 grams of potable laboratory tap water and the hydrated bentonite mixture.

- This reagent slurry was then added to the untreated material and blended until visually homogenous.

Mixture design sheets for all five mixtures are provided in **Appendix C** and the mixture designs are summarized in **Table 3** below.

The following is a summary of treated material curing techniques, testing performed on the treated samples, and brief descriptions of the protocols utilized for the Soil 1 Admixture testing:

- The five mixtures were poured into cylindrical curing molds. Each sample mold was firmly tapped on a hard surface to remove any air bubbles, and allowed to cure at ambient temperature (68 ˚F to 72 ˚F) in moisture-sealed containers.

- Pocket penetrometer testing was performed by KEMRON on the mixtures at cure times including 1, 3, 5 and 7 days. Approximately 100 grams of each treated material was placed into a small plastic cup then cured and tested at the above intervals to evaluate the potential setting characteristics. Results of the pocket penetrometer testing are noted individually on each of the mixture design sheets provided in **Appendix C**, and are summarized in **Table 3**.

- After 7 and 28 days of curing, KEMRON tested the unconfined compressive strength (UCS) of each of the five mixtures. UCS testing was performed in accordance with ASTM Method D2166 by first removing each cured sample specimen from its cylindrical mold. The weight and physical dimensions of the sample were recorded on the appropriate data sheet, and the specimen was placed on a UCS load frame and compressed at a rate of 1% strain per minute until the sample failed or 15% strain had been achieved. Throughout the testing, KEMRON documented the load at specific strain values. A representative aliquot of the post-test specimen was then subjected to moisture content testing. UCS test results are presented in **Table 3**, and the data sheets are provided in **Appendix D**.

- After 7 and 28 days of curing, the hydraulic conductivity of each mixture was tested in accordance with ASTM D5084. Treated samples of each mixture, measuring approximately 3 inches in diameter by 3 inches in height, were forwarded to Geotesting Express, an ASTM certified lab in Atlanta, GA, for Hydraulic Conductivity testing. A confining pressure of 24 psi was used for testing. Hydraulic Conductivity test results are presented in **Table 3**, and the data sheets are provided in **Appendix D**.

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TABLE 3

SOIL 1 ADMIXTURE TESTING
Mixture Designs, Pocket Penotrometer,Unconfined Compressive Strength, and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Pocket Penotrometer (TSF)				Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-01	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	3.0/2.0	300.0	1.25	2.75	>4.5	>4.5	7	22.05	122.7	100.6	26.0	22.7	121.0	98.3	1.2×10^{-7}
									28	21.63	121.2	99.7	35.3	22.6	119.0	97.4	8.0×10^{-8}
BWM-02	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	4.0/2.0	300.0	1.25	2.25	>4.5	>4.5	7	22.87	118.4	96.3	27.2	23.8	122.0	98.9	2.4 x 10-7
									28	22.14	121.3	99.3	49.0	23.7	119.0	96.6	5.1×10^{-8}
BWM-03	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	0.50	2.75	>4.5	>4.5	7	26.53	120.2	95.0	32.1	26.2	121.0	96.1	2.1 x 10-7
									28	25.07	121.2	96.9	44.3	26.2	120.0	94.8	9.1×10^{-8}
BWM-04	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	6.0/3.0	300.0	0.00	2.00	4.25	>4.5	7	30.18	115.5	88.7	32.2	30.7	117.0	89.9	1.1 x 10-7
									28	30.06	116.2	89.3	39.8	30.5	118.0	90.2	6.0×10^{-8}
BWM-05	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	8.0/4.0	300.0	0.00	1.25	3.00	4.00	7	39.00	112.7	81.1	27.3	38.1	113.0	82.1	1.3 x 10-7
									28	38.18	112.2	81.2	47.7	37.6	110.0	80.1	8.7×10^{-8}

Notes:
% = Percent
Wt= Weight
TSF = Tons per square foot
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
cm/sec = centimeter per second

Review of the results presented in **Table 3** indicates that four of the five mixtures achieved pocket penetrometer strength gains in excess of 4.5 tons per square foot (tsf) after 7 days of curing and one of the mixtures had a penetrometer strength of 4.0 tsf.

A review of the UCS and hydraulic conductivity testing results presented in **Table 3** shows that at the 7 day curing interval the treated mixtures exhibited strength values ranging from 26.0 to 32.2 pounds per square inch (psi). In addition, after 28 days of curing, the treated mixtures exhibited strength values ranging from 35.3 to 49.0 psi. Hydraulic conductivity testing performed on the treated materials at the 7 day curing date resulted in hydraulic conductivity values in the 10^{-7} centimeter per second (cm/sec) range. The treated materials at the 28 day curing interval resulted in hydraulic conductivity values in the 10^{-8} cm/sec range.

3.2 Tier 2 Admixture Testing

KEMRON prepared mixtures utilizing the Coarse Sand material (Soil 1), the Fine Sand material (Soil 2) and the NAPL material (Soil 3) for the Tier 2 Admixture testing phase of the study. The reagents that were requested by B&V and used in the mixtures included:

REAGENT	SOURCE
Type I Portland Cement	Local Hardware Store
Wyo-Ben Hydrogel	WyoBen, Billings, MO
GGBFS Grade 120	LeHigh Hanson, Cape Canaveral, FL
Ag-Dolomite	Baker Lime, York, PA
High Calcium Quicklime	Lhoist North America, Fort Worth, TX
Lime Kiln Dust	Sheppard Materials, Ravena, NY

3.2.1 NAPL Soil Admixture Chemical Compatibility Testing

Black & Veatch selected optimal Tier 1 mixture designs for chemical compatibility testing using the NAPL material (Soil 3). KEMRON prepared two mixtures, in duplicate, using the same methodology as previously mentioned. The following is a summary of the treated material curing techniques and testing performed on the treated samples:

- The four mixtures were poured into small plastic cups. Each cup was lightly tapped on a hard surface to remove air voids and allowed to cure at ambient temperature (68 ˚F to 72 ˚F) in a moisture-sealed container.

- Pocket penetrometer testing was performed by KEMRON on the mixtures at cure times of 4, 7 and 14 days. Results of the pocket penetrometer testing are noted individually on each of the mixture design sheets provided in **Appendix E** and are summarized in **Table 4** below.

A review of the pocket penetrometer results presented in **Table 4** indicate that none of the treated mixtures utilizing the optimal Tier 1 mixture designs and NAPL material exhibited any measurable strength gain after 14 days of testing.

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TABLE 4

NAPL SOIL ADMIXTURE CHEMICAL COMPATIBILITY TESTING
Mixture Designs, Pocket Penotrometer,Unconfined Compressive Strength, and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water (1) Addition % by Reagent wt.	Pocket Penotrometer (TSF)		
					4 Day	7 Day	14 Day
BWM-06	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel	4.0/2.0	300.0	0.00	0.00	0.00
BWM-06 DUP	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel	4.0/2.0	300.0	0.00	0.00	0.00
BWM-07	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	0.00	0.00	0.00
BWM-07 DUP	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	0.00	0.00	0.00

Notes:
TSF = Tons per square foot
Wt= Weight
% = Percent

Based on the results of the Tier 2A NAPL Soil Admixture Chemical Compatibility testing, Black & Veatch provided KEMRON with experimental mixture designs to evaluate a higher optimal SCB ratio. KEMRON prepared seven mixtures utilizing the NAPL material (Soil 3) and a 50:50 composite of the NAPL material (Soil 3) and Coarse Sand material (Soil 1). Pocket penetrometer testing was performed on the mixtures at cure times of 3, 5, 7 and 14 days. The results of the pocket penetrometer testing are noted individually on each of the mixture design sheets provided in **Appendix E** and are summarized in **Table 5**.

The results of the penetrometer testing presented in **Table 5** indicate that one of the seven mixtures achieved pocket penetrometer strength gain after 14 days of testing. These results led Black & Veatch to provide KEMRON with more experimental mixture designs to test for strength gain. KEMRON then prepared five additional mixtures utilizing the NAPL material and five additional mixtures utilizing a 50:25:25 composite of NAPL material, Coarse Sand and Fine Sand material. Pocket Penetrometer testing was performed on each mixture at cure times of 3, 5 and 7 days. The results of the pocket penetrometer testing are noted individually on each of the mixture design sheets provided in **Appendix E** and are summarized in **Table 5**.

The results in **Table 5** of the pocket penetrometer testing performed on the additional 10 experimental mixtures indicate that four of the 10 mixtures achieved pocket penetrometer strength in excess of 4.5 tsf after 7 days of curing. The remaining six mixtures exhibited pocket penetrometer strengths ranging from 0 to 2.5 tsf.

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TABLE 5

Experimental NAPL Soil Admixture Chemical Compatibility Testing
Mixture Designs & Pocket Penotrometer

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Pocket Penotrometer (TSF)			
					3 Day	5 Day	7 Day	14 Day
EXP-001	50%NAPL/50%Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	1.50	2.50	2.75	2.75
EXP-002	50%NAPL/ 50%Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	4.0/8.0	300.0	3.50	4.00	4.00	4.00
EXP-003	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel/GGBFS	3.0/2.0/6.0	300.0	0.00	0.00	0.00	0.00
EXP-004	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel/GGBFS	4.0/2.0/8.0	300.0	0.00	0.00	0.00	0.00
EXP-005	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel/GGBFS	6.0/2.0/6.0	300.0	0.00	0.00	0.00	0.00
EXP-006	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel/GGBFS/Ag Dolomite	4.0/2.0/6.0/10.0	300.0	0.00	0.00	0.00	0.00
EXP-007	NAPL	Type I Portland Cement/Wyoming Bentonite Hydrogel/ Ag Dolomite	6.0/2.0/10.0	300.0	0.00	0.00	0.00	0.00
EXP-008	NAPL	Type I/II Portland Cement, Wyoming Bentonite Hydrogel	10.0/2.0	150.0	0.00	0.00	0.00	
EXP-009	NAPL	Type I/IIPortland Cement, hydrated CaO (quick lime), Wyoming Bentonite Hydrogel	8.0/4.0/2.0	200.0	1.00	1.25	2.00	
EXP-010	NAPL	Type I/IIPortland Cement / Lime Kiln Dust / Wyoming Bentonite Hydrogel	8.0/8.0/2.0	200.0	0.00	1.00	1.00	
EXP-011	NAPL	Type I/IIPortland Cement/ hydrated CaO (quicklime), Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0	3.25	>4.5	>4.5	
EXP-012	NAPL	Type I/IIPortland Cement/ Lime Kiln Dust/ Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0	1.25	3.75	4.50	
EXP-013	50%NAPL/25%Coarse/ 25%Fine	Type I/IIPortland Cement, Wyoming Bentonite Hydrogel	10.0/2.0	150.0	4.50	>4.5	>4.5	
EXP-014	50%NAPL/25%Coarse/ 25%Fine	Type I/IIPortland Cement, hydrated CaO (quick lime), Wyoming Bentonite Hydrogel	10.0/4.0/2.0	200.0	0.25	0.75	1.00	
EXP-015	50%NAPL/25%Coarse/ 25%Fine	Type I/IIPortland Cement / Lime Kiln Dust / Wyoming Bentonite Hydrogel	8.0/8.0/2.0	150.0	1.75	2.00	2.50	
EXP-016	50%NAPL/25%Coarse/ 25%Fine	Type I/IIPortland Cement/ hydrated CaO (quicklime), Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0	>4.5	>4.5	>4.5	
EXP-017	50%NAPL/25%Coarse/ 25%Fine	Type I/IIPortland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0	2.50	3.25	>4.5	

Notes:
Wt= Weight
% = Percent
TSF = Tons per square foot

3.2.2 Soil 1, Soil 2 and NAPL Admixture Testing

KEMRON prepared 18 mixtures for the next phase of the study. The mixtures were prepared using the same methodology as previously outlined and are described below:

- Two duplicate mixtures of a Tier 1 mixture utilizing Coarse Sand material. Testing on these mixtures included pocket penetrometer testing at 1, 3 and 5 days of curing and UCS testing at 28 days of curing.

- Four mixtures with duplicates (total of eight mixtures) utilizing the Fine Sand material. Testing included pocket penetrometer testing at 3, 5 and 7 days of curing, UCS testing at 28 days of curing and Hydraulic Conductivity testing at 28 days of curing. For the Hydraulic Conductivity testing, the mixtures were removed from the curing molds, and the weights and physical dimensions of the samples were recorded on the appropriate data sheets. The permeameter was assembled, and the samples were saturated to a minimum value of 95%, and then consolidated using a 24 psi confining pressure. Water was then passed through the samples, and the Hydraulic Conductivity was determined.

- One mixture with a duplicate (total of two mixtures) utilizing the Fine Sand material. Testing included pocket penetrometer testing at 3, 5, 7 and 14 days of curing and UCS testing at 14 days of curing.

- Two mixtures with duplicates (total of four mixtures) utilizing the NAPL material. Testing included pocket penetrometer testing at 3, 5 and 7 days of curing, UCS testing at 28 days of curing and Hydraulic Conductivity testing at 28 days of curing.

- Two mixtures utilizing the NAPL material. Testing included UCS testing at 28 days of curing and Hydraulic Conductivity testing at 28 days of curing.

The results of the pocket penetrometer testing are noted individually on each of the mixture design sheets provided in **Appendix E** and are summarized in **Table 6**. The results of the UCS and Hydraulic Conductivity testing are summarized in **Table 6** and the data sheets are provided in **Appendix F**.

Review of the pocket penetrometer results presented in **Table 6** indicate that six of the 18 mixtures achieved pocket penetrometer strength gains in excess of 4.5 tsf after 3 days of curing, two of the 18 mixtures achieved strength gains in excess of 4.5 tsf after 5 days of curing and four mixtures achieved strength gains in excess of 4.5 tsf after 7 days of curing. The remaining six mixtures exhibited penetrometer strengths ranging from 1.25 to 4.5 tsf after 7 days of curing. The two mixtures that were tested for pocket penetrometer strength gain after 14 days of curing, resulted in strengths of 2.0 and 2.25 tsf.

A review of the UCS and hydraulic conductivity testing results presented in **Table 6** shows that at the 7 day curing interval two of the treated mixtures exhibited strength values ranging from 14.0 to 14.1 pounds per square inch (psi). In addition, after 28 days of curing, the remaining treated mixtures exhibited strength values ranging from 30.8 to 56.4 psi. Hydraulic conductivity testing performed on the treated materials at the 28 day curing date resulted in hydraulic conductivity values ranging from 10^{-6} to 10^{-7} cm/sec.

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TABLE 6

TIER 2 TESTING
Mixture Designs, Pocket Penotrometer, Unconfined Compressive Strength, and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Pocket Penetrometer (TSF)					Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day	14 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-03 DUP (A)	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	1.75	4.25	>4.50			28	23.80	122.7	99.10	35.5				
BWM-03 DUP (B)	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	1.75	4.50	>4.50			28	24.51	122.0	98.00	35.8				
BWM-08	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		3.25	3.50	4.25		28	35.95	106.5	78.30	47.6	34.97	107.6	79.7	3.59E-07
BWM-08 DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		3.50	3.75	4.50		28	35.82	106.4	78.30	56.4	34.03	107.2	80.0	2.40E-07
BWM-09	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		2.50	3.25	>4.5		28	37.49	105.1	76.50	39.2	32.43	112.1	84.6	1.76E-06
BWM-09 DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		2.50	3.75	>4.5		28	42.13	104.2	73.30	39.9	33.89	111.1	83.0	2.51E-06
BWM-10	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0		0.75	1.00	1.25	2.25	7	38.62	112.8	81.40	14.1				
BWM-10 DUP	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0		0.75	1.00	1.25	2.00	7	38.61	111.1	80.10	14.0				
BWM-11	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0						28	38.96	110.2	79.30	42.0	34.98	111.7	82.8	1.02E-06
BWM-12	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0						28	41.14	107.2	76.00	30.8	33.93	112.3	83.8	2.03E-06
BWM-13	Fine Material	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-13 DUP	Fine Material	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-14	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-14 DUP	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-15	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/2.0	150.0		>4.5	>4.5	>4.5		28	40.70	112.1	79.7	46.9	36.3	114.6	84.1	8.10E-07
BWM-15 DUP	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/2.0	150.0		>4.5	>4.5	>4.5		28	37.45	113.0	82.2	52.7	37.6	113.3	82.3	8.50E-07
BWM-16	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	8.0/4.0/2.0	150.0		3.25	4.25	>4.5		28	38.80	114.6	82.6	45.5	34.8	114.2	84.7	1.80E-06
BWM-16 DUP	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	8.0/4.0/2.0	150.0		3.25	4.50	>4.5		28	36.24	114.2	83.8	55.0	34.5	115.4	85.8	1.30E-06

Notes:
Wt= Weight
% = Percent
TSF = Tons per square foot
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
cm/sec = centimter per second

3.2.3 Tier 2 Supplemental Evaluation Screening

Based on the results of the Soil 1, Soil 2 and NAPL Admixture Testing, Black & Veatch provided KEMRON with supplemental mixture designs. KEMRON prepared 12 mixtures utilizing the NAPL material and a 75:25 composite of Coarse Sand material and Fine Sand material. Pocket penetrometer testing was performed on the mixtures at cure times of 7 and 14 days. The results of the pocket penetrometer testing are noted individually on each of the mixture design sheets provided in **Appendix E** and are summarized in **Table 7**.

The pocket penetrometer results presented in **Table 7** indicate that three of the 12 mixtures achieved pocket penetrometer strength gains in excess of 4.5 tsf after7 days of curing and three mixtures achieved strength gains in excess of 4.5 tsf after 14 days of curing. The remaining six mixtures exhibited penetrometer strengths ranging from 2.0 to 4.5 tsf after 14 days of curing.

3.2.4 Tier 2 Compatibility and Confirmation Testing

Based on the results of the Supplemental Evaluation Screening, Black and Veatch chose four optimal mixture designs for Compatibility testing. KEMRON prepared four mixtures with duplicates (total of eight mixtures) utilizing the NAPL material and a 75:25 composite of Coarse Sand material and Fine Sand material. Testing performed on the mixtures included pocket penetrometer, UCS and Hydraulic Conductivity testing. The mixture development sheets are provided in **Appendix G**. The results of the pocket penetrometer, UCS and Hydraulic Conductivity testing are summarized in **Table 8** and the data sheets are provided in **Appendix H**.

The pocket penetrometer testing resulted in three of the four samples gaining strength in excess of 4.5 tsf after 21 days of testing. The remaining mixture resulted in a pocket penetrometer strength of 4.5 tsf after 21 days of curing. Review of the UCS testing results indicate that the treated mixtures exhibited UCs values ranging from 35.8 to 49.1 psi after 28 days of curing. The Hydraulic conductivity results indicate that the treated mixtures exhibited Hydraulic Conductivity values ranging from 10^{-7} to 10^{-8} cm/sec.

KEMRON also performed long term hydraulic conductivity testing on mixtures BWM-23 and BWM-24. Several readings were recorded on a weekly basis for four weeks. The Hydraulic Conductivity “K” value was graphed versus the cure interval. The figures are included in the **Appendix I**.

KEMRON prepared two mixtures for confirmation testing utilizing a 75:25 composite of the Coarse Sand and Fine Sand materials. Testing performed on the mixtures included UCS at the 7 day cure interval. The mixture development sheets are provided in **Appendix G**. The results of the UCS testing is summarized in **Table 9** and the data sheets are also provided in **Appendix H**. Review of the UCS results indicate that the confirmation mixtures exhibited UCS values of 7.8 and 16.3 psi after 7 days of curing. Based on the UCS testing results performed on the Confirmation mixtures, Black & Veatch instructed KEMRON to terminate further testing.

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TABLE 7

TIER 2 Supplemental Evaluation Screening - New batch of Portland cement
Mixture Designs and Pocket Penetrometer

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water (1) Addition % by Reagent wt.	Pocket Penetrometer (TSF)	
					7 Day	14Day
BWM-17 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.0	300.0	4.25	>4.5
BWM-18 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.5	300.0	4.00	4.50
BWM-19 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	12.5/3.0	300.0	3.00	4.00
BWM-20 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	12.5/3.5	300.0	2.50	3.25
BWM-21 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/3.0	150.0	>4.5	>4.5
BWM-22 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/3.0	150.0	3.00	>4.5
BWM-23 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/3.5	150.0	>4.5	>4.5
BWM-24 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/3.5	150.0	3.50	>4.5
BWM-25 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	17.5/4.0/3.0	150.0	4.50	4.50
BWM-26 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	17.5/8.0/3.0	150.0	2.75	4.00
BWM-27 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	17.5/4.0/3.5	150.0	>4.5	>4.5
BWM-28 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	17.5/8.0/3.5	150.0	1.25	2.00

Notes:
Wt= Weight
% = Percent
TSF = Tons per square foot

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TABLE 8

Tier 2 Compatibility Testing
Mixture Designs, Pocket Penetrometer, Unconfined Compressive Strength, and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Pocket Penetrometer (TSF)					Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day	21 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-17	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.0	300.0	1.00	1.50	3.00		4.50	28	51.78	107.6	70.9	23.0	48.3	107.0	72.1	8.7×10^{-7}
BWM-17 DUP	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.0	300.0						28	61.31	116.2	72.0	25.0	49.1	112.0	75	8.3×10^{-7}
BWM-18	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	10.0/3.5	300.0	1.25	1.75	3.50		>4.5	28	40.96	109.9	78.0	24.1	46.6	106.0	72.4	6.9×10^{-7}
BWM-18 DUP	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	10.0/3.5	300.0						28	49.63	115.1	76.9	21.7	45.5	108.0	74.3	6.9×10^{-7}
BWM-23	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/3.5	150.0		>4.5	>4.5	>4.5	>4.5	28	40.85	107.1	76.0	81.6	41.2	112.0	79.3	3.8×10^{-8}
BWM-23 DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/3.5	150.0						28	36.95	107.2	78.3	81.0	35.8	109.0	80.1	3.3×10^{-8}
BWM-24	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/3.5	150.0		3.25	>4.5	>4.5	>4.5	28	41.76	106.7	75.3	69.1	40.6	109.0	77.6	4.7×10^{-8}
BWM-24 DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/3.5	150.0						28	32.33	105.8	82.2	55.4	38.8	108.0	78	4.3×10^{-8}

Notes:
Type I/II Portland Cement #842
Wyoming Bentonite #807
High Calcium Quicklime #1112
Lime Kiln Dust#1054
TSF = Tons per square foot
Wt= Weight
% = Percent
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
cm/sec = centimeter per second
Each mixtures were prepared as one batch. UCS and Hydraulic Conductivity testing were performed in duplicate tests.

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TABLE 9

Confirmation Testing
Mixture Designs,Unconfined Compressive Strength, and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Cure Day	Unconfined Compressive Strength ASTM D2166			
						Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)
BWM-29	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	12.5/3.5	300.0	7	69.51	90.4	53.3	7.8
BWM-30	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	15.0/3.5	300.0	7	55.96	111.6	71.6	16.3

Notes:
Type I/II Portland Cement #842
Wyoming Bentonite #807
Wt= Weight
% = Percent
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch

3.2.5 Thermal Compatibility Testing

KEMRON conducted Thermal Compatibility testing on two of the Tier 2 mixtures, selected by Black & Veatch, to determine if exposure to elevated temperatures would have an effect on the physical characteristics of the material. Testing was performed on mixtures BWM-23 and BWM-24, with duplicates. The testing was evaluated at temperatures of 80°C, 100°C and 125°C. Please note, the samples at room temperature were tested at the 28 day cure interval and the thermal compatibility test samples were tested at the 103 and 104 cure interval.

Testing was performed by removing the samples from the curing molds and recording the weight and physical dimensions. The complete data sheets are provided in **Appendix J**. Photographs and visual observations of each sample were also obtained. Each sample was then placed into a stainless steel box reactor and completely submerged in de-ionized water. The weight of the reactor and samples were recorded at two water levels prior to sealing the reactor. The reactor was then sealed using a temperature resistant graphite gasket and lid. The reactors were placed into a standard laboratory drying oven and a stainless steel tube was connected to the lid to allow a pressure transducer to be attached to the reactor. A temperature thermocouple and multi-channel data logger was used to monitor the temperature of the water bath inside the reactor and the temperature of the oven. A graphical presentation of temperature monitoring activities is included in **Appendix J**. Fluctuations in both the water bath and oven temperatures are present on the graphs. This is due to the reactor being removed from the oven for weighing or when additional water was added to the reactors.

A pressurized leak test was then performed on the reactor. The reactor was pressurized to approximately 30 psi and held at this pressure to ensure the reactor was leak free. The reactor was then heated to the target temperature and held at this temperature for 28 days.

During the heating process, the reactor was periodically weighed and any water lost was replaced with fresh DI water. Throughout testing, KEMRON observed that weighing the reactors was not an efficient quality assurance method. Before removing the reactors to be weighed, the pressure build up was released. During this process, a significant amount of water was lost, therefore, the weight of the reactor was not an accurate representation of the water lost through evaporation. Therefore, KEMRON added water throughout each day and added enough water to obtain the original weight.

After the 28 day heating duration, the samples were removed from the reactors, photographed and the weight and physical dimensions were recorded. The samples were then tested for UCS testing and Hydraulic Conductivity Testing. Samples that were held at 20°C (room temperature) were also tested for UCS and Hydraulic Conductivity. The UCS and Hydraulic Conductivity testing results are summarized in **Table 10** and the data sheets are provided in **Appendix J**. A photographic log of the Thermal Compatibility testing is provided in **Appendix K**.

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TABLE 10

Thermal Compatibility Testing
Mixture Designs,Unconfined Compressive Strength, and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
						Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-23 20C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	35.73	105.4	77.7	107.0	33.5	106	79.6	6.4×10^{-8}
BWM-23 20C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	33.52	104.7	78.4	106.5	33.4	107	80.5	8.6×10^{-8}
BWM-23 80C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	40.89	108.7	77.1	211.4	36.7	110	80.8	3.1×10^{-8}
BWM-23 80C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	40.37	108.4	77.2	202.5	38.4	108	78.3	1.3×10^{-8}
BWM-23 100C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	41.30	107.2	75.9	236.3	39.6	108	77.6	3.6×10^{-8}
BWM-23 100C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	41.20	108.2	76.6	271.8	38.8	109	78.2	3.7×10^{-8}
BWM-23 125C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	104	42.53	107.1	75.1	355.6	40.3	107	76.2	4.7×10^{-9}
BWM-23 125C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	104	42.91	108.2	75.7	282.4	37.1	109	79.4	3.4×10^{-9}
BWM-24 20C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	41.44	105.1	74.3	96.4	28.6	111	86.3	1.1×10^{-7}
BWM-24 20C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	41.31	105.0	74.3	99.6	28.9	114	88.3	3.1×10^{-7}
BWM-24 80C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	43.22	106.4	74.3	125.0	36	110	81.2	7.8×10^{-8}
BWM-24 80C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	39.35	107.9	77.4	120.5	38.1	109	79.0	9.4×10^{-8}
BWM-24 100C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	42.01	109.6	77.1	151.1	37.3	109	79.4	1.3×10^{-7}
BWM-24 100C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	43.34	107.9	75.3	131.0	37.6	110	79.8	3.0×10^{-7}
BWM-24 125C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	104	41.85	106.3	74.9	258.1	36.7	108	79.3	1.6×10^{-6}
BWM-24 125C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	104	48.04	107.3	72.5	204.3	41.1	107	76.0	2.1×10^{-6}

Notes:
Type I Portland Cement #842
Wyoming Bentonite #807
High Calcium Quicklime #1112
Lime Kiln Dust #1054
Wt= Weight
% = Percent
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
cm/sec = centimeter per second
103/104 day UCS and Hydraulic Conductivity testing were performed in duplicate tests.

Review of the UCS results presented in **Table 10** indicate the following:

- The UCS values increase after thermal treatment for both the BWM-23 and BWM-24 samples
- BWM-23 and BWM-23 DUP, at 20°C, resulted in UCS values of 107.0 and 106.5, respectively.
- BWM-23 80°C resulted in an increase to 211.4 psi after being treated at 80°C for 28 days.
- BWM-23 80°C DUP resulted in an increase to 202.5 psi after being treated at 80°C for 28 days.
- BWM-23 100°C resulted in an increase to 236.3 psi after being treated at 100°C for 28 days.
- BWM-23 100°C DUP resulted in an increase to 271.8 psi after being treated at 100°C for 28 days.
- BWM-23 125°C resulted in an increase to 355.6 psi after being treated at 125°C for 28 days.
- BWM-23 125°C DUP resulted in an increase to 282.4 psi after being treated at 125°C for 28 days.
- BWM-24 and BWM-24 DUP, at 20°C, resulted in UCS values of 96.4 and 99.6, respectively.
- BWM-24 80°C resulted in an increase to 125.0 psi after being treated at 80°C for 28 days.
- BWM-24 80°C DUP resulted in an increase to 120.5 psi after being treated at 80°C for 28 days.
- BWM-24 100°C resulted in an increase to 151.1 psi after being treated at 100°C for 28 days.
- BWM-24 100°C DUP resulted in an increase to 131.0 psi after being treated at 100°C for 28 days.
- BWM-24 125°C resulted in an increase to 258.1 psi after being treated at 125°C for 28 days.
- BWM-24 125°C DUP resulted in an increase to 204.3 psi after being treated at 125°C for 28 days.

Review of the Hydraulic Conductivity results presented in **Table 10** indicate the following:

- The Hydraulic Conductivity testing indicates that permeability values were relatively similar with the treated BWM-23 soils cured at temperatures of 20, 80, and 100°C, and was reduced by an order of magnitude with the treated material cured at a temperature of 125°C. Test results for the BWM-24 treated soil indicates that that the 80°C cured samples had a slower permeability value than the 20°C cured soil but the hydraulic conductivity remained the same with curing at the 100°C temperature and increased with curing at the 125°C temperature. Specifically, the 125°C cured soil had a permeability value an order of magnitude faster than the 20°C cured soil.

- The hydraulic conductivity results between the duplicate samples of each mixture showed good reproducibility.

4.0 CONCLUSIONS

KEMRON evaluated a variety of soil-cement-bentonite mixture designs, under the guidance of Black & Veatch, which are potentially capable of improving the physical properties of the Site Study materials. The performance criteria for the Site included a UCS value of at least 25 pounds per square inch (psi) at the 28 day cure interval and a Hydraulic Conductivity of less than $1x10^{-7}$ cm/sec.

Untreated material characterization testing identified that the Coarse Sand and Fine Sand materials were classified as poorly graded sand with silt and the NAPL material is classified as a poorly graded sand. The Fine Sand material exhibited a slightly higher moisture content than the Coarse Sand and NAPL materials. The NAPL material exhibited a slightly higher Loss on Ignition than the Coarse Sand and Fine Sand materials.

KEMRON prepared five mixtures for the Tier 1 Admixture Testing phase utilizing the Coarse Sand material. The mixtures were prepared to determine optimal mixture designs for further testing. The pocket penetrometer testing results presented in **Table 3** show that four of the five mixtures achieved pocket penetrometer strength gains in excess of 4.5 tons per square foot (tsf) after 7 days of curing. The UCS testing results show that at the 28 day curing interval, the treated mixtures exhibited strength values ranging from 35.3 to 49.0 pounds per square inch (psi). In addition, after 28 days of curing, the treated mixtures exhibited hydraulic conductivity values in the 10^{-8} cm/sec range.

After review of the Tier 1 Admixture testing results, Black & Veatch selected optimal mixture designs to test on the Coarse Sand, Fine Sand and NAPL materials. KEMRON prepared four mixtures utilizing the NAPL material. The pocket penetrometer results presented in **Table 4** show that none of the treated mixtures exhibited strength gain after 14 days of testing. These results led Black & Veatch to provide KEMRON with seven experimental mixture/designs to evaluate a higher optimal SCB ratio utilizing a 50:50 composite of the NAPL material and Coarse Sand material. Pocket penetrometer results, presented in **Table 5**, show that one of the treated mixtures gained strength after 14 days. Based on these results, KEMRON prepared ten additional mixtures utilizing a 50:50 composite of the NAPL and Coarse Sand material and the NAPL material alone. Pocket penetrometer results, also presented in **Table 5**, show that four of the 10 mixtures exhibited strength in excess of 4.5 tsf after 7 days.

KEMRON prepared 18 mixtures for the next phase of the study. Pocket penetrometer results,

presented in **Table 6**, show that 12 of the 18 mixtures exhibited strength in excess of 4.5 tsf after 7 days. UCS testing results show the treated mixtures exhibited strength values ranging from 30.8 to 56.4 psi after 28 days. Hydraulic Conductivity results show values ranging from 10^{-6} to 10^{-7} cm/sec after 28 days.

Black & Veatch provided KEMRON with supplemental mixture designs based on the results of the Soil 1, Soil 2 and NAPL Admixture testing. KEMRON prepared 12 mixtures utilizing the NAPL material and a 75:25 composite of Coarse Sand and Fine Sand materials. Pocket penetrometer results, presented in **Table 7,** show that six of the 12 mixtures exhibited strength in excess of 4.5 tsf after 14 days.

KEMRON then prepared eight mixtures, selected by Black & Veatch, based on h results of the supplemental evaluation screening. The mixtures utilized the NAPL material and a 75:25 composite of Coarse Sand and Fine Sand materials. UCS testing results, presented in **Table 8**, show the treated mixtures exhibited strength values ranging from 35.8 to 49.1 psi after 28 days. Hydraulic Conductivity results show values ranging from 10^{-6} to 10^{-7} cm/sec after 28 days.

KEMRON prepared two mixtures for confirmation testing utilizing a 75:25 composite of the Coarse Sand and Fine Sand materials. UCS testing results, presented in Table 9, show that the treated mixtures exhibited strengths ranging from 7.8 to 16.3 psi after 7 days. Black & Veatch instructed KEMRON to terminate further testing because of the results.

Thermal Compatibility testing was conducted by KEMRON on treated mixtures BWM-23 and BWM-24, with duplicates. The samples were maintained at 20°C, 80°C, 100C and 125°C for 28 days. After 28 days, the samples were tested for UCS and Hydraulic Conductivity. The UCS testing results, presented in **Table 10**, show that the UCS values increased after thermal treatment for both the BWM-23 and BWM-24 samples. Hydraulic Conductivity testing results show the hydraulic conductivity slowed down after each thermal treatment for sample BWM-23, when compared to the 20°C sample. For sample BWM-24, the Hydraulic Conductivity slowed down slightly after being treated at 80°C, remained the same at 100°C and then accelerated after being treated at 125°C.

This report should be reviewed in its entirety including all attachments prior to making decisions concerning a remedial approach. This study is intended to suggest what will occur in the field but does not guarantee the same results. If you have any questions concerning the data provided in this report, please do not hesitate to contact us at 404-601-6927.

Sincerely,

KEMRON Environmental Services, Inc.

Tomecia N. Bradley, CHMM
Program Manager

Mark Clark
Senior Technologist

Appendix A:
SOW for Barrier Wall Mix Design and Compatibility Testing Treatability Study

ATTACHMENT A
AMERICAN CREOSOTE WORKS SITE
SOW FOR BARRIER WALL MIX DESIGN AND COMPATIBILITY
TESTING TREATABILITY STUDY

The objective of the American Creosote Works Site bench-scale treatability study (TS) is to develop sufficient data to at minimum produce one economical and effective Soil-cement-bentonite (SCB) mix design for a barrier wall at the Site. The TS should also develop performance and cost data to assist in preparation of a Remedial Design (RD) for the preferred remedy at the ACW Site. The TS goals for the SCB mixes are:

- A hydraulic conductivity of hydraulic conductivity of $1x10^{-7}$ cm/s or less and is stable in the presence of site-specific contaminants; and
- A 28 day minimum unconfined compressive strength (UCS) of 25 psi.

The Site is located about 500 yards north of Bayou Chico in Pensacola Bay, Florida. The ACW facility used coal tar creosote and pentachlorophenol (PCP) in the wood treating treatment process. As a result, the primary contaminants in the environmental media at the ACW Site are NAPL creosote, Semivolatile organic compounds (SVOCs), dioxins, and PCP.

Alternative #2 for contaminated media zone (CMZ)-1 consists of a barrier wall constructed using a deep soil mixing technology or traditional trench and backfill techniques capable of barrier wall construction depths in excess of 120 foot (ft) to completely surround the zone combined with a low permeability cap and cover. This alternative would provide physical isolation and hydraulic containment of the top, base, and side boundaries of the zone. The barrier wall will be installed to a depth of approximately 115 ft below the nominal ground surface (keying a minimum of 4-ft into the competent clay layer), and to the extents of CMZ-1. The barrier wall will have a rectangular shaped perimeter of 1,980 linear ft to surround a surface area of 5.1 acres. The 690 ft southern limit of CMZ-1 is bounded by CMZ-2A. The impact of adjacent Steam-Enhanced Extraction, the proposed remedy for CMZ-2A, will be considered in phasing the construction of the barrier wall (and in the Tier 2 treatability testing below).

The barrier wall mix design and compatibility testing includes the development of, at minimum, one economical and effective SCB mix design. The testing program will consist of an (i) initial geotechnical characterization; (ii) a mix design evaluation where mixes of soil, water (hydrant water), bentonite, and cement are prepared and tested by permeation and compression loading; (iii) a DNAPL compatibility evaluation where effective mix designs are prepared with DNAPL and tested for changes in geotechnical properties; and (iv) a thermal compatibility evaluation where the resultant mix design is subjected to thermal stress and tested for changes in hydraulic conductivity and strength.

Initial evaluations may conclude that cement will not be required in the mix design. If so, the barrier wall mix design and compatibility testing will not include the testing of mixes containing cement; however, the remainder of this SOW is written to include the option.

Black & Veatch has prepared a January 2018 work plan, BARRIER WALL MIX DESIGN AND COMPATIBILITY TESTING WORK PLAN, (attached) that describes the following aspects of the study:

- The objectives of the study
- The experimental design
- The analytical requirements and number of samples to be analyzed

Black & Veatch will collect representative soil samples, as identified in the work plan and Field Sampling Plan. Undisturbed Shelby-tube soil samples and 5-gallon bucket bulk soil samples will be obtained and forwarded to the SCB testing laboratory for testing.

Sample Requirements

Soil

Subsurface soil sample collection will be conducted via sonic drilling by Black & Vetch along the alignment of the barrier wall to obtain Site soils that will be used in the SCB mix design preparation:

- Soil 1 will be composited from bulk samples biased to contain coarser well sorted sands, soil in which it will likely be more difficult to achieve the desired low permeability.
- Soil 2 will be composited from bulk samples biased to include clay and sandy clay, soil in which it may be more difficult to achieve desired strength.
- A NAPL impacted soil, Soil 3, will be collected by selecting sections of the more heavily NAPL impacted soil wherever encountered, and compositing into the NAPL soil samples to test for chemical reaction compatibility.

The Treatability Study samples will be field selected collaboratively by Black & Veatch's outside expert and Black & Veatch from 15 Soil Borings based on soil findings and review of the geotechnical borings advanced by Black & Veatch. Additional material may be sampled after further review of the Site's geotechnical information. Each barrier wall mix design and compatibility testing soil sample will be labeled with the boring ID, depth, and to which composite soil sample it will added (Boring ID: BW01; Depth: 20 to 25 ft bls; Soil Sample: Soil 1) in the logbook and on sample containers, and surveyed.

The rotosonic borings (to at least the bottom of the design barrier wall key, 115 ft) will be used for direct observation of subsurface stratigraphy and for the collection of soil samples. Disturbed samples of the unconsolidated material encountered will be collected for use in the mix design and compatibility

testing program. Material will be retrieved from the plastic sleeve rotosonic core, and placed in 5-gallon DOT shipping pails with screw-sealable lids.

- Soil 1 - Approximately three (3), 5-gallon pails of higher permeability material, coarser well sorted sands, will be obtained likely from the upper 25 ft of the stratigraphy,
- Soil 2 - Approximately three (3), 5-gallon pails will be obtained, likely from depths greater than 25 ft, with the focus on lenses and layers of silty clay, sandy clay, and clay for the purposes of developing samples representative of the full depth of the barrier wall, and
- Soil 3 - One to three 5-gallon pails will be filled with the most highly contaminated NAPL impacted soils regardless of depth or soil type. Sample depths may be field-adjusted depending on findings.

The bulk soil samples in DOT shipping pails will be submitted to the laboratory for soil index property testing and for use in SCB mix design preparation and testing.
Relatively undisturbed samples will also be obtained at three boring locations in the competent clay confining layer near the anticipated depth of the barrier wall key (the barrier wall will be keyed into the clay layer) using a thin-walled tube sampler, "Shelby tubes". These samples will be sealed with wax, protected from disturbance, and sent to the laboratory for permeability testing to assure the competence of the bottom clay layer.

Bentonite

Bentonite used as a soil additive to the SB backfill mixture will be premium Wyoming grade sodium bentonite meeting the requirements of API Specification 13A Section 9 (for example, CETCO Premium Gel and Wyo- Ben Hydrogel). Manufacturer's bentonite powder documentation and test results will be submitted to Black & Veatch.

Cement

Type 1 Portland Cement will be procured from a local hardware store.

Initial Geotechnical Characteristic Testing and Soil Mixtures Preparation

As summarized in **Table 1**, Untreated Soil Property Testing will be performed on the 3 aliquots obtained at random from the homogenized mixes – Soil 1, Soil 2, and Soil 3. The following tests will be used to evaluate the soil properties and assure the bulk soil sample is homogenous:

(i) moisture content (ASTM D2216);
(ii) engineering classification (ASTM D2487);
(iii) grain size distribution (ASTM D422); and
(iv) organic content (ASTM D2974).

Hydraulic conductivity of the barrier wall key material will be obtained from three relatively undisturbed samples obtained from three borings located along the alignment of the barrier wall at the anticipated depth of the key (**Table 1**).

Results from the initial geotechnical characteristic testing will be summarized and presented to B&V within 3 days of completion of the testing along with recommendations for candidate mix designs. Once selection of the mix designs has been completed and approved by B&V, mixing of the selected designs will be conducted and tested as described below.

Hydraulic Conductivity/Strength/Compatibility Testing

As summarized in **Table 2**, the barrier wall mix design, strength, compatibility, and thermal testing will be conducted in two testing tiers.

TIER 1

Once the geotechnical sample results are available on the homogenized soil materials, Black & Veatch, the SBC testing laboratory, and Black & Veatch's outside expert will determine the final Tier 1 mixes to be tested (may be optimized based on soil property testing results).

Tier 1 will be completed prior to Tier 2. Tier 1 mix testing includes the evaluation of up to six (6) SCB design mixes of variable proportions of soil, cement, and bentonite for unconfined compressive strength (UCS) and hydraulic conductivity testing. An example of this testing approach is shown on **Table 2**. The Tier 1 testing utilizes sandy soil from composited Soil 1. Design of the SCB backfill mixes (the selected percentage of reagent added) will be dependent upon a review of the geotechnical characteristics and fines content of the soils used in preparing the mixes. (Soils used in constructing barrier walls generally need to have a fines content of 20 to 30 percent [%]). The soils used in preparation of the mixes will be gray to brown sand, considered to be representative of the most difficult conditions in which to achieve low permeability on Site biased toward coarser, well sorted sands.

The testing program for each mix design sample will include visual observations and daily pocket penetrometer (PP) testing to monitor strength gain; PP testing will stop once the measured sample strength reaches the maximum value of the penetrometer or if the coupons for a mix have not had strength gain for seven days (B&V to be notified if this is the case). Performance testing will be conducted after designated curing periods of 14 and 28 days, as indicated below and summarized in **Table 2:**

- UCS (by ASTM D1633) - must meet the desired 28 day minimum strength of 25 psi,
- hydraulic conductivity (ASTM D5084) - must meet the desired maximum hydraulic conductivity of $1x10^{-7}$ cm/sec.

Note that the results of the testing conducted in Tier 1 will provide a decision point. Up to this point in the testing program, the likely worst case conditions (coarse sand) have been considered. If the desired hydraulic conductivity cannot be achieved with the addition of bentonite and cement alone, the mix design and compatibility testing program will be adapted as appropriate.

Tier 1 mixes that failed one or more of the acceptance criteria, but show promise if the reagent formula is modified may also have their mixes modified and the modified mix tested in Tier 2. As with the Tier 1 mixes that produced over-treated samples, the failed mixtures will be evaluated by Black & Veatch, the SCB testing laboratory, and Black & Veatch's outside expert for possible modification and further testing in Tier 2.

If all the Tier 1 mix designs fail the acceptance criteria, the SBC TS will be halted while the SBC testing laboratory, Black & Veatch, Black & Veatch's outside expert, and the EPA discuss whether additional mixes should be tested, if the mix design acceptance criteria should be modified, or if SBC is not a suitable technology for remediation of the ACW Site.

TIER 2

The Tier 2 mix designs will be tested after Tier 1 is completed, using Soil 1, Soil 2, and Soil 3. Tier 2 testing will evaluate the selected optimal Tier 1 mix design for chemical compatibility (Tier 2A) using soil 3, fine grained soil compatibility (Tier 2B) using soil 2, thermal compatibility (Tier 2C) using soil 1 or , plus a repeat mixing/testing of the optimal mix using soil 1 to confirm the results of Tier 1 testing (Tier 2D). All Tier 2 testing will be conducted concurrently.

In Tier 2 Black & Veatch will select the mix for testing based on observations and review of the initial geotechnical test results and Tier 1 test results. The Tier 2 mix will be determined by Black & Veatch, with input from the testing laboratory and Black & Veatch's outside expert.

The Tier 2 treated coupons will be evaluated using the Tier 1 procedures described above (daily PP testing, acceptance testing at 28 days, if appropriate).

Tier 2A

In Tier 2A chemical compatibility testing, using the optimal SCB ratio derived from Tier 1 will be mixed with NAPL-impacted soil, Soil 3, from the Site and evaluated for changes in compressive strength, hydraulic conductivity or visual reactions. Tier 2A chemical compatibility testing requires duplicate sample testing/analysis. The SCB mix will be evaluated for adverse reactions through

- visual monitoring,

- unconfined compressive strength (ASTM D1633) - minimum 28 day unconfined compressive strength of 25 psi, and
- hydraulic conductivity testing (ASTM D5084) - maximum hydraulic conductivity of $1x10^{-7}$ cm/sec as per **Table 2**.

Tier 2B

Tier 2B mix testing takes the results of Tier 1 testing into account and analyzes the optimal SCB ratio using Soil 2, the clay and sandy clay. Tier 2B mix testing also requires duplicate sample analysis. The resulting SCB mix will be evaluated for

- hydraulic conductivity (ASTM D5084) - must meet the desired maximum hydraulic conductivity of $1x10^{-7}$ cm/sec, and
- unconfined compressive strength (ASTM D1633) - must meet the desired 28 day minimum strength of 25 psi as per **Table 2**.

The purpose of Tier 2B testing it to confirm the optimal mix design derived in sandy material also performs well in the clay layers and lenses encountered on site.

At the conclusion of the Tier 2B the selected SCB design mix will have achieved minimum strength requirements and met the desired maximum hydraulic conductivity for conditions representative of the entire soil column in which the barrier wall will be constructed.

Tier 2C

Tier 2C thermal compatibility testing takes the results of Tier 1 testing into account and analyzes the selected BW SCB ratio using Soil 1 (the soil mix considered to be representative of the most difficult conditions in which to achieve low permeability on Site) at 40 degrees Celsius (^{o}C) and 60 ^{o}C. The thermal testing is intended to simulate the construction of the southern extent of the barrier wall in a soil matrix returning to ambient temperature (6 - 12 months after conclusion of Steam-Enhanced Extraction in CMZ-2A). The specimens should be formed using heated soil, heated reagents, and water heated to the temperature specified in Table 2. Once formed, the samples are to remain in a 100% humid atmosphere or water bath at the specified temperature through the completion of the strength and hydraulic conductivity testing. Tier 2C thermal compatibility testing also requires duplicate sample analysis.

The primary purpose of Tier 2C testing is to establish at what, if any, elevated matrix temperature an effective barrier wall can be constructed. The principal concern is that elevated barrier wall temperatures will result in increased permeability due to shrinkage in the heated bentonite. Results of the thermal testing will not drive mix design development but rather inform barrier wall construction

sequencing, specifically the duration of cooling required after conclusion of thermal activities. The barrier wall will only be constructed in matrix temperatures which have achieved satisfactory minimum strength and maximum hydraulic conductivity results in the lab.

The resulting SCB mix will be evaluated for

- hydraulic conductivity (ASTM D5084) - must meet the desired maximum hydraulic conductivity of $1x10^{-7}$ cm/sec, and
- unconfined compressive strength (ASTM D1633) - must meet the desired 28 day minimum strength of 25 psi as per **Table 2**.

Tier 2D

Tier 2D confirmation testing will replicate the Tier 1 mix design selected as the optimal mix design for soil 1. The optimal mix design will again be mixed with the worst case, sandy soil from composited Soil 1. The optimal design mix must substantiate the Tier 1 results, satisfying the desired

- maximum hydraulic conductivity (ASTM D5084) of $1x10^{-7}$ cm/sec and
- minimum 28 day unconfined compressive strength (ASTM D1633) of 25 psi, as per **Table 2**.

As with all Tier 2 tests, the Tier 2D confirmation testing will be conducted in duplicate.

Summary

As discussed above and summarized in **Table 2**, the SCB mix design and compatibility testing will be conducted in two Tiers. Reagent formulations (mix designs) will be mixed with the untreated soils (1, 2, and 3) to demonstrate "proof-of-technology" and provide a broad base of test results. The acceptance criteria for functional SCB mixes are:

(i) a SCB mix that generates an unconfined compressive strength of 25 psi for the combined, blended materials using the least mass of reagents;

(ii) and that generates a stable hydraulic conductivity of at most $1x10^{-7}$ cm/s when the SCB mix design is prepared and permeated with water.

Failure to meet these criteria may result in additional mix design testing to be covered under a separate scope.

REPORTING

At specific stages of the testing program, the SCB testing laboratory will summarize preliminary findings/results and discuss these results with Black & Veatch. Black & Veatch will share these data with their outside expert. Black & Veatch, the SCB testing laboratory, and Black & Veatch's outside expert will use these data to select the mix design to advance into Tier 2 for additional testing. Specific reports needed for decision-making include:

- Untreated Soil Property Testing Results
- Tier 1 Week 1 PP results
- Tier 1 Week 2 PP, 14 day USC, and 14 day hydraulic conductivity results
- Tier 1 28 day USC and 28 day hydraulic conductivity results

Weekly status updates will be prepared by the laboratory and emailed to the Black & Veatch project team for the duration of the project which is anticipated to cover the period from approximately March - July 2018. Calls will be conducted periodically to review and discuss results and recommendations for continuation or changes to the program.

The results of the various tests will be presented in an interpretative report completed by the laboratory. Both draft and Final Reports will be required. The report will recommend functional bentonite slurry and SCB mix design recipes and provide information on the compatibility of the recommended slurry(ies) and SCB mixes with DNAPL.

SCHEDULE

Below is a proposed schedule for the laboratory portion of the SCB Treatability Study. The estimated start date is approximately March 8, 2018.

Upon receipt of the Site soil samples at the geotechnical laboratory the barrier wall mix design and compatibility testing is expected to be completed in approximately 17 weeks as described below and with the following limitations.

- Soil mixtures homogenized and geotechnical characteristic testing – 2 weeks
- Tier I Hydraulic conductivity and strength testing – 6 weeks
- Tier 2 DNAPL/Soil 2/Thermal compatibility and confirmation testing – 6 weeks
- Preparation of draft report – 2 weeks
- Preparation of Final Report 1 Week

The length of the hydraulic conductivity tests are subject to the time required for two pore volumes of water to pass through the test specimens. Due to this limitation the hydraulic conductivity and DNAPL compatibility testing portion of the study may require from 4 - 12 weeks to complete. On average this test requires 6 weeks which was used to calculate the approximate amount of time required to complete the entire study.

Tables

Table 1
Untreated Soil Property Testing

Sample ID	Boring	Depth	Soil Contents and Sample Description	Sieve Analysis	Moisture Content[1]	Organic Content	Soil Classification	Hydraulic Conductivity[2]
Soil 1 - Coarse, Well Sorted Sands (bulk disturbed soil samples, 5-gallon)								
TS-Soil 1-1	-	-	The (3) coarse, well sorted sands samples collected will be homogenized to create Soil 1. From Soil 1, 3 randomly obtained aliquots will be analyzed for grain size (sieve), moisture content, organic content, and soil classification	x	x	x	x	
TS-Soil 1-2	-	-		x	x	x	x	
TS-Soil 1-3	-	-		x	x	x	x	
Soil 2 - Clay and Sandy Clay (bulk disturbed soil samples, 5-gallon)								
TS-Soil 2-1	-	-	The (3) clay and sandy clay samples collected will be homogenized to create Soil 2. From Soil 2, 3 randomly obtained aliquots will be analyzed for grain size (sieve), moisture content, organic content, and soil classification	x	x	x	x	
TS-Soil 2-2	-	-		x	x	x	x	
TS-Soil 2-3	-	-		x	x	x	x	
Soil 3 - NAPL Impacted Soil (bulk disturbed soil samples, 5-gallon)								
TS-Soil 3-1	-	-	The (3) NAPL impacted soil samples collected will be homogenized to create Soil 3. From Soil 3, 3 randomly obtained aliquots will be analyzed for grain size (sieve), moisture content, organic content, and soil classification	x	x	x	x	
TS-Soil 3-2	-	-		x	x	x	x	
TS-Soil 3-3	-	-		x	x	x	x	
Basal Clay Layer[3] (undisturbed samples, Shelby tube)								
BTM-CLAY -1	BW##	TBD	At least (3) undisturbed (Shelby tube) samples from the bottom clay -- gray to red/orange brown, very stiff, high plasticity, moist -- will be analyzed for hydraulic conductivity.					x
BTM-CLAY-2	BW##	TBD						x
BTM-CLAY-3	BW##	TBD						x

Notes:

1. Moisture Content should be collected in a separate container (such as a 2oz jar)
2. Shelby Tube samples to be collected from the bottom clay key layer at three locations along the wall alignment.
3. The Clay Zone is the 10-ft thick unweathered competent clay zone underlying CMZ-1 encountered at approximately 107 to 117 ft bgs.

Table 2
Barrier Wall Mix Design and Compatibility Testing

Sample ID	Soil Content	Reagent Addition[1] (% by Wet Soil)		Temperature (°C)	Mix Water Type	Permeant	Cure Duration (days)	Unconfined Compressive Strength[2] (psi)	Hydraulic Conductivity[3] (cm/sec)
		Bentonite	Cement						
Tier 1: Soil 1 Admixture Testing									
BWM-01[4]	Soil 1	2	3	Ambient	Tap Water	Tap Water	14	x	x
							28	x	x
BWM-02	Soil 1	2	4	Ambient	Tap Water	Tap Water	14	x	x
							28	x	x
BWM-03	Soil 1	2	5	Ambient	Tap Water	Tap Water	14	x	x
							28	x	x
BWM-04	Soil 1	3	6	Ambient	Tap Water	Tap Water	14	x	x
							28	x	x
BWM-05	Soil 1	4	8	Ambient	Tap Water	Tap Water	14	x	x
							28	x	x
BWM-0C[5]	Soil 1	TBD	TBD	Ambient	Tap Water	Tap Water	14	x	x
							28	x	x
Tier 2A: NAPL Soil Admixture Chemical Compatibility Testing[6]									
BWM-07	Soil 3	*	**	Ambient	Tap Water	Tap Water	14		
							28	x	x
BWM-07dup	Soil 3	*	**	Ambient	Tap Water	Tap Water	14		
							28	x	x
Tier 2B: Soil 2 Admixture Testing[6]									
BWM-8	Soil 2	*	**	Ambient	Tap Water	Tap Water	14		
							28	x	x
BWM-08dup	Soil 2	*	**	Ambient	Tap Water	Tap Water	14		
							28	x	x
Tier 2C: Soil 1 Admixture Thermal Compatibility Testing[6,7]									
BWM-9	Soil 1	*	**	40	Tap Water	Tap Water	14		
							28	x	x
BWM-09dup	Soil 1	*	**	40	Tap Water	Tap Water	14		
							28	x	x
BWM-10	Soil 1	*	**	60	Tap Water	Tap Water	14		
							28	x	x
BWM-10dup	Soil 1	*	**	60	Tap Water	Tap Water	14		
							28	x	x
Tier 2D: Soil 1 Admixture Confirmation Testing[6]									
BWM-11	Soil 1	*	**	Ambient	Tap Water	Tap Water	14		
							28	x	x
BWM-11dup	Soil 1	*	**	Ambient	Tap Water	Tap Water	14		
							28	x	x

Notes:

1. Tier 1 Reagent percentages are tentatively selected and may be optimized based on soil property testing results.
2. Test and record strength gain daily using a Pocket Penetrometer in both Tier 1 and Tier 2.

Table 2 (Continued)
Barrier Wall Mix Design and Compatibility Testing

3. Hydraulic conductivity testing anticipated to be conducted at consolidation pressure approximately equivalent to the effective overburden pressure at the midpoint of the barrier wall, assuming the wall is 115 ft deep (24 pounds per square inch [psi]).

4. BWM – Barrier Wall Mix

5. BMW-0C is a contingent sample of Soil 1, to be used if none of the BMW-01 through BMW-05 mixes meet the performance requirements.

6. Tier 2A, 2B, 2C, 2D testing is to be conducted concurrently following selection of a successful formulation during Tier 1.

7. Tier 2C specimens should be formed using soil, reagents and water heated to the specified temperature. Once formed, the samples are to remain in a 100% humid atmosphere or water bath at the specified temperature through the completion of the strength and hydraulic conductivity testing.

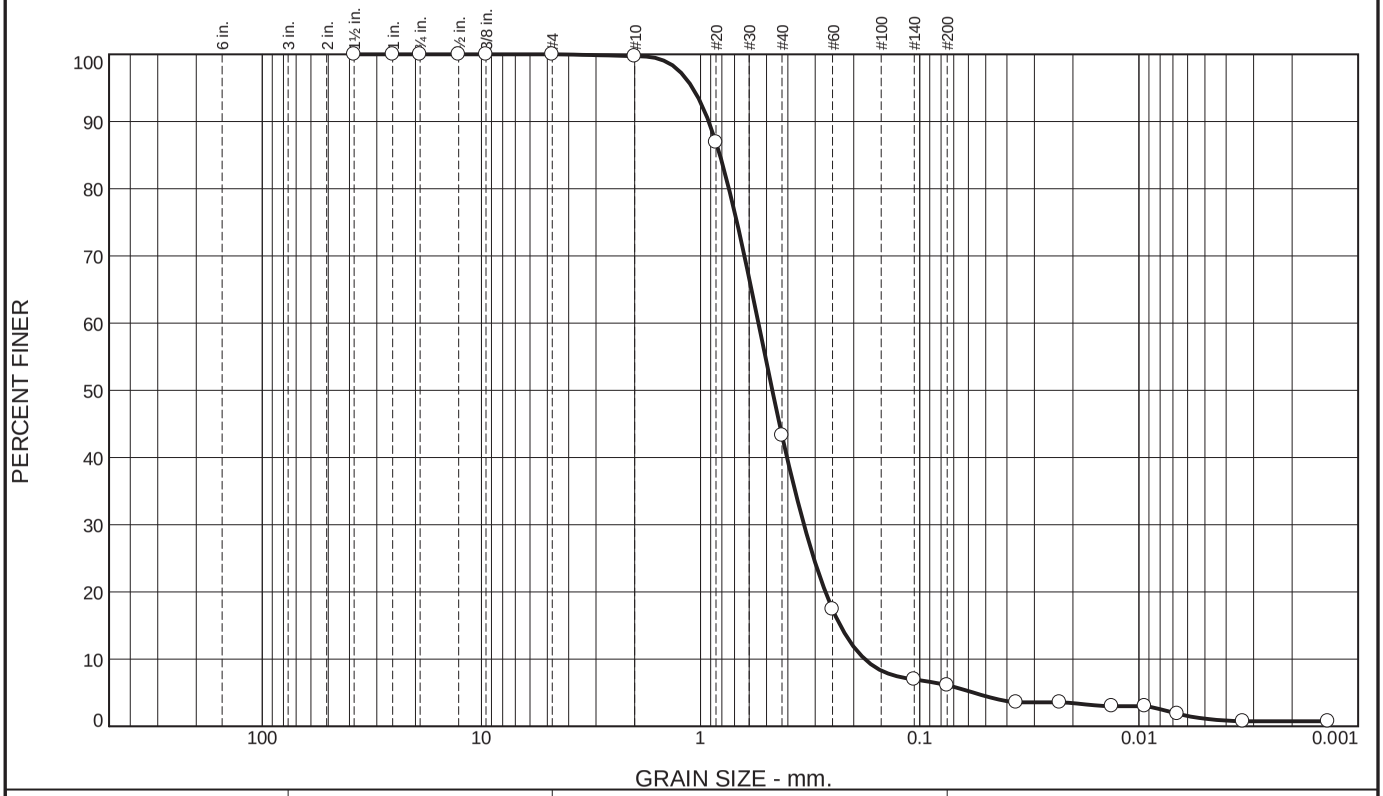
dup - denotes duplicate test

* Represents the percent bentonite of the optimal design mix selected based on Tier 1 test results.

** Represents the percent cement of the optimal design mix selected based on Tier 1 test results.

Appendix B:
Untreated Material Physical Properties Data Sheets

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	56.4	37.2	5.4	0.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.7		
#20	86.9		
#40	43.3		
#60	17.4		
#140	7.0		
#200	6.1		
0.0363 mm.	3.6		
0.0230 mm.	3.6		
0.0133 mm.	3.0		
0.0094 mm.	3.0		
0.0067 mm.	1.9		
0.0034 mm.	0.7		
0.0014 mm.	0.7		

* (no specification provided)

Soil Description

Light brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.9175 D_{85}= 0.8163 D_{60}= 0.5446
D_{50}= 0.4707 D_{30}= 0.3375 D_{15}= 0.2304
D_{10}= 0.1782 C_u= 3.06 C_c= 1.17

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Sample Number: Coarse Sand A

Date: 4/4/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C083

Tested By: TAJ **Checked By:** TAJ

MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Coarse Sand A
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C083

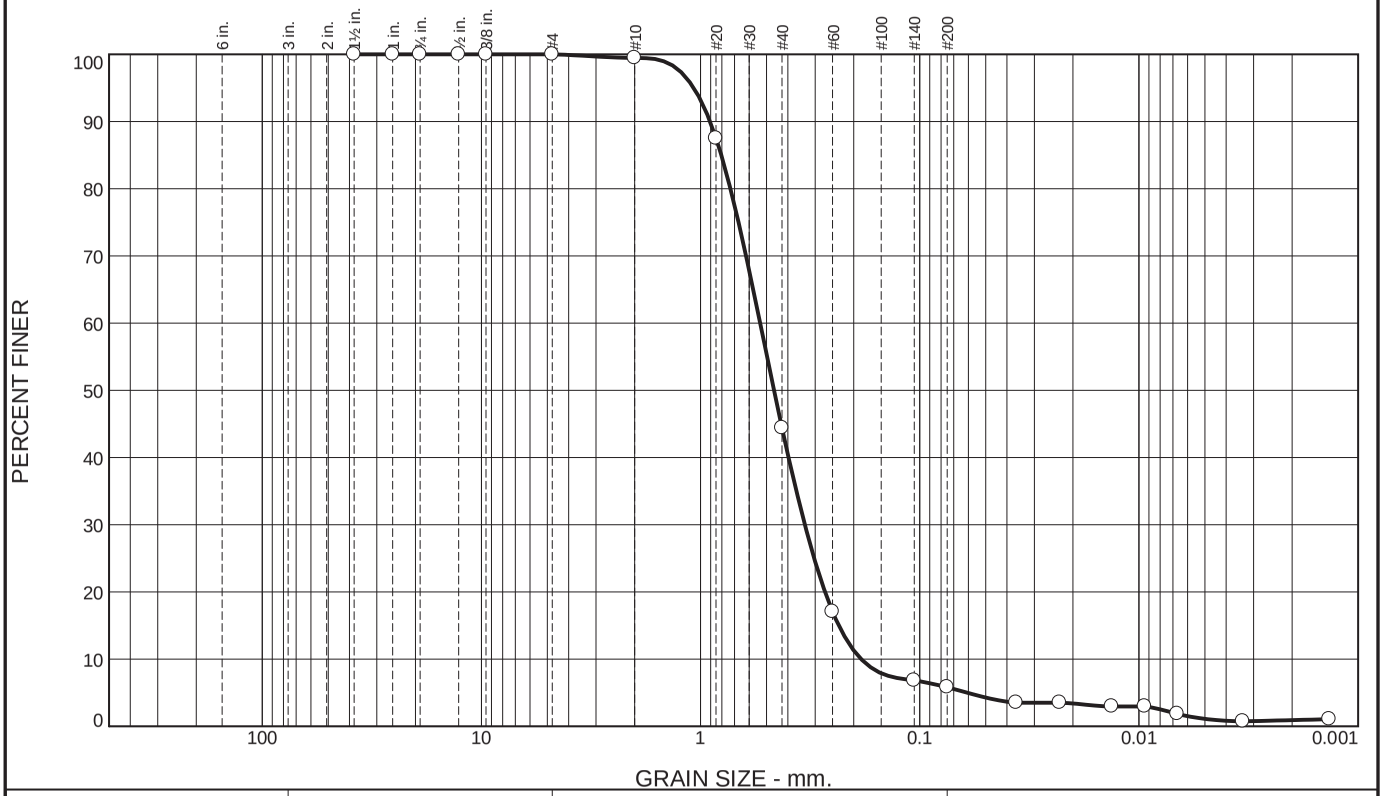
MOISTURE CONTENT (Dry & Wet Basis)					
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0504	g	0.9976	g	1.0270	g
3. WT WET SOIL + TARE	15.6675	g	25.6093	g	25.8760	g
4. WT DRY SOIL + TARE	14.2342	g	22.1474	g	22.3812	g
5. WT WATER, Ww	1.4333	g	3.4619	g	3.4948	g
6. WT DRY SOIL, Ws	13.1838	g	21.1498	g	21.3542	g
7. ASTM MOISTURE CONTENT	10.87	%	16.37	%	16.37	%
8. PERCENT SOLIDS	90.19	%	85.93	%	85.94	%
9. AVERAGE ASTM MOISTURE CONTENT	14.54	%				
10. AVERAGE PERCENT SOLIDS	87.35	%				

LOSS ON IGNITION
(ORGANIC CONTENT)
ASTM D2974

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Coarse Sand A
TESTING DATE:	4/4/2018
TESTED BY:	MEH/TAJ
TRACKING CODE:	C083

MOISTURE CONTENT / LOSS ON IGNITION						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	70.258	g	53.157	g	53.554	g
3. WT WET SOIL + TARE	120.613	g	103.685	g	105.076	g
4. WT DRY SOIL + TARE	115.181	g	98.318	g	99.452	g
5. WT WATER, Ww	5.431	g	5.367	g	5.623	g
6. WT DRY SOIL, Ws	44.924	g	45.161	g	45.898	g
7. WT FINAL SOIL + TARE	115.155	g	98.264	g	99.385	g
8. WT FINAL SOIL, Wf	44.897	g	45.106	g	45.831	g
9. WT ORGANICS, Wo	0.027	g	0.055	g	0.067	g
10. MOISTURE CONTENT(ASTM)	12.09	%	11.88	%	12.25	%
11. LOSS ON IGNITION	0.06	%	0.12	%	0.15	%
12. AVERAGE MOISTURE CONTENT	12.08	%				
13. AVERAGE LOSS ON IGNITION	0.11	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	55.1	38.6	4.9	0.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.5		
#20	87.5		
#40	44.4		
#60	17.1		
#140	6.8		
#200	5.8		
0.0363 mm.	3.5		
0.0230 mm.	3.5		
0.0133 mm.	3.0		
0.0094 mm.	3.0		
0.0067 mm.	1.9		
0.0034 mm.	0.7		
0.0014 mm.	1.1		

* (no specification provided)

Soil Description

Light brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.9050 D_{85}= 0.8044 D_{60}= 0.5349
D_{50}= 0.4623 D_{30}= 0.3343 D_{15}= 0.2342
D_{10}= 0.1852 C_u= 2.89 C_c= 1.13

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Sample Number: Coarse Sand B

Date: 4/4/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C084

Tested By: TAJ **Checked By:** TAJ

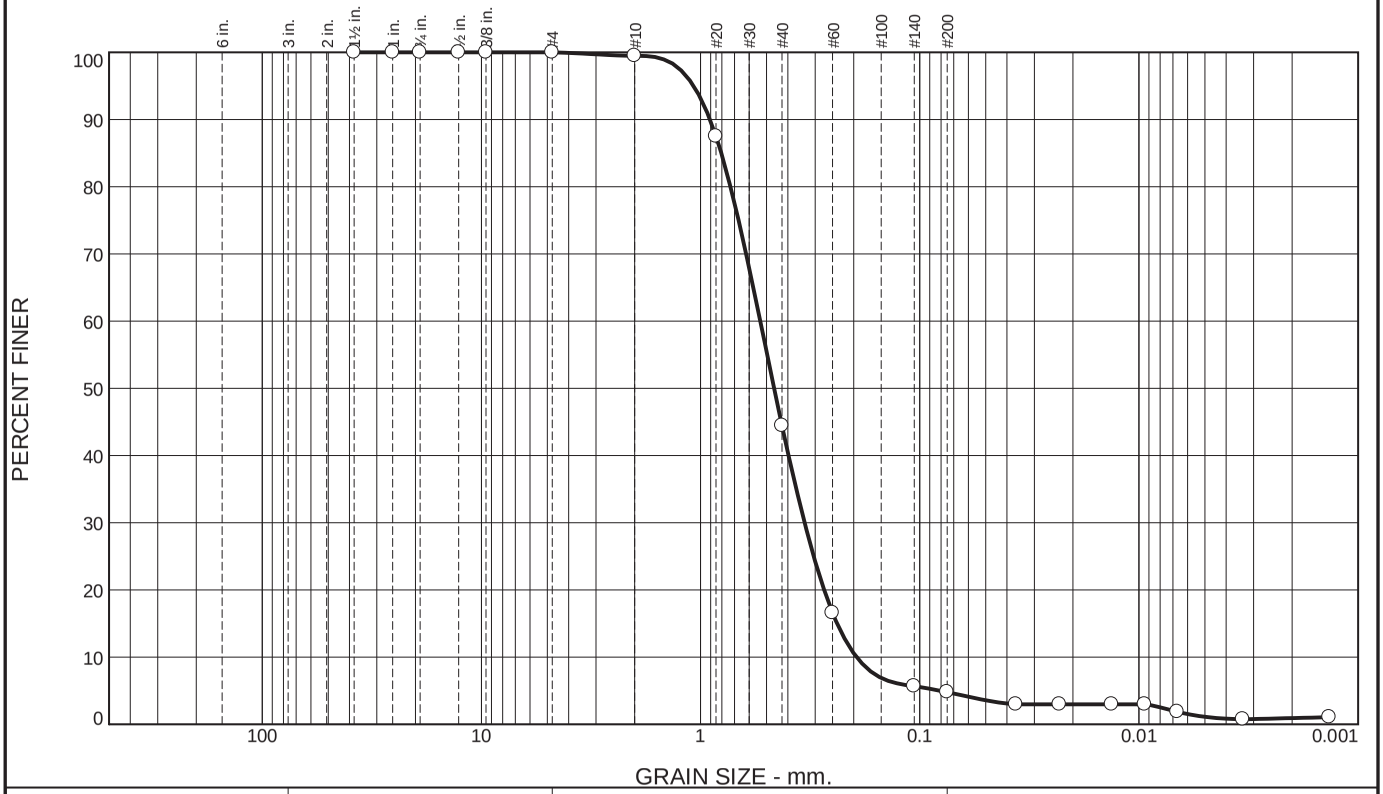
MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Coarse Sand B
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C084

MOISTURE CONTENT (Dry & Wet Basis)						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0157	g	0.9985	g	0.9919	g
3. WT WET SOIL + TARE	23.2583	g	23.5387	g	15.6012	g
4. WT DRY SOIL + TARE	21.3949	g	21.5227	g	14.3918	g
5. WT WATER, Ww	1.8634	g	2.0160	g	1.2094	g
6. WT DRY SOIL, Ws	20.3792	g	20.5242	g	13.3999	g
7. ASTM MOISTURE CONTENT	9.14	%	9.82	%	9.03	%
8. PERCENT SOLIDS	91.62	%	91.06	%	91.72	%
9. AVERAGE ASTM MOISTURE CONTENT	9.33	%				
10. AVERAGE PERCENT SOLIDS	91.47	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	55.1	39.6	3.9	0.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.5		
#20	87.5		
#40	44.4		
#60	16.6		
#140	5.7		
#200	4.8		
0.0364 mm.	3.0		
0.0230 mm.	3.0		
0.0133 mm.	3.0		
0.0094 mm.	3.0		
0.0067 mm.	1.9		
0.0034 mm.	0.7		
0.0014 mm.	1.1		

* (no specification provided)

Soil Description

Light brown poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.9056 D_{85}= 0.8045 D_{60}= 0.5343
D_{50}= 0.4619 D_{30}= 0.3352 D_{15}= 0.2383
D_{10}= 0.1942 C_u= 2.75 C_c= 1.08

Classification

USCS= SP AASHTO= A-1-b

Remarks

Sample Number: Coarse Sand C

Date: 4/4/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C085

Tested By: TAJ **Checked By:** TAJ

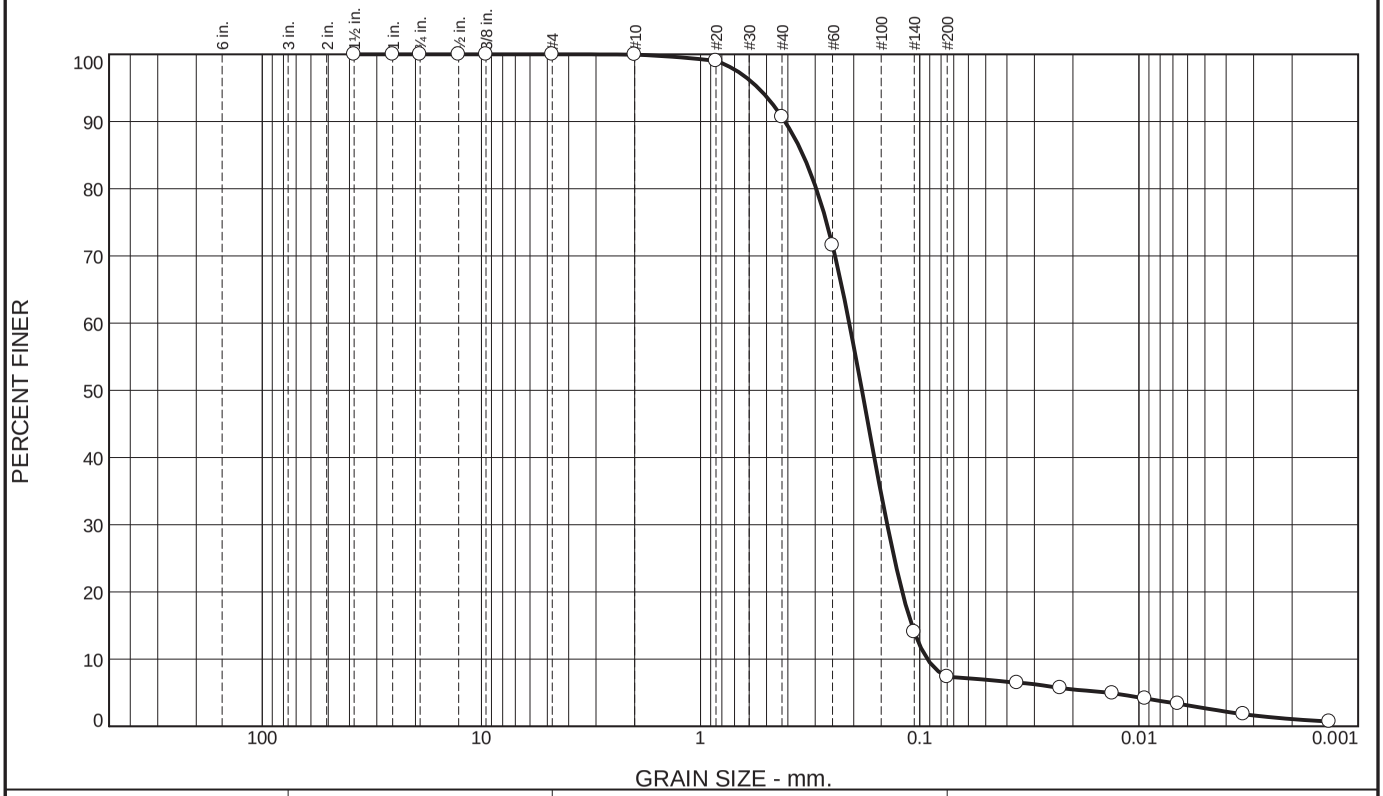
MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Coarse Sand C
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C085

MOISTURE CONTENT (Dry & Wet Basis)					
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0319	g	1.0162	g	1.0495	g
3. WT WET SOIL + TARE	17.2070	g	18.9978	g	13.9900	g
4. WT DRY SOIL + TARE	16.0017	g	17.5364	g	12.8779	g
5. WT WATER, Ww	1.2053	g	1.4614	g	1.1121	g
6. WT DRY SOIL, Ws	14.9698	g	16.5202	g	11.8284	g
7. ASTM MOISTURE CONTENT	8.05	%	8.85	%	9.40	%
8. PERCENT SOLIDS	92.55	%	91.87	%	91.41	%
9. AVERAGE ASTM MOISTURE CONTENT	8.77	%				
10. AVERAGE PERCENT SOLIDS	91.94	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	9.3	83.3	6.3	1.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	100.0		
#20	99.0		
#40	90.7		
#60	71.6		
#140	14.0		
#200	7.4		
0.0360 mm.	6.5		
0.0228 mm.	5.7		
0.0132 mm.	4.9		
0.0094 mm.	4.1		
0.0066 mm.	3.4		
0.0033 mm.	1.8		
0.0014 mm.	0.7		

* (no specification provided)

Soil Description

Tan poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.4120 D_{85}= 0.3405 D_{60}= 0.2098
D_{50}= 0.1836 D_{30}= 0.1407 D_{15}= 0.1086
D_{10}= 0.0924 C_u= 2.27 C_c= 1.02

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Sample Number: Fine Sand A

Date: 4/6/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C086

Tested By: TAJ **Checked By:** TAJ

MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Fine Sand A
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C086

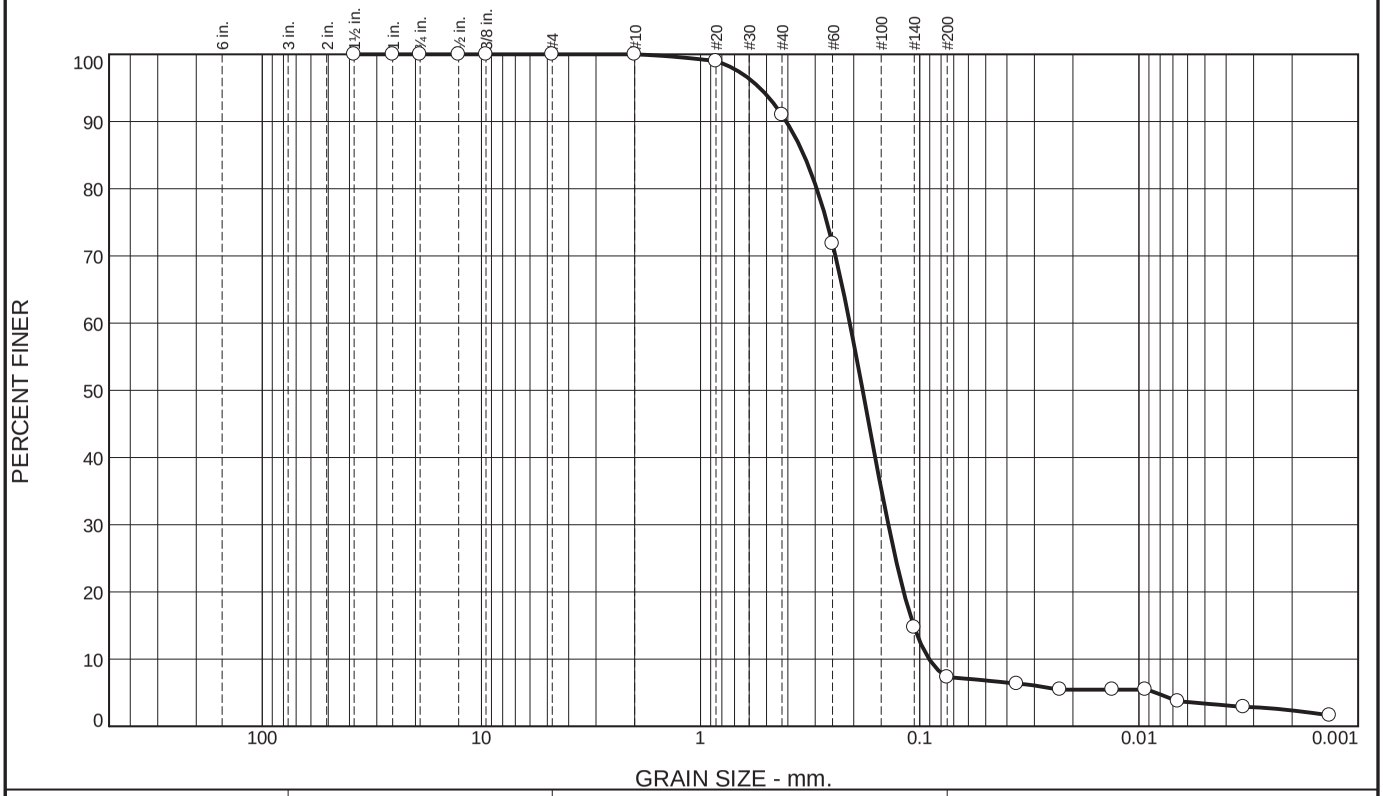
MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	0.9908 g	1.0369 g	1.0203 g
3. WT WET SOIL + TARE	20.2233 g	32.6930 g	20.7741 g
4. WT DRY SOIL + TARE	17.0891 g	27.4759 g	17.5887 g
5. WT WATER, Ww	3.1342 g	5.2171 g	3.1854 g
6. WT DRY SOIL, Ws	16.0983 g	26.4390 g	16.5684 g
7. ASTM MOISTURE CONTENT	19.47 %	19.73 %	19.23 %
8. PERCENT SOLIDS	83.70 %	83.52 %	83.87 %
9. AVERAGE ASTM MOISTURE CONTENT	19.48 %		
10. AVERAGE PERCENT SOLIDS	83.70 %		

LOSS ON IGNITION
(ORGANIC CONTENT)
ASTM D2974

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Fine Sand A
TESTING DATE:	4/4/2018
TESTED BY:	MEH/TAJ
TRACKING CODE:	C086

MOISTURE CONTENT / LOSS ON IGNITION						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	65.354	g	63.350	g	65.597	g
3. WT WET SOIL + TARE	89.229	g	101.707	g	91.336	g
4. WT DRY SOIL + TARE	85.325	g	95.527	g	87.092	g
5. WT WATER, Ww	3.904	g	6.180	g	4.243	g
6. WT DRY SOIL, Ws	19.972	g	32.177	g	21.495	g
7. WT FINAL SOIL + TARE	85.307	g	95.507	g	87.030	g
8. WT FINAL SOIL, Wf	19.954	g	32.157	g	21.433	g
9. WT ORGANICS, Wo	0.018	g	0.020	g	0.062	g
10. MOISTURE CONTENT(ASTM)	19.55	%	19.21	%	19.74	%
11. LOSS ON IGNITION	0.09	%	0.06	%	0.29	%
12. AVERAGE MOISTURE CONTENT	19.50	%				
13. AVERAGE LOSS ON IGNITION	0.15	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	9.0	83.7	4.9	2.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	100.0		
#20	99.0		
#40	91.0		
#60	71.8		
#140	14.7		
#200	7.3		
0.0361 mm.	6.3		
0.0229 mm.	5.5		
0.0132 mm.	5.5		
0.0093 mm.	5.5		
0.0066 mm.	3.7		
0.0033 mm.	2.9		
0.0014 mm.	1.6		

* (no specification provided)

Soil Description

Tan poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.4064 D_{85}= 0.3377 D_{60}= 0.2086
D_{50}= 0.1822 D_{30}= 0.1391 D_{15}= 0.1067
D_{10}= 0.0906 C_u= 2.30 C_c= 1.02

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Sample Number: Fine Sand B

Date: 4/6/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C087

Tested By: TAJ **Checked By:** TAJ

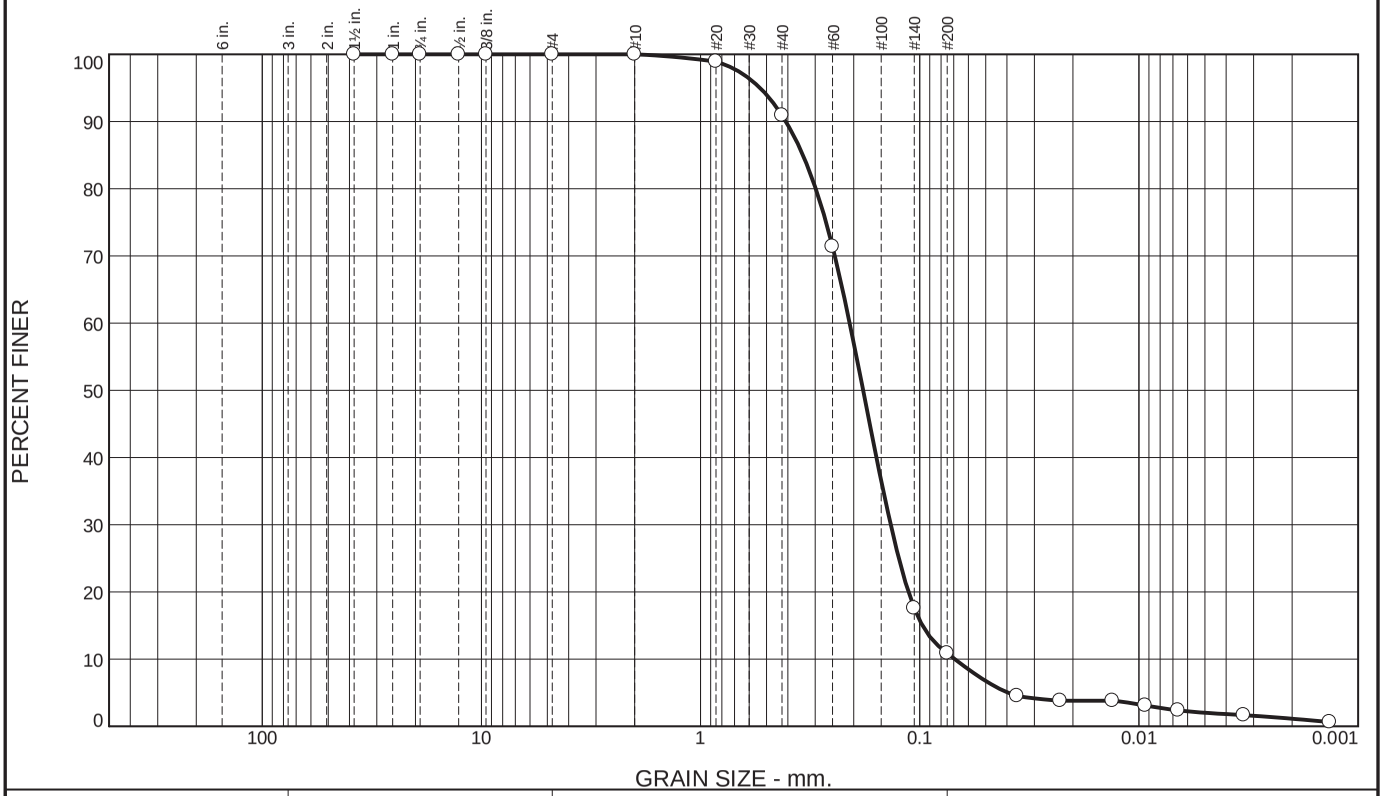
MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Fine Sand B
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C087

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	0.9780 g	1.0374 g	1.0349 g
3. WT WET SOIL + TARE	10.4752 g	17.6475 g	16.7740 g
4. WT DRY SOIL + TARE	8.9003 g	15.1029 g	14.3248 g
5. WT WATER, Ww	1.5749 g	2.5446 g	2.4492 g
6. WT DRY SOIL, Ws	7.9223 g	14.0655 g	13.2899 g
7. ASTM MOISTURE CONTENT	19.88 %	18.09 %	18.43 %
8. PERCENT SOLIDS	83.42 %	84.68 %	84.44 %
9. AVERAGE ASTM MOISTURE CONTENT	18.80 %		
10. AVERAGE PERCENT SOLIDS	84.18 %		

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	9.1	80.0	9.8	1.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	100.0		
#20	98.9		
#40	90.9		
#60	71.4		
#140	17.6		
#200	10.9		
0.0360 mm.	4.5		
0.0228 mm.	3.8		
0.0132 mm.	3.8		
0.0093 mm.	3.1		
0.0066 mm.	2.4		
0.0033 mm.	1.7		
0.0013 mm.	0.6		

* (no specification provided)

Soil Description

Tan poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.4083 D_{85}= 0.3412 D_{60}= 0.2089
D_{50}= 0.1813 D_{30}= 0.1357 D_{15}= 0.0973
D_{10}= 0.0692 C_u= 3.02 C_c= 1.27

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

Sample Number: Fine Sand C

Date: 4/6/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C088

Tested By: TAJ **Checked By:** TAJ

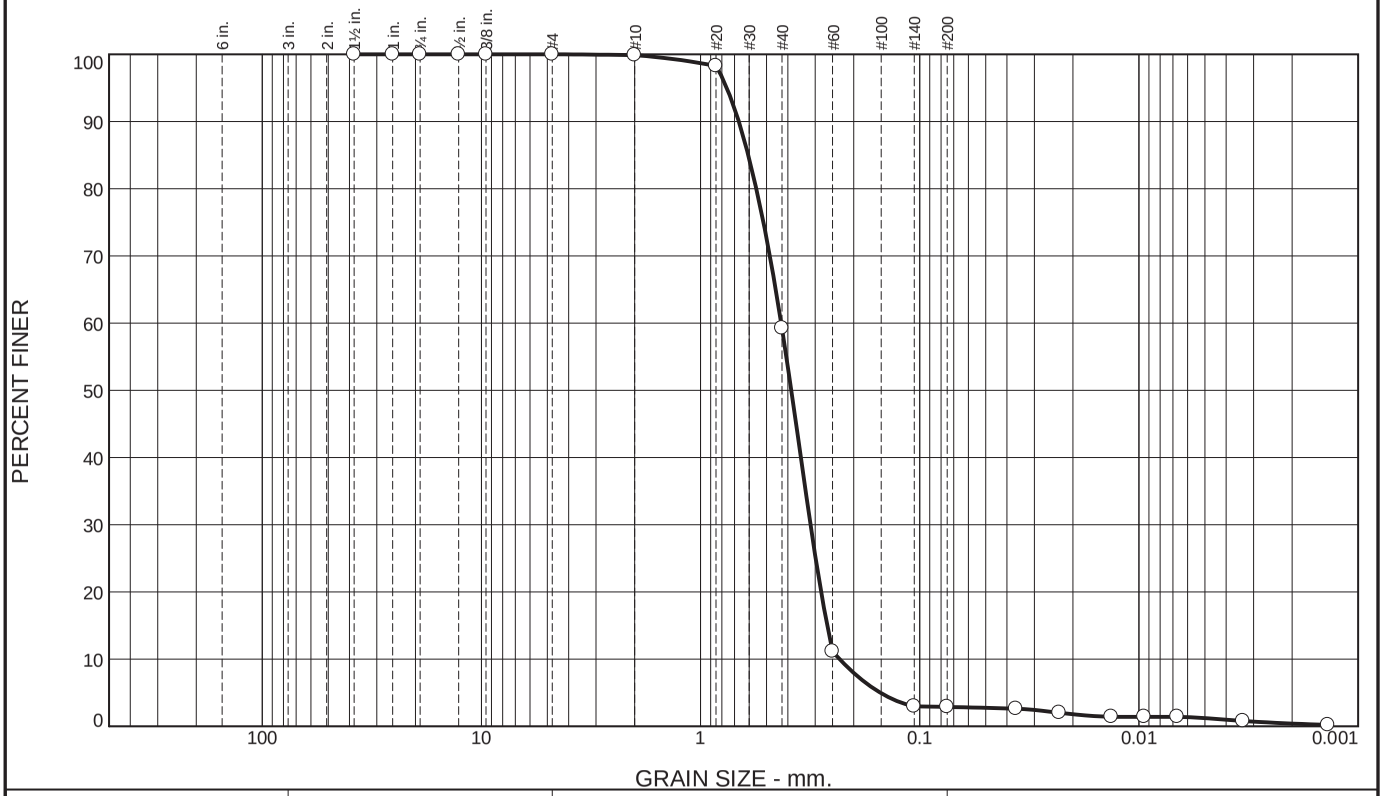
MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	Fine Sand C
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C088

MOISTURE CONTENT (Dry & Wet Basis)					
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0378	g	1.0450	g	1.0172	g
3. WT WET SOIL + TARE	9.3602	g	10.9349	g	11.4280	g
4. WT DRY SOIL + TARE	7.9970	g	9.3334	g	9.8297	g
5. WT WATER, Ww	1.3632	g	1.6015	g	1.5983	g
6. WT DRY SOIL, Ws	6.9592	g	8.2884	g	8.8125	g
7. ASTM MOISTURE CONTENT	19.59	%	19.32	%	18.14	%
8. PERCENT SOLIDS	83.62	%	83.81	%	84.65	%
9. AVERAGE ASTM MOISTURE CONTENT	19.02	%				
10. AVERAGE PERCENT SOLIDS	84.02	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	40.7	56.3	2.5	0.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.9		
#20	98.3		
#40	59.2		
#60	11.2		
#140	3.0		
#200	2.9		
0.0364 mm.	2.6		
0.0231 mm.	2.0		
0.0134 mm.	1.4		
0.0094 mm.	1.4		
0.0067 mm.	1.4		
0.0033 mm.	0.8		
0.0014 mm.	0.2		

* (no specification provided)

Soil Description

Black poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6695 D_{85}= 0.6061 D_{60}= 0.4287
D_{50}= 0.3856 D_{30}= 0.3150 D_{15}= 0.2645
D_{10}= 0.2321 C_u= 1.85 C_c= 1.00

Classification

USCS= SP AASHTO= A-3

Remarks

Sample Number: NAPL A

Date: 4/4/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C089

Tested By: TAJ **Checked By:** TAJ

MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	NAPL A
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C089

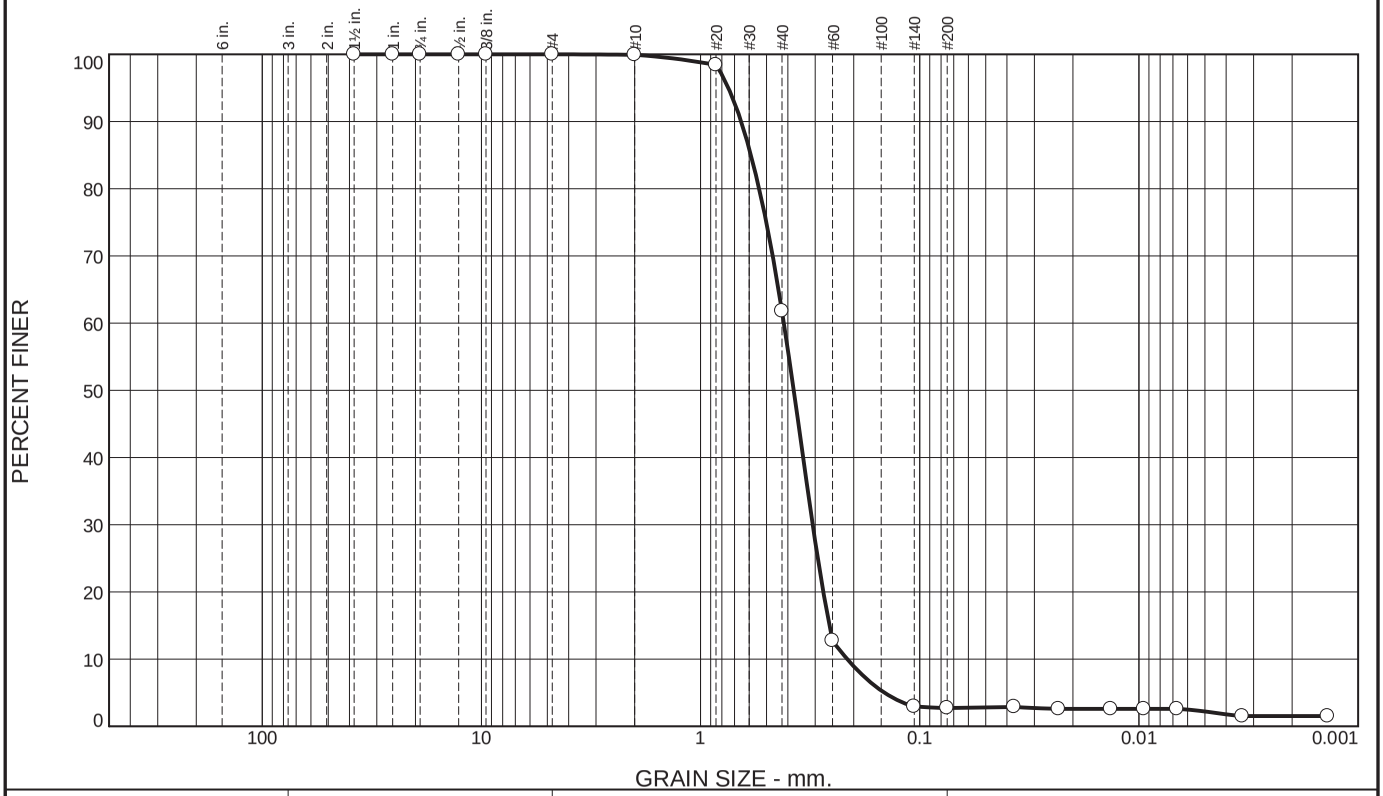
MOISTURE CONTENT (Dry & Wet Basis)						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0106	g	1.0095	g	0.9931	g
3. WT WET SOIL + TARE	16.5450	g	10.8240	g	8.8179	g
4. WT DRY SOIL + TARE	14.0909	g	9.2255	g	7.5372	g
5. WT WATER, Ww	2.4541	g	1.5985	g	1.2807	g
6. WT DRY SOIL, Ws	13.0803	g	8.2160	g	6.5441	g
7. ASTM MOISTURE CONTENT	18.76	%	19.46	%	19.57	%
8. PERCENT SOLIDS	84.20	%	83.71	%	83.63	%
9. AVERAGE ASTM MOISTURE CONTENT	19.26	%				
10. AVERAGE PERCENT SOLIDS	83.85	%				

LOSS ON IGNITION
(ORGANIC CONTENT)
ASTM D2974

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	NAPL A
TESTING DATE:	4/4/2018
TESTED BY:	MEH/TAJ
TRACKING CODE:	C089

MOISTURE CONTENT / LOSS ON IGNITION						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	59.243	g	66.909	g	69.062	g
3. WT WET SOIL + TARE	108.962	g	100.453	g	110.291	g
4. WT DRY SOIL + TARE	101.338	g	95.253	g	103.911	g
5. WT WATER, Ww	7.624	g	5.200	g	6.380	g
6. WT DRY SOIL, Ws	42.095	g	28.344	g	34.849	g
7. WT FINAL SOIL + TARE	99.920	g	94.338	g	102.768	g
8. WT FINAL SOIL, Wf	40.677	g	27.429	g	33.706	g
9. WT ORGANICS, Wo	1.418	g	0.915	g	1.143	g
10. MOISTURE CONTENT(ASTM)	18.11	%	18.35	%	18.31	%
11. LOSS ON IGNITION	3.37	%	3.23	%	3.28	%
12. AVERAGE MOISTURE CONTENT	18.25	%				
13. AVERAGE LOSS ON IGNITION	3.29	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	38.1	59.1	1.2	1.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.9		
#20	98.4		
#40	61.8		
#60	12.7		
#140	3.0		
#200	2.7		
0.0371 mm.	2.9		
0.0232 mm.	2.6		
0.0134 mm.	2.6		
0.0095 mm.	2.6		
0.0067 mm.	2.6		
0.0034 mm.	1.5		
0.0014 mm.	1.5		

* (no specification provided)

Soil Description

Black poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6533 D_{85}= 0.5892 D_{60}= 0.4168
D_{50}= 0.3758 D_{30}= 0.3078 D_{15}= 0.2584
D_{10}= 0.2143 C_u= 1.95 C_c= 1.06

Classification

USCS= SP AASHTO= A-3

Remarks

Sample Number: NAPL B

Date: 4/4/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C090

Tested By: TAJ **Checked By:** TAJ

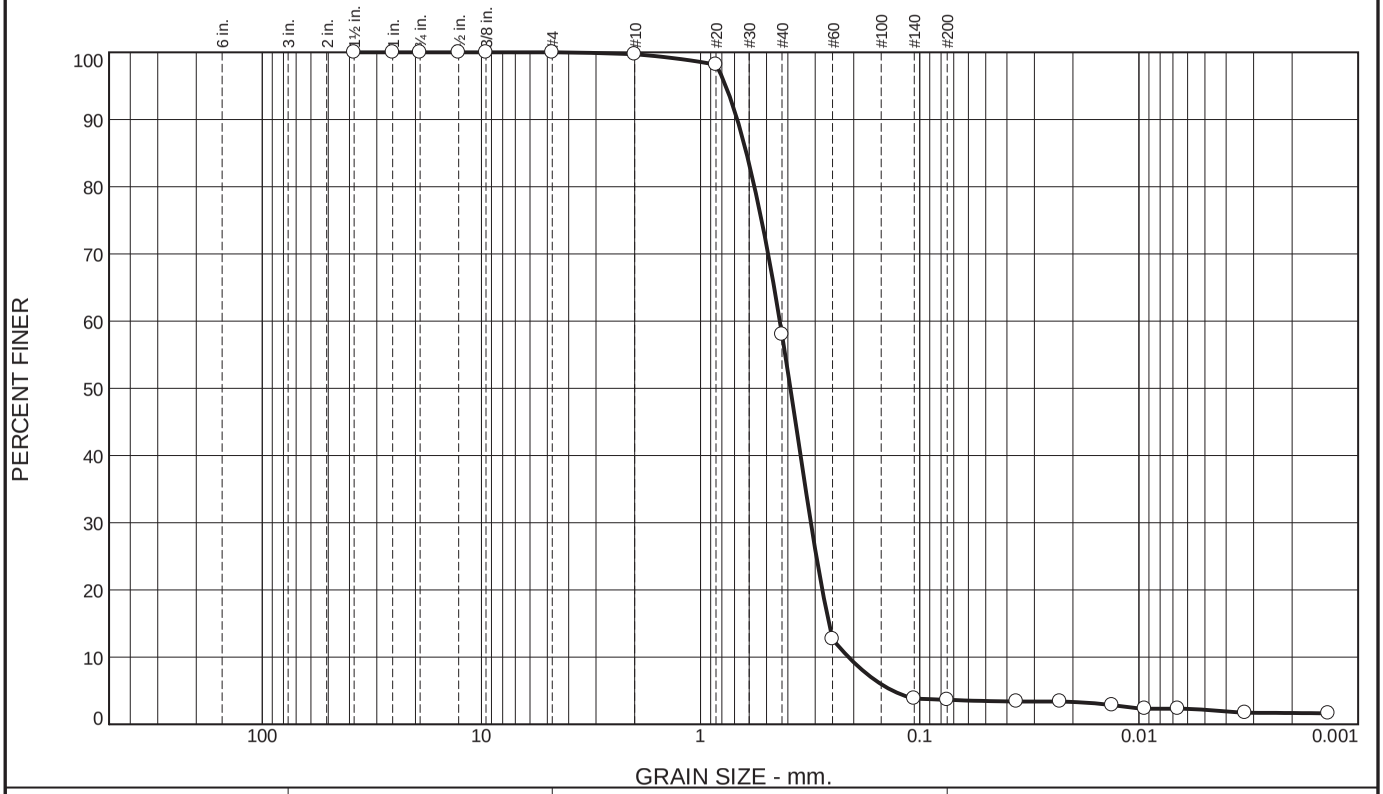
MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	NAPL B
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C090

MOISTURE CONTENT (Dry & Wet Basis)						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0245	g	1.0045	g	1.0235	g
3. WT WET SOIL + TARE	9.4230	g	13.5112	g	13.3879	g
4. WT DRY SOIL + TARE	8.1065	g	11.5191	g	11.3465	g
5. WT WATER, Ww	1.3165	g	1.9921	g	2.0414	g
6. WT DRY SOIL, Ws	7.0820	g	10.5146	g	10.3230	g
7. ASTM MOISTURE CONTENT	18.59	%	18.95	%	19.78	%
8. PERCENT SOLIDS	84.32	%	84.07	%	83.49	%
9. AVERAGE ASTM MOISTURE CONTENT	19.10	%				
10. AVERAGE PERCENT SOLIDS	83.96	%				

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	41.7	54.3	2.0	1.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.7		
#20	98.2		
#40	58.0		
#60	12.7		
#140	3.8		
#200	3.7		
0.0362 mm.	3.4		
0.0229 mm.	3.4		
0.0133 mm.	2.9		
0.0094 mm.	2.3		
0.0066 mm.	2.3		
0.0033 mm.	1.7		
0.0014 mm.	1.6		

* (no specification provided)

Soil Description

Black poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6805 D_{85}= 0.6176 D_{60}= 0.4348
D_{50}= 0.3891 D_{30}= 0.3139 D_{15}= 0.2595
D_{10}= 0.2113 C_u= 2.06 C_c= 1.07

Classification

USCS= SP AASHTO= A-3

Remarks

Sample Number: NAPL C

Date: 4/4/18

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: Black & Veatch
Project: American Creosote ISS
Project No: SH0682 **Figure** C091

Tested By: TAJ **Checked By:** TAJ

MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	ACW
PROJECT No.:	SH0682
SAMPLE No.:	NAPL C
TESTING DATE:	04/04/18
TESTED BY:	TAJ
TRACKING CODE:	C091

MOISTURE CONTENT (Dry & Wet Basis)					
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.0171	g	1.0280	g	0.9969	g
3. WT WET SOIL + TARE	9.7752	g	10.3165	g	11.5481	g
4. WT DRY SOIL + TARE	8.3470	g	8.7078	g	9.9403	g
5. WT WATER, Ww	1.4282	g	1.6087	g	1.6078	g
6. WT DRY SOIL, Ws	7.3299	g	7.6798	g	8.9434	g
7. ASTM MOISTURE CONTENT	19.48	%	20.95	%	17.98	%
8. PERCENT SOLIDS	83.69	%	82.68	%	84.76	%
9. AVERAGE ASTM MOISTURE CONTENT	19.47	%				
10. AVERAGE PERCENT SOLIDS	83.71	%				

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	Florida		
GTX #:	GTX-307929		
Start Date:	4/10/2018	Tested By:	jm
End Date:	4/13/2018	Checked By:	mcm
Boring	---	Test #:	K-1
Sample #:	BW-03		
Depth:	111 ft		
Visual Description:	Moist, grayish brown clay		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P2

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.58	1.58
Diameter, in	2.88	2.88
Area, in^2	6.51	6.51
Volume, in^3	10.3	10.3
Mass, g	305	311
Bulk Density, pcf	113	115
Moisture Content, %	37.2	40.2
Dry Density, pcf	82.0	82.0
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	85	Pressure Increment, psi:	4.8
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
4/12	1	85	80	187.1	187.0	0.1	3600	46.6	1.2E-09	21	0.976	1.1E-09
4/12	2	85	80	187.0	186.8	0.2	6600	46.6	1.3E-09	21	0.976	1.2E-09
4/12	3	85	80	186.8	186.7	0.1	3600	46.5	1.2E-09	21	0.976	1.1E-09
4/13	4	85	80	186.7	185.2	1.5	57720	46.5	1.1E-09	21	0.976	1.1E-09

PERMEABILITY AT 20° C: 1.1 x 10^{-*} cm/sec (@ 5 psi effective stress)

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	Florida		
GTX #:	GTX-307929		
Start Date:	4/10/2018	Tested By:	jm
End Date:	4/13/2018	Checked By:	mcm
Boring	---	Test #:	K-1
Sample #:	BW-05		
Depth:	111 ft		
Visual Description:	Moist, grayish brown clay		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K3

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.54	1.54
Diameter, in	2.90	2.90
Area, in^2	6.61	6.61
Volume, in^3	10.2	10.2
Mass, g	300	306
Bulk Density, pcf	112	114
Moisture Content, %	38.7	41.4
Dry Density, pcf	81.0	81.0
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	85	Pressure Increment, psi:	4.8
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
4/12	1	85	80	183.8	183.4	0.4	8580	47.0	1.9E-09	21	0.976	1.9E-09
4/12	2	85	80	183.4	183.1	0.3	5600	46.9	2.2E-09	21	0.976	2.1E-09
4/12	3	85	80	183.1	182.9	0.2	4320	46.8	1.9E-09	21	0.976	1.8E-09
4/13	4	85	80	182.9	180.1	2.8	57360	46.7	2.0E-09	21	0.976	2.0E-09

PERMEABILITY AT 20° C: 2.0 x 10^{-9} cm/sec (@ 5 psi effective stress)

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	Florida		
GTX #:	GTX-307929		
Start Date:	4/10/2018	Tested By:	jm
End Date:	4/16/2018	Checked By:	mcm
Boring	---	Test #:	K-1
Sample #:	BW-08		
Depth:	111.8 ft		
Visual Description:	Moist, grayish brown clay		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K1

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.58	1.58
Diameter, in	2.82	2.82
Area, in^2	6.25	6.25
Volume, in^3	9.9	9.9
Mass, g	296	299
Bulk Density, pcf	114	115
Moisture Content, %	37.5	38.8
Dry Density, pcf	83.0	83.0
Degree of Saturation, %	---	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	85	Pressure Increment, psi:	4.8
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,	R_t	Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C		cm/sec
4/12	1	85	80	197.0	196.6	0.4	10400	49.1	1.5E-09	21	0.976	1.5E-09
4/12	2	85	80	196.6	195.9	0.7	19200	49.0	1.5E-09	21	0.976	1.4E-09
4/12	3	85	80	195.9	195.5	0.4	11800	48.8	1.4E-09	21	0.976	1.3E-09
4/13	4	85	80	195.2	193.6	1.6	54320	48.6	1.2E-09	21	0.976	1.2E-09

PERMEABILITY AT 20° C: 1.4 x 10^{-9} cm/sec (@ 5 psi effective stress)

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	Florida		
GTX #:	GTX-307929		
Start Date:	4/10/2018	Tested By:	jm
End Date:	4/16/2018	Checked By:	mcm
Boring	---	Test #:	K-1
Sample #:	BW-13		
Depth:	111 ft		
Visual Description:	Moist, grayish brown clay		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P16

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.40	1.40
Diameter, in	2.86	2.86
Area, in^2	6.42	6.42
Volume, in^3	9.0	9.0
Mass, g	264	267
Bulk Density, pcf	112	113
Moisture Content, %	35.3	36.9
Dry Density, pcf	82.4	82.4
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	85	Pressure Increment, psi:	4.8
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,	R_t	Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C		cm/sec
4/12	1	85	80	186.6	186.1	0.5	10400	52.5	1.6E-09	21	0.976	1.6E-09
4/12	2	85	80	186.1	185.4	0.7	18000	52.3	1.4E-09	21	0.976	1.3E-09
4/12	3	85	80	185.4	184.5	0.8	18400	52.1	1.7E-09	21	0.976	1.7E-09
4/13	4	85	80	184.5	182.4	2.0	54320	51.9	1.4E-09	21	0.976	1.4E-09

PERMEABILITY AT 20° C: 1.5 x 10^{-9} cm/sec (@ 5 psi effective stress)

Appendix C:
Tier 1 – Soil 1 Admixture Testing
Mixture Development Sheets

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-01
MIXING DATE:	1-May-18	MIXED BY:	TAJ

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		**1,700 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	3.00 %	51.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	255.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 4/30/18. On 5/1/18, 153 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5, 7
UCS @ 14 and 28 day cure
Hydraulic Conductivity at 14 and 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	7	
PENETROMETER (tons/ft^2)	1.25	2.75	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-02
MIXING DATE:	1-May-18	MIXED BY:	TAJ

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		1,700 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	4.00 %	68.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	306.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 4/30/18. On 5/1/18, 204 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5, 7
UCS @ 14 and 28 day cure
Hydraulic Conductivity at 14 and 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	7	
PENETROMETER (tons/ft^2)	1.25	2.25	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-03
MIXING DATE:	1-May-18	MIXED BY:	TAJ

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		1,700 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	5.00 %	85.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	357.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 4/30/18. On 5/1/18, 255 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5, 7
UCS @ 14 and 28 day cure
Hydraulic Conductivity at 14 and 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	7	
PENETROMETER (tons/ft^2)	0.50	2.75	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-04
MIXING DATE:	1-May-18	MIXED BY:	TAJ

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		**1,700 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	6.00 %	102.0 g
Wyoming Bentonite Hydrogel #807	3.00 %	51.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	459.0 g

OBSERVATIONS / NOTES

51 g of Bentonite was hydrated with 153 g of water on 4/30/18. On 5/1/18, 306 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5, 7
UCS @ 14 and 28 day cure
Hydraulic Conductivity at 14 and 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	7	
PENETROMETER (tons/ft^2)	0.0	2.0	4.25	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-05
MIXING DATE:	1-May-18	MIXED BY:	TAJ

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		**1,700 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	8.00 %	136.0 g
Wyoming Bentonite Hydrogel #807	4.00 %	68.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	612.0 g

OBSERVATIONS / NOTES

68 g of Bentonite was hydrated with 204 g of water on 4/30/18. On 5/1/18, 408 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5, 7
UCS @ 14 and 28 day cure
Hydraulic Conductivity at 14 and 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	7	
PENETROMETER (tons/ft^2)	0.0	1.25	3.0	4.0	

Appendix D:
Tier 1 – Soil 1 Admixture Testing
Physical Properties Data Sheets

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-01 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	77.57	g
3. WT WET SOIL + TARE	240.27	g
4. WT DRY SOIL + TARE	210.88	g
5. WT WATER, Ww	29.39	g
6. WT DRY SOIL, Ws	133.31	g
7. MOISTURE CONTENT, W	**22.05**	**%**

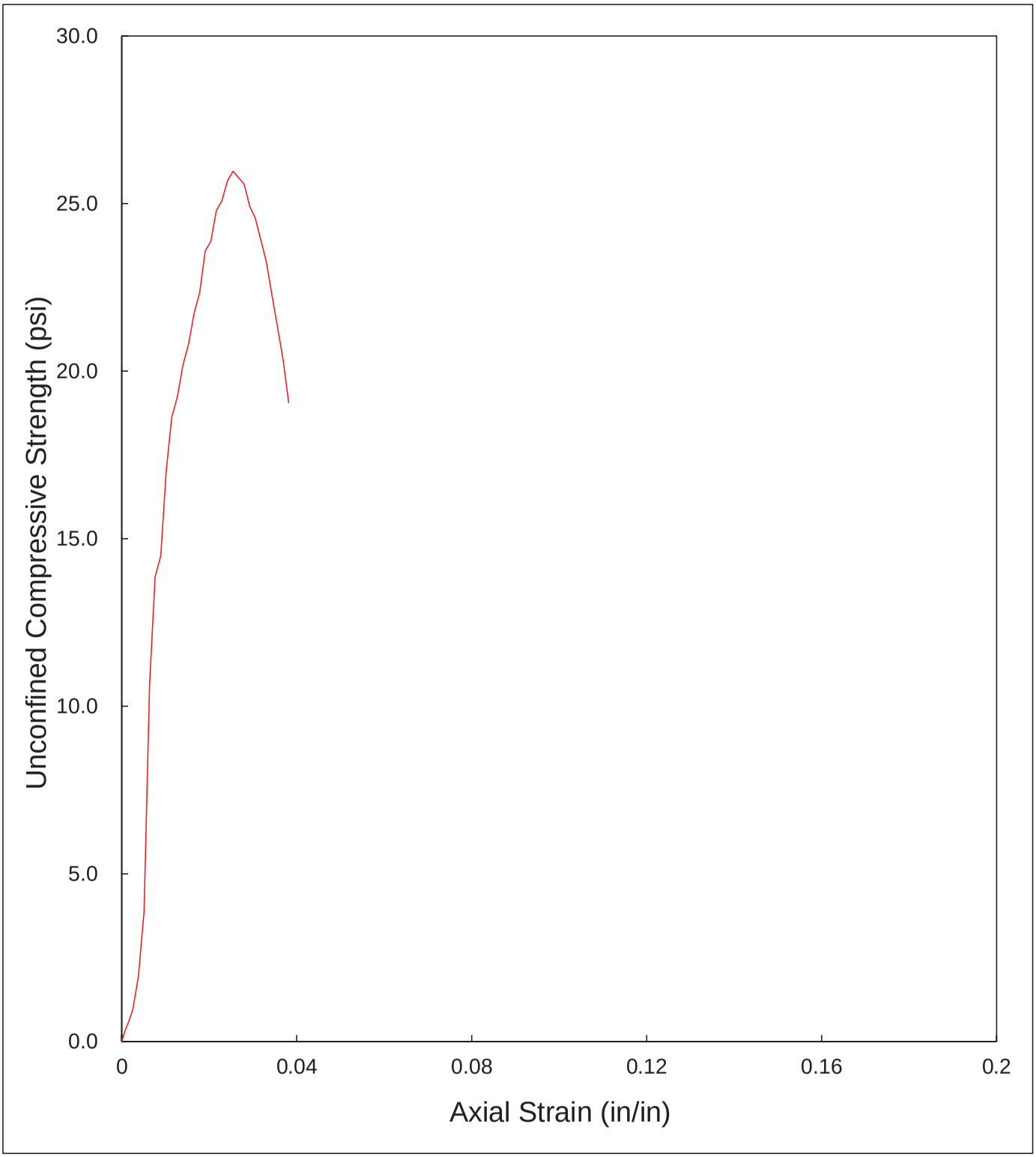
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.98	in.	3.92	in.
No. 2	1.98	in.	3.93	in.
No. 3	1.98	in.	3.94	in.
Average	**1.98**	**in.**	**3.93**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***389.87***	***g***
Initial Area, Ao	3.08	in^2
Initial Volume, Vo	12.10	in^3
Initial Bulk Unit Weight,	122.7	lb/ft^3
Initial Dry Unit Weight	100.6	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	26.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.078	0.0000	0.0
1	0.003	0.003	3.080	0.0008	0.3
2	0.007	0.007	3.084	0.0018	0.6
3	0.010	0.010	3.086	0.0025	1.0
6	0.015	0.015	3.090	0.0038	1.9
12	0.020	0.020	3.094	0.0051	3.9
33	0.025	0.025	3.098	0.0064	10.7
43	0.030	0.030	3.102	0.0076	13.9
45	0.035	0.035	3.106	0.0089	14.5
53	0.040	0.040	3.110	0.0102	17.0
58	0.045	0.045	3.114	0.0114	18.6
60	0.050	0.050	3.118	0.0127	19.2
63	0.055	0.055	3.122	0.0140	20.2
65	0.060	0.060	3.126	0.0153	20.8
68	0.065	0.065	3.130	0.0165	21.7
70	0.070	0.070	3.134	0.0178	22.3
74	0.075	0.075	3.138	0.0191	23.6
75	0.080	0.080	3.142	0.0204	23.9
78	0.085	0.085	3.146	0.0216	24.8
79	0.090	0.090	3.150	0.0229	25.1
81	0.095	0.095	3.154	0.0242	25.7
82	0.100	0.100	3.158	0.0254	26.0
81	0.110	0.110	3.167	0.0280	25.6
79	0.115	0.115	3.171	0.0293	24.9
78	0.120	0.120	3.175	0.0305	24.6
76	0.125	0.125	3.179	0.0318	23.9
74	0.130	0.130	3.183	0.0331	23.2
71	0.135	0.135	3.188	0.0343	22.3
68	0.140	0.140	3.192	0.0356	21.3
65	0.145	0.145	3.196	0.0369	20.3
61	0.150	0.150	3.200	0.0382	19.1

UNCONFINED COMPRESSION TESTING

Sample No. BWM-01 (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-01 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	0

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	22.0	**%**
BULK UNIT WEIGHT	122.7	lb/ft^3
DRY UNIT WEIGHT	100.6	lb/ft^3
UCS *	26.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/8/2018	Tested By:	jm
End Date:	5/11/2018	Checked By:	mcm
Boring	---	Test #:	K-1
Sample #:	BMW-01		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P2

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.55	1.55
Diameter, in	2.94	2.95
Area, in^2	6.79	6.83
Volume, in^3	10.5	10.6
Mass, g	334	334
Bulk Density, pcf	121	120
Moisture Content, %	22.7	22.7
Dry Density, pcf	98.3	97.6
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/10	2	99	75	101.9	101.6	0.3	180	25.9	1.2E-07	21	0.976	1.2E-07
5/10	3	99	75	101.6	100.9	0.7	420	25.8	1.2E-07	21	0.976	1.2E-07
5/10	4	99	75	100.9	100.0	0.9	540	25.6	1.2E-07	21	0.976	1.2E-07
4/13	5	99	75	100.0	97.6	2.4	1500	25.4	1.2E-07	21	0.976	1.1E-07

PERMEABILITY AT 20° C: 1.2 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-02 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C147

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	65.06	g
3. WT WET SOIL + TARE	282.38	g
4. WT DRY SOIL + TARE	241.93	g
5. WT WATER, Ww	40.45	g
6. WT DRY SOIL, Ws	176.87	g
7. MOISTURE CONTENT, W	**22.87**	**%**

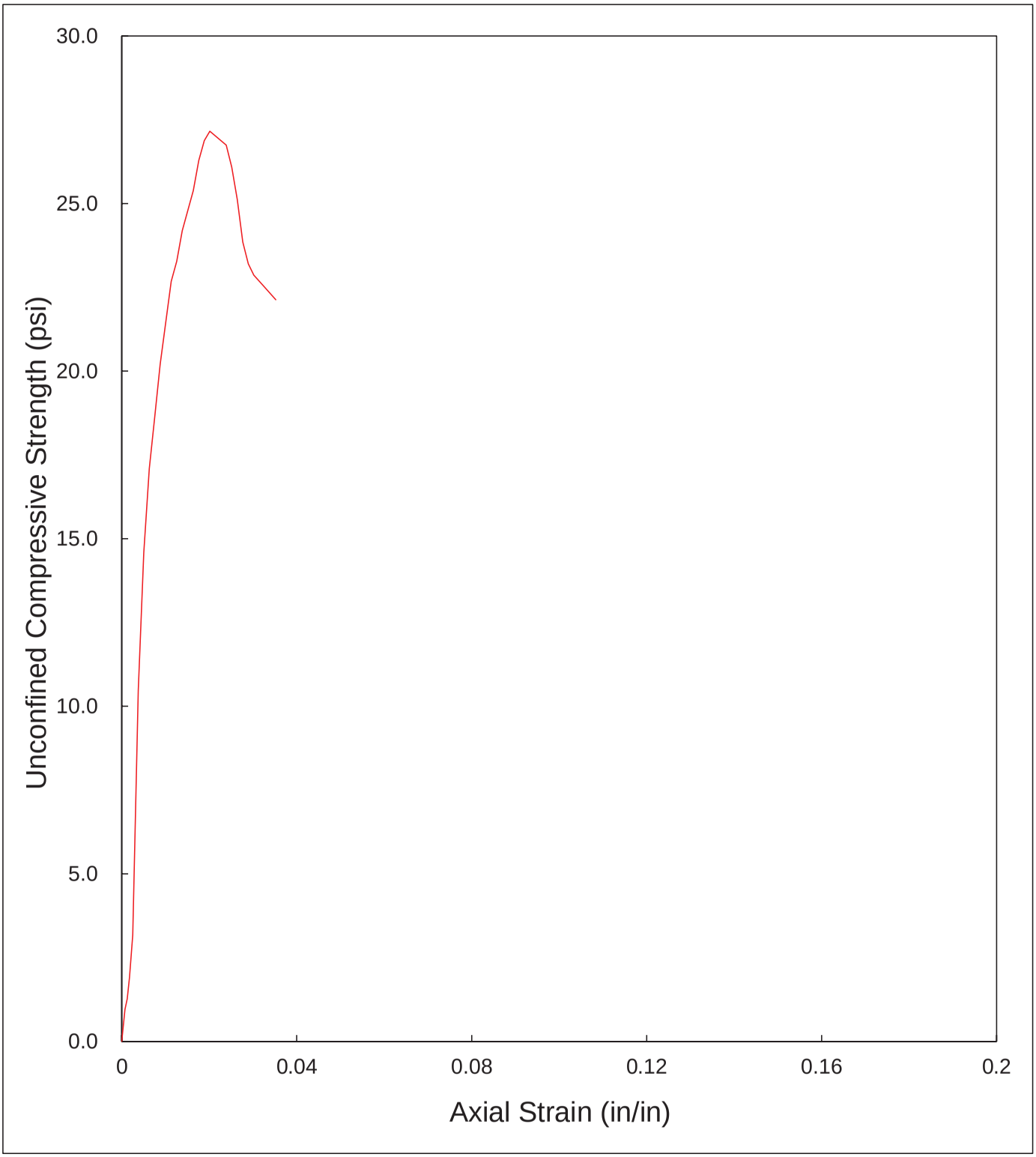
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.97	in.
No. 2	2.00	in.	3.99	in.
No. 3	2.00	in.	3.96	in.
Average	**2.00**	**in.**	**3.97**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***387.71***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	12.48	in^3
Initial Bulk Unit Weight,	118.4	lb/ft^3
Initial Dry Unit Weight	96.3	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	27.2	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.139	0.0000	0.0
3	0.003	0.003	3.141	0.0008	1.0
4	0.005	0.005	3.143	0.0013	1.3
6	0.007	0.007	3.145	0.0018	1.9
10	0.010	0.010	3.147	0.0025	3.2
33	0.015	0.015	3.151	0.0038	10.5
46	0.020	0.020	3.155	0.0050	14.6
54	0.025	0.025	3.159	0.0063	17.1
59	0.030	0.030	3.163	0.0075	18.7
64	0.035	0.035	3.167	0.0088	20.2
68	0.040	0.040	3.171	0.0101	21.4
72	0.045	0.045	3.175	0.0113	22.7
74	0.050	0.050	3.179	0.0126	23.3
77	0.055	0.055	3.183	0.0138	24.2
79	0.060	0.060	3.187	0.0151	24.8
81	0.065	0.065	3.191	0.0164	25.4
84	0.070	0.070	3.195	0.0176	26.3
86	0.075	0.075	3.199	0.0189	26.9
87	0.080	0.080	3.203	0.0201	27.2
86	0.095	0.095	3.216	0.0239	26.7
84	0.100	0.100	3.220	0.0252	26.1
81	0.105	0.105	3.224	0.0264	25.1
77	0.110	0.110	3.228	0.0277	23.9
75	0.115	0.115	3.232	0.0289	23.2
74	0.120	0.120	3.237	0.0302	22.9
73	0.130	0.130	3.245	0.0327	22.5
72	0.140	0.140	3.254	0.0352	22.1

UNCONFINED COMPRESSION TESTING

Sample No. BWM-02 (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-02 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C147

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	22.9	**%**
BULK UNIT WEIGHT	118.4	lb/ft^3
DRY UNIT WEIGHT	96.3	lb/ft^3
UCS *	27.2	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/8/2018	Tested By:	jm
End Date:	5/11/2018	Checked By:	mcm
Boring	---	Test #:	K-2
Sample #:	BMW-02		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K9

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.85	1.85
Diameter, in	2.96	2.97
Area, in^2	6.88	6.93
Volume, in^3	12.7	12.8
Mass, g	410	414
Bulk Density, pcf	122	123
Moisture Content, %	23.8	25.0
Dry Density, pcf	98.9	98.2
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/10	2	99	75	108.9	108.5	0.4	120	23.2	2.6E-07	21	0.976	2.6E-07
5/10	3	99	75	108.5	107.9	0.6	180	23.1	2.6E-07	21	0.976	2.6E-07
5/10	4	99	75	107.9	103.8	4.1	1380	23.0	2.4E-07	21	0.976	2.3E-07
4/13	5	99	75	103.8	100.6	3.2	1260	22.1	2.1E-07	21	0.976	2.1E-07

PERMEABILITY AT 20° C: 2.4 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C148

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	67.40	g
3. WT WET SOIL + TARE	212.91	g
4. WT DRY SOIL + TARE	182.40	g
5. WT WATER, Ww	30.51	g
6. WT DRY SOIL, Ws	115.00	g
7. MOISTURE CONTENT, W	**26.53**	**%**

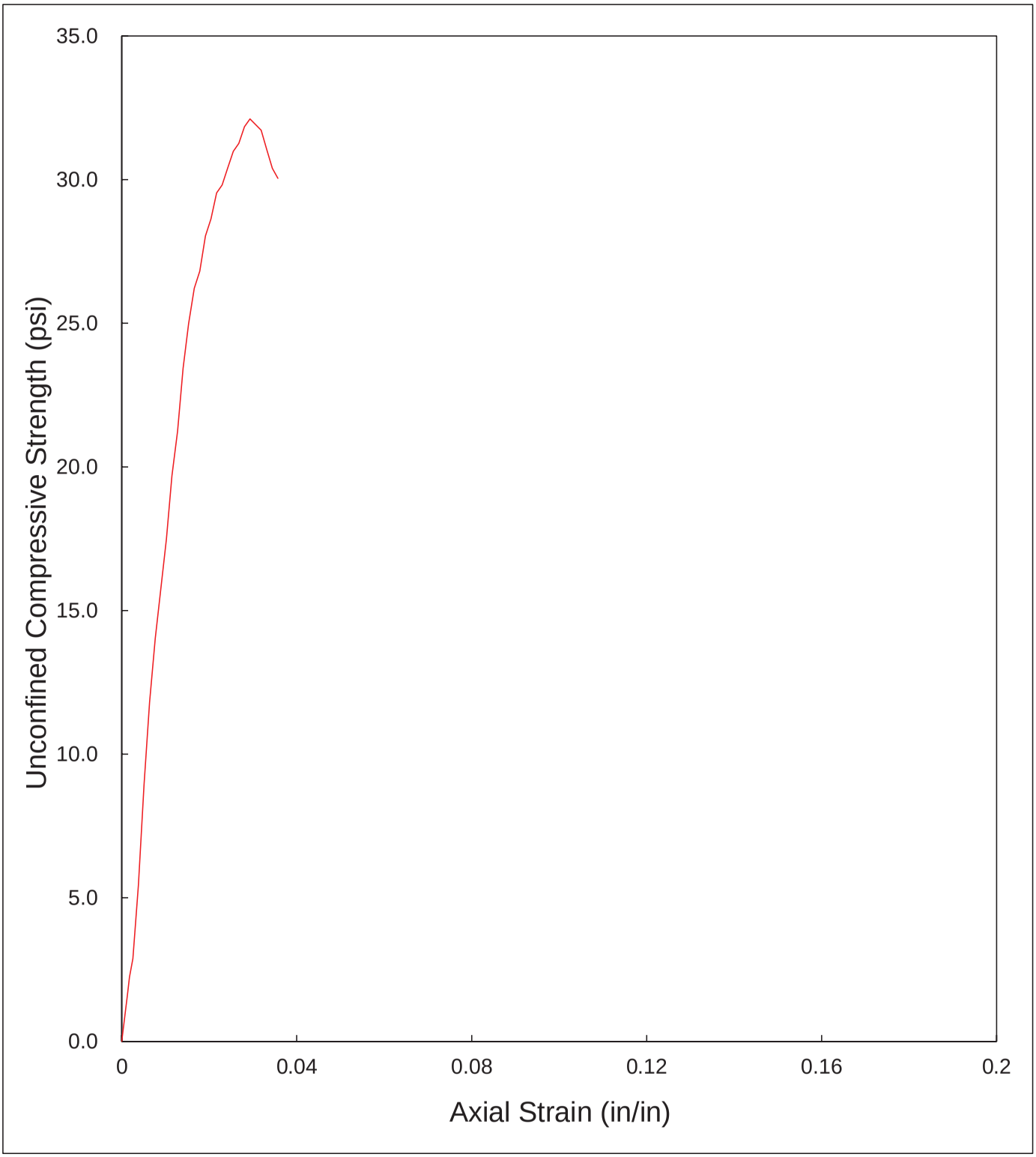
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.92	in.
No. 2	1.99	in.	3.91	in.
No. 3	1.99	in.	3.94	in.
Average	**1.99**	**in.**	**3.92**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***385.14***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	12.21	in^3
Initial Bulk Unit Weight,	120.2	lb/ft^3
Initial Dry Unit Weight	95.0	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	32.1	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.113	0.0000	0.0
3	0.003	0.003	3.116	0.0008	1.0
5	0.005	0.005	3.117	0.0013	1.6
7	0.007	0.007	3.119	0.0018	2.2
9	0.010	0.010	3.121	0.0026	2.9
17	0.015	0.015	3.125	0.0038	5.4
28	0.020	0.020	3.129	0.0051	8.9
37	0.025	0.025	3.133	0.0064	11.8
44	0.030	0.030	3.137	0.0077	14.0
55	0.040	0.040	3.145	0.0102	17.5
62	0.045	0.045	3.150	0.0115	19.7
67	0.050	0.050	3.154	0.0128	21.2
74	0.055	0.055	3.158	0.0140	23.4
79	0.060	0.060	3.162	0.0153	25.0
83	0.065	0.065	3.166	0.0166	26.2
85	0.070	0.070	3.170	0.0179	26.8
89	0.075	0.075	3.174	0.0191	28.0
91	0.080	0.080	3.178	0.0204	28.6
94	0.085	0.085	3.182	0.0217	29.5
95	0.090	0.090	3.187	0.0230	29.8
97	0.095	0.095	3.191	0.0242	30.4
99	0.100	0.100	3.195	0.0255	31.0
100	0.105	0.105	3.199	0.0268	31.3
102	0.110	0.110	3.203	0.0281	31.8
103	0.115	0.115	3.207	0.0293	32.1
102	0.125	0.125	3.216	0.0319	31.7
100	0.130	0.130	3.220	0.0332	31.1
98	0.135	0.135	3.224	0.0344	30.4
97	0.140	0.140	3.229	0.0357	30.0
94	0.145	0.145	3.233	0.0370	29.1
91	0.150	0.150	3.237	0.0383	28.1
89	0.155	0.155	3.242	0.0395	27.5
85	0.160	0.160	3.246	0.0408	26.2
82	0.165	0.165	3.250	0.0421	25.2

UNCONFINED COMPRESSION TESTING

Sample No. BWM-03 (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C148

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	26.5	**%**
BULK UNIT WEIGHT	120.2	lb/ft^3
DRY UNIT WEIGHT	95.0	lb/ft^3
UCS *	32.1	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/8/2018	Tested By:	jm
End Date:	5/11/2018	Checked By:	mcm
Boring	---	Test #:	K-3
Sample #:	BMW-03		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K9

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.85	1.85
Diameter, in	2.98	2.97
Area, in^2	6.97	6.93
Volume, in^3	12.9	12.8
Mass, g	412	413
Bulk Density, pcf	121	122
Moisture Content, %	26.2	26.6
Dry Density, pcf	96.1	96.7
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
5/10	2	99	75	93.8	93.5	0.3	120	20.0	2.3E-07	21	0.976	2.2E-07
5/10	3	99	75	93.5	92.6	0.9	420	19.9	2.0E-07	21	0.976	1.9E-07
5/10	4	99	75	92.6	91.7	0.9	420	19.7	2.0E-07	21	0.976	1.9E-07
4/13	5	99	75	91.7	89.2	2.5	1020	19.5	2.3E-07	21	0.976	2.3E-07

PERMEABILITY AT 20° C: 2.1 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-04 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C149

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	106.57	g
3. WT WET SOIL + TARE	316.15	g
4. WT DRY SOIL + TARE	267.56	g
5. WT WATER, Ww	48.59	g
6. WT DRY SOIL, Ws	160.99	g
7. MOISTURE CONTENT, W	**30.18**	**%**

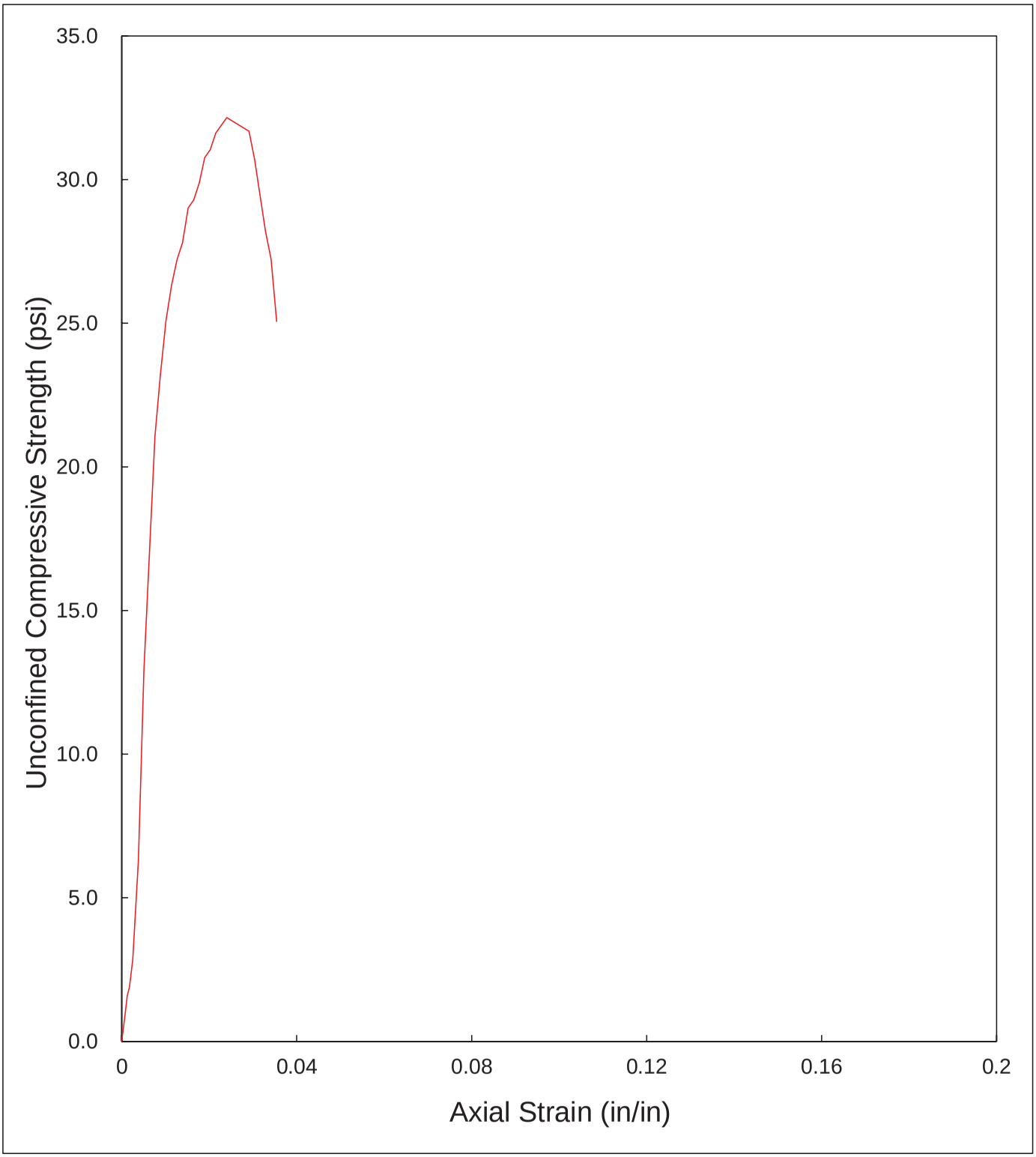
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.02	in.	3.99	in.
No. 2	2.00	in.	3.93	in.
No. 3	1.99	in.	3.94	in.
Average	**2.00**	**in.**	**3.95**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***378.23***	***g***
Initial Area, Ao	3.16	in^2
Initial Volume, Vo	12.48	in^3
Initial Bulk Unit Weight,	115.5	lb/ft^3
Initial Dry Unit Weight	88.7	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	32.2	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.156	0.0000	0.0
3	0.003	0.003	3.159	0.0008	0.9
5	0.005	0.005	3.160	0.0013	1.6
6	0.007	0.007	3.162	0.0018	1.9
9	0.010	0.010	3.164	0.0025	2.8
20	0.015	0.015	3.168	0.0038	6.3
41	0.020	0.020	3.172	0.0051	12.9
54	0.025	0.025	3.176	0.0063	17.0
67	0.030	0.030	3.180	0.0076	21.1
74	0.035	0.035	3.184	0.0089	23.2
80	0.040	0.040	3.189	0.0101	25.1
84	0.045	0.045	3.193	0.0114	26.3
87	0.050	0.050	3.197	0.0126	27.2
89	0.055	0.055	3.201	0.0139	27.8
93	0.060	0.060	3.205	0.0152	29.0
94	0.065	0.065	3.209	0.0164	29.3
96	0.070	0.070	3.213	0.0177	29.9
99	0.075	0.075	3.217	0.0190	30.8
100	0.080	0.080	3.221	0.0202	31.0
102	0.085	0.085	3.226	0.0215	31.6
103	0.090	0.090	3.230	0.0228	31.9
104	0.095	0.095	3.234	0.0240	32.2
103	0.115	0.115	3.251	0.0291	31.7
100	0.120	0.120	3.255	0.0304	30.7
96	0.125	0.125	3.259	0.0316	29.5
92	0.130	0.130	3.264	0.0329	28.2
89	0.135	0.135	3.268	0.0342	27.2
82	0.140	0.140	3.272	0.0354	25.1
78	0.145	0.145	3.276	0.0367	23.8
72	0.150	0.150	3.281	0.0379	21.9

UNCONFINED COMPRESSION TESTING

Sample No. BWM-04 (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-04 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C149

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	30.2	**%**
BULK UNIT WEIGHT	115.5	lb/ft^3
DRY UNIT WEIGHT	88.7	lb/ft^3
UCS *	32.2	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/8/2018	Tested By:	jm
End Date:	5/11/2018	Checked By:	mcm
Boring	---	Test #:	K-5
Sample #:	BMW-04		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K3

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	2.25	2.25
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	15.6	15.6
Mass, g	482	482
Bulk Density, pcf	117	118
Moisture Content, %	30.7	30.9
Dry Density, pcf	89.9	89.9
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/10	1	99	75	108.5	107.3	1.2	900	19.0	1.3E-07	21	0.976	1.3E-07
5/10	2	99	75	107.3	104.6	2.7	2520	18.8	1.1E-07	21	0.976	1.0E-07
5/10	3	99	75	104.6	102.7	1.9	1380	18.3	1.4E-07	21	0.976	1.3E-07
5/10	4	99	75	102.7	80.5	22.2	24000	18.0	1.1E-07	21	0.976	1.0E-07

PERMEABILITY AT 20° C: 1.1 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-05 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C150

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	115.00	g
3. WT WET SOIL + TARE	253.03	g
4. WT DRY SOIL + TARE	214.30	g
5. WT WATER, Ww	38.73	g
6. WT DRY SOIL, Ws	99.30	g
7. MOISTURE CONTENT, W	**39.00**	**%**

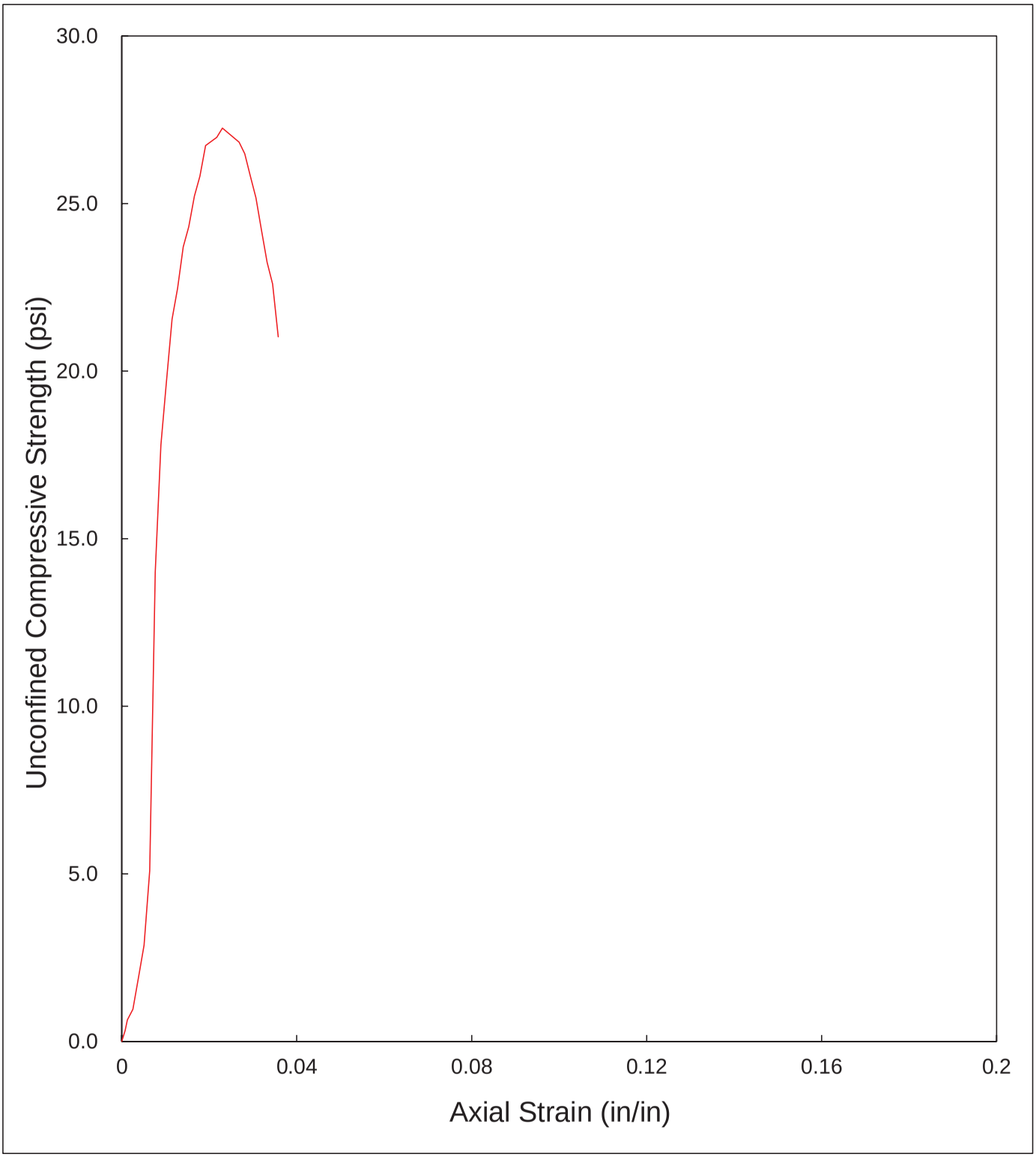
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.93	in.
No. 2	2.00	in.	3.92	in.
No. 3	1.99	in.	3.90	in.
Average	**1.99**	**in.**	**3.91**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***361.00***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	12.21	in^3
Initial Bulk Unit Weight,	112.7	lb/ft^3
Initial Dry Unit Weight	81.1	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	27.3	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.119	0.0000	0.0
1	0.003	0.003	3.122	0.0008	0.3
2	0.005	0.005	3.123	0.0013	0.6
3	0.010	0.010	3.127	0.0026	1.0
6	0.015	0.015	3.131	0.0038	1.9
9	0.020	0.020	3.135	0.0051	2.9
16	0.025	0.025	3.139	0.0064	5.1
44	0.030	0.030	3.143	0.0077	14.0
56	0.035	0.035	3.147	0.0089	17.8
62	0.040	0.040	3.151	0.0102	19.7
68	0.045	0.045	3.155	0.0115	21.6
71	0.050	0.050	3.159	0.0128	22.5
75	0.055	0.055	3.164	0.0141	23.7
77	0.060	0.060	3.168	0.0153	24.3
80	0.065	0.065	3.172	0.0166	25.2
82	0.070	0.070	3.176	0.0179	25.8
85	0.075	0.075	3.180	0.0192	26.7
86	0.085	0.085	3.188	0.0217	27.0
87	0.090	0.090	3.193	0.0230	27.3
86	0.105	0.105	3.205	0.0268	26.8
85	0.110	0.110	3.209	0.0281	26.5
83	0.115	0.115	3.214	0.0294	25.8
81	0.120	0.120	3.218	0.0307	25.2
78	0.125	0.125	3.222	0.0319	24.2
75	0.130	0.130	3.226	0.0332	23.2
73	0.135	0.135	3.231	0.0345	22.6
68	0.140	0.140	3.235	0.0358	21.0
65	0.145	0.145	3.239	0.0371	20.1
59	0.150	0.150	3.243	0.0383	18.2
56	0.155	0.155	3.248	0.0396	17.2
52	0.160	0.160	3.252	0.0409	16.0

UNCONFINED COMPRESSION TESTING

Sample No. BWM-05 (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-05 (7 day)		
TESTING DATE:	8-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB	TRACKING CODE:	C150

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	39.0	**%**
BULK UNIT WEIGHT	112.7	lb/ft^3
DRY UNIT WEIGHT	81.1	lb/ft^3
UCS *	27.3	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/8/2018	Tested By:	jm
End Date:	5/11/2018	Checked By:	mcm
Boring	---	Test #:	K-4
Sample #:	BMW-05		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P6

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	2.95	2.95
Diameter, in	2.97	2.96
Area, in^2	6.93	6.88
Volume, in^3	20.4	20.3
Mass, g	609	607
Bulk Density, pcf	113	114
Moisture Content, %	38.1	37.7
Dry Density, pcf	82.1	82.6
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/10	1	99	75	108.9	108.8	0.1	120	14.5	1.2E-07	21	0.976	1.1E-07
5/10	2	99	75	108.8	108.1	0.7	600	14.5	1.5E-07	21	0.976	1.4E-07
5/10	3	99	75	108.1	106.7	1.4	1200	14.4	1.5E-07	21	0.976	1.5E-07
4/13	4	99	75	106.7	105.0	1.7	1680	14.2	1.3E-07	21	0.976	1.3E-07

PERMEABILITY AT 20° C: 1.3 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-01 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C181

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	169.11	g
3. WT WET SOIL + TARE	336.82	g
4. WT DRY SOIL + TARE	307.00	g
5. WT WATER, Ww	29.82	g
6. WT DRY SOIL, Ws	137.89	g
7. MOISTURE CONTENT, W	**21.63**	**%**

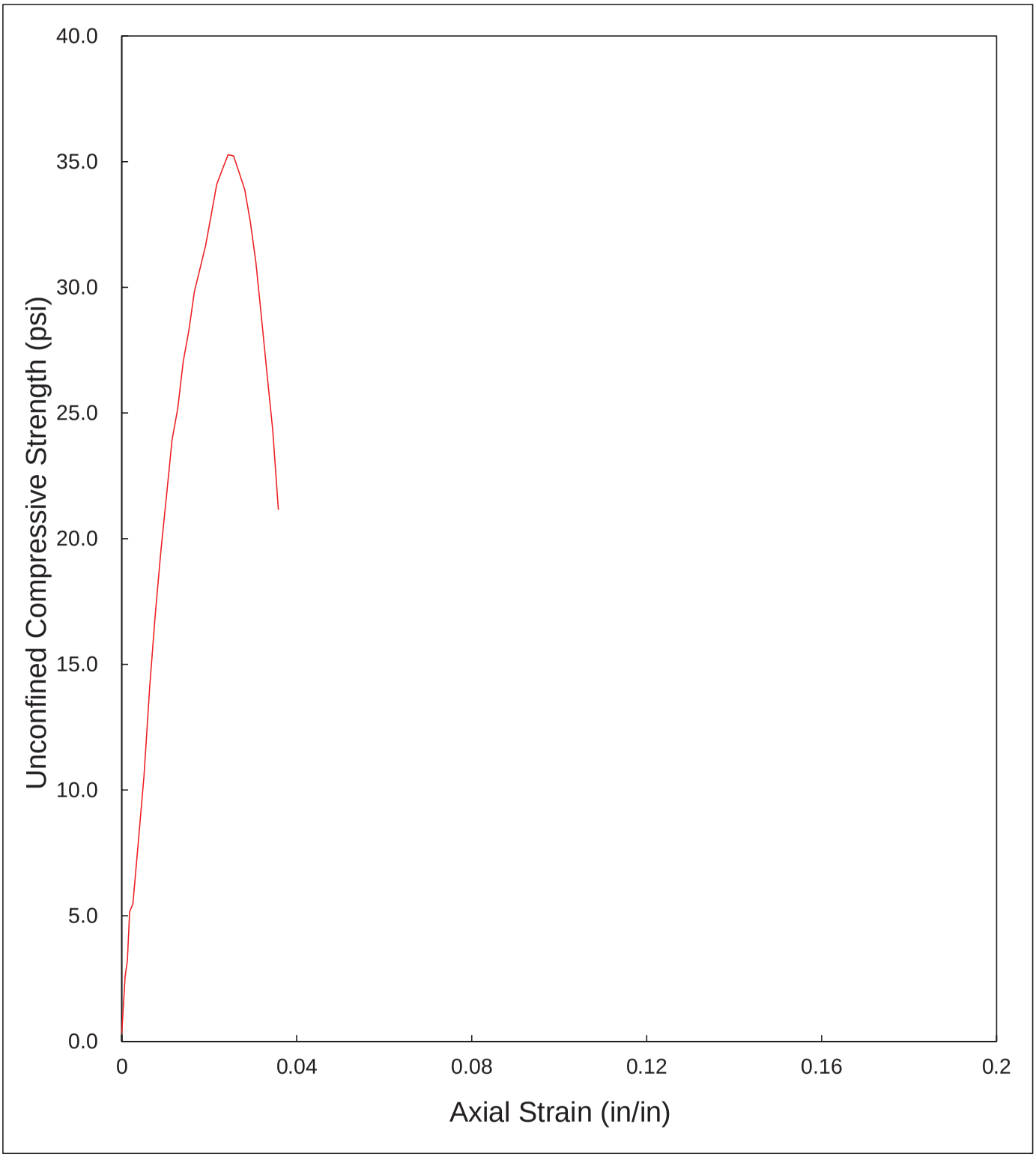
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.91	in.
No. 2	2.00	in.	3.92	in.
No. 3	1.96	in.	3.90	in.
Average	**1.99**	**in.**	**3.91**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***385.43***	***g***
Initial Area, Ao	3.10	in^2
Initial Volume, Vo	12.11	in^3
Initial Bulk Unit Weight,	121.2	lb/ft^3
Initial Dry Unit Weight	99.7	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	35.3	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
1	0.000	0.000	3.098	0.0000	0.3
8	0.003	0.003	3.100	0.0008	2.6
10	0.005	0.005	3.102	0.0013	3.2
16	0.007	0.007	3.103	0.0018	5.2
17	0.010	0.010	3.106	0.0026	5.5
25	0.015	0.015	3.110	0.0038	8.0
33	0.020	0.020	3.114	0.0051	10.6
44	0.025	0.025	3.118	0.0064	14.1
53	0.030	0.030	3.122	0.0077	17.0
61	0.035	0.035	3.126	0.0090	19.5
68	0.040	0.040	3.130	0.0102	21.7
75	0.045	0.045	3.134	0.0115	23.9
79	0.050	0.050	3.138	0.0128	25.2
85	0.055	0.055	3.142	0.0141	27.1
89	0.060	0.060	3.146	0.0153	28.3
94	0.065	0.065	3.150	0.0166	29.8
97	0.070	0.070	3.154	0.0179	30.8
100	0.075	0.075	3.158	0.0192	31.7
104	0.080	0.080	3.162	0.0205	32.9
108	0.085	0.085	3.167	0.0217	34.1
110	0.090	0.090	3.171	0.0230	34.7
112	0.095	0.095	3.175	0.0243	35.3
112	0.100	0.100	3.179	0.0256	35.2
110	0.105	0.105	3.183	0.0269	34.6
108	0.110	0.110	3.187	0.0281	33.9
104	0.115	0.115	3.192	0.0294	32.6
99	0.120	0.120	3.196	0.0307	31.0
92	0.125	0.125	3.200	0.0320	28.7
85	0.130	0.130	3.204	0.0332	26.5
78	0.135	0.135	3.209	0.0345	24.3
68	0.140	0.140	3.213	0.0358	21.2

UNCONFINED COMPRESSION TESTING

Sample No. BWM-01 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-01 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C181

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	21.6	**%**
BULK UNIT WEIGHT	121.2	lb/ft^3
DRY UNIT WEIGHT	99.7	lb/ft^3
UCS *	35.3	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/29/2018	Tested By:	jm
End Date:	6/2/2018	Checked By:	mcm
Boring	---	Test #:	K-6
Sample #:	BMW-01 (28 Day)		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P9

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.62	1.62
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	11.2	11.2
Mass, g	353	356
Bulk Density, pcf	119	121
Moisture Content, %	22.6	23.9
Dry Density, pcf	97.4	97.4
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/30	3	99	75	111.6	110.5	1.1	900	27.1	8.2E-08	21	0.976	8.0E-08
5/30	4	99	75	110.5	108.4	2.1	1680	26.8	8.5E-08	21	0.976	8.3E-08
5/30	5	99	75	108.4	106.3	2.1	1800	26.3	8.1E-08	21	0.976	7.9E-08
5/30	6	99	75	106.3	101.7	4.6	4200	25.8	7.9E-08	21	0.976	7.7E-08

PERMEABILITY AT 20° C: 8.0 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-02 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C182

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	167.48	g
3. WT WET SOIL + TARE	328.96	g
4. WT DRY SOIL + TARE	299.69	g
5. WT WATER, Ww	29.27	g
6. WT DRY SOIL, Ws	132.21	g
7. MOISTURE CONTENT, W	**22.14**	**%**

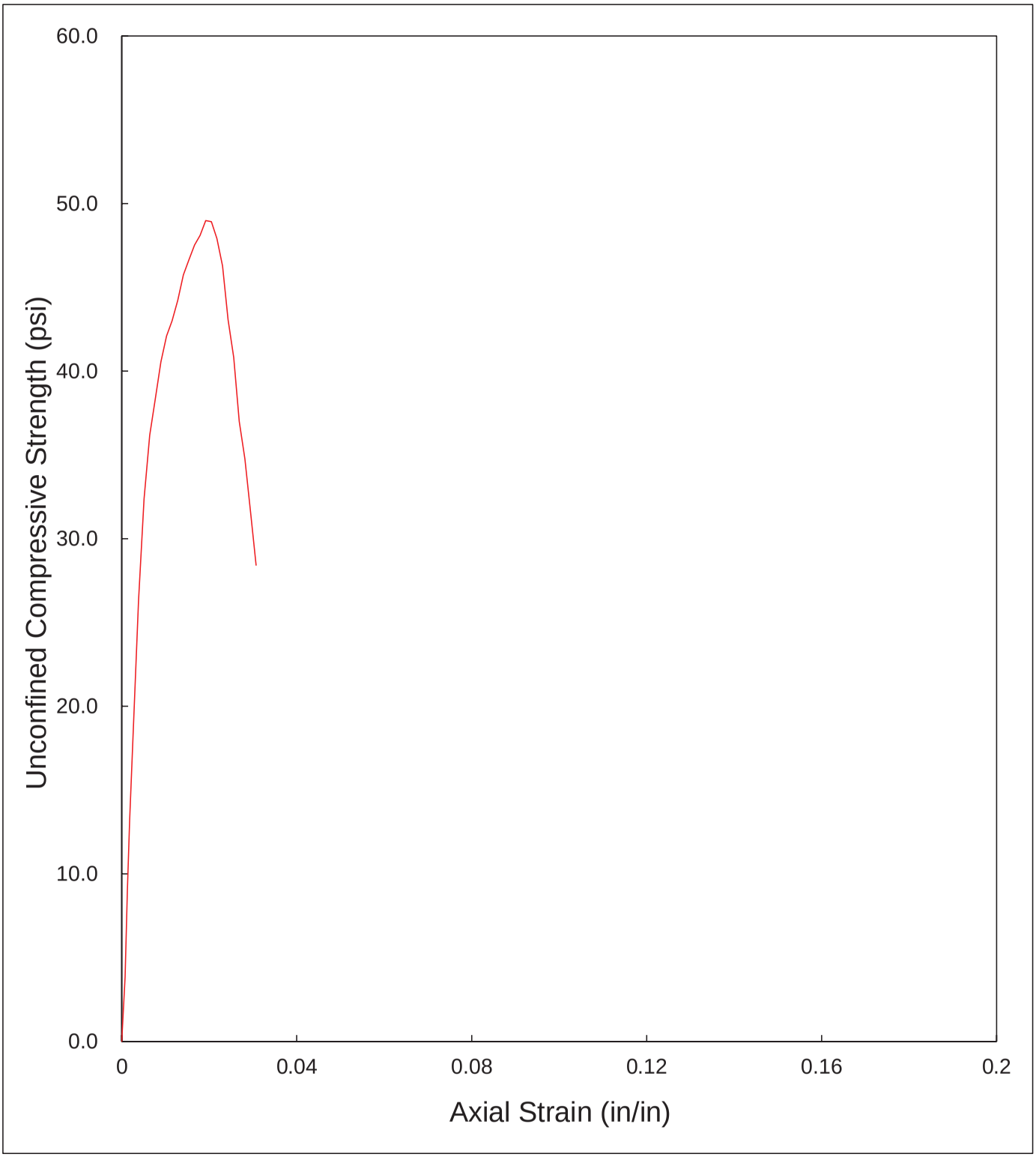
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.90	in.
No. 2	1.99	in.	3.91	in.
No. 3	1.98	in.	3.91	in.
Average	**1.99**	**in.**	**3.91**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***385.95***	***g***
Initial Area, Ao	3.10	in^2
Initial Volume, Vo	12.12	in^3
Initial Bulk Unit Weight,	121.3	lb/ft^3
Initial Dry Unit Weight	99.3	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	49.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.103	0.0000	0.0
12	0.003	0.003	3.106	0.0008	3.9
28	0.005	0.005	3.107	0.0013	9.0
41	0.007	0.007	3.109	0.0018	13.2
56	0.010	0.010	3.111	0.0026	18.0
82	0.015	0.015	3.115	0.0038	26.3
101	0.020	0.020	3.119	0.0051	32.4
113	0.025	0.025	3.123	0.0064	36.2
120	0.030	0.030	3.128	0.0077	38.4
127	0.035	0.035	3.132	0.0090	40.6
132	0.040	0.040	3.136	0.0102	42.1
135	0.045	0.045	3.140	0.0115	43.0
139	0.050	0.050	3.144	0.0128	44.2
144	0.055	0.055	3.148	0.0141	45.7
147	0.060	0.060	3.152	0.0154	46.6
150	0.065	0.065	3.156	0.0166	47.5
152	0.070	0.070	3.160	0.0179	48.1
155	0.075	0.075	3.164	0.0192	49.0
155	0.080	0.080	3.168	0.0205	48.9
152	0.085	0.085	3.173	0.0218	47.9
147	0.090	0.090	3.177	0.0230	46.3
137	0.095	0.095	3.181	0.0243	43.1
130	0.100	0.100	3.185	0.0256	40.8
118	0.105	0.105	3.189	0.0269	37.0
111	0.110	0.110	3.193	0.0282	34.8
101	0.115	0.115	3.198	0.0294	31.6
91	0.120	0.120	3.202	0.0307	28.4

UNCONFINED COMPRESSION TESTING

Sample No. BWM-02 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-02 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C182

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	22.1	**%**
BULK UNIT WEIGHT	121.3	lb/ft^3
DRY UNIT WEIGHT	99.3	lb/ft^3
UCS *	49.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/29/2018	Tested By:	jm
End Date:	6/2/2018	Checked By:	mcm
Boring	---	Test #:	K-7
Sample #:	BMW-02 (28 Day)		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P4

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.61	1.61
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	11.2	11.2
Mass, g	350	353
Bulk Density, pcf	119	120
Moisture Content, %	23.7	24.6
Dry Density, pcf	96.6	96.6
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/30	3	99	75	96.2	95.0	1.2	1620	23.5	5.8E-08	21	0.976	5.6E-08
5/30	4	99	75	95.0	93.6	1.4	1980	23.2	5.6E-08	21	0.976	5.4E-08
5/30	5	99	75	93.6	91.2	2.4	4020	22.9	4.8E-08	21	0.976	4.7E-08
5/30	6	99	75	91.2	90.0	1.2	2100	22.3	4.7E-08	21	0.976	4.6E-08

PERMEABILITY AT 20° C: 5.1 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C183

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	227.46	g
3. WT WET SOIL + TARE	349.74	g
4. WT DRY SOIL + TARE	325.23	g
5. WT WATER, Ww	24.51	g
6. WT DRY SOIL, Ws	97.77	g
7. MOISTURE CONTENT, W	**25.07**	**%**

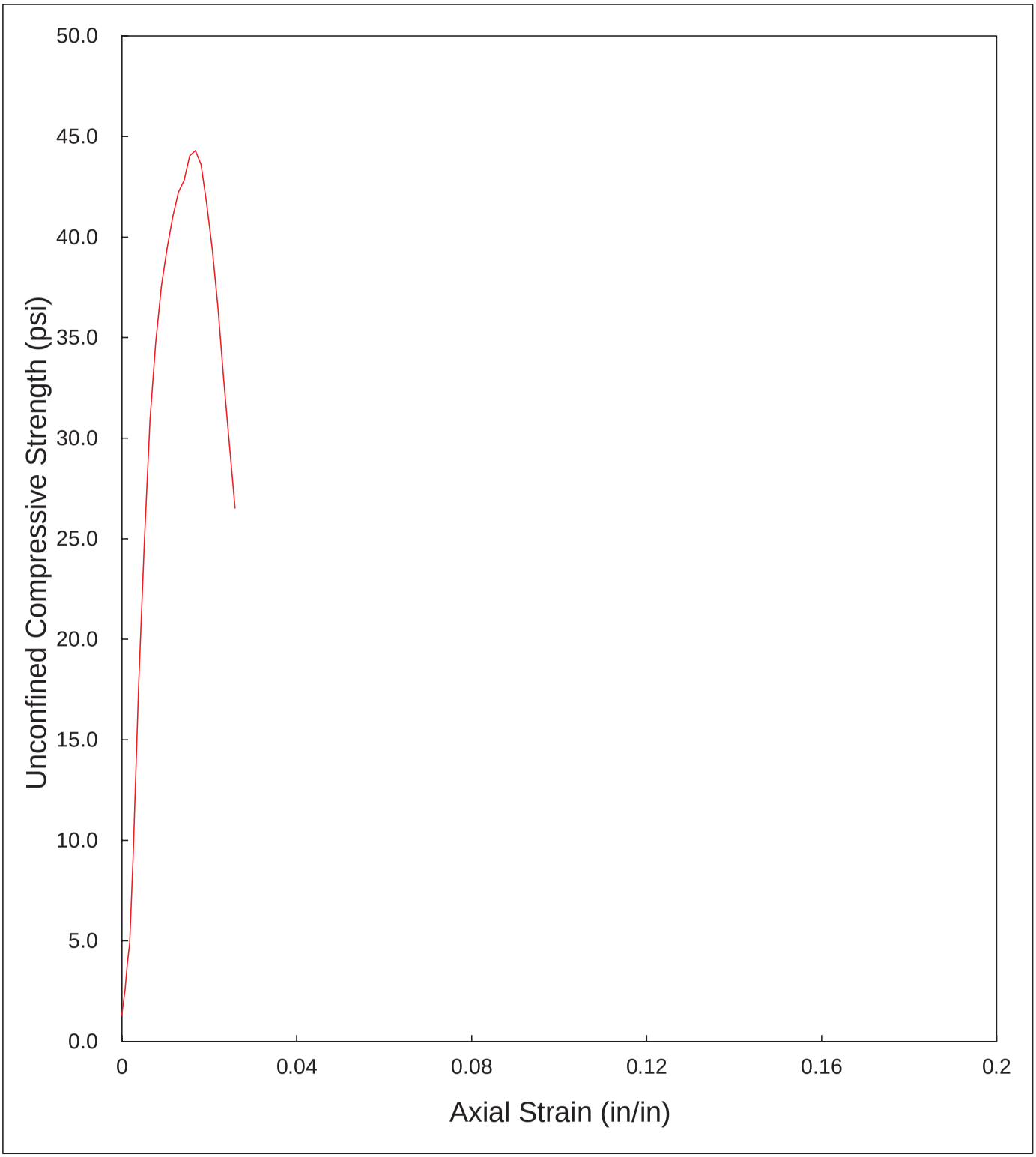
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.98	in.	3.86	in.
No. 2	1.98	in.	3.86	in.
No. 3	1.99	in.	3.86	in.
Average	**1.98**	**in.**	**3.86**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***378.79***	***g***
Initial Area, Ao	3.08	in^2
Initial Volume, Vo	11.91	in^3
Initial Bulk Unit Weight,	121.2	lb/ft^3
Initial Dry Unit Weight	96.9	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	44.3	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
4	0.000	0.000	3.085	0.0000	1.3
8	0.003	0.003	3.087	0.0008	2.6
12	0.005	0.005	3.089	0.0013	3.9
15	0.007	0.007	3.090	0.0018	4.9
28	0.010	0.010	3.093	0.0026	9.1
55	0.015	0.015	3.097	0.0039	17.8
77	0.020	0.020	3.101	0.0052	24.8
96	0.025	0.025	3.105	0.0065	30.9
108	0.030	0.030	3.109	0.0078	34.7
117	0.035	0.035	3.113	0.0091	37.6
123	0.040	0.040	3.117	0.0104	39.5
128	0.045	0.045	3.121	0.0117	41.0
132	0.050	0.050	3.125	0.0130	42.2
134	0.055	0.055	3.129	0.0142	42.8
138	0.060	0.060	3.133	0.0155	44.0
139	0.065	0.065	3.138	0.0168	44.3
137	0.070	0.070	3.142	0.0181	43.6
131	0.075	0.075	3.146	0.0194	41.6
124	0.080	0.080	3.150	0.0207	39.4
115	0.085	0.085	3.154	0.0220	36.5
104	0.090	0.090	3.158	0.0233	32.9
94	0.095	0.095	3.163	0.0246	29.7
84	0.100	0.100	3.167	0.0259	26.5
	0.105	0.105	3.171	0.0272	
	0.110	0.110	3.175	0.0285	
	0.115	0.115	3.179	0.0298	
	0.120	0.120	3.184	0.0311	

UNCONFINED COMPRESSION TESTING

Sample No. BWM-03 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C183

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	25.1	**%**
BULK UNIT WEIGHT	121.2	lb/ft^3
DRY UNIT WEIGHT	96.9	lb/ft^3
UCS *	44.3	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/30/2018	Tested By:	jm
End Date:	6/3/2018	Checked By:	mcm
Boring	---	Test #:	K-8
Sample #:	BMW-03 (28 Day)		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K9

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	1.72	1.72
Diameter, in	2.99	2.99
Area, in^2	7.02	7.02
Volume, in^3	12.1	12.1
Mass, g	380	383
Bulk Density, pcf	120	121
Moisture Content, %	26.2	27.1
Dry Density, pcf	94.8	94.8
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/31	1	99	75	113.7	111.2	2.5	1800	26.0	9.7E-08	21	0.976	9.5E-08
5/31	2	99	75	111.2	109.5	1.7	1380	25.4	8.8E-08	21	0.976	8.5E-08
5/31	3	99	75	109.5	106.0	3.5	2700	25.1	9.4E-08	21	0.976	9.2E-08
5/31	4	99	75	106.0	91.2	14.7	12600	24.3	9.3E-08	21	0.976	9.1E-08

PERMEABILITY AT 20° C: 9.1 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-04 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C184

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	170.47	g
3. WT WET SOIL + TARE	325.71	g
4. WT DRY SOIL + TARE	289.83	g
5. WT WATER, Ww	35.88	g
6. WT DRY SOIL, Ws	119.36	g
7. MOISTURE CONTENT, W	**30.06**	**%**

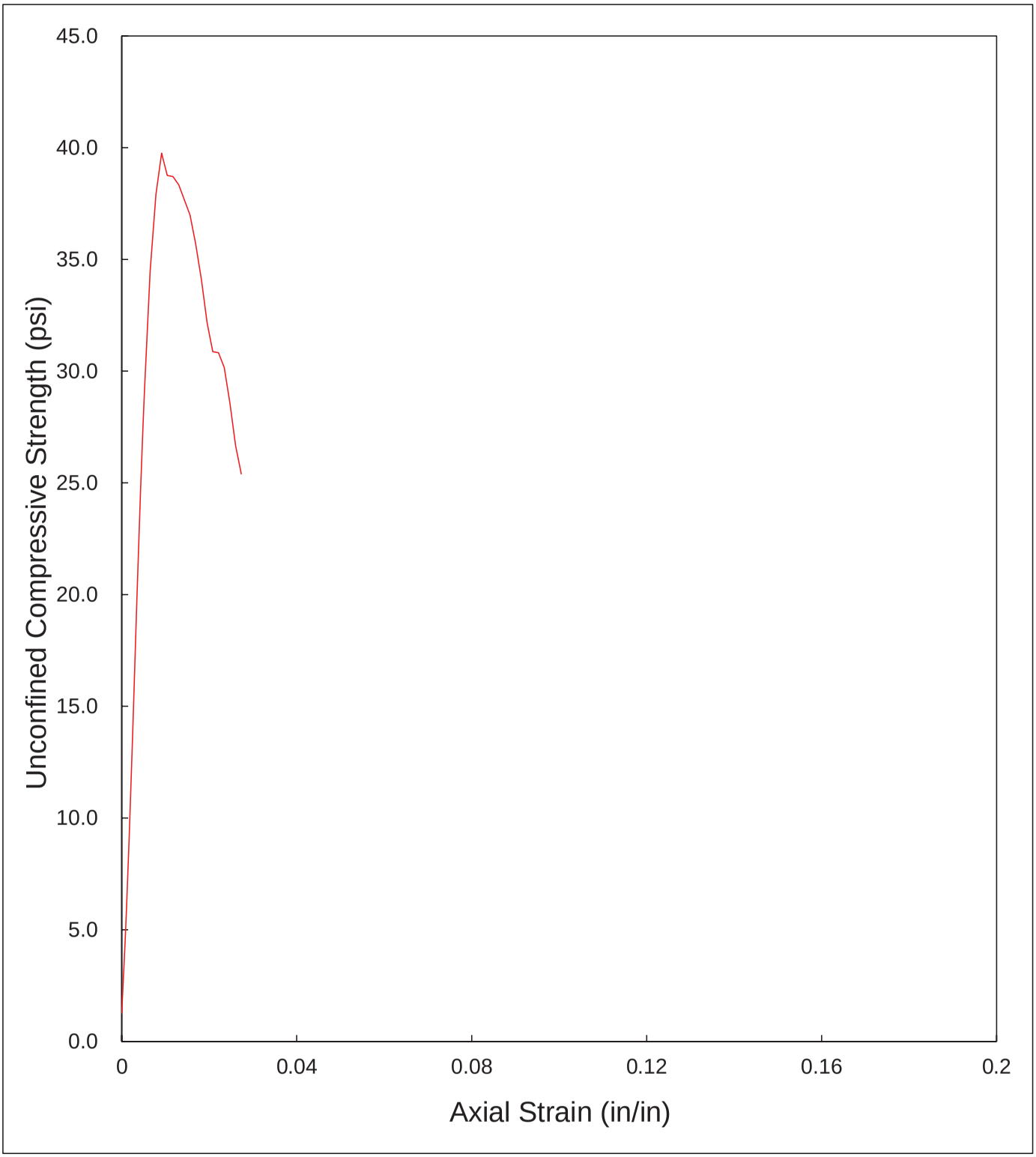
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.02	in.	3.86	in.
No. 2	2.00	in.	3.84	in.
No. 3	1.98	in.	3.83	in.
Average	**2.00**	**in.**	**3.84**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***367.91***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	12.07	in^3
Initial Bulk Unit Weight,	116.2	lb/ft^3
Initial Dry Unit Weight	89.3	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	39.8	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
4	0.000	0.000	3.141	0.0000	1.3
14	0.003	0.003	3.143	0.0008	4.5
22	0.005	0.005	3.145	0.0013	7.0
31	0.007	0.007	3.146	0.0018	9.9
45	0.010	0.010	3.149	0.0026	14.3
71	0.015	0.015	3.153	0.0039	22.5
92	0.020	0.020	3.157	0.0052	29.1
109	0.025	0.025	3.161	0.0065	34.5
120	0.030	0.030	3.165	0.0078	37.9
126	0.035	0.035	3.169	0.0091	39.8
123	0.040	0.040	3.174	0.0104	38.8
123	0.045	0.045	3.178	0.0117	38.7
122	0.050	0.050	3.182	0.0130	38.3
120	0.055	0.055	3.186	0.0143	37.7
118	0.060	0.060	3.190	0.0156	37.0
114	0.065	0.065	3.195	0.0169	35.7
109	0.070	0.070	3.199	0.0182	34.1
103	0.075	0.075	3.203	0.0195	32.2
99	0.080	0.080	3.207	0.0208	30.9
99	0.085	0.085	3.212	0.0221	30.8
97	0.090	0.090	3.216	0.0234	30.2
92	0.095	0.095	3.220	0.0247	28.6
86	0.100	0.100	3.224	0.0260	26.7
82	0.105	0.105	3.229	0.0273	25.4
	0.110	0.110	3.233	0.0286	
	0.115	0.115	3.237	0.0299	
	0.120	0.120	3.242	0.0312	

UNCONFINED COMPRESSION TESTING

Sample No. BWM-04 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-04 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C184

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	30.1	**%**
BULK UNIT WEIGHT	116.2	lb/ft^3
DRY UNIT WEIGHT	89.3	lb/ft^3
UCS *	39.8	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/31/2018	Tested By:	jm
End Date:	6/3/2018	Checked By:	mcm
Boring	---	Test #:	K-9
Sample #:	BMW-04 (28 Day)		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K3

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	2.18	2.18
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	15.2	15.2
Mass, g	471	472
Bulk Density, pcf	118	118
Moisture Content, %	30.5	30.8
Dry Density, pcf	90.2	90.2
Degree of Saturation, %	---	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
5/31	2	99	75	97.2	96.1	1.1	1740	17.6	6.5E-08	21	0.976	6.4E-08
5/31	3	99	75	96.1	95.3	0.8	1260	17.4	6.6E-08	21	0.976	6.5E-08
5/31	4	99	75	95.3	93.8	1.5	2820	17.2	5.6E-08	21	0.976	5.5E-08
5/31	5	99	75	93.8	92.3	1.5	2880	16.9	5.6E-08	21	0.976	5.5E-08

PERMEABILITY AT 20° C: 6.0 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-05 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C185

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	171.56	g
3. WT WET SOIL + TARE	298.40	g
4. WT DRY SOIL + TARE	263.35	g
5. WT WATER, Ww	35.05	g
6. WT DRY SOIL, Ws	91.79	g
7. MOISTURE CONTENT, W	**38.18**	**%**

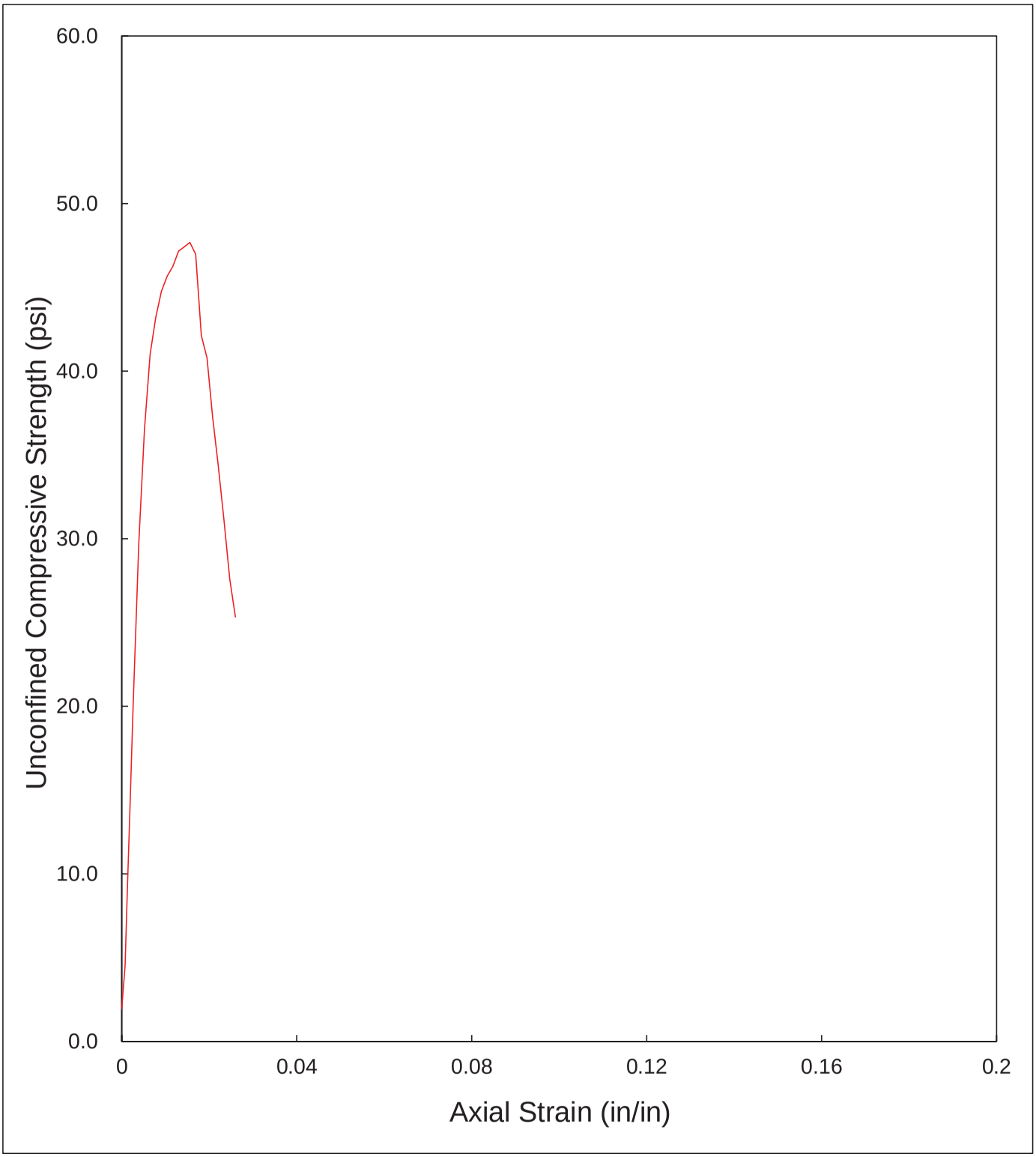
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.98	in.	3.85	in.
No. 2	1.98	in.	3.83	in.
No. 3	1.98	in.	3.86	in.
Average	**1.98**	**in.**	**3.85**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***348.66***	***g***
Initial Area, Ao	3.08	in^2
Initial Volume, Vo	11.84	in^3
Initial Bulk Unit Weight,	112.2	lb/ft^3
Initial Dry Unit Weight	81.2	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	47.7	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
6	0.000	0.000	3.076	0.0000	2.0
14	0.003	0.003	3.079	0.0008	4.5
28	0.005	0.005	3.080	0.0013	9.1
41	0.007	0.007	3.082	0.0018	13.3
62	0.010	0.010	3.084	0.0026	20.1
92	0.015	0.015	3.089	0.0039	29.8
113	0.020	0.020	3.093	0.0052	36.5
127	0.025	0.025	3.097	0.0065	41.0
134	0.030	0.030	3.101	0.0078	43.2
139	0.035	0.035	3.105	0.0091	44.8
142	0.040	0.040	3.109	0.0104	45.7
144	0.045	0.045	3.113	0.0117	46.3
147	0.050	0.050	3.117	0.0130	47.2
148	0.055	0.055	3.121	0.0143	47.4
149	0.060	0.060	3.125	0.0156	47.7
147	0.065	0.065	3.129	0.0169	47.0
132	0.070	0.070	3.133	0.0182	42.1
128	0.075	0.075	3.138	0.0195	40.8
117	0.080	0.080	3.142	0.0208	37.2
108	0.085	0.085	3.146	0.0221	34.3
98	0.090	0.090	3.150	0.0234	31.1
87	0.095	0.095	3.154	0.0247	27.6
80	0.100	0.100	3.159	0.0260	25.3
	0.105	0.105	3.163	0.0273	
	0.110	0.110	3.167	0.0286	
	0.115	0.115	3.171	0.0299	
	0.120	0.120	3.176	0.0312	

UNCONFINED COMPRESSION TESTING

Sample No. BWM-05 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-05 (28 Day)		
TESTING DATE:	29-May-18	LOADING RATE:	0.0400 in./min
TESTED BY:	TNB, ICD, VCB	TRACKING CODE:	C185

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	38.2	**%**
BULK UNIT WEIGHT	112.2	lb/ft^3
DRY UNIT WEIGHT	81.2	lb/ft^3
UCS *	47.7	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	Black & Veatch-American Creosote Works		
Project Location:	---		
GTX #:	GTX-308093		
Start Date:	5/31/2018	Tested By:	jm
End Date:	6/3/2018	Checked By:	mcm
Boring	---	Test #:	K-10
Sample #:	BMW-05 (28 Day)		
Depth:	---		
Visual Description:	Moist, brown core		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Intact	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P9

Sample Preparation: Test specimen weighed nnd dimensionned the placed inn the permeameter at the "as received" moisture content.

Parameter	Initial	Final
Height, in	2.88	2.88
Diameter, in	2.99	2.99
Area, in^2	7.02	7.02
Volume, in^3	20.2	20.2
Mass, g	586	595
Bulk Density, pcf	110	112
Moisture Content, %	37.6	39.7
Dry Density, pcf	80.1	80.1
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	75	Pressure Increment, psi:	4.8
Sample Pressure, psi:	70	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
5/31	1	99	75	90.5	89.2	1.3	1980	12.4	9.6E-08	21	0.976	9.4E-08
5/31	2	99	75	89.2	87.2	2.0	3540	12.2	8.4E-08	21	0.976	8.2E-08
5/31	3	99	75	87.2	84.9	2.3	3960	11.9	8.9E-08	21	0.976	8.7E-08
5/31	4	99	75	84.9	82.5	2.4	4380	11.6	8.6E-08	21	0.976	8.4E-08

PERMEABILITY AT 20° C: 8.7 x 10^{-8} cm/sec (@ 24 psi effective stress)

Appendix E:
Tier 2 Admixture Testing Mixture Development Sheets

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-06
MIXING DATE:	15-Jun-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,000 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	4.00 %	40.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	20.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	180.0 g

OBSERVATIONS / NOTES

20 g of Bentonite was hydrated with 60 g of water on 6/14/18. On 6/15/18, 120 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 day
UCS @ 28 day cure
Hydraulic Conductivity @ 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		4	7	14	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-06 DUP
MIXING DATE:	15-Jun-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**1,000 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	4.00 %	40.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	20.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	180.0 g

OBSERVATIONS / NOTES

20 g of Bentonite was hydrated with 60 g of water on 6/14/18. On 6/15/18, 120 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 day
UCS @ 28 day cure
Hydraulic Conductivity @ 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		4	7	14	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-07
MIXING DATE:	15-Jun-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,000 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	5.00 %	50.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	20.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	210.0 g

OBSERVATIONS / NOTES

20 g of Bentonite was hydrated with 60 g of water on 6/14/18. On 6/15/18, 150 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 day
UCS @ 28 day cure
Hydraulic Conductivity @ 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		4	7	14	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-07 DUP
MIXING DATE:	15-Jun-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,000 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	5.00 %	50.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	20.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	210.0 g

OBSERVATIONS / NOTES

20 g of Bentonite was hydrated with 60 g of water on 6/14/18. On 6/15/18, 150 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 day
UCS @ 28 day cure
Hydraulic Conductivity @ 28 day cure

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		4	7	14	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-001
MIXING DATE:	11-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		50:50 Comp NAPL/Coarse Sand
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	5.00 %	5.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	2.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	21.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 7/10/18. On 7/11/18, 15 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		1.50	2.5	2.75	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-002
MIXING DATE:	10-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		50:50 Comp NAPL/Coarse Sand
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	4.00 %	4.0 g
Wyoming Bentonite Hydrogel #807	8.00 %	8.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	36.0 g

OBSERVATIONS/ NOTES

8 g of Bentonite was hydrated with 24 g of water on 7/10/18. On 7/11/18, 12 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.5	4.0	4.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-003
MIXING DATE:	10-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	3.00 %	3.0 g
GGBFS #1119	6.00 %	6.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	2.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	33.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 7/10/18. On 7/11/18, 27 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.00	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-004
MIXING DATE:	10-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	4.00 %	4.0 g
GGBFS #1119	8.00 %	8.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	2.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	42.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 7/10/18. On 7/11/18, 36 g of water was added to Portland cement, GGBFS and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-005
MIXING DATE:	10-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	6.00 %	6.0 g
GGBFS #1119	6.00 %	6.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	2.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	42.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 7/10/18. On 7/11/18, 36 g of water was added to Portland cement, GGBFS and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.00	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-006
MIXING DATE:	10-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	4.00 %	4.0 g
GGBFS #1119	6.00 %	6.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	2.0 g
Ag Dolomite	10.00 %	10.0 g
	%	0.0 g
Water Addition	300 %	66.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 7/10/18. On 7/11/18, 30 g of water was added to Ag Dolomite to create slurry. The Ag Dolomite and water slurry was added to the untreated soil. 30 g of water was added to Portland cement, GGBFS and Bentonite to create a slurry. The Portland cement, GGBFS and Bentonite slurry was added to the untreated soil/Ag Dolomite composite.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.00	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-007
MIXING DATE:	10-Jul-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I Portland Cement #842	6.00 %	6.0 g
Wyoming Bentonite Hydrogel #807	2.00 %	2.0 g
Ag Dolomite	10.00 %	10.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	54.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 7/10/18. On 7/11/18, 24 g of water was added to Ag Dolomite to create slurry. The Ag Dolomite and water slurry was added to the untreated soil. 24 g of water was added to Portland cement and Bentonite to create a slurry. The Portland cement and Bentonite slurry was added to the untreated soil/Ag Dolomite composite.

Pocket Penetrometer 3, 5, and 7 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-008
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	10.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	18.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 12 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5, 7

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.0	0.0	0.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-009
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	8.00 %	8.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
High Calcium Quicklime #1112	4.00 %	4.0 g
	%	0.0 g
	%	0.0 g
Water Addition	200 %	28.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 4 g of High Calcium Quicklime was hydrated with 8 g of water 2 hours before mixing. Temperature of the hydrated lime: 78°C. 14 g of water was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		1.0	1.25	2.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-010
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	8.00 %	8.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
Lime Kiln Dust #1054	8.00 %	8.0 g
	%	0.0 g
	%	0.0 g
Water Addition	200 %	36.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 30 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.0	1.0	1.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-011
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
High Calcium Quicklime #1112	4.00 %	4.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	31.5 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 4 g of High Calcium Quicklime was hydrated with 8 g of water 2 hours before mixing. Temperature of the hydrated lime: 70°C. 17.5 g of water was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.25	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-012
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
Lime Kiln Dust #1054	8.00 %	8.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	37.5 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 31.5 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		1.25	3.75	4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-013
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE	50% NAPL, 25% coarse sand, 25% fine sand)
WEIGHT OF UNTREATED MATERIAL	**100 g**

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	10.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	18.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 12 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-014
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE	50% NAPL, 25% coarse sand, 25% fine sand
WEIGHT OF UNTREATED MATERIAL	**100 g**

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	10.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
High Calcium Quicklime #1112	4.00 %	4.0 g
	%	0.0 g
	%	0.0 g
Water Addition	200 %	32.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 4 g of High Calcium Quicklime was hydrated with 8 g of water 2 hours before mixing. Temperature of the hydrated lime: 83°C. 18 g of water was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		0.25	0.75	1.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-015
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE	50% NAPL, 25% coarse sand, 25% fine sand
WEIGHT OF UNTREATED MATERIAL	**100 g**

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	8.00 %	8.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
Lime Kiln Dust #1054	8.00 %	8.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	27.0 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 21 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		1.75	2.0	2.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-016
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE	50% NAPL, 25% coarse sand, 25% fine sand
WEIGHT OF UNTREATED MATERIAL	**100 g**

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
High Calcium Quicklime #1112	4.00 %	4.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	31.5 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 4 g of High Calcium Quicklime was hydrated with 8 g of water 2 hours before mixing. Temperature of the hydrated lime: 73°C. 17.5 g of water was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		EXP-017
MIXING DATE:	3-Aug-18	MIXED BY:	ICD

UNTREATED MATERIAL TYPE	50% NAPL, 25% coarse sand, 25% fine sand
WEIGHT OF UNTREATED MATERIAL	**100 g**

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
Wyoming Bentonite #807	2.00 %	2.0 g
Lime Kiln Dust #1054	8.00 %	8.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	37.5 g

OBSERVATIONS / NOTES

2 g of Bentonite was hydrated with 6 g of water on 8/2/18. On 8/3/18, 31.5 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		2.5	3.25	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-03 DUP (A)
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		1,700 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	5.00 %	85.0 g
Wyoming Bentonite #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	357.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 10/18/18. On 10/19/18, 255 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5
UCS @ 28 day
Hydraulic Conductivity at 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		1	3	5	
PENETROMETER (tons/ft^2)		1.75	4.25	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-03 DUP (B)
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Coarse Sand
WEIGHT OF UNTREATED MATERIAL		1,700 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	5.00 %	85.0 g
Wyoming Bentonite #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	357.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 10/18/18. On 10/19/18, 255 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 1,3, 5
UCS @ 28 day
Hydraulic Conductivity at 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		1	3	5	
PENETROMETER (tons/ft^2)		1.75	4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-08
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
High Calcium Quicklime #1112	4.00 %	48.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	378.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/18/18. On 10/19/18, 48 g of High Calcium Quicklime was hydrated with 100 g of water 2 hours before mixing. Temperature of the hydrated lime: 94°C. 206 g of was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.25	3.5	4.25	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-08 DUP
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
High Calcium Quicklime #1112	4.00 %	48.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	378.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/18/18. On 10/19/18, 48 g of High Calcium Quicklime was hydrated with 100 g of water 2 hours before mixing. Temperature of the hydrated lime: 96°C. 206 g of was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.5	3.75	4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-09
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
Lime Kiln Dust #1054	8.00 %	96.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	450.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/18/18. On 10/19/18, 378 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		2.5	3.25	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-09 DUP
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
Lime Kiln Dust #1054	8.00 %	96.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	450.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/18/18. On 10/19/18, 378 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		2.5	3.8	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-10
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,700 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	5.00 %	85.0 g
Wyoming Bentonite #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	357.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 10/18/18. On 10/19/18, 255 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7
UCS @ 28 day
Hydraulic Conductivity at 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	14	
PENETROMETER (tons/ft^2)	0.75	1.0	1.25	2.25	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-10 DUP
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,700 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	5.00 %	85.0 g
Wyoming Bentonite #807	2.00 %	34.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	357.0 g

OBSERVATIONS / NOTES

34 g of Bentonite was hydrated with 102 g of water on 10/18/18. On 10/19/18, 255 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7
UCS @ 28 day
Hydraulic Conductivity at 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	14	
PENETROMETER (tons/ft^2)	0.75	1.0	1.25	2.0	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-11
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		5,000 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	750.0 g
High Calcium Quicklime #1112	4.00 %	200.0 g
Wyoming Bentonite #807	2.00 %	100.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	1575.0 g

OBSERVATIONS / NOTES

100 g of Bentonite was hydrated with 300 g of water on 10/18/18. On 10/19/18, 200 g of High Calcium Quicklime was hydrated with 250 g of water 2 hours before mixing. Temperature of the hydrated lime: 94°C. 1,025 g of was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-12
MIXING DATE:	19-Oct-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		5,000 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	750.0 g
Lime Kiln Dust #1054	8.00 %	400.0 g
Wyoming Bentonite #807	2.00 %	100.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	1875.0 g

OBSERVATIONS / NOTES

100 g of Bentonite was hydrated with 300 g of water on 10/18/18. On 10/19/18, 1,575 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust
and water slurry was added to the untreated soil.

28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-13
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
High Calcium Quicklime #1112	4.00 %	48.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	378.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18, 48 g of High Calcium Quicklime was hydrated with 144 g of water 2 hours before mixing. Temperature of the hydrated lime: 93°C. 144 g of was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-13 DUP
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
High Calcium Quicklime #1112	4.00 %	48.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	378.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18, 48 g of High Calcium Quicklime was hydrated with 144 g of water 2 hours before mixing. Temperature of the hydrated lime: 91°C. 144 g of was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-14
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
Lime Kiln Dust #1054	8.00 %	96.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	450.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18, 378 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-14 DUP
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	180.0 g
Lime Kiln Dust #1054	8.00 %	96.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	450.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18, 378 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-15
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	120.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	200 %	288.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18, 216 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to
the untreated soil.

Pocket Penetrometer 1,3, 5
UCS @ 28 day
Hydraulic Conductivity at 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-15 DUP
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	120.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	200 %	288.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18, 216 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to
the untreated soil.

Pocket Penetrometer 1,3, 5
UCS @ 28 day
Hydraulic Conductivity at 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-16
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	8.00 %	96.0 g
Lime Kiln Dust #1054	4.00 %	48.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	252.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18,180 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.25	4.25	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-16 DUP
MIXING DATE:	1-Nov-18	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		Fine material
WEIGHT OF UNTREATED MATERIAL		1,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	8.00 %	96.0 g
Lime Kiln Dust #1054	4.00 %	48.0 g
Wyoming Bentonite #807	2.00 %	24.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	252.0 g

OBSERVATIONS / NOTES

24 g of Bentonite was hydrated with 72 g of water on 10/31/18. On 11/1/18,180 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 3, 5, 7 Days
28 day UCS
28 day Perm

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.25	4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-17 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE	75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL	100 g

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	10.0 g
Wyoming Bentonite #807	3.00 %	3.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	39.0 g

OBSERVATIONS / NOTES

3 g of Bentonite was hydrated with 6 g of water on 1/22/19. On 1/23/19, 30 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		4.25	>4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-18 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE	75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL	100 g

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	10.0 g
Wyoming Bentonite #807	3.50 %	3.5 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	40.5 g

OBSERVATIONS / NOTES

3.5 g of Bentonite was hydrated with 10.5 g of water on 1/22/19. On 1/23/19, 30 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to
the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		4.0	4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-19 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	12.50 %	12.5 g
Wyoming Bentonite #807	3.00 %	3.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	46.5 g

OBSERVATIONS / NOTES

3 g of Bentonite was hydrated with 6 g of water on 1/22/19. On 1/23/19, 37.5 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		3.0	4.0		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-20 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE	75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL	100 g

REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	12.50 %	12.5 g
Wyoming Bentonite #807	3.50 %	3.5 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	48.0 g

OBSERVATIONS / NOTES

3.5 g of Bentonite was hydrated with 10.5 g of water on 1/22/19. On 1/23/19, 37.5 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		2.5	3.25		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-21 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
High Calcium Quicklime #1112	4.00 %	4.0 g
Wyoming Bentonite #807	3.00 %	3.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	33.0 g

OBSERVATIONS / NOTES

3 g of Bentonite was hydrated with 9 g of water on 1/22/19. On 1/23/19, 4 g of High Calcium Quicklime was hydrated with 10 g of water 2 hours before mixing. 14 g of water was added to the Portland cement Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		>4.5	>4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-22 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
Lime Kiln Dust #1054	8.00 %	8.0 g
Wyoming Bentonite #807	3.00 %	3.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	39.0 g

OBSERVATIONS / NOTES

3 g of Bentonite was hydrated with 9 g of water on 1/22/19. On 1/23/19, 30 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		3.0	>4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-23 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
High Calcium Quicklime #1112	4.00 %	4.0 g
Wyoming Bentonite #807	3.50 %	3.5 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	33.8 g

OBSERVATIONS / NOTES

3.5 g of Bentonite was hydrated with 10.5 g of water on 1/22/19. On 1/23/19, 4 g of High Calcium Quicklime was hydrated with 10 g of water 2 hours before mixing. 13.3 g of water was added to the Portland cement Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		>4.5	>4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-24 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	15.0 g
Lime Kiln Dust #1054	8.00 %	8.0 g
Wyoming Bentonite #807	3.50 %	3.5 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	39.8 g

OBSERVATIONS / NOTES

3.5 g of Bentonite was hydrated with 10.5 g of water on 1/22/19. On 1/23/19, 29.3 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		3.5	>4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-25 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	17.50 %	17.5 g
High Calcium Quicklime #1112	4.00 %	4.0 g
Wyoming Bentonite #807	3.00 %	3.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	36.8 g

OBSERVATIONS / NOTES

3 g of Bentonite was hydrated with 9 g of water on 1/22/19. On 1/23/19, 4 g of High Calcium Quicklime was hydrated with 10 g of water 2 hours before mixing. 17.8 g of water was added to the Portland cement Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		4.5	4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-26 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		**100 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	17.50 %	17.5 g
Lime Kiln Dust #1054	8.00 %	8.0 g
Wyoming Bentonite #807	3.00 %	3.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	42.8 g

OBSERVATIONS / NOTES

3 g of Bentonite was hydrated with 9 g of water on 1/22/19. On 1/23/19, 33.8 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		2.75	4.0		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-27 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	17.50 %	17.5 g
High Calcium Quicklime #1112	4.00 %	4.0 g
Wyoming Bentonite #807	3.50 %	3.5 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	37.5 g

OBSERVATIONS / NOTES

3.5 g of Bentonite was hydrated with 10.5 g of water on 1/22/19. On 1/23/19, 4 g of High Calcium Quicklime was hydrated with 10 g of water 2 hours before mixing. 17 g of water was added to the Portland cement Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		>4.5	>4.5		

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-28 EXP
MIXING DATE:	23-Jan-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		100 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	17.50 %	17.5 g
Lime Kiln Dust #1054	8.00 %	8.0 g
Wyoming Bentonite #807	3.50 %	3.5 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	43.5 g

OBSERVATIONS / NOTES

3.5 g of Bentonite was hydrated with 10.5 g of water on 1/22/19. On 1/23/19, 33 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust and water slurry was added to the untreated soil.

Pocket Penetrometer 7 and 14 days

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		7	14		
PENETROMETER (tons/ft^2)		1.25	2.0		

Appendix F:
Soil 1, Soil 2 and NAPL Admixture Testing Physical Properties Data Sheets

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 DUP (A) (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C647

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	113.27	g
3. WT WET SOIL + TARE	277.19	g
4. WT DRY SOIL + TARE	245.68	g
5. WT WATER, Ww	31.51	g
6. WT DRY SOIL, Ws	132.41	g
7. MOISTURE CONTENT, W	**23.80**	**%**

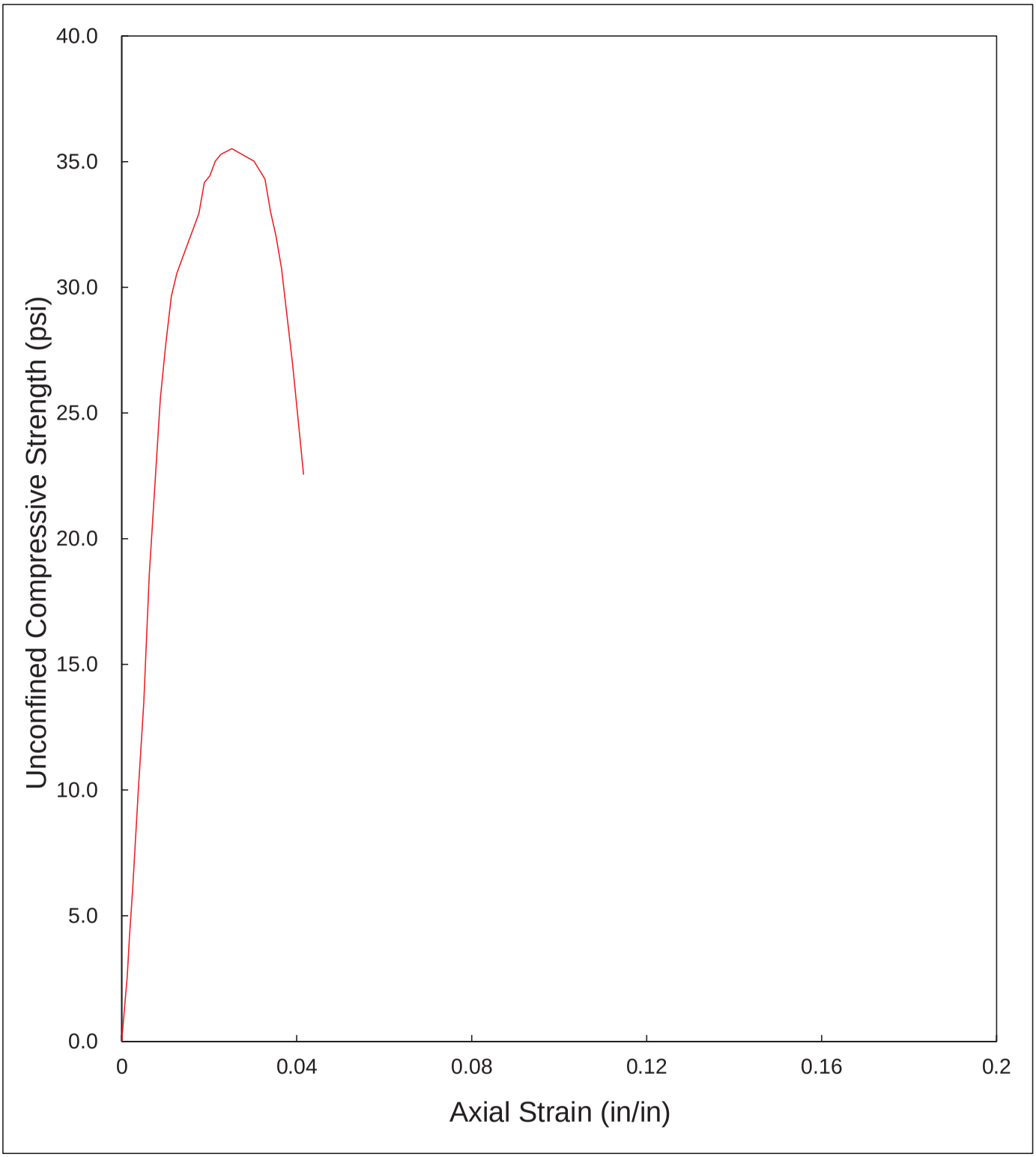
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.97	in.
No. 2	1.98	in.	3.98	in.
No. 3	1.98	in.	3.95	in.
Average	**1.99**	**in.**	**3.97**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***396.47***	***g***
Initial Area, Ao	3.10	in^2
Initial Volume, Vo	12.31	in^3
Initial Bulk Unit Weight,	122.7	lb/ft^3
Initial Dry Unit Weight	99.1	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	35.5	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.101	0.0000	0.0
5	0.003	0.003	3.104	0.0008	1.6
8	0.005	0.005	3.105	0.0013	2.6
13	0.007	0.007	3.107	0.0018	4.2
19	0.010	0.010	3.109	0.0025	6.1
31	0.015	0.015	3.113	0.0038	10.0
42	0.020	0.020	3.117	0.0050	13.5
58	0.025	0.025	3.121	0.0063	18.6
69	0.030	0.030	3.125	0.0076	22.1
80	0.035	0.035	3.129	0.0088	25.6
87	0.040	0.040	3.133	0.0101	27.8
93	0.045	0.045	3.137	0.0113	29.6
96	0.050	0.050	3.141	0.0126	30.6
98	0.055	0.055	3.145	0.0139	31.2
100	0.060	0.060	3.149	0.0151	31.8
102	0.065	0.065	3.153	0.0164	32.3
104	0.070	0.070	3.157	0.0176	32.9
108	0.075	0.075	3.161	0.0189	34.2
109	0.080	0.080	3.165	0.0202	34.4
111	0.085	0.085	3.169	0.0214	35.0
112	0.090	0.090	3.173	0.0227	35.3
113	0.100	0.100	3.182	0.0252	35.5
112	0.120	0.120	3.198	0.0302	35.0
110	0.130	0.130	3.206	0.0327	34.3
106	0.135	0.135	3.211	0.0340	33.0
103	0.140	0.140	3.215	0.0353	32.0
99	0.145	0.145	3.219	0.0365	30.8
93	0.150	0.150	3.223	0.0378	28.9
87	0.155	0.155	3.227	0.0390	27.0
80	0.160	0.160	3.232	0.0403	24.8
73	0.165	0.165	3.236	0.0416	22.6

UNCONFINED COMPRESSION TESTING

Sample No: BWM-03 DUP (A) (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 DUP (A) (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C647

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	23.8	**%**
BULK UNIT WEIGHT	122.7	lb/ft^3
DRY UNIT WEIGHT	99.1	lb/ft^3
UCS *	35.5	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 DUP (B) (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C648

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	114.98	g
3. WT WET SOIL + TARE	305.63	g
4. WT DRY SOIL + TARE	268.10	g
5. WT WATER, Ww	37.53	g
6. WT DRY SOIL, Ws	153.12	g
7. MOISTURE CONTENT, W	**24.51**	**%**

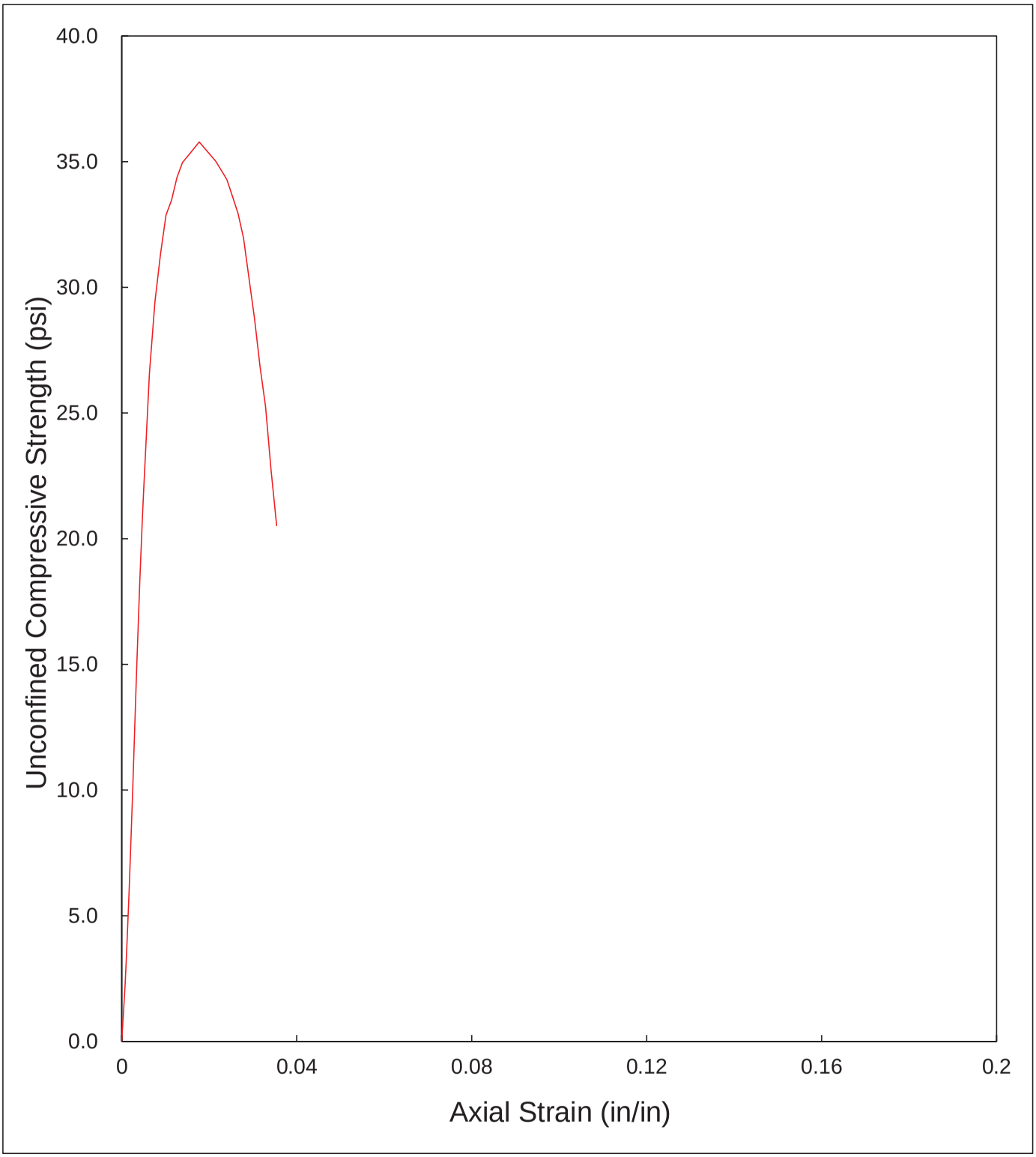
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.95	in.
No. 2	1.99	in.	3.97	in.
No. 3	1.98	in.	3.94	in.
Average	**1.99**	**in.**	**3.95**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***392.85***	***g***
Initial Area, Ao	3.10	in^2
Initial Volume, Vo	12.26	in^3
Initial Bulk Unit Weight,	122.0	lb/ft^3
Initial Dry Unit Weight	98.0	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	35.8	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.102	0.0000	0.0
7	0.003	0.003	3.104	0.0008	2.3
13	0.005	0.005	3.106	0.0013	4.2
20	0.007	0.007	3.107	0.0018	6.4
31	0.010	0.010	3.110	0.0025	10.0
52	0.015	0.015	3.114	0.0038	16.7
69	0.020	0.020	3.118	0.0051	22.1
83	0.025	0.025	3.122	0.0063	26.6
92	0.030	0.030	3.126	0.0076	29.4
98	0.035	0.035	3.130	0.0089	31.3
103	0.040	0.040	3.134	0.0101	32.9
105	0.045	0.045	3.138	0.0114	33.5
108	0.050	0.050	3.142	0.0126	34.4
110	0.055	0.055	3.146	0.0139	35.0
111	0.060	0.060	3.150	0.0152	35.2
113	0.070	0.070	3.158	0.0177	35.8
111	0.085	0.085	3.170	0.0215	35.0
109	0.095	0.095	3.178	0.0240	34.3
107	0.100	0.100	3.182	0.0253	33.6
105	0.105	0.105	3.187	0.0266	33.0
102	0.110	0.110	3.191	0.0278	32.0
97	0.115	0.115	3.195	0.0291	30.4
92	0.120	0.120	3.199	0.0304	28.8
86	0.125	0.125	3.203	0.0316	26.8
81	0.130	0.130	3.207	0.0329	25.3
73	0.135	0.135	3.212	0.0341	22.7
66	0.140	0.140	3.216	0.0354	20.5

UNCONFINED COMPRESSION TESTING

Sample No. BWM-03 DUP (B) (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-03 DUP (B) (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C648

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	24.5	**%**
BULK UNIT WEIGHT	122.0	lb/ft^3
DRY UNIT WEIGHT	98.0	lb/ft^3
UCS *	35.8	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-08 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C649

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	171.34	g
3. WT WET SOIL + TARE	330.01	g
4. WT DRY SOIL + TARE	288.05	g
5. WT WATER, Ww	41.96	g
6. WT DRY SOIL, Ws	116.71	g
7. MOISTURE CONTENT, W	**35.95**	**%**

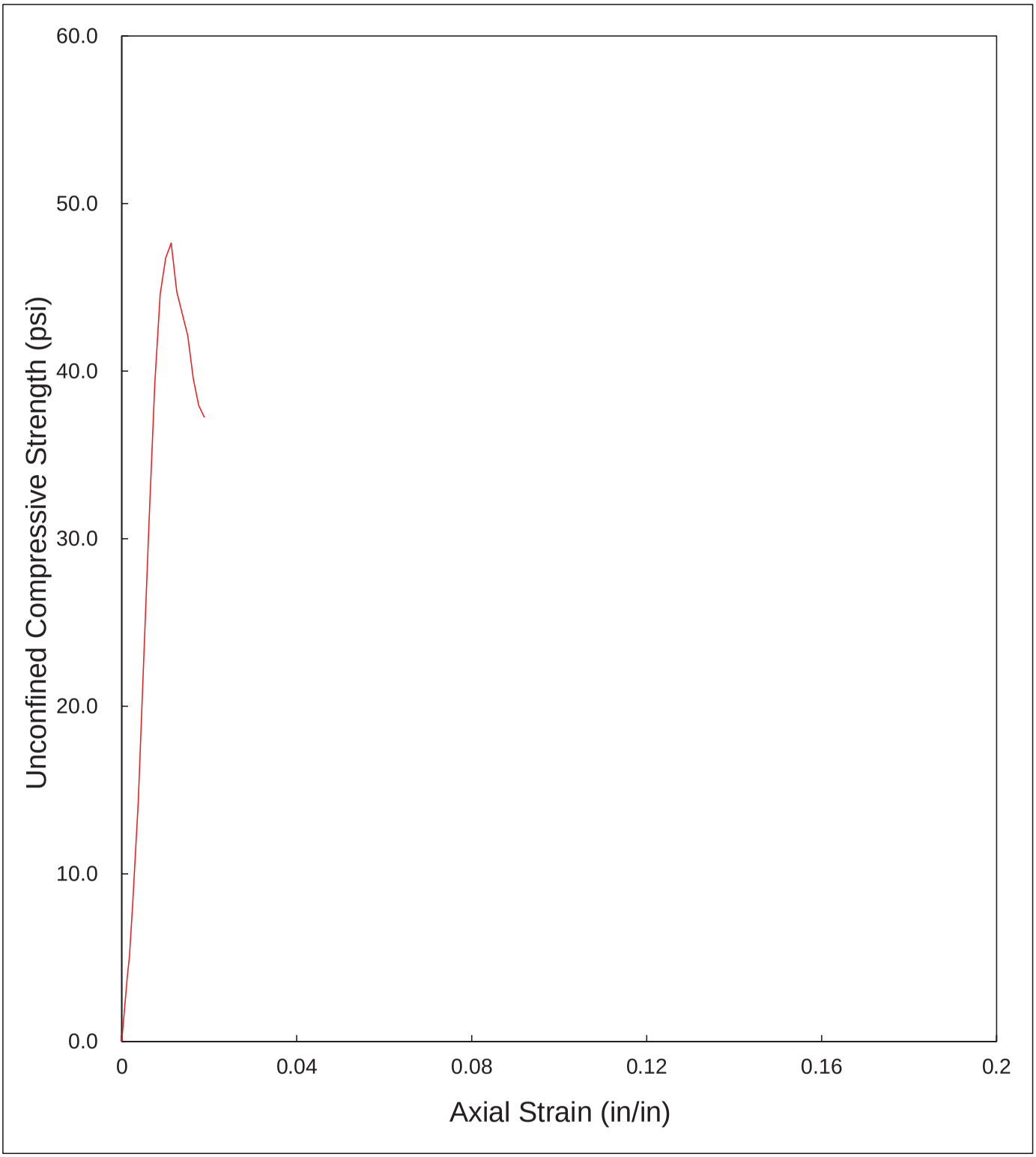
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	4.01	in.
No. 2	2.00	in.	3.96	in.
No. 3	1.99	in.	3.96	in.
Average	**2.00**	**in.**	**3.98**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***348.26***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	12.46	in^3
Initial Bulk Unit Weight,	106.5	lb/ft^3
Initial Dry Unit Weight	78.3	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	47.6	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.134	0.0000	0.0
7	0.003	0.003	3.136	0.0008	2.2
12	0.005	0.005	3.138	0.0013	3.8
16	0.007	0.007	3.139	0.0018	5.1
26	0.010	0.010	3.142	0.0025	8.3
45	0.015	0.015	3.146	0.0038	14.3
72	0.020	0.020	3.150	0.0050	22.9
99	0.025	0.025	3.154	0.0063	31.4
124	0.030	0.030	3.158	0.0075	39.3
141	0.035	0.035	3.162	0.0088	44.6
148	0.040	0.040	3.166	0.0101	46.8
151	0.045	0.045	3.170	0.0113	47.6
142	0.050	0.050	3.174	0.0126	44.7
138	0.055	0.055	3.178	0.0138	43.4
134	0.060	0.060	3.182	0.0151	42.1
126	0.065	0.065	3.186	0.0164	39.6
121	0.070	0.070	3.190	0.0176	37.9
119	0.075	0.075	3.194	0.0189	37.3

UNCONFINED COMPRESSION TESTING

Sample No. BWM-08 (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-08 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C649

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	36.0	**%**
BULK UNIT WEIGHT	106.5	lb/ft^3
DRY UNIT WEIGHT	78.3	lb/ft^3
UCS *	47.6	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		

MOISTURE CONTENT (Dry Basis)	*INITIAL*		*FINAL*	
1. MOISTURE TIN NO.				
2. WT MOISTURE TIN (tare weight)	0.00	***g***	204.35	***g***
3. WT WET SOIL + TARE	434.02	***g***	645.50	***g***
4. WT DRY SOIL + TARE	321.57	***g***	525.92	***g***
5. WT WATER, Ww	112.45	g	119.58	g
6. WT DRY SOIL, Ws	321.57	g	321.57	g
7. MOISTURE CONTENT, W	34.97	%	37.19	%

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	*DIAMETER*		*HEIGHT*	
ANALYSES	*INITIAL*	*FINAL*	*INITIAL*	*FINAL*
No. 1	***2.99 in.***	***2.95 in.***	***2.23 in.***	***2.19 in.***
No. 2	***2.99 in.***	***2.95 in.***	***2.19 in.***	***2.21 in.***
No. 3	***2.98 in.***	***2.96 in.***	***2.17 in.***	***2.20 in.***
Average	2.99 in.	2.95 in.	2.19 in.	2.20 in.

SPECIMEN CONDITIONS	*INITIAL*	*FINAL*
Specimen WT, Wo	***434.02 g***	***441.15 g***
Area, Ao	7.00 in^2	6.84 in^2
Volume, Vo	15.36 in^3	15.05 in^3
Bulk Unit Weight	107.6 lb/ft^3	111.7 lb/ft^3
Dry Unit Weight	79.7 lb/ft^3	81.4 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
11/26/18	14 : 38	ICD	7.0	5.0	6.7				
11/27/18	14 : 2	ICD	17.0	15.0	17.0	12.1	10.0	5.4	0.54
11/27/18	15 : 5	ICD	27.0	25.0	26.7	23.7	10.0	6.7	0.67
11/27/18	16 : 6	ICD	37.0	35.0	37.0	34.8	10.0	8.1	0.81
11/28/18	9 : 51	ICD	47.0	45.0	46.9	46.1	10.0	9.1	0.91
11/28/18	10 : 35	ICD	57.0	55.0	56.7	56.3	10.0	9.4	0.94
11/28/18	12 : 6	ICD	67.0	65.0	*	66.4	10.0	9.7	0.97
11/28/18	12 : 6	ICD	77.0	75.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		

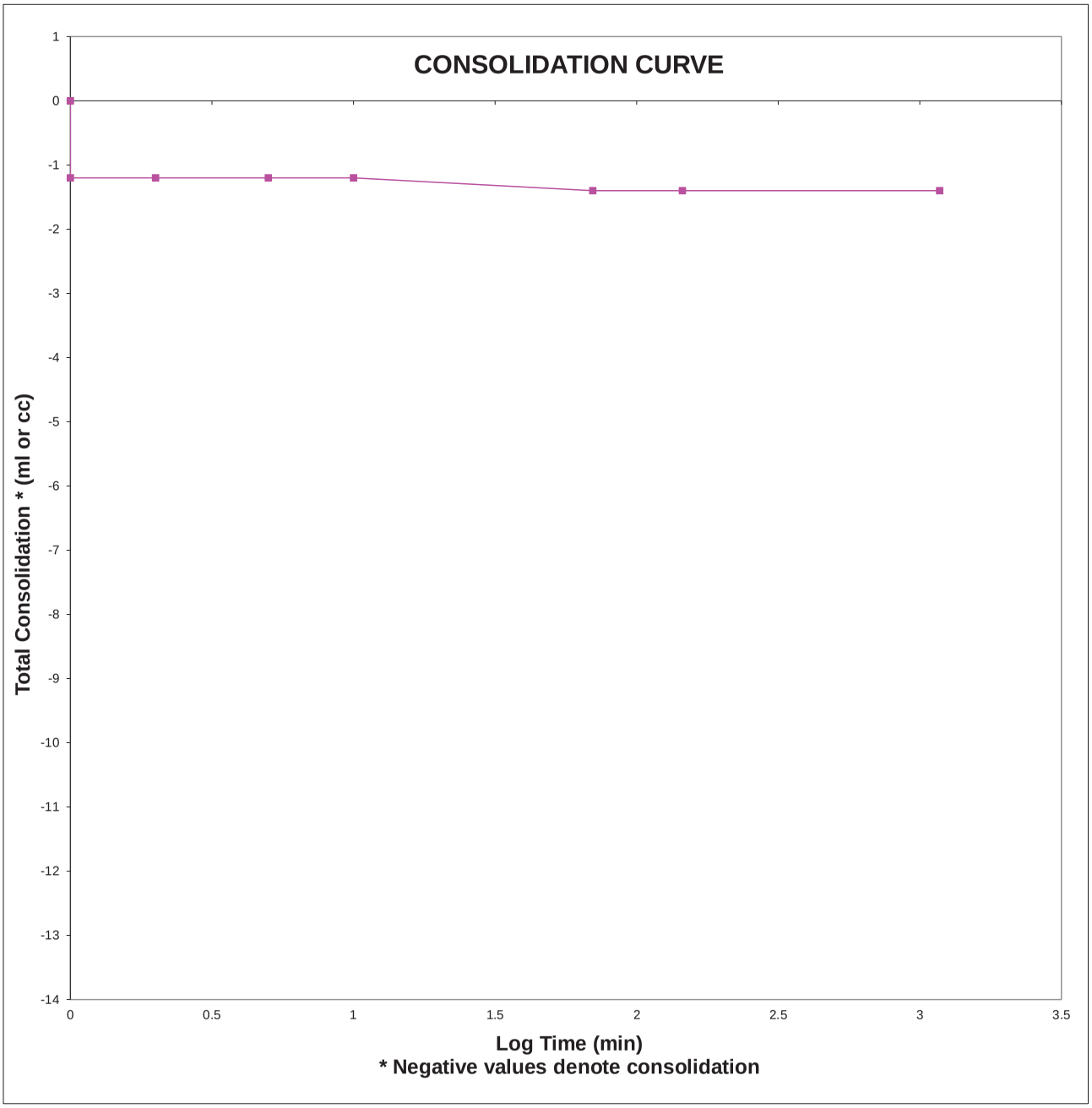
CELL PRESSURE: 79 psi **BACK PRESSURE:** 55 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
12 / 5 / 18	ICD	14 : 7	0	0	0	23.0	24.0	0.0
12 / 5 / 18	ICD	14 : 8	1	1	0.00	22.9	22.9	1.2
12 / 5 / 18	ICD	14 : 9	1	2	0.30	22.9	22.9	1.2
12 / 5 / 18	ICD	14 : 12	3	5	0.70	22.9	22.9	1.2
12 / 5 / 18	ICD	14 : 17	5	10	1.00	22.9	22.9	1.2
12 / 5 / 18	ICD	15 : 17	60	70	1.85	22.8	22.8	1.4
12 / 5 / 18	ICD	16 : 32	75	145	2.16	22.8	22.8	1.4
12 / 6 / 18	ICD	9 42	1030	1175	3.07	22.8	22.8	1.4

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
12 / 6 / 18	ICD	14 : 15	0	1.0	24.0	20.0	79.0	55.0	55.0
12 / 6 / 18	ICD	16 : 6	111	1.5	23.5	20.0	79.0	55.0	55.0
12 / 7 / 18	ICD	10 : 9	1083	4.9	20.1	20.0	79.0	55.0	55.0
12 / 7 / 18	ICD	13 : 36	207	5.4	19.6	20.0	79.0	55.0	55.0
12 / 10 / 18	ICD	9 : 57	RESET	1.0	24.0	20.0	79.0	55.0	55.0
12 / 10 / 18	ICD	12 : 16	139	1.5	23.5	20.0	79.0	55.0	55.0
12 / 10 / 18	ICD	14 : 35	RESET	1.0	24.0	20.0	79.0	55.0	55.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				4.126		
111	0.5	0.5	1.00	3.947	4.12E-07	4.14E-07
1083	3.4	3.4	1.00	2.727	3.51E-07	3.53E-07
207	0.5	0.5	1.00	2.548	3.38E-07	3.40E-07
RESET				4.126		
139	0.5	0.5	1.00	3.947	3.29E-07	3.30E-07

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C649
SAMPLE No.:	BWM-08	EQUIPMENT No.:	6
TEST DATE:	11/26/2018		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	107.6 lb/ft³	111.7 lb/ft³
DRY UNIT WEIGHT	79.7 lb/ft³	81.4 lb/ft³
MOISTURE CONTENT	35.0 %	37.2 %
PERMEABILITY @ 20°C	3.6E-07 cm/sec	

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-08 DUP (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C650

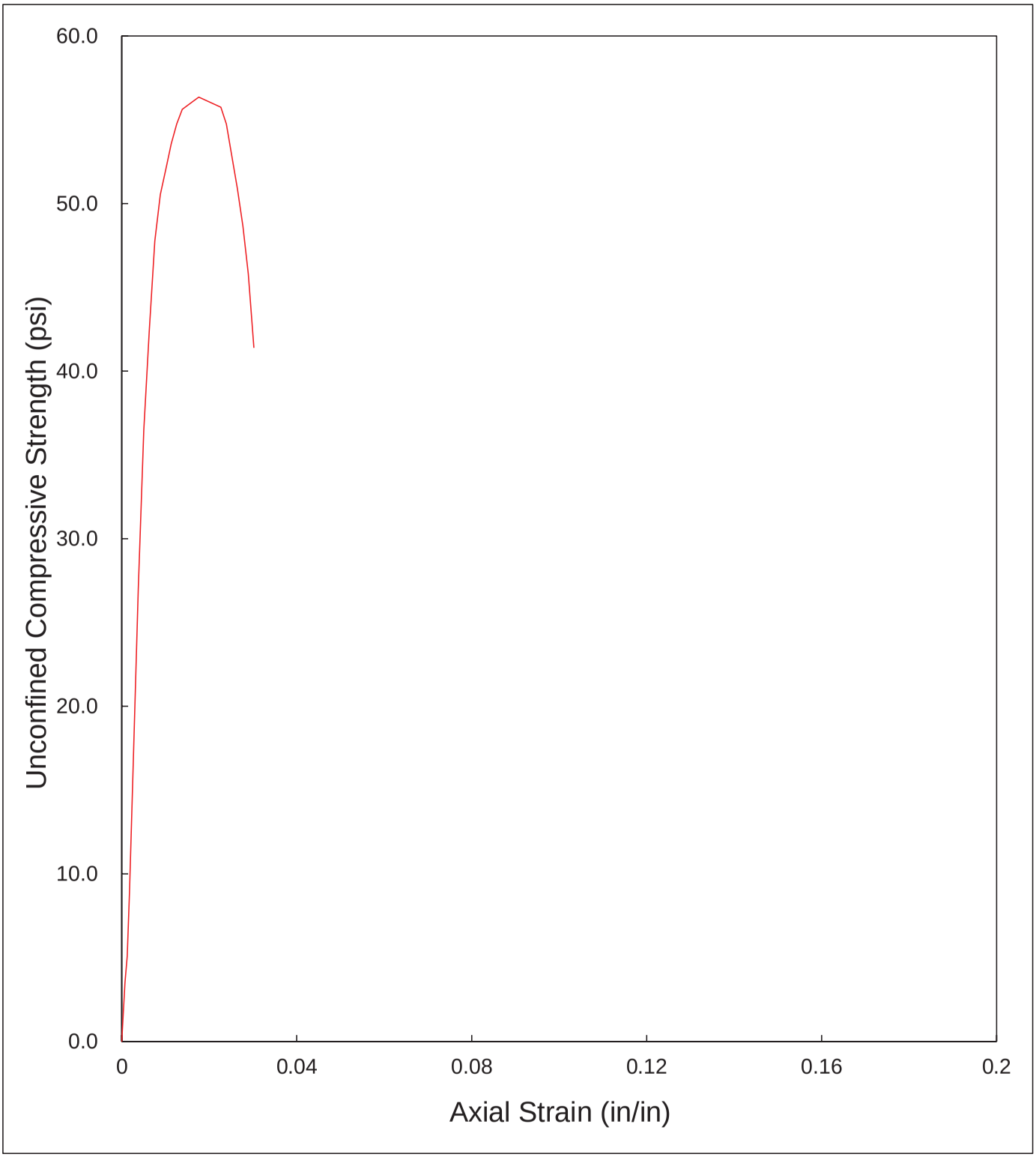
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	115.96	g
3. WT WET SOIL + TARE	270.60	g
4. WT DRY SOIL + TARE	229.82	g
5. WT WATER, Ww	40.78	g
6. WT DRY SOIL, Ws	113.86	g
7. MOISTURE CONTENT, W	**35.82**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.95	in.
No. 2	2.00	in.	4.00	in.
No. 3	1.99	in.	3.97	in.
Average	**2.00**	**in.**	**3.97**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***348.09***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	12.47	in^3
Initial Bulk Unit Weight,	106.4	lb/ft^3
Initial Dry Unit Weight	78.3	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	56.4	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.138	0.0000	0.0
11	0.003	0.003	3.140	0.0008	3.5
16	0.005	0.005	3.142	0.0013	5.1
28	0.007	0.007	3.143	0.0018	8.9
49	0.010	0.010	3.146	0.0025	15.6
85	0.015	0.015	3.150	0.0038	27.0
115	0.020	0.020	3.154	0.0050	36.5
134	0.025	0.025	3.158	0.0063	42.4
151	0.030	0.030	3.162	0.0076	47.8
160	0.035	0.035	3.166	0.0088	50.5
165	0.040	0.040	3.170	0.0101	52.1
170	0.045	0.045	3.174	0.0113	53.6
174	0.050	0.050	3.178	0.0126	54.8
177	0.055	0.055	3.182	0.0138	55.6
179	0.065	0.065	3.190	0.0164	56.1
180	0.070	0.070	3.194	0.0176	56.4
179	0.090	0.090	3.211	0.0227	55.8
176	0.095	0.095	3.215	0.0239	54.7
170	0.100	0.100	3.219	0.0252	52.8
164	0.105	0.105	3.223	0.0264	50.9
157	0.110	0.110	3.227	0.0277	48.6
148	0.115	0.115	3.231	0.0289	45.8
134	0.120	0.120	3.236	0.0302	41.4

UNCONFINED COMPRESSION TESTING
Sample NoBWM-08 DUP (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-08 DUP (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C650

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	35.8	**%**
BULK UNIT WEIGHT	106.4	lb/ft^3
DRY UNIT WEIGHT	78.3	lb/ft^3
UCS *	56.4	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		

MOISTURE CONTENT (Dry Basis)	***INITIAL***	***FINAL***
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	227.46 ***g***
3. WT WET SOIL + TARE	346.17 ***g***	581.20 ***g***
4. WT DRY SOIL + TARE	258.28 ***g***	485.74 ***g***
5. WT WATER, Ww	87.89 g	95.46 g
6. WT DRY SOIL, Ws	258.28 g	258.28 g
7. MOISTURE CONTENT, W	34.03 %	36.96 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	***DIAMETER***		***HEIGHT***	
ANALYSES	***INITIAL***	***FINAL***	***INITIAL***	***FINAL***
No. 1	***2.98 in.***	***2.99 in.***	***1.77 in.***	***1.76 in.***
No. 2	***2.97 in.***	***2.97 in.***	***1.77 in.***	***1.75 in.***
No. 3	***3.00 in.***	***2.97 in.***	***1.75 in.***	***1.75 in.***
Average	2.98 in.	2.98 in.	1.76 in.	1.75 in.

SPECIMEN CONDITIONS	***INITIAL***	***FINAL***
Specimen WT, Wo	***346.17 g***	***353.74 g***
Area, Ao	6.97 in^2	6.96 in^2
Volume, Vo	12.31 in^3	12.20 in^3
Bulk Unit Weight	107.2 lb/ft^3	110.4 lb/ft^3
Dry Unit Weight	80.0 lb/ft^3	80.6 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
12/11/18	16 : 2	ICD	7.0	5.0	5.6				
12/12/18	9 : 47	ICD	17.0	15.0	15.7	14.5	10.0	8.9	0.89
12/12/18	11 : 41	ICD	27.0	25.0	25.6	25.1	10.0	9.4	0.94
12/12/18	12 : 46	ICD	37.0	35.0	35.6	35.2	10.0	9.6	0.96
12/12/18	13 : 55	ICD	47.0	45.0	*	45.4	10.0	9.8	0.98
12/12/18	13 : 55	ICD	57.0	55.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		

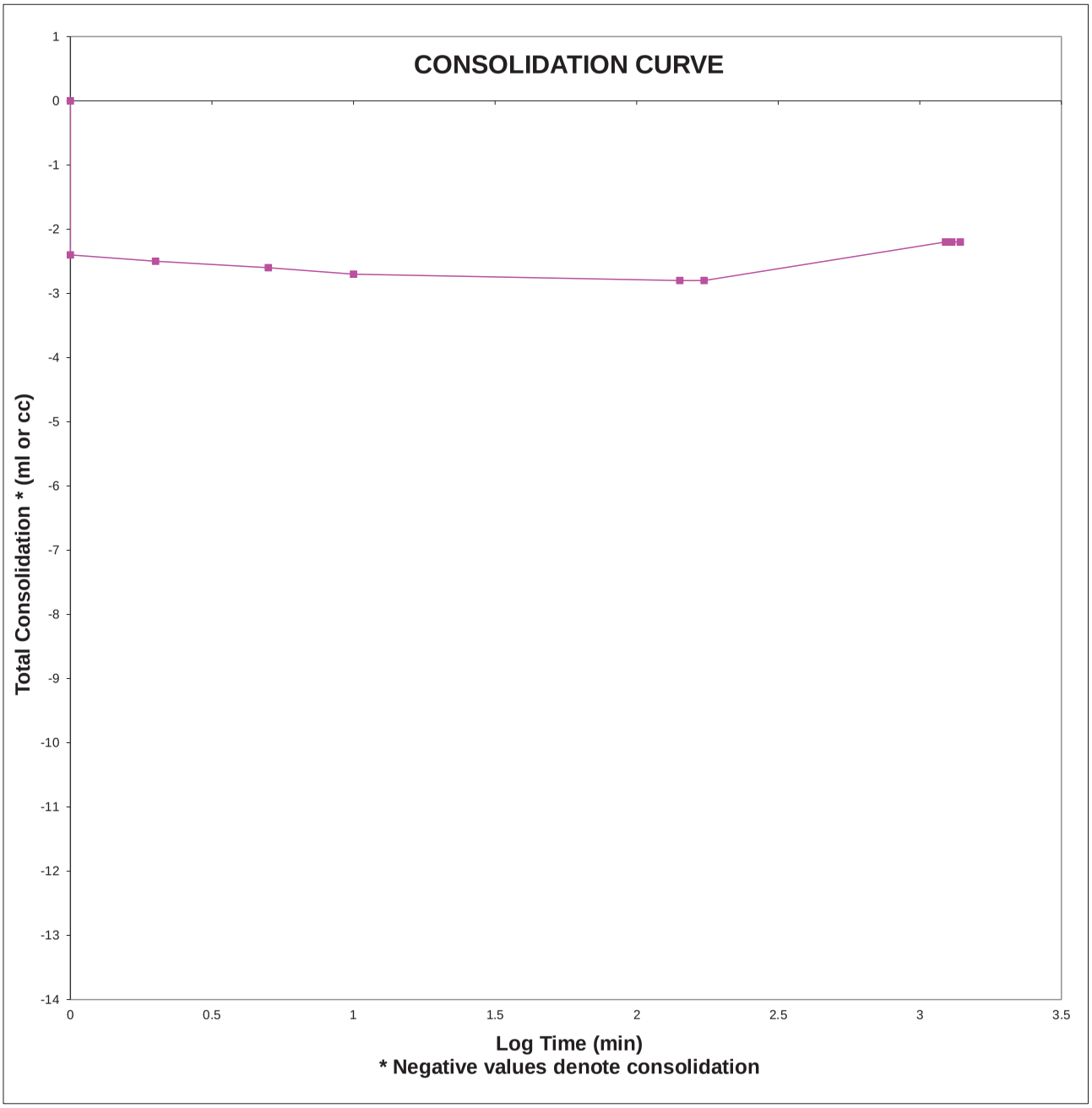
CELL PRESSURE: 59 psi **BACK PRESSURE:** 35 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
12 / 12 / 2018	ICD	14 : 0	0	0	0	25.0	25.0	0.0
12 / 12 / 2018	ICD	14 : 1	1	1	0.00	24.0	23.6	2.4
12 / 12 / 2018	ICD	14 : 2	1	2	0.30	24.0	23.5	2.5
12 / 12 / 2018	ICD	14 : 5	3	5	0.70	23.9	23.5	2.6
12 / 12 / 2018	ICD	14 : 10	5	10	1.00	23.9	23.4	2.7
12 / 12 / 2018	ICD	16 : 22	132	142	2.15	23.9	23.3	2.8
12 / 12 / 2018	ICD	16 : 53	31	173	2.24	23.9	23.3	2.8
12 / 13 / 2018	ICD	10 : 33	1060	1233	3.09	24.6	23.2	2.2
12 / 13 / 2018	ICD	11 : 38	65	1298	3.11	24.6	23.2	2.2
12 / 13 / 2018	ICD	13 : 10	92	1390	3.14	24.6	23.2	2.2

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
12 / 13 / 18	ICD	13 : 11	0	0.0	25.0	20.0	59.0	35.0	35.0
12 / 13 / 18	ICD	15 : 22	131	0.5	24.5	20.0	59.0	35.0	35.0
12 / 14 / 18	ICD	9 : 17	1075	3.6	21.4	20.0	59.0	35.0	35.0
12 / 14 / 18	ICD	14 : 28	311	4.3	20.7	20.0	59.0	35.0	35.0
12 / 18 / 18	ICD	14 : 9	RESET	0.0	25.0	20.0	59.0	35.0	35.0
12 / 18 / 18	ICD	16 : 27	138	0.5	24.5	20.0	59.0	35.0	35.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				5.578		
131	0.5	0.5	1.00	5.355	2.59E-07	2.60E-07
1075	3.1	3.1	1.00	3.972	2.31E-07	2.32E-07
311	0.7	0.7	1.00	3.659	2.19E-07	2.20E-07
RESET				5.578		
138	0.5	0.5	1.00	5.355	2.46E-07	2.47E-07

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C650
SAMPLE No.:	BWM-08 DUP	EQUIPMENT No.:	3
TEST DATE:	12/4/2018		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	107.2 lb/ft³	110.4 lb/ft³
DRY UNIT WEIGHT	80.0 lb/ft³	80.6 lb/ft³
MOISTURE CONTENT	34.0 %	37.0 %
PERMEABILITY @ 20°C	2.4E-07 cm/sec	

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-09 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C651

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	116.05	g
3. WT WET SOIL + TARE	281.74	g
4. WT DRY SOIL + TARE	236.56	g
5. WT WATER, Ww	45.18	g
6. WT DRY SOIL, Ws	120.51	g
7. MOISTURE CONTENT, W	**37.49**	**%**

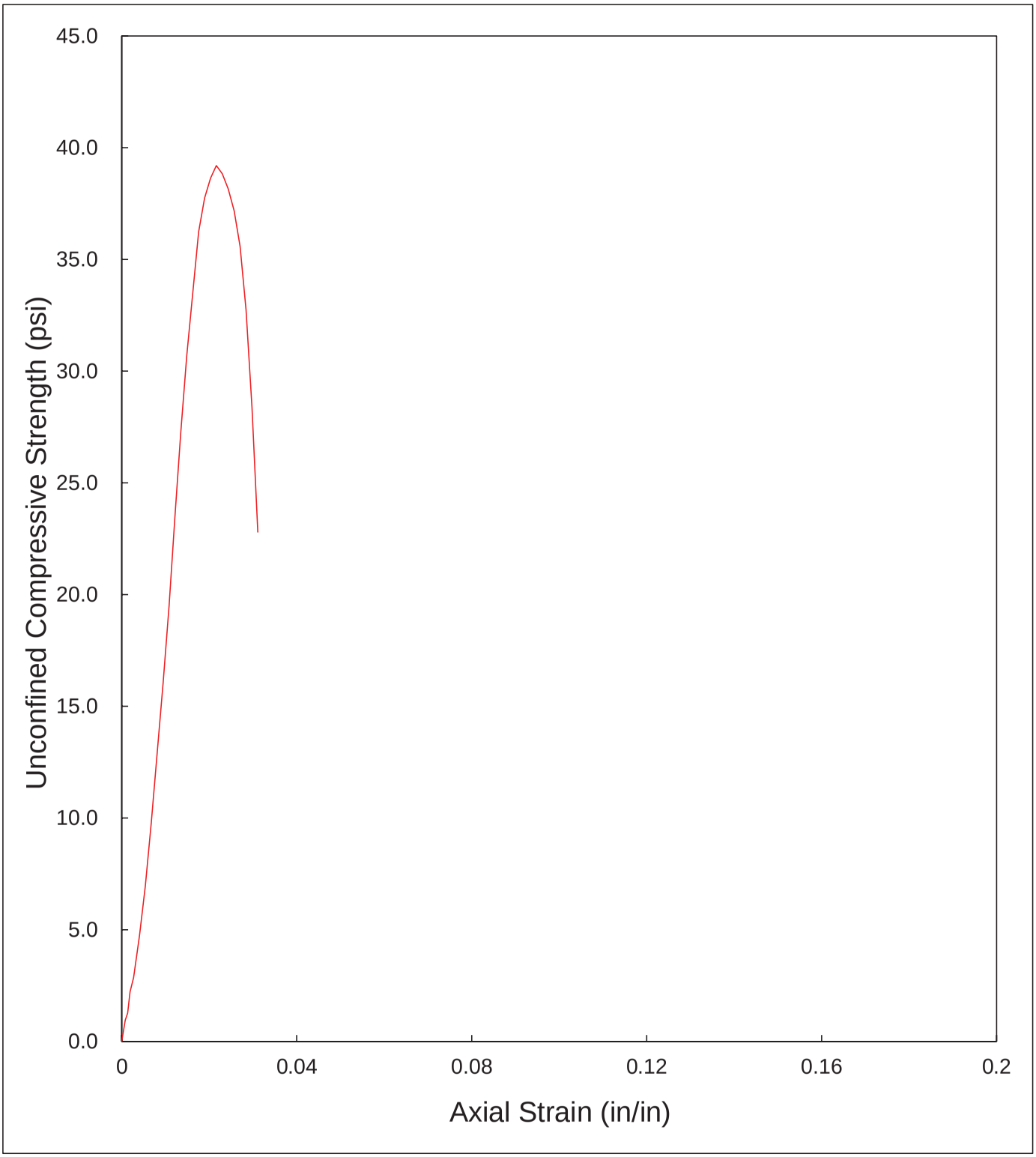
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.69	in.
No. 2	2.01	in.	3.72	in.
No. 3	2.00	in.	3.68	in.
Average	**2.00**	**in.**	**3.70**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***320.76***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	11.63	in^3
Initial Bulk Unit Weight,	105.1	lb/ft^3
Initial Dry Unit Weight	76.5	lb/ft^3
15 % Strain (0.15 Lo)	0.55	in.
UCS	39.2	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.145	0.0000	0.0
3	0.003	0.003	3.147	0.0008	1.0
4	0.005	0.005	3.149	0.0014	1.3
7	0.007	0.007	3.151	0.0019	2.2
9	0.010	0.010	3.153	0.0027	2.9
15	0.015	0.015	3.158	0.0041	4.8
22	0.020	0.020	3.162	0.0054	7.0
31	0.025	0.025	3.166	0.0068	9.8
41	0.030	0.030	3.170	0.0081	12.9
51	0.035	0.035	3.175	0.0095	16.1
62	0.040	0.040	3.179	0.0108	19.5
75	0.045	0.045	3.183	0.0122	23.6
87	0.050	0.050	3.188	0.0135	27.3
98	0.055	0.055	3.192	0.0149	30.7
107	0.060	0.060	3.197	0.0162	33.5
116	0.065	0.065	3.201	0.0176	36.2
121	0.070	0.070	3.205	0.0189	37.7
124	0.075	0.075	3.210	0.0203	38.6
126	0.080	0.080	3.214	0.0216	39.2
125	0.085	0.085	3.219	0.0230	38.8
123	0.090	0.090	3.223	0.0243	38.2
120	0.095	0.095	3.228	0.0257	37.2
115	0.100	0.100	3.232	0.0271	35.6
106	0.105	0.105	3.237	0.0284	32.7
92	0.110	0.110	3.241	0.0298	28.4
74	0.115	0.115	3.246	0.0311	22.8

UNCONFINED COMPRESSION TESTING

Sample No. BWM-09 (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-09 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C651

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	37.5	**%**
BULK UNIT WEIGHT	105.1	lb/ft^3
DRY UNIT WEIGHT	76.5	lb/ft^3
UCS *	39.2	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		

MOISTURE CONTENT (Dry Basis)	*INITIAL*	*FINAL*
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	228.61 ***g***
3. WT WET SOIL + TARE	390.39 ***g***	622.40 ***g***
4. WT DRY SOIL + TARE	294.79 ***g***	523.40 ***g***
5. WT WATER, Ww	95.60 g	99.00 g
6. WT DRY SOIL, Ws	294.79 g	294.79 g
7. MOISTURE CONTENT, W	32.43 %	33.58 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	*DIAMETER*		*HEIGHT*	
ANALYSES	*INITIAL*	*FINAL*	*INITIAL*	*FINAL*
No. 1	***2.98 in.***	***2.98 in.***	***1.92 in.***	***1.92 in.***
No. 2	***2.98 in.***	***2.97 in.***	***1.91 in.***	***1.91 in.***
No. 3	***2.97 in.***	***2.97 in.***	***1.88 in.***	***1.91 in.***
Average	2.98 in.	2.97 in.	1.90 in.	1.91 in.

SPECIMEN CONDITIONS	*INITIAL*	*FINAL*
Specimen WT, Wo	***390.39 g***	***393.79 g***
Area, Ao	6.97 in^2	6.94 in^2
Volume, Vo	13.27 in^3	13.27 in^3
Bulk Unit Weight	112.1 lb/ft^3	113.0 lb/ft^3
Dry Unit Weight	84.6 lb/ft^3	84.6 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
11/27/18	15 : 3	ICD	7.0	5.0	5.5				
11/27/18	16 : 4	ICD	17.0	15.0	15.5	10.7	10.0	5.2	0.52
11/28/18	9 : 50	ICD	27.0	25.0	25.4	23.9	10.0	8.4	0.84
11/28/18	10 : 31	ICD	37.0	35.0	35.1	34.6	10.0	9.2	0.92
11/28/18	12 : 33	ICD	47.0	45.0	*	45.1	10.0	10.0	1.00
11/28/18	12 : 33	ICD	57.0	55.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		

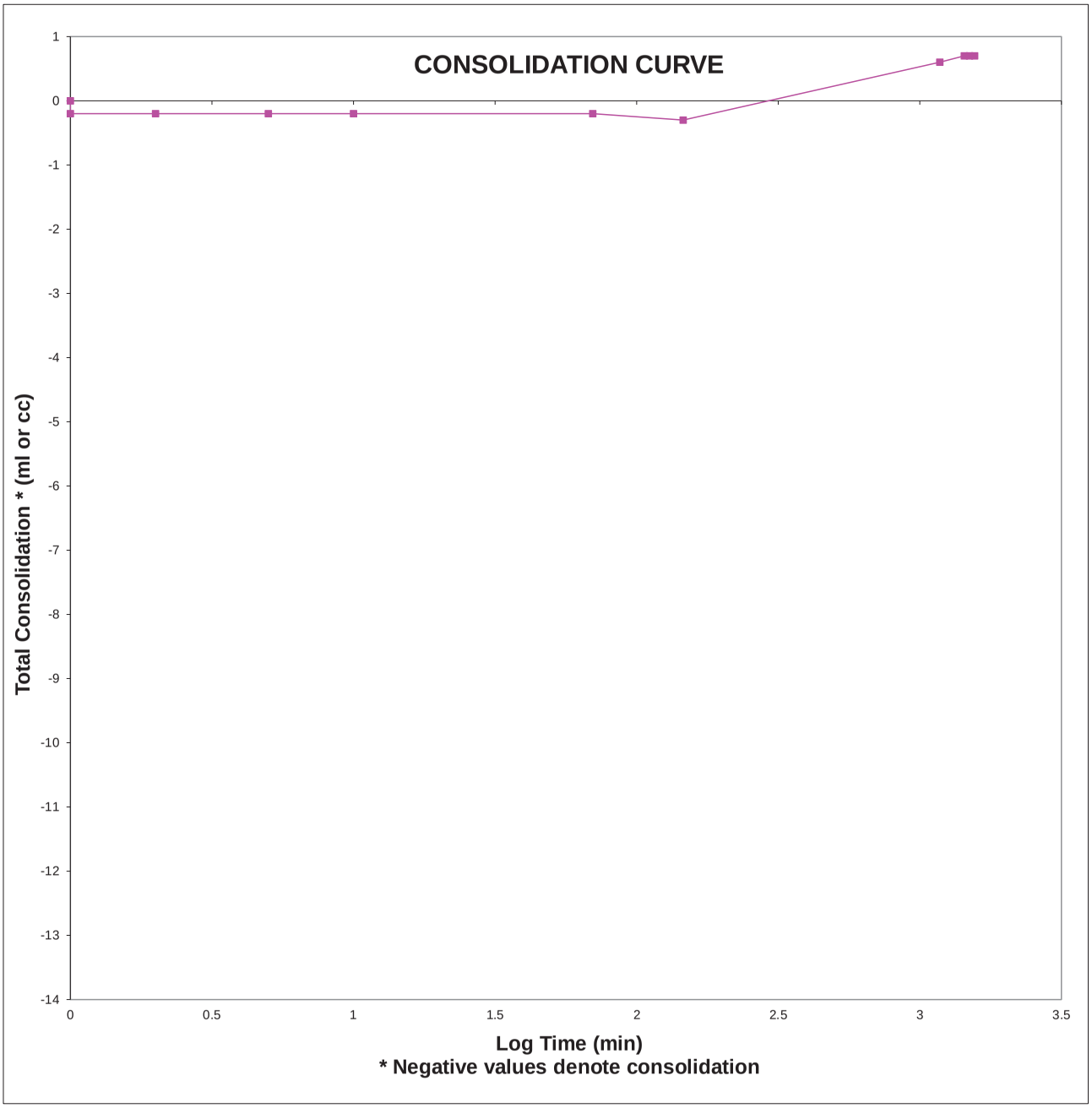
CELL PRESSURE: 59 psi **BACK PRESSURE:** 35 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	TESTED BY	TIME (Military)	ELAPSED TIME (minutes)	TOTAL TIME (minutes)	TOTAL TIME (Log)	SPECIMEN CONSOLIDATION (ML) READING BOTTOM	READING TOP	ACTUAL TOTAL (Ct)
12 / 5 / 2018	ICD	14 : 5	0	0	0	23.0	23.0	0.0
12 / 5 / 2018	ICD	14 : 6	1	1	0.00	22.9	22.9	0.2
12 / 5 / 2018	ICD	14 : 7	1	2	0.30	22.9	22.9	0.2
12 / 5 / 2018	ICD	14 : 10	3	5	0.70	22.9	22.9	0.2
12 / 5 / 2018	ICD	14 : 15	5	10	1.00	22.9	22.9	0.2
12 / 5 / 2018	ICD	15 : 15	60	70	1.85	22.9	22.9	0.2
12 / 5 / 2018	ICD	16 : 31	76	146	2.16	22.7	23.0	0.3
12 / 6 / 2018	ICD	9 41	1030	1176	3.07	22.6	24.0	-0.6
12 / 6 / 2018	ICD	14 1	260	1436	3.16	22.6	24.1	-0.7
12 / 6 / 2018	ICD	15 3	62	1498	3.18	22.6	24.1	-0.7
12 / 6 / 2018	ICD	16 6	63	1561	3.19	22.6	24.1	-0.7

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
12 / 7 / 18	ICD	13 : 36	0	0.0	25.0	20.0	59.0	35.0	35.0
12 / 7 / 18	ICD	14 : 24	48	1.1	23.9	20.0	59.0	35.0	35.0
12 / 7 / 18	ICD	14 : 51	27	1.7	23.3	20.0	59.0	35.0	35.0
12 / 10 / 18	ICD	9 : 53	RESET	0.0	25.0	20.0	59.0	35.0	35.0
12 / 10 / 18	ICD	10 : 17	24	0.6	24.4	20.0	59.0	35.0	35.0
12 / 10 / 18	ICD	10 : 40	23	1.1	23.9	20.0	59.0	35.0	35.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				5.170		
48	1.1	1.1	1.00	4.715	1.72E-06	1.73E-06
27	0.6	0.6	1.00	4.467	1.79E-06	1.80E-06
RESET				5.170		
24	0.6	0.6	1.00	4.922	1.84E-06	1.84E-06
23	0.5	0.5	1.00	4.715	1.67E-06	1.68E-06

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C651
SAMPLE No.:	BWM-09	EQUIPMENT No.:	5
TEST DATE:	11/26/2018		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	112.1 lb/ft³	113.0 lb/ft³
DRY UNIT WEIGHT	84.6 lb/ft³	84.6 lb/ft³
MOISTURE CONTENT	32.4 %	33.6 %
PERMEABILITY @ 20°C	1.8E-06 cm/sec	

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-09 DUP (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C652

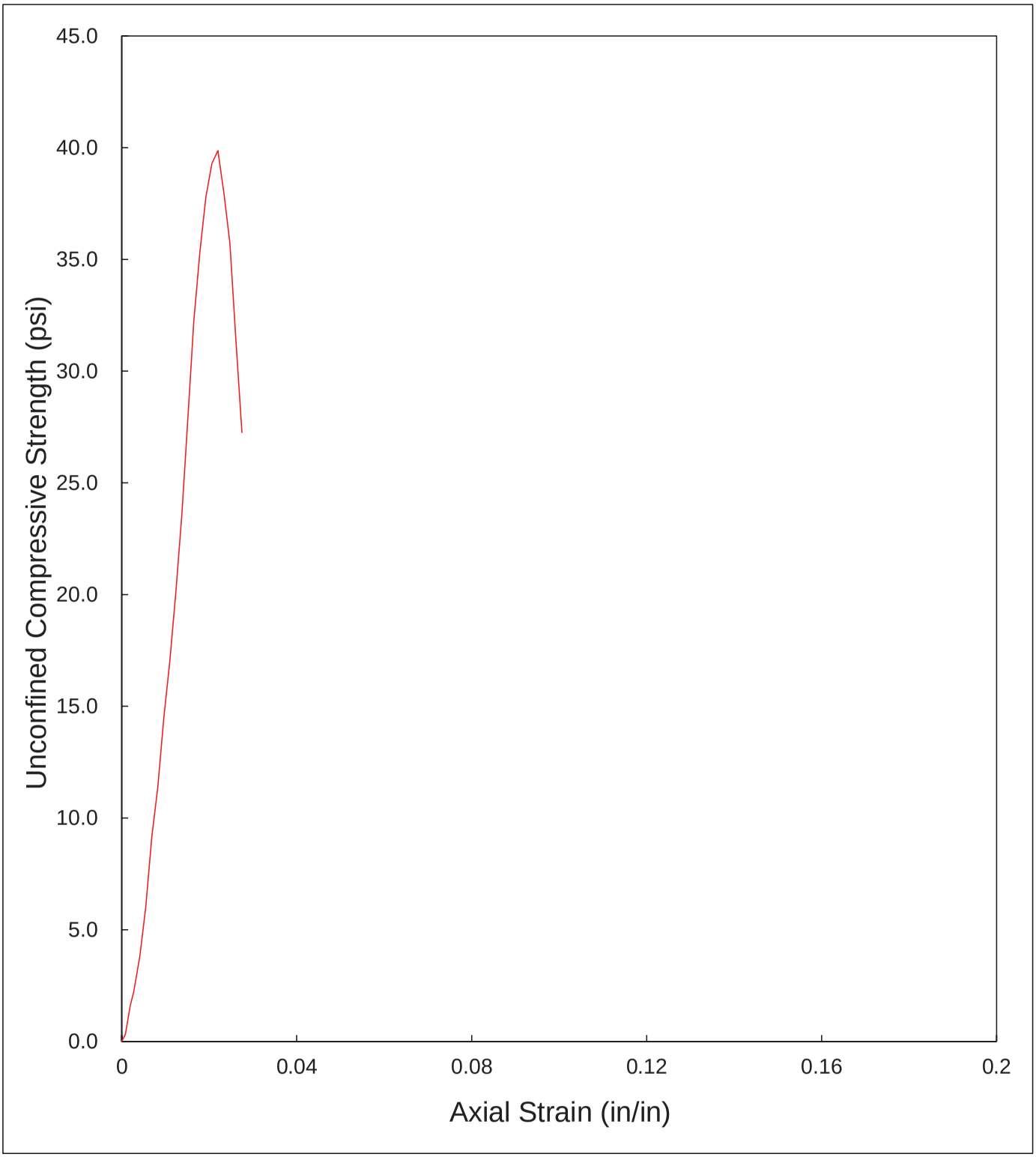
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	117.88	g
3. WT WET SOIL + TARE	270.40	g
4. WT DRY SOIL + TARE	225.19	g
5. WT WATER, Ww	45.21	g
6. WT DRY SOIL, Ws	107.31	g
7. MOISTURE CONTENT, W	**42.13**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.67	in.
No. 2	2.00	in.	3.63	in.
No. 3	1.99	in.	3.62	in.
Average	**2.00**	**in.**	**3.64**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***312.53***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	11.43	in^3
Initial Bulk Unit Weight,	104.2	lb/ft^3
Initial Dry Unit Weight	73.3	lb/ft^3
15 % Strain (0.15 Lo)	0.55	in.
UCS	39.9	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.140	0.0000	0.0
1	0.003	0.003	3.143	0.0008	0.3
3	0.005	0.005	3.144	0.0014	1.0
5	0.007	0.007	3.146	0.0019	1.6
7	0.010	0.010	3.149	0.0027	2.2
12	0.015	0.015	3.153	0.0041	3.8
19	0.020	0.020	3.157	0.0055	6.0
29	0.025	0.025	3.162	0.0069	9.2
36	0.030	0.030	3.166	0.0082	11.4
46	0.035	0.035	3.171	0.0096	14.5
54	0.040	0.040	3.175	0.0110	17.0
64	0.045	0.045	3.179	0.0124	20.1
75	0.050	0.050	3.184	0.0137	23.6
89	0.055	0.055	3.188	0.0151	27.9
103	0.060	0.060	3.193	0.0165	32.3
113	0.065	0.065	3.197	0.0179	35.3
121	0.070	0.070	3.202	0.0192	37.8
126	0.075	0.075	3.206	0.0206	39.3
128	0.080	0.080	3.211	0.0220	39.9
122	0.085	0.085	3.215	0.0234	37.9
115	0.090	0.090	3.220	0.0247	35.7
101	0.095	0.095	3.224	0.0261	31.3
88	0.100	0.100	3.229	0.0275	27.3

UNCONFINED COMPRESSION TESTING
Sample NoBWM-09 DUP (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-09 DUP (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C652

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	42.1	**%**
BULK UNIT WEIGHT	104.2	lb/ft^3
DRY UNIT WEIGHT	73.3	lb/ft^3
UCS *	39.9	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		

MOISTURE CONTENT (Dry Basis)	***INITIAL***	***FINAL***
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	215.51 ***g***
3. WT WET SOIL + TARE	371.24 ***g***	589.83 ***g***
4. WT DRY SOIL + TARE	277.27 ***g***	492.78 ***g***
5. WT WATER, Ww	93.97 g	97.05 g
6. WT DRY SOIL, Ws	277.27 g	277.27 g
7. MOISTURE CONTENT, W	33.89 %	35.00 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	***DIAMETER***		***HEIGHT***	
ANALYSES	***INITIAL***	***FINAL***	***INITIAL***	***FINAL***
No. 1	***2.98 in.***	***2.97 in.***	***1.86 in.***	***1.82 in.***
No. 2	***2.97 in.***	***2.97 in.***	***1.83 in.***	***1.84 in.***
No. 3	***2.96 in.***	***2.98 in.***	***1.82 in.***	***1.85 in.***
Average	2.97 in.	2.98 in.	1.84 in.	1.84 in.

SPECIMEN CONDITIONS	***INITIAL***	***FINAL***
Specimen WT, Wo	***371.24 g***	***374.32 g***
Area, Ao	6.94 in^2	6.95 in^2
Volume, Vo	12.73 in^3	12.76 in^3
Bulk Unit Weight	111.1 lb/ft^3	111.8 lb/ft^3
Dry Unit Weight	83.0 lb/ft^3	82.8 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
12/05/18	14 : 24	ICD	7.0	5.0	4.7				
12/05/18	16 : 33	ICD	17.0	15.0	14.0	7.8	10.0	3.1	0.31
12/06/18	14 : 0	ICD	27.0	25.0	23.1	19.6	10.0	5.6	0.56
12/06/18	14 : 35	ICD	37.0	35.0	32.2	30.0	10.0	6.9	0.69
12/06/18	16 : 25	ICD	47.0	45.0	41.6	40.1	10.0	7.9	0.79
12/07/18	13 : 22	ICD	57.0	55.0	50.9	50.5	10.0	8.9	0.89
12/07/18	14 : 24	ICD	67.0	65.0	60.4	59.9	10.0	9.0	0.90
12/10/18	9 : 42	ICD	77.0	75.0	69.7	69.6	10.0	9.2	0.92
12/10/18	10 : 19	ICD	87.0	85.0	*	79.4	10.0	9.7	0.97
12/10/18	10 : 19	ICD	97.0	95.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		

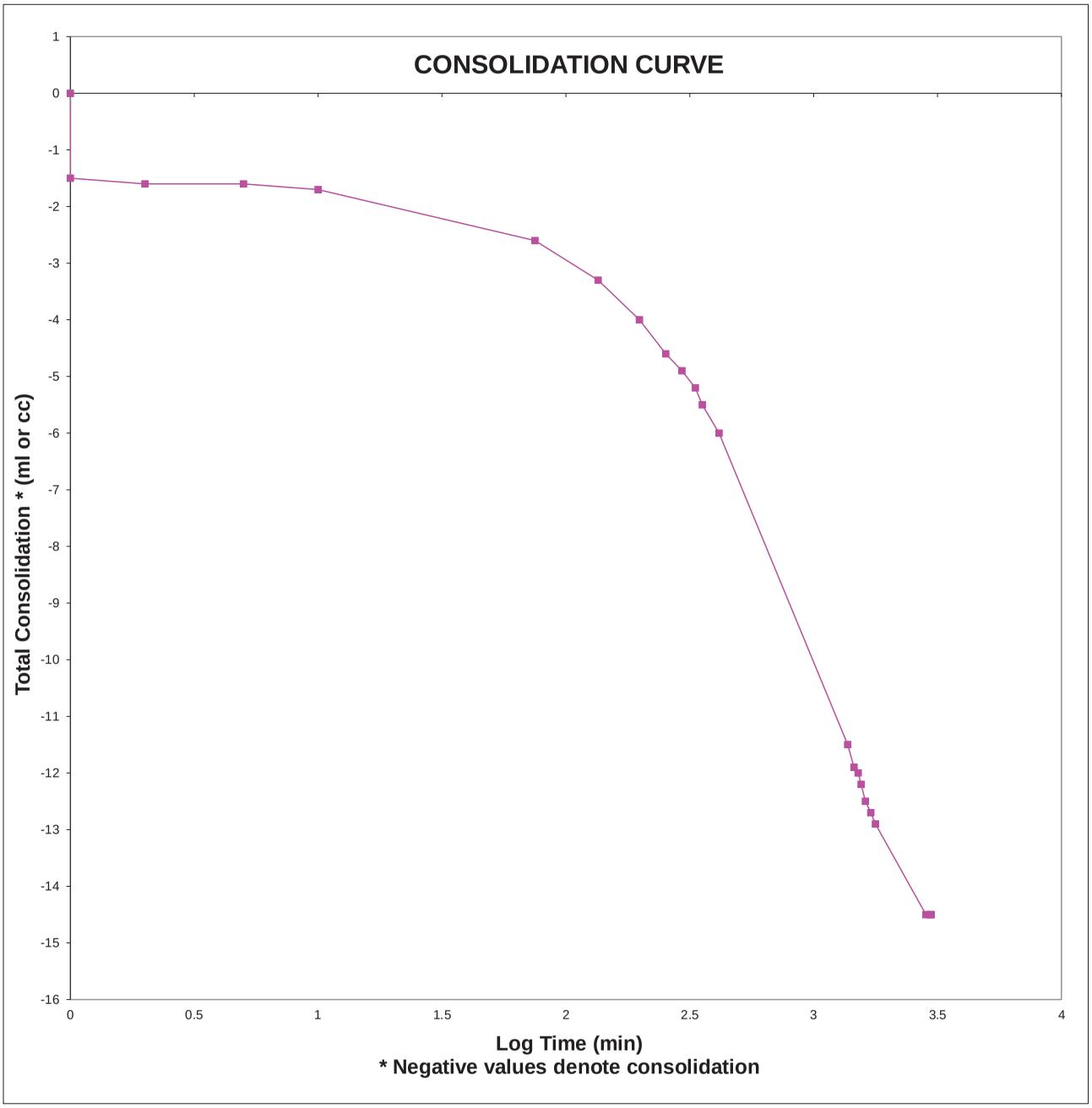
CELL PRESSURE: 99 psi **BACK PRESSURE:** 75 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
12 / 10 / 2018	ICD	10 : 25	0	0	0	24.0	24.0	0.0
12 / 10 / 2018	ICD	10 : 26	1	1	0.00	23.2	23.3	1.5
12 / 10 / 2018	ICD	10 : 27	1	2	0.30	23.2	23.2	1.6
12 / 10 / 2018	ICD	10 : 30	3	5	0.70	23.2	23.2	1.6
12 / 10 / 2018	ICD	10 : 35	5	10	1.00	23.1	23.2	1.7
12 / 10 / 2018	ICD	11 : 40	65	75	1.88	22.3	23.1	2.6
12 / 10 / 2018	ICD	12 : 40	60	135	2.13	21.7	23.0	3.3
12 / 10 / 2018	ICD	13 : 43	63	198	2.30	21.2	22.8	4.0
12 / 10 / 2018	ICD	14 : 38	55	253	2.40	20.8	22.6	4.6
12 / 10 / 2018	ICD	15 : 19	41	294	2.47	20.6	22.5	4.9
12 / 10 / 2018	ICD	15 : 58	39	333	2.52	20.4	22.4	5.2
12 / 10 / 2018	ICD	16 : 20	22	355	2.55	20.2	22.3	5.5
12 / 10 / 2018	ICD	17 : 20	60	415	2.62	19.9	22.1	6.0
12 / 11 / 2018	ICD	9 : 17	957	1372	3.14	17.3	19.2	11.5
12 / 11 / 2018	ICD	10 : 41	84	1456	3.16	17.1	19.0	11.9
12 / 11 / 2018	ICD	11 : 38	57	1513	3.18	17.1	18.9	12.0
12 / 11 / 2018	ICD	12 : 19	41	1554	3.19	17.0	18.8	12.2
12 / 11 / 2018	ICD	13 : 23	64	1618	3.21	16.9	18.6	12.5
12 / 11 / 2018	ICD	14 : 45	82	1700	3.23	16.8	18.5	12.7
12 / 11 / 2018	ICD	16 : 0	75	1775	3.25	16.8	18.3	12.9
12 / 12 / 2018	ICD	9 : 46	1066	2841	3.45	16.4	17.1	14.5
12 / 12 / 2018	ICD	11 : 41	115	2956	3.47	16.4	17.1	14.5
12 / 12 / 2018	ICD	12 : 5	24	2980	3.47	16.4	17.1	14.5

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		

			ELAPSED	HYDRAULIC			GAUGE		
	TESTED	TIME	TIME	HEAD (cm)		TEMP.	PRESSURE (psi)		
DATE	BY	(military)	(minutes)	INFLUENT	EFFLUENT	C°	CELL	INFLUENT	EFFLUENT
12 / 12 / 18	ICD	12 : 6	0	1.0	24.0	20.0	99.0	75.0	75.0
12 / 12 / 18	ICD	12 : 43	37	2.2	22.8	20.0	99.0	75.0	75.0
12 / 12 / 18	ICD	13 : 3	20	2.7	22.3	20.0	99.0	75.0	75.0
12 / 12 / 18	ICD	14 : 6	RESET	1.0	24.0	20.0	99.0	75.0	75.0
12 / 12 / 18	ICD	14 : 25	19	1.6	23.4	20.0	99.0	75.0	75.0
12 / 12 / 18	ICD	14 : 44	19	2.2	22.8	20.0	99.0	75.0	75.0
12 / 12 / 18	ICD	15 : 0	16	2.7	22.3	20.0	99.0	75.0	75.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				4.935		
37	1.2	1.2	1.00	4.420	2.59E-06	2.60E-06
20	0.5	0.5	1.00	4.205	2.16E-06	2.17E-06
RESET				4.935		
19	0.6	0.6	1.00	4.677	2.45E-06	2.46E-06
19	0.6	0.6	1.00	4.420	2.59E-06	2.60E-06
16	0.5	0.5	1.00	4.205	2.70E-06	2.71E-06

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C652
SAMPLE No.:	BWM-09 DUP	EQUIPMENT No.:	2
TEST DATE:	12/4/2018		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	111.1 lb/ft³	111.8 lb/ft³
DRY UNIT WEIGHT	83.0 lb/ft³	82.8 lb/ft³
MOISTURE CONTENT	33.9 %	35.0 %
PERMEABILITY @ 20°C	2.5E-06 cm/sec	

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-10 (7 day)		
TESTING DATE:	26-Oct-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C573

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	117.88	g
3. WT WET SOIL + TARE	365.13	g
4. WT DRY SOIL + TARE	296.24	g
5. WT WATER, Ww	68.89	g
6. WT DRY SOIL, Ws	178.36	g
7. MOISTURE CONTENT, W	**38.62**	**%**

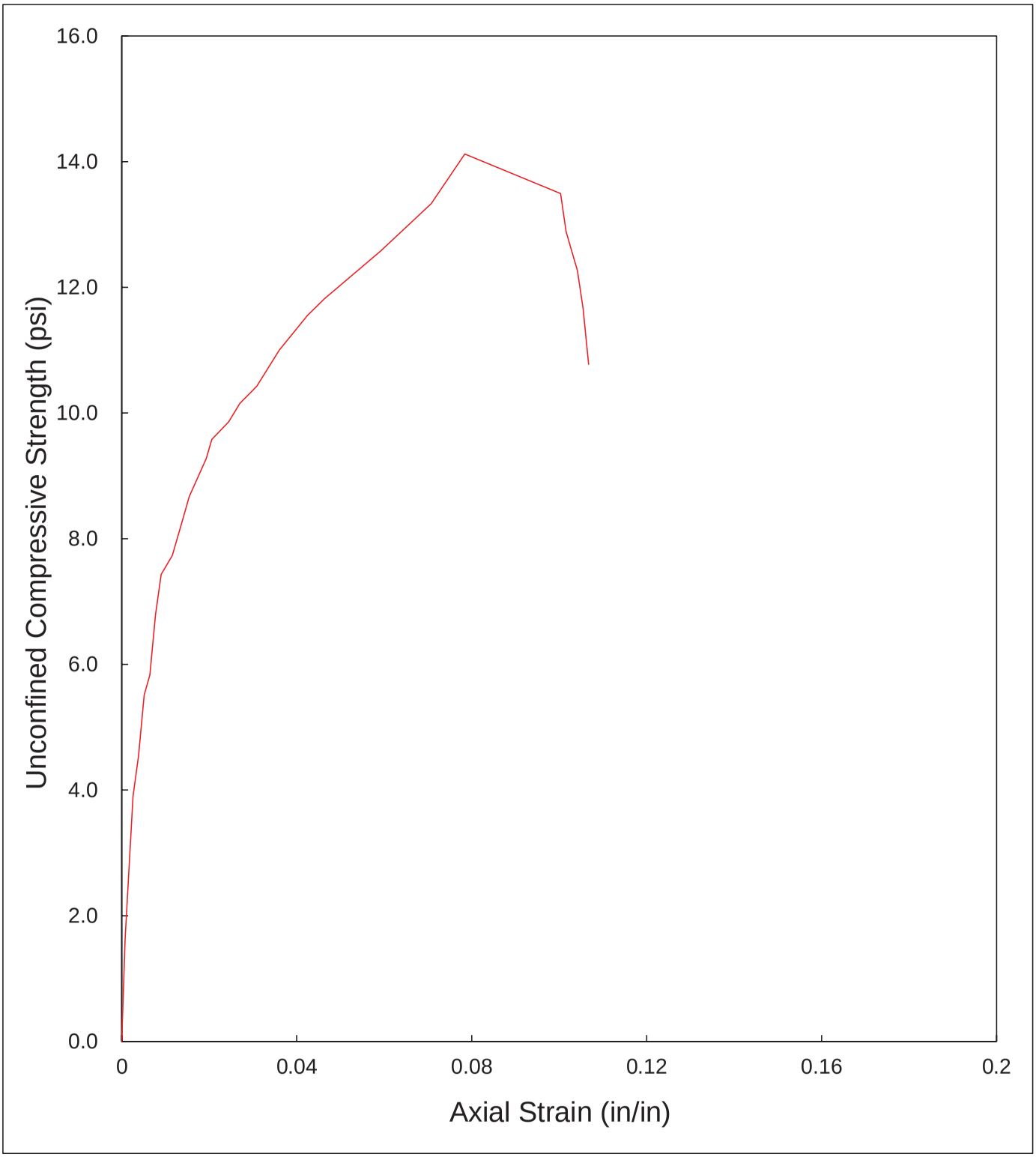
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.97	in.	3.90	in.
No. 2	1.99	in.	3.88	in.
No. 3	1.97	in.	3.88	in.
Average	**1.98**	**in.**	**3.89**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***353.15***	***g***
Initial Area, Ao	3.07	in^2
Initial Volume, Vo	11.93	in^3
Initial Bulk Unit Weight,	112.8	lb/ft^3
Initial Dry Unit Weight	81.4	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	14.1	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.067	0.0000	0.0
5	0.003	0.003	3.070	0.0008	1.6
7	0.005	0.005	3.071	0.0013	2.3
9	0.007	0.007	3.073	0.0018	2.9
12	0.010	0.010	3.075	0.0026	3.9
14	0.015	0.015	3.079	0.0039	4.5
17	0.020	0.020	3.083	0.0051	5.5
18	0.025	0.025	3.087	0.0064	5.8
21	0.030	0.030	3.091	0.0077	6.8
23	0.035	0.035	3.095	0.0090	7.4
24	0.045	0.045	3.103	0.0116	7.7
25	0.050	0.050	3.107	0.0129	8.0
26	0.055	0.055	3.111	0.0141	8.4
27	0.060	0.060	3.115	0.0154	8.7
29	0.075	0.075	3.127	0.0193	9.3
30	0.080	0.080	3.132	0.0206	9.6
31	0.095	0.095	3.144	0.0244	9.9
32	0.105	0.105	3.152	0.0270	10.2
33	0.120	0.120	3.165	0.0309	10.4
35	0.140	0.140	3.182	0.0360	11.0
37	0.165	0.165	3.203	0.0424	11.6
38	0.180	0.180	3.216	0.0463	11.8
41	0.230	0.230	3.260	0.0592	12.6
44	0.275	0.275	3.301	0.0707	13.3
47	0.305	0.305	3.328	0.0784	14.1
46	0.390	0.390	3.409	0.1003	13.5
44	0.395	0.395	3.414	0.1016	12.9
43	0.400	0.400	3.419	0.1029	12.6
42	0.405	0.405	3.424	0.1042	12.3
40	0.410	0.410	3.429	0.1054	11.7
37	0.415	0.415	3.434	0.1067	10.8

UNCONFINED COMPRESSION TESTING

Sample No. BWM-10 (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-10 (7 day)		
TESTING DATE:	26-Oct-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C573

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	38.6	**%**
BULK UNIT WEIGHT	112.8	lb/ft^3
DRY UNIT WEIGHT	81.4	lb/ft^3
UCS *	14.1	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-10 DUP (7 day)		
TESTING DATE:	26-Oct-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C574

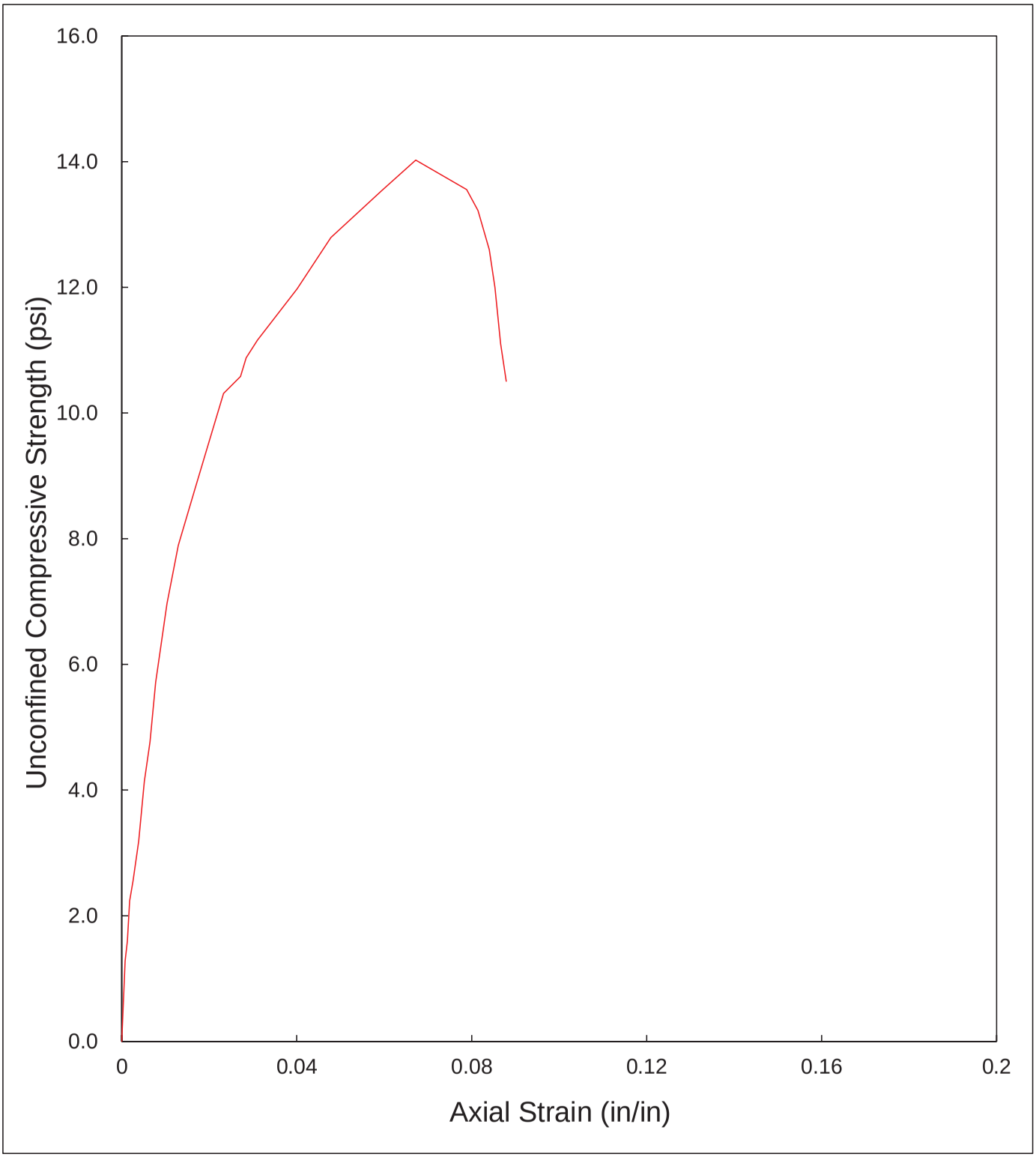
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	113.24	g
3. WT WET SOIL + TARE	374.63	g
4. WT DRY SOIL + TARE	301.82	g
5. WT WATER, Ww	72.81	g
6. WT DRY SOIL, Ws	188.58	g
7. MOISTURE CONTENT, W	**38.61**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.87	in.
No. 2	2.00	in.	3.87	in.
No. 3	1.98	in.	3.86	in.
Average	**2.00**	**in.**	**3.87**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***352.59***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	12.09	in^3
Initial Bulk Unit Weight,	111.1	lb/ft^3
Initial Dry Unit Weight	80.1	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	14.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.126	0.0000	0.0
4	0.003	0.003	3.128	0.0008	1.3
5	0.005	0.005	3.130	0.0013	1.6
7	0.007	0.007	3.132	0.0018	2.2
8	0.010	0.010	3.134	0.0026	2.6
10	0.015	0.015	3.138	0.0039	3.2
13	0.020	0.020	3.142	0.0052	4.1
15	0.025	0.025	3.146	0.0065	4.8
18	0.030	0.030	3.150	0.0078	5.7
20	0.035	0.035	3.154	0.0090	6.3
22	0.040	0.040	3.159	0.0103	7.0
25	0.050	0.050	3.167	0.0129	7.9
28	0.065	0.065	3.179	0.0168	8.8
29	0.070	0.070	3.184	0.0181	9.1
30	0.075	0.075	3.188	0.0194	9.4
32	0.085	0.085	3.196	0.0220	10.0
33	0.090	0.090	3.200	0.0233	10.3
34	0.105	0.105	3.213	0.0271	10.6
35	0.110	0.110	3.217	0.0284	10.9
36	0.120	0.120	3.226	0.0310	11.2
39	0.155	0.155	3.256	0.0401	12.0
42	0.185	0.185	3.283	0.0478	12.8
45	0.230	0.230	3.324	0.0595	13.5
47	0.260	0.260	3.351	0.0672	14.0
46	0.305	0.305	3.393	0.0789	13.6
45	0.315	0.315	3.403	0.0814	13.2
44	0.320	0.320	3.408	0.0827	12.9
43	0.325	0.325	3.413	0.0840	12.6
41	0.330	0.330	3.417	0.0853	12.0
38	0.335	0.335	3.422	0.0866	11.1
36	0.340	0.340	3.427	0.0879	10.5

UNCONFINED COMPRESSION TESTING
Sample No.BWM-10 DUP (7 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-10 DUP (7 day)		
TESTING DATE:	26-Oct-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C574

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	38.6	**%**
BULK UNIT WEIGHT	111.1	lb/ft^3
DRY UNIT WEIGHT	80.1	lb/ft^3
UCS *	14.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-11 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C653

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	111.87	g
3. WT WET SOIL + TARE	261.18	g
4. WT DRY SOIL + TARE	219.32	g
5. WT WATER, Ww	41.86	g
6. WT DRY SOIL, Ws	107.45	g
7. MOISTURE CONTENT, W	**38.96**	**%**

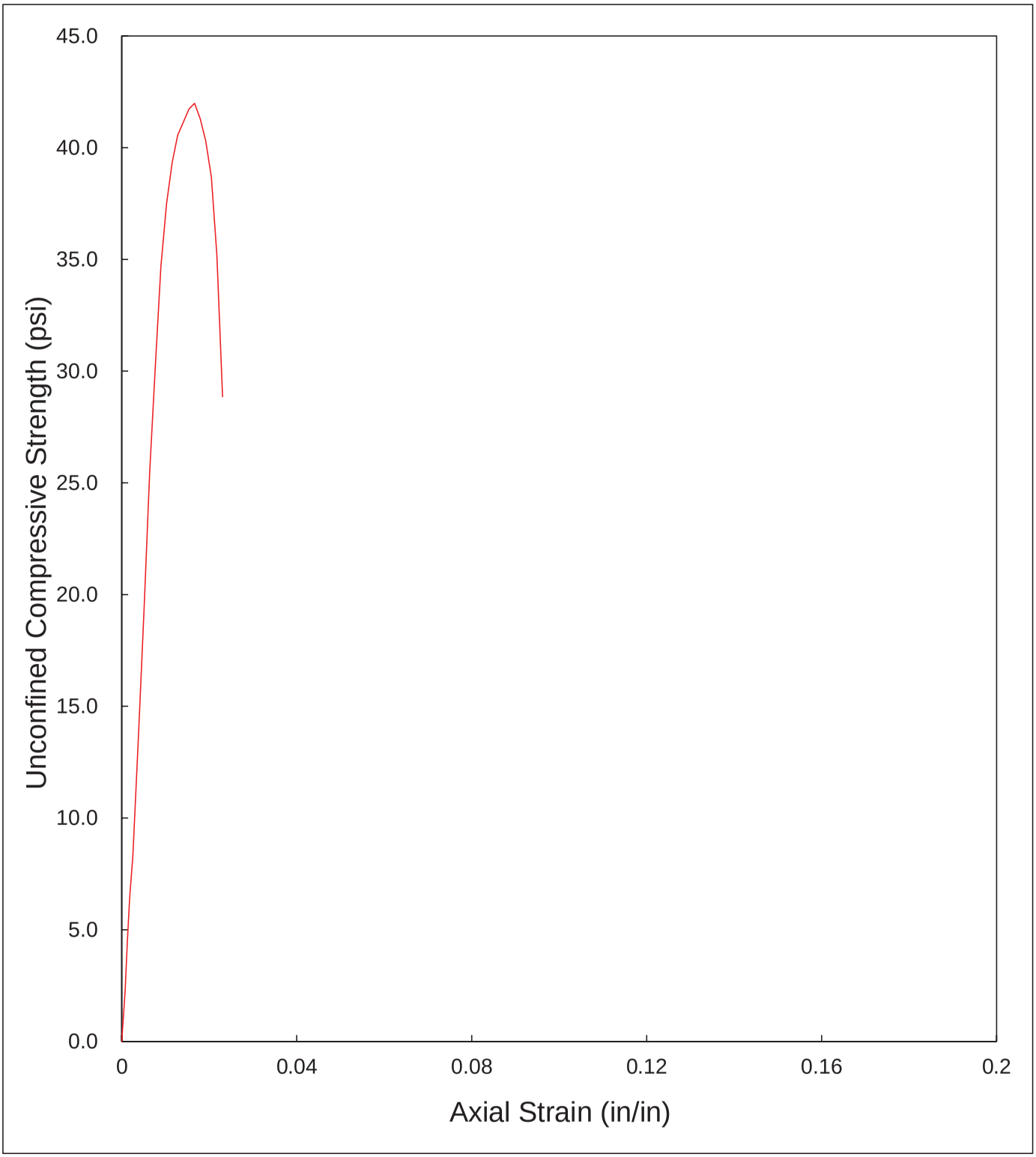
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.88	in.
No. 2	1.99	in.	3.95	in.
No. 3	1.99	in.	3.89	in.
Average	**1.99**	**in.**	**3.91**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***351.83***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	12.16	in^3
Initial Bulk Unit Weight,	110.2	lb/ft^3
Initial Dry Unit Weight	79.3	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	42.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.115	0.0000	0.0
7	0.003	0.003	3.117	0.0008	2.2
14	0.005	0.005	3.119	0.0013	4.5
20	0.007	0.007	3.121	0.0018	6.4
26	0.010	0.010	3.123	0.0026	8.3
43	0.015	0.015	3.127	0.0038	13.8
61	0.020	0.020	3.131	0.0051	19.5
80	0.025	0.025	3.135	0.0064	25.5
95	0.030	0.030	3.139	0.0077	30.3
109	0.035	0.035	3.143	0.0090	34.7
118	0.040	0.040	3.147	0.0102	37.5
124	0.045	0.045	3.151	0.0115	39.3
128	0.050	0.050	3.155	0.0128	40.6
130	0.055	0.055	3.159	0.0141	41.1
132	0.060	0.060	3.164	0.0154	41.7
133	0.065	0.065	3.168	0.0166	42.0
131	0.070	0.070	3.172	0.0179	41.3
128	0.075	0.075	3.176	0.0192	40.3
123	0.080	0.080	3.180	0.0205	38.7
112	0.085	0.085	3.184	0.0218	35.2
92	0.090	0.090	3.188	0.0230	28.9

UNCONFINED COMPRESSION TESTING

Sample No. BWM-11 (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-11 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C653

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	39.0	**%**
BULK UNIT WEIGHT	110.2	lb/ft^3
DRY UNIT WEIGHT	79.3	lb/ft^3
UCS *	42.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		

MOISTURE CONTENT (Dry Basis)	***INITIAL***	***FINAL***
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	341.93 ***g***
3. WT WET SOIL + TARE	414.22 ***g***	759.20 ***g***
4. WT DRY SOIL + TARE	306.87 ***g***	648.80 ***g***
5. WT WATER, Ww	107.35 g	110.40 g
6. WT DRY SOIL, Ws	306.87 g	306.87 g
7. MOISTURE CONTENT, W	34.98 %	35.98 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	***DIAMETER***		***HEIGHT***	
ANALYSES	***INITIAL***	***FINAL***	***INITIAL***	***FINAL***
No. 1	***2.98 in.***	***2.92 in.***	***2.05 in.***	***1.97 in.***
No. 2	***2.98 in.***	***2.98 in.***	***2.01 in.***	***1.91 in.***
No. 3	***2.97 in.***	***3.00 in.***	***2.01 in.***	***1.97 in.***
Average	2.98 in.	2.96 in.	2.03 in.	1.95 in.

SPECIMEN CONDITIONS	***INITIAL***	***FINAL***
Specimen WT, Wo	***414.22 g***	***417.27 g***
Area, Ao	6.97 in^2	6.90 in^2
Volume, Vo	14.13 in^3	13.45 in^3
Bulk Unit Weight	111.7 lb/ft^3	118.2 lb/ft^3
Dry Unit Weight	82.8 lb/ft^3	86.9 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
12/10/18	10 : 2	ICD	7.0	5.0	6.7				
12/10/18	10 : 34	ICD	17.0	15.0	16.8	12.5	10.0	5.8	0.58
12/10/18	11 : 10	ICD	27.0	25.0	26.7	24.7	10.0	7.9	0.79
12/10/18	12 : 40	ICD	37.0	35.0	36.6	35.3	10.0	8.6	0.86
12/10/18	13 : 48	ICD	47.0	45.0	46.5	45.9	10.0	9.3	0.93
12/10/18	14 : 37	ICD	57.0	55.0	*	56.3	10.0	9.8	0.98
12/10/18	14 : 37	ICD	67.0	45.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		

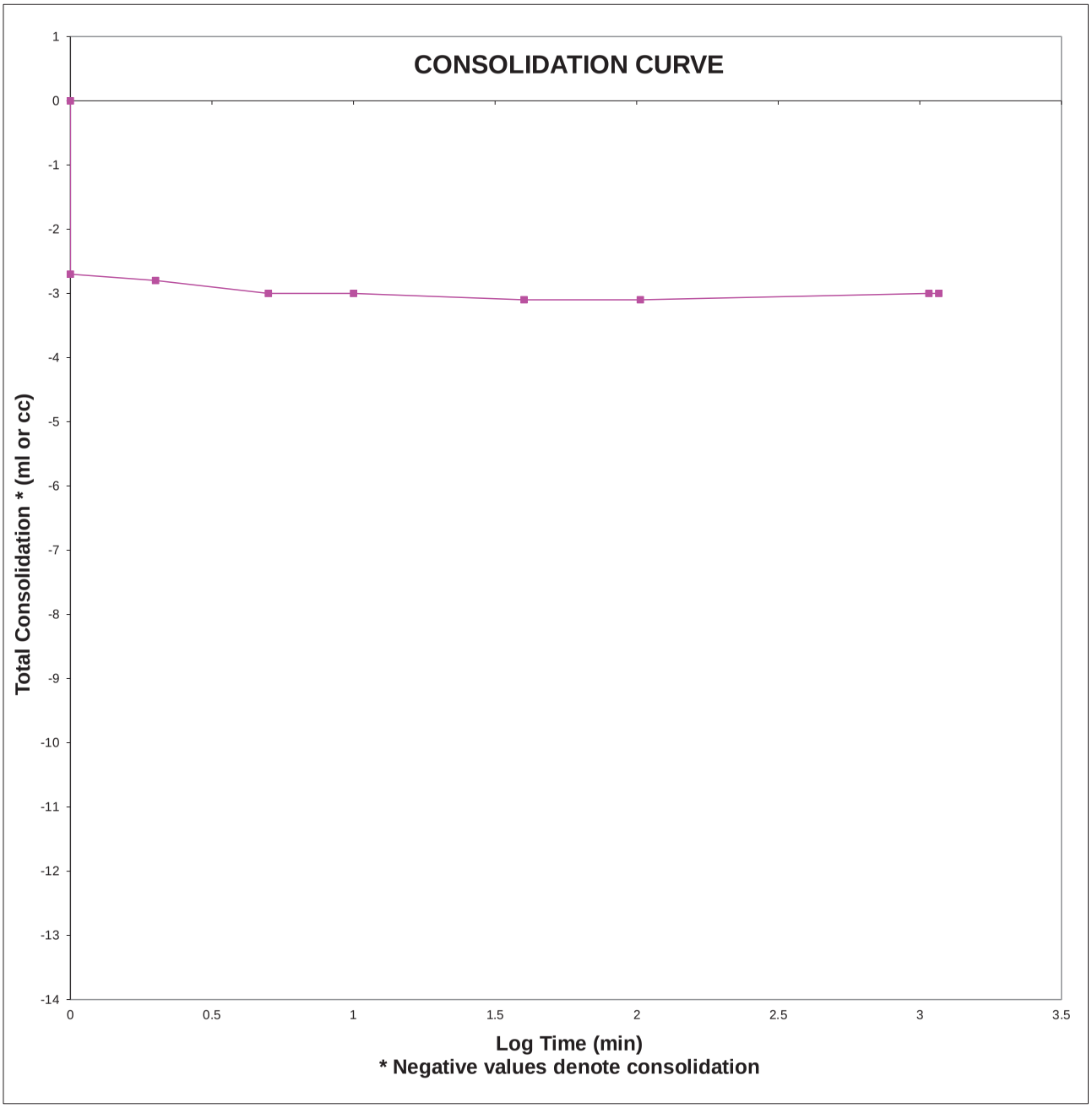
CELL PRESSURE: 69 psi **BACK PRESSURE:** 45 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
12 / 10 / 2018	ICD	15 : 22	0	0	0	25.0	25.0	0.0
12 / 10 / 2018		15 : 23	1	1	0.00	23.4	23.9	2.7
12 / 10 / 2018		15 : 24	1	2	0.30	23.4	23.8	2.8
12 / 10 / 2018		15 : 27	3	5	0.70	23.3	23.7	3.0
12 / 10 / 2018		15 : 32	5	10	1.00	23.3	23.7	3.0
12 / 10 / 2018		16 : 2	30	40	1.60	23.3	23.6	3.1
12 / 10 / 2018		17 : 5	63	103	2.01	23.3	23.6	3.1
12 / 11 / 2018		9 : 18	973	1076	3.03	23.5	23.5	3.0
12 / 11 / 2018		10 : 49	91	1167	3.07	23.5	23.5	3.0

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
12 / 11 / 18	ICD	10 : 56	0	0.0	25.0	20.0	69.0	45.0	45.0
12 / 11 / 18	ICD	11 : 43	47	0.6	24.4	20.0	69.0	45.0	45.0
12 / 11 / 18	ICD	12 : 24	41	1.1	23.9	20.0	69.0	45.0	45.0
12 / 11 / 18	ICD	13 : 24	60	1.8	23.2	20.0	69.0	45.0	45.0
12 / 11 / 18	ICD	14 : 24	60	2.5	22.5	20.0	69.0	45.0	45.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				4.857		
47	0.6	0.6	1.00	4.624	9.98E-07	1.00E-06
41	0.5	0.5	1.00	4.430	9.98E-07	1.00E-06
60	0.7	0.7	1.00	4.158	1.01E-06	1.01E-06
60	0.7	0.7	1.00	3.886	1.08E-06	1.08E-06

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C653
SAMPLE No.:	BWM-11	EQUIPMENT No.:	7
TEST DATE:	12/7/2018		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	111.7 lb/ft³	118.2 lb/ft³
DRY UNIT WEIGHT	82.8 lb/ft³	86.9 lb/ft³
MOISTURE CONTENT	35.0 %	36.0 %
PERMEABILITY @ 20°C	1.0E-06 cm/sec	

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-12 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C654

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	106.57	g
3. WT WET SOIL + TARE	251.93	g
4. WT DRY SOIL + TARE	209.56	g
5. WT WATER, Ww	42.37	g
6. WT DRY SOIL, Ws	102.99	g
7. MOISTURE CONTENT, W	**41.14**	**%**

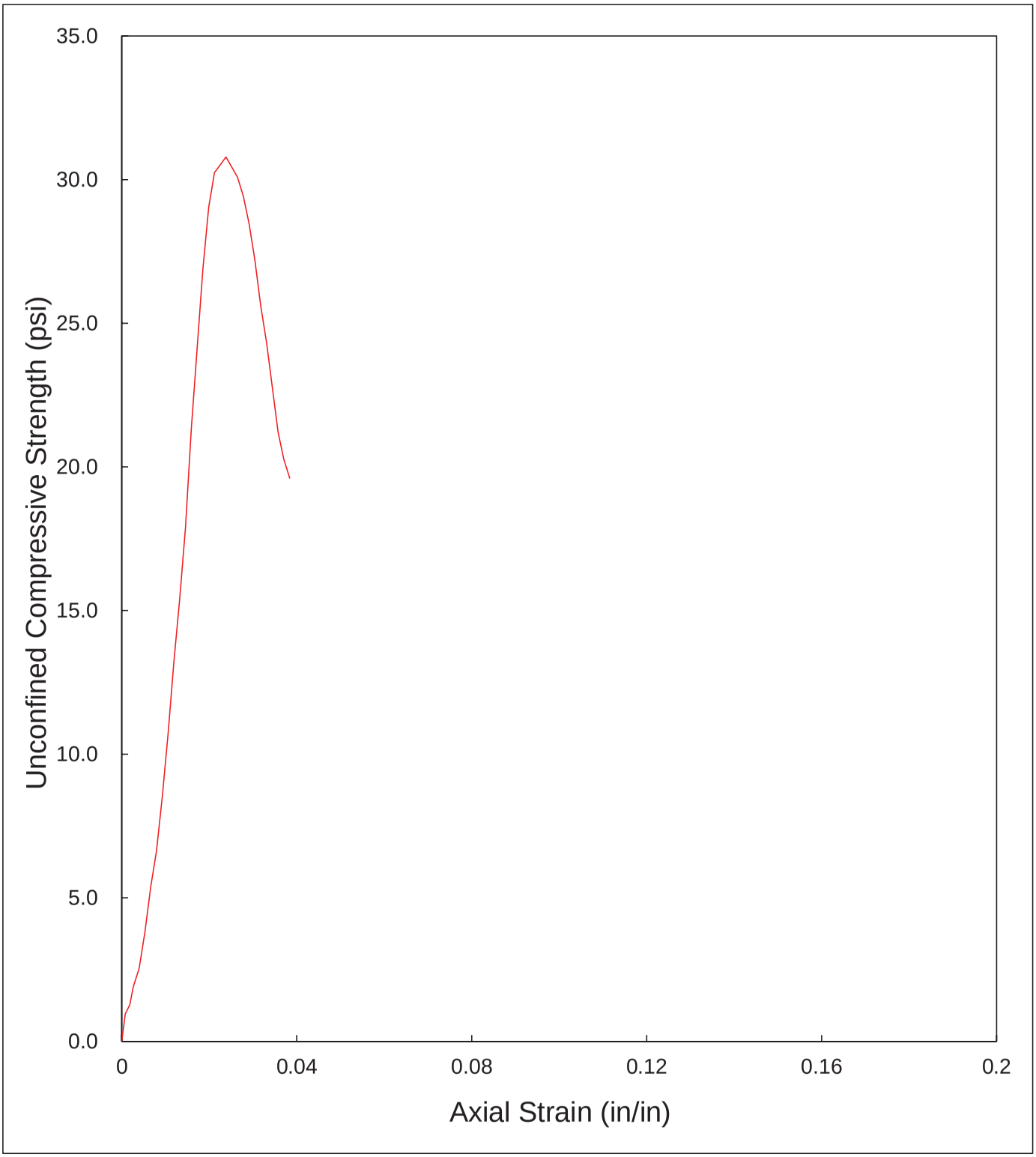
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.78	in.
No. 2	2.01	in.	3.74	in.
No. 3	1.98	in.	3.80	in.
Average	**2.00**	**in.**	**3.78**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***333.51***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	11.85	in^3
Initial Bulk Unit Weight,	107.2	lb/ft^3
Initial Dry Unit Weight	76.0	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	30.8	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.139	0.0000	0.0
3	0.003	0.003	3.141	0.0008	1.0
4	0.007	0.007	3.145	0.0019	1.3
6	0.010	0.010	3.147	0.0026	1.9
8	0.015	0.015	3.151	0.0040	2.5
12	0.020	0.020	3.156	0.0053	3.8
17	0.025	0.025	3.160	0.0066	5.4
21	0.030	0.030	3.164	0.0079	6.6
27	0.035	0.035	3.168	0.0093	8.5
34	0.040	0.040	3.173	0.0106	10.7
42	0.045	0.045	3.177	0.0119	13.2
49	0.050	0.050	3.181	0.0132	15.4
57	0.055	0.055	3.185	0.0146	17.9
68	0.060	0.060	3.190	0.0159	21.3
77	0.065	0.065	3.194	0.0172	24.1
86	0.070	0.070	3.198	0.0185	26.9
93	0.075	0.075	3.203	0.0199	29.0
97	0.080	0.080	3.207	0.0212	30.2
98	0.085	0.085	3.211	0.0225	30.5
99	0.090	0.090	3.216	0.0238	30.8
98	0.095	0.095	3.220	0.0252	30.4
97	0.100	0.100	3.224	0.0265	30.1
95	0.105	0.105	3.229	0.0278	29.4
92	0.110	0.110	3.233	0.0291	28.5
88	0.115	0.115	3.238	0.0305	27.2
83	0.120	0.120	3.242	0.0318	25.6
79	0.125	0.125	3.246	0.0331	24.3
74	0.130	0.130	3.251	0.0344	22.8
69	0.135	0.135	3.255	0.0358	21.2
66	0.140	0.140	3.260	0.0371	20.2
64	0.145	0.145	3.264	0.0384	19.6

UNCONFINED COMPRESSION TESTING

Sample No. BWM-12 (28 day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-12 (28 day)		
TESTING DATE:	16-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C654

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.1	**%**
BULK UNIT WEIGHT	107.2	lb/ft^3
DRY UNIT WEIGHT	76.0	lb/ft^3
UCS *	30.8	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		

MOISTURE CONTENT (Dry Basis)	***INITIAL***	***FINAL***
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	224.06 ***g***
3. WT WET SOIL + TARE	373.66 ***g***	597.56 ***g***
4. WT DRY SOIL + TARE	279.00 ***g***	503.06 ***g***
5. WT WATER, Ww	94.66 g	94.50 g
6. WT DRY SOIL, Ws	279.00 g	279.00 g
7. MOISTURE CONTENT, W	33.93 %	33.87 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	***DIAMETER***		***HEIGHT***	
ANALYSES	***INITIAL***	***FINAL***	***INITIAL***	***FINAL***
No. 1	***2.97 in.***	***2.97 in.***	***1.81 in.***	***1.82 in.***
No. 2	***2.97 in.***	***2.96 in.***	***1.86 in.***	***1.83 in.***
No. 3	***2.97 in.***	***2.96 in.***	***1.82 in.***	***1.82 in.***
Average	2.97 in.	2.96 in.	1.83 in.	1.82 in.

SPECIMEN CONDITIONS	***INITIAL***	***FINAL***
Specimen WT, Wo	***373.66 g***	***373.50 g***
Area, Ao	6.93 in^2	6.88 in^2
Volume, Vo	12.68 in^3	12.55 in^3
Bulk Unit Weight	112.3 lb/ft^3	113.3 lb/ft^3
Dry Unit Weight	83.8 lb/ft^3	84.7 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
11/26/18	14 : 35	ICD	7.0	5.0	5.7				
11/26/18	15 : 35	ICD	17.0	15.0	15.7	9.6	10.0	3.9	0.39
11/27/18	13 : 57	ICD	27.0	25.0	25.9	22.3	10.0	6.6	0.66
11/27/18	14 : 55	ICD	37.0	35.0	35.8	33.5	10.0	7.6	0.76
11/27/18	15 : 59	ICD	47.0	45.0	45.8	44.3	10.0	8.5	0.85
11/28/18	9 : 47	ICD	57.0	55.0	*	55.6	10.0	9.8	0.98
11/28/18	9 : 47	ICD	67.0	65.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		

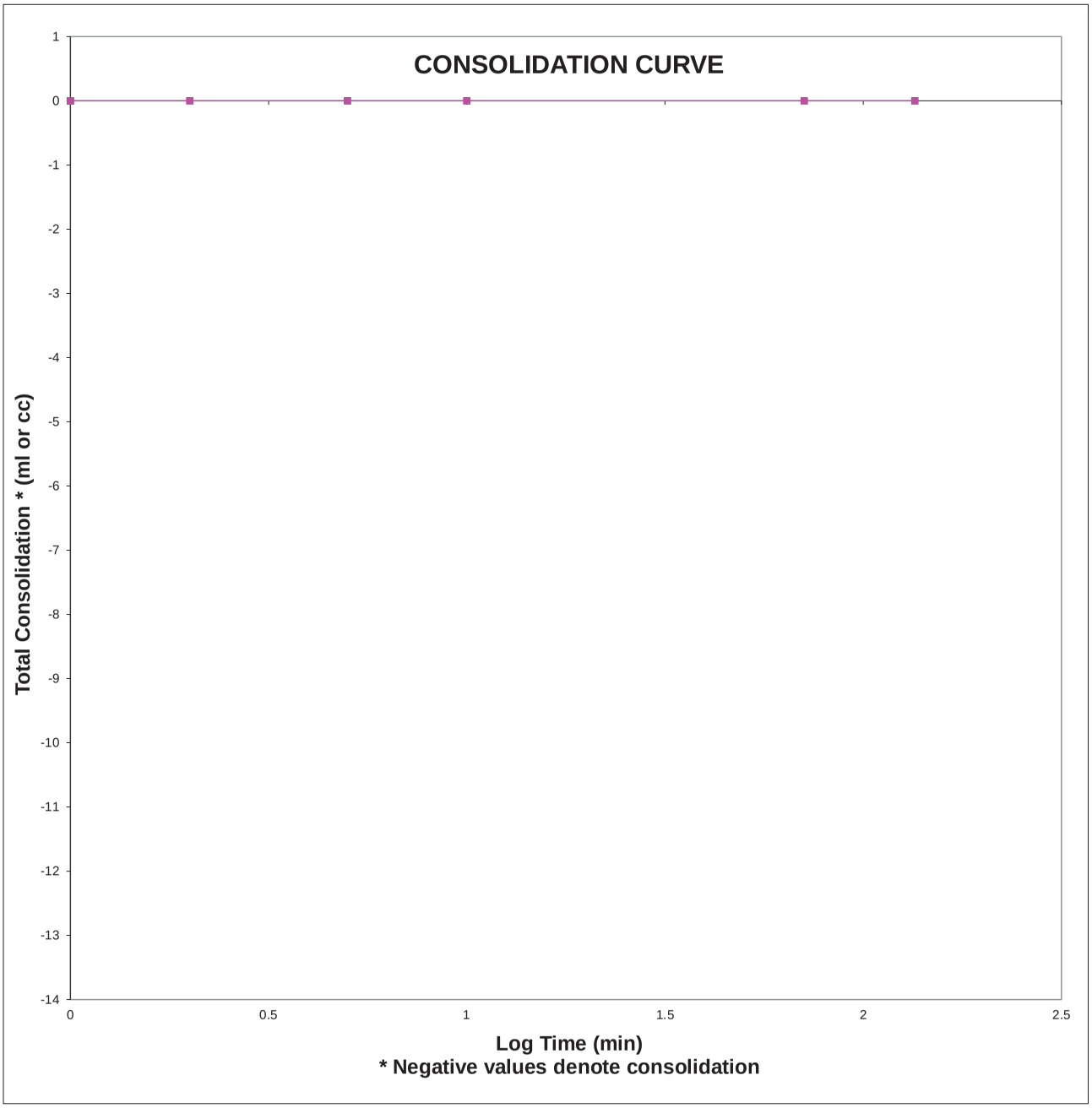
CELL PRESSURE: 69 psi **BACK PRESSURE:** 45 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
12 / 10 / 2018	ICD	10 : 0	0	0	0	25.0	25.0	0.0
12 / 10 / 2018	ICD	10 : 1	1	1	0.00	25.0	25.0	0.0
12 / 10 / 2018	ICD	10 : 2	1	2	0.30	25.0	25.0	0.0
12 / 10 / 2018	ICD	10 : 5	3	5	0.70	25.0	25.0	0.0
12 / 10 / 2018	ICD	10 : 10	5	10	1.00	25.0	25.0	0.0
12 / 10 / 2018	ICD	11 : 11	61	71	1.85	25.0	25.0	0.0
12 / 10 / 2018	ICD	12 : 15	64	135	2.13	25.0	25.0	0.0

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
12 / 10 / 18	ICD	13 : 44	0	0.0	25.0	20.0	69.0	45.0	45.0
12 / 10 / 18	ICD	14 : 4	20	0.5	24.5	20.0	69.0	45.0	45.0
12 / 10 / 18	ICD	14 : 20	16	1.0	24.0	20.0	69.0	45.0	45.0
12 / 10 / 18	ICD	15 : 19	59	2.4	22.6	20.0	69.0	45.0	45.0
12 / 10 / 18	ICD	15 : 40	21	2.9	22.1	20.0	69.0	45.0	45.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				5.381		
20	0.5	0.5	1.00	5.166	1.77E-06	1.78E-06
16	0.5	0.5	1.00	4.951	2.30E-06	2.31E-06
59	1.4	1.4	1.00	4.348	1.90E-06	1.91E-06
21	0.5	0.5	1.00	4.133	2.09E-06	2.10E-06

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	ICD
PROJECT No.:	SH0682	TRACKING CODE:	C654
SAMPLE No.:	BWM-12	EQUIPMENT No.:	1
TEST DATE:	11/26/2018		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	112.3 lb/ft³	113.3 lb/ft³
DRY UNIT WEIGHT	83.8 lb/ft³	84.7 lb/ft³
MOISTURE CONTENT	33.9 %	33.9 %
PERMEABILITY @ 20°C	2.0E-06 cm/sec	

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-15		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C712

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	113.99	g
3. WT WET SOIL + TARE	229.55	g
4. WT DRY SOIL + TARE	196.12	g
5. WT WATER, Ww	33.43	g
6. WT DRY SOIL, Ws	82.13	g
7. MOISTURE CONTENT, W	**40.70**	**%**

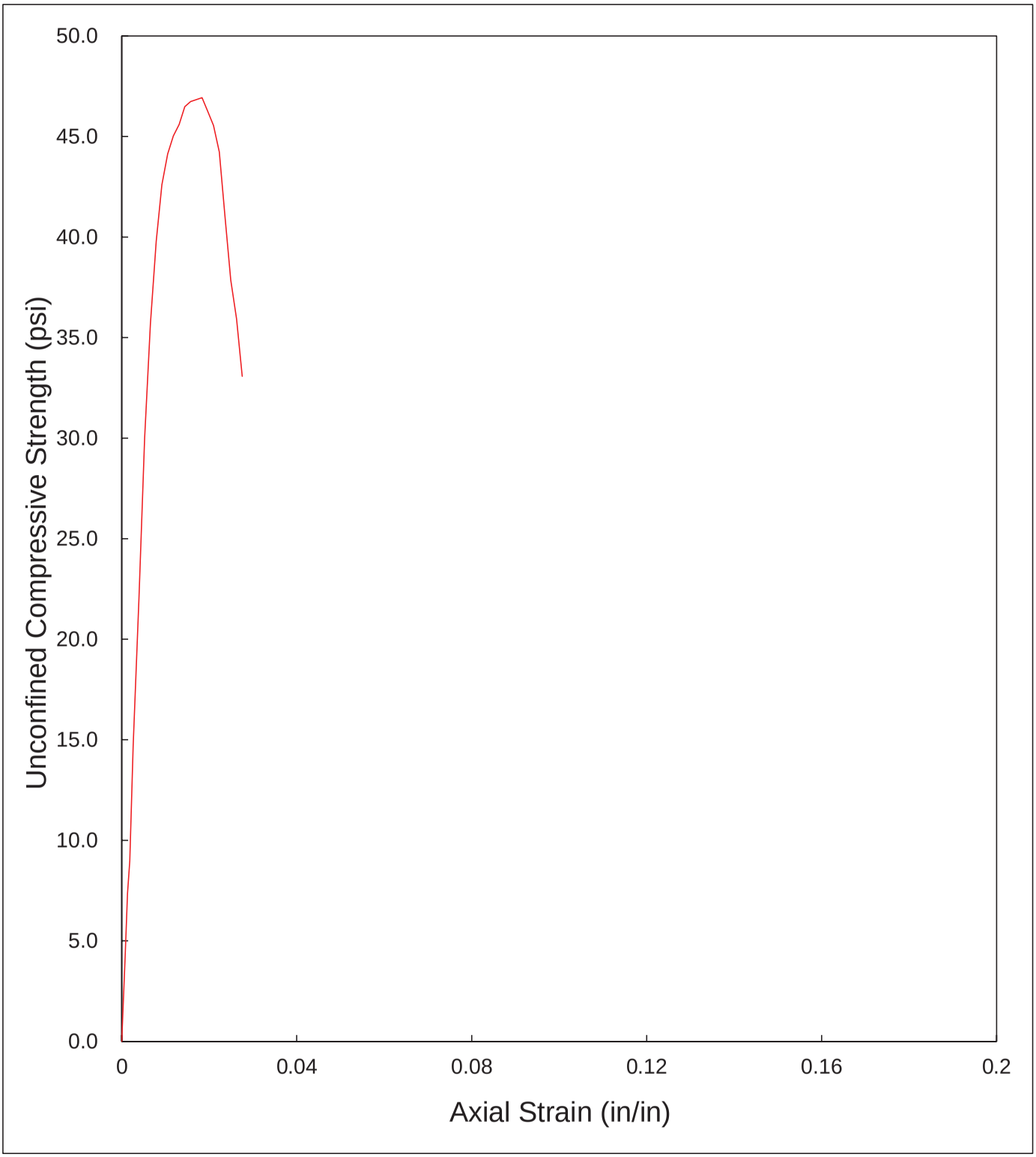
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.81	in.
No. 2	1.99	in.	3.82	in.
No. 3	1.99	in.	3.80	in.
Average	**1.99**	**in.**	**3.81**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***349.60***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	11.88	in^3
Initial Bulk Unit Weight,	112.1	lb/ft^3
Initial Dry Unit Weight	79.7	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	46.9	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.117	0.0000	0.0
13	0.003	0.003	3.119	0.0008	4.2
23	0.005	0.005	3.121	0.0013	7.4
28	0.007	0.007	3.122	0.0018	9.0
46	0.010	0.010	3.125	0.0026	14.7
69	0.015	0.015	3.129	0.0039	22.1
94	0.020	0.020	3.133	0.0052	30.0
112	0.025	0.025	3.137	0.0066	35.7
125	0.030	0.030	3.141	0.0079	39.8
134	0.035	0.035	3.145	0.0092	42.6
139	0.040	0.040	3.150	0.0105	44.1
142	0.045	0.045	3.154	0.0118	45.0
144	0.050	0.050	3.158	0.0131	45.6
147	0.055	0.055	3.162	0.0144	46.5
148	0.060	0.060	3.166	0.0157	46.7
149	0.070	0.070	3.175	0.0184	46.9
147	0.075	0.075	3.179	0.0197	46.2
145	0.080	0.080	3.183	0.0210	45.5
141	0.085	0.085	3.188	0.0223	44.2
131	0.090	0.090	3.192	0.0236	41.0
121	0.095	0.095	3.196	0.0249	37.9
115	0.100	0.100	3.200	0.0262	35.9
106	0.105	0.105	3.205	0.0275	33.1

UNCONFINED COMPRESSION TESTING

Sample No. BWM-15



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-15		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C712

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	40.7	**%**
BULK UNIT WEIGHT	112.1	lb/ft^3
DRY UNIT WEIGHT	79.7	lb/ft^3
UCS *	46.9	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	12/18/18
Checked By	

Client Pr. #	SH0682	Lab. PR. #	18131-04-1
Pr. Name	ACW	S. Type	Mold
Sample ID	29659/BWM-15	Depth/Elev.	-
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.185	in	5.55	cm
Diameter	2.964	in	7.53	cm
Area	6.90	in^2	44.52	cm^2
Volume	247.06	cm^3	0.0087	ft^3
Mass	453.60	g	1.00	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	84.0	pcf		

Moisture Content

Mass of wet sample & tare	453.60	g
Mass of dry sample & tare	332.70	g
Mass of tare	0.00	g
% Moisture	36.3	

Test Data

Speed	10	
Board Number	7	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	90.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	10.0	psi
Max Head	35.87	cm
Min Head	35.17	cm
Maximum Gradient	6.46	
Minimum Gradient	6.33	

Final Data (After Test)

Average Height of Sample		2.187	in	5.55	cm
Average Diameter of Sample		2.974	in	7.55	cm
Area	6.95 in^2	44.82	cm^2		
Volume	248.96 cm^3	0.0088	ft^3		
Mass	456.00 g	1.01	lb		

Dry Density	83.4	pcf
Vol. of Voids	125.73	cm^3
Vol. of Solids	123.22	cm^3
Void Ratio	1.02	
Saturation	98.1	%

Moisture Content

Mass of wet sample & tare	520.30	g
Mass of dry sample & tare	397.00	g
Mass of tare	64.30	g
% Moisture	37.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
12/18/18	11	30	-	0.51	35.87	6.46	18.5	-	-	-	
12/18/18	11	40	600	0.50	35.17	6.33	18.5	7.82E-07	1.038	8.11E-07	
12/18/18	11	50	600	0.51	35.87	6.46	18.5	7.82E-07	1.038	8.11E-07	
12/18/18	12	0	600	0.50	35.17	6.33	18.5	7.82E-07	1.038	8.11E-07	*
12/18/18	12	10	600	0.51	35.87	6.46	18.5	7.82E-07	1.038	8.11E-07	*
12/18/18	12	20	600	0.50	35.17	6.33	18.5	7.82E-07	1.038	8.11E-07	*
12/18/18	12	30	600	0.51	35.87	6.46	18.5	7.82E-07	1.038	8.11E-07	*

Reported Average Hydraulic Conductivity* 8.1E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-15 DUP		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C713

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	199.88	g
3. WT WET SOIL + TARE	358.92	g
4. WT DRY SOIL + TARE	315.59	g
5. WT WATER, Ww	43.33	g
6. WT DRY SOIL, Ws	115.71	g
7. MOISTURE CONTENT, W	**37.45**	**%**

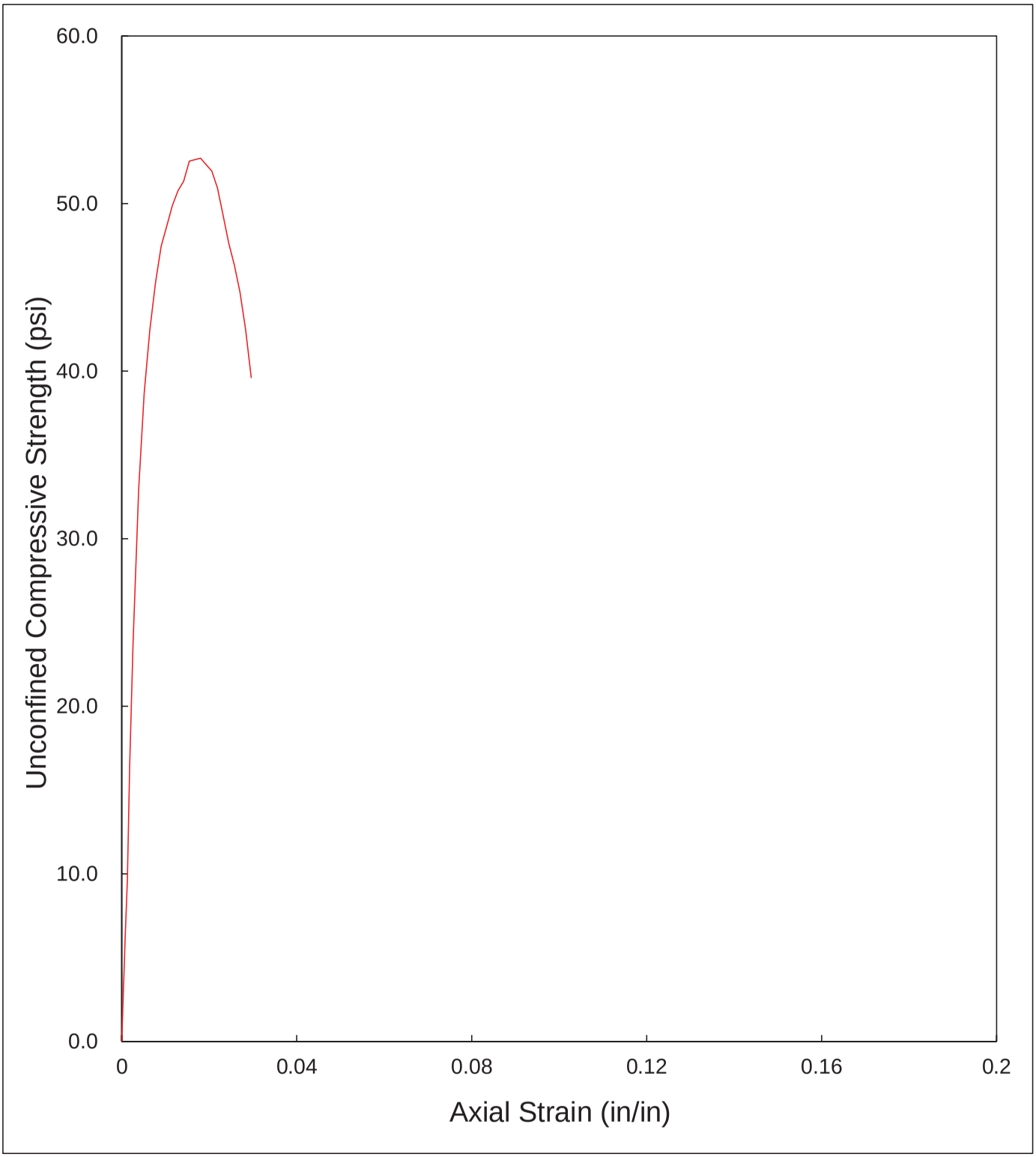
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.87	in.
No. 2	1.99	in.	3.90	in.
No. 3	1.99	in.	3.88	in.
Average	**1.99**	**in.**	**3.88**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***358.63***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	12.09	in^3
Initial Bulk Unit Weight,	113.0	lb/ft^3
Initial Dry Unit Weight	82.2	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	52.7	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.111	0.0000	0.0
19	0.003	0.003	3.114	0.0008	6.1
30	0.005	0.005	3.115	0.0013	9.6
51	0.007	0.007	3.117	0.0018	16.4
74	0.010	0.010	3.119	0.0026	23.7
103	0.015	0.015	3.123	0.0039	33.0
121	0.020	0.020	3.127	0.0051	38.7
133	0.025	0.025	3.131	0.0064	42.5
142	0.030	0.030	3.136	0.0077	45.3
149	0.035	0.035	3.140	0.0090	47.5
153	0.040	0.040	3.144	0.0103	48.7
157	0.045	0.045	3.148	0.0116	49.9
160	0.050	0.050	3.152	0.0129	50.8
162	0.055	0.055	3.156	0.0142	51.3
166	0.060	0.060	3.160	0.0154	52.5
167	0.070	0.070	3.168	0.0180	52.7
166	0.075	0.075	3.173	0.0193	52.3
165	0.080	0.080	3.177	0.0206	51.9
162	0.085	0.085	3.181	0.0219	50.9
157	0.090	0.090	3.185	0.0232	49.3
152	0.095	0.095	3.189	0.0245	47.7
148	0.100	0.100	3.194	0.0257	46.3
143	0.105	0.105	3.198	0.0270	44.7
136	0.110	0.110	3.202	0.0283	42.5
127	0.115	0.115	3.206	0.0296	39.6

UNCONFINED COMPRESSION TESTING

Sample No. BWM-15 DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-15 DUP		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C713

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	37.4	**%**
BULK UNIT WEIGHT	113.0	lb/ft^3
DRY UNIT WEIGHT	82.2	lb/ft^3
UCS *	52.7	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

TIMELY ENGINEERING SOIL TESTS, LLC
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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	12/18/18
Checked By	

Client Pr. #	SH0682	Lab. PR. #	18131-04-1
Pr. Name	ACW	S. Type	Mold
Sample ID	29660/BWM-15 DUP	Depth/Elev.	-
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.145	in	5.45	cm
Diameter	2.968	in	7.54	cm
Area	6.92	in^2	44.64	cm^2
Volume	243.19	cm^3	0.0086	ft^3
Mass	441.30	g	0.97	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	82.3	pcf		

Moisture Content

Mass of wet sample & tare	441.30	g
Mass of dry sample & tare	320.60	g
Mass of tare	0.00	g
% Moisture	37.6	

Test Data

Speed	10	
Board Number	8	
Cell Number	11	
Flow Pump Number	2B	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	90.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	10.0	psi
Max Head	33.76	cm
Min Head	33.06	cm
Maximum Gradient	6.18	
Minimum Gradient	6.05	

Final Data (After Test)

Average Height of Sample			2.152	in	5.47 cm
Average Diameter of Sample			2.968	in	7.54 cm
Area	6.92	in^2	44.64	cm^2	
Volume	243.98	cm^3	0.0086	ft^3	
Mass	443.40	g	0.98	lb	

Dry Density	82.3	pcf
Vol. of Voids	124.87	cm^3
Vol. of Solids	119.12	cm^3
Void Ratio	1.05	
Saturation	97.5	%

Moisture Content

Mass of wet sample & tare	516.10	g
Mass of dry sample & tare	394.70	g
Mass of tare	74.10	g
% Moisture	37.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(^oC)	@ T_x	R_T	@ 20 ^oC	
12/18/18	11	30	-	0.48	33.76	6.18	18.5	-	-	-	
12/18/18	11	40	600	0.47	33.06	6.05	18.5	8.21E-07	1.038	8.52E-07	
12/18/18	11	50	600	0.48	33.76	6.18	18.5	8.21E-07	1.038	8.52E-07	
12/18/18	12	0	600	0.47	33.06	6.05	18.5	8.21E-07	1.038	8.52E-07	*
12/18/18	12	10	600	0.48	33.76	6.18	18.5	8.21E-07	1.038	8.52E-07	*
12/18/18	12	20	600	0.47	33.06	6.05	18.5	8.21E-07	1.038	8.52E-07	*
12/18/18	12	30	600	0.48	33.76	6.18	18.5	8.21E-07	1.038	8.52E-07	*

Reported Average Hydraulic Conductivity* 8.5E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-16		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C714

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	171.54	g
3. WT WET SOIL + TARE	303.72	g
4. WT DRY SOIL + TARE	266.77	g
5. WT WATER, Ww	36.95	g
6. WT DRY SOIL, Ws	95.23	g
7. MOISTURE CONTENT, W	**38.80**	**%**

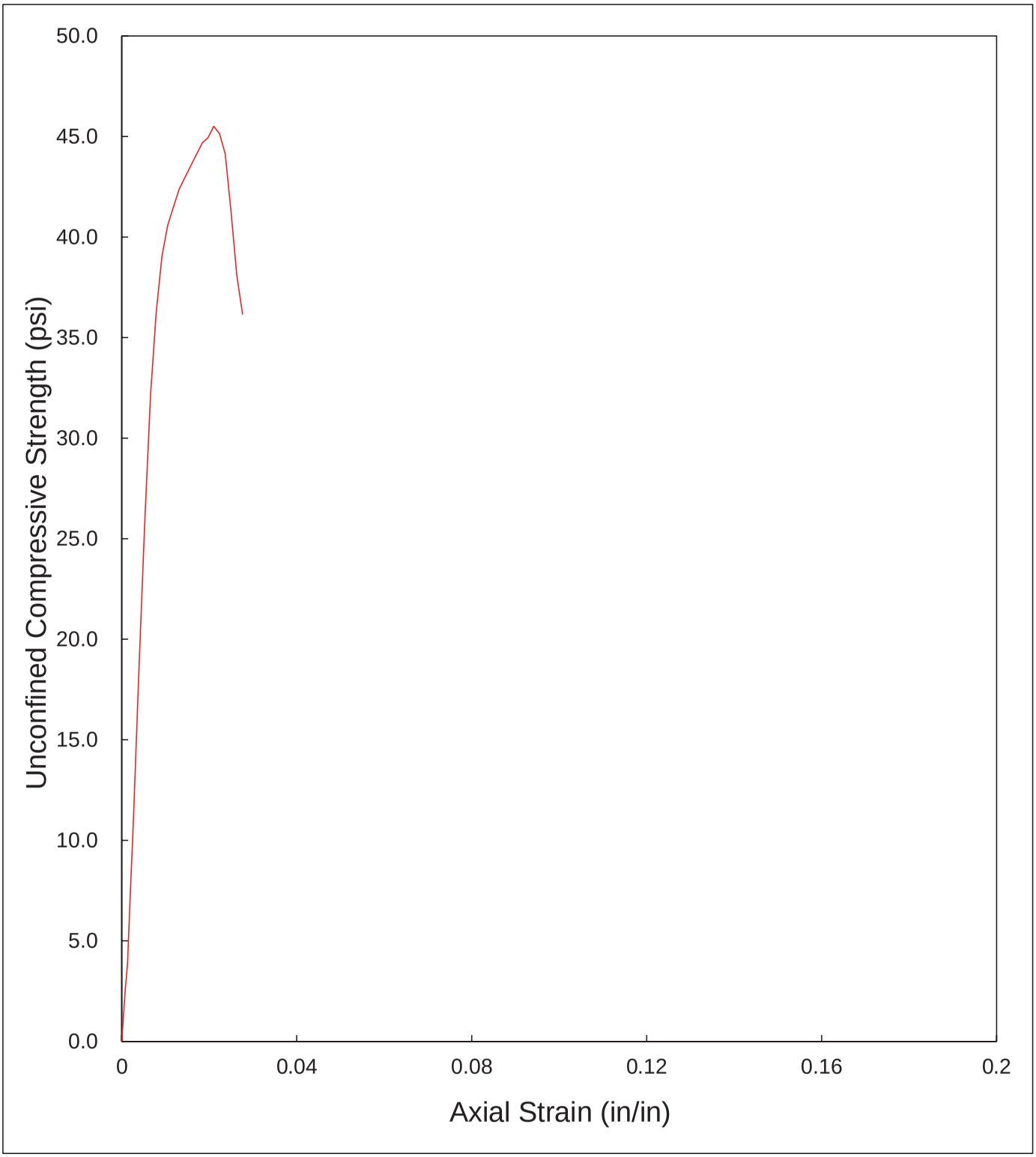
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.81	in.
No. 2	2.00	in.	3.80	in.
No. 3	1.98	in.	3.80	in.
Average	**1.99**	**in.**	**3.80**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***356.71***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	11.86	in^3
Initial Bulk Unit Weight,	114.6	lb/ft^3
Initial Dry Unit Weight	82.6	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	45.5	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.119	0.0000	0.0
8	0.003	0.003	3.122	0.0008	2.6
12	0.005	0.005	3.123	0.0013	3.8
21	0.007	0.007	3.125	0.0018	6.7
34	0.010	0.010	3.127	0.0026	10.9
58	0.015	0.015	3.131	0.0039	18.5
81	0.020	0.020	3.136	0.0053	25.8
101	0.025	0.025	3.140	0.0066	32.2
114	0.030	0.030	3.144	0.0079	36.3
123	0.035	0.035	3.148	0.0092	39.1
128	0.040	0.040	3.152	0.0105	40.6
131	0.045	0.045	3.156	0.0118	41.5
134	0.050	0.050	3.161	0.0132	42.4
136	0.055	0.055	3.165	0.0145	43.0
138	0.060	0.060	3.169	0.0158	43.5
140	0.065	0.065	3.173	0.0171	44.1
142	0.070	0.070	3.178	0.0184	44.7
143	0.075	0.075	3.182	0.0197	44.9
145	0.080	0.080	3.186	0.0210	45.5
144	0.085	0.085	3.190	0.0224	45.1
141	0.090	0.090	3.195	0.0237	44.1
132	0.095	0.095	3.199	0.0250	41.3
122	0.100	0.100	3.203	0.0263	38.1
116	0.105	0.105	3.208	0.0276	36.2

UNCONFINED COMPRESSION TESTING

Sample No. BWM-16



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-16		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C714

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	38.8	**%**
BULK UNIT WEIGHT	114.6	lb/ft^3
DRY UNIT WEIGHT	82.6	lb/ft^3
UCS *	45.5	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	12/18/18
Checked By	LB

Client Pr. #	SH0682	Lab. PR. #	18131-04-1
Pr. Name	ACW	S. Type	Mold
Sample ID	29661/BWM-16	Depth/Elev.	-
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	1.853	in	4.71	cm
Diameter	2.974	in	7.55	cm
Area	6.95	in^2	44.82	cm^2
Volume	210.93	cm^3	0.0074	ft^3
Mass	385.80	g	0.85	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	84.6	pcf		

Moisture Content

Mass of wet sample & tare	385.80	g
Mass of dry sample & tare	286.10	g
Mass of tare	0.00	g
% Moisture	34.8	

Test Data

Speed	10	
Board Number	18	
Cell Number	14	
Flow Pump Number	2B	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	90.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	10.0	psi
Max Head	14.07	cm
Min Head	13.36	cm
Maximum Gradient	2.99	
Minimum Gradient	2.84	

Final Data (After Test)

Average Height of Sample			1.850	in	4.70 cm
Average Diameter of Sample			2.968	in	7.54 cm
Area	6.92	in^2	44.64	cm^2	
Volume	209.74	cm^3	0.0074	ft^3	
Mass	387.00	g	0.85	lb	

Dry Density	85.1	pcf
Vol. of Voids	103.81	cm^3
Vol. of Solids	105.94	cm^3
Void Ratio	0.98	
Saturation	97.3	%

Moisture Content

Mass of wet sample & tare	468.60	g
Mass of dry sample & tare	367.60	g
Mass of tare	81.50	g
% Moisture	35.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
12/18/18	10	0	-	0.20	14.07	2.99	18.5	-	-	-	
12/18/18	10	10	600	0.19	13.36	2.84	18.5	1.72E-06	1.038	1.78E-06	
12/18/18	10	20	600	0.20	14.07	2.99	18.5	1.72E-06	1.038	1.78E-06	
12/18/18	10	30	600	0.19	13.36	2.84	18.5	1.72E-06	1.038	1.78E-06	*
12/18/18	10	40	600	0.20	14.07	2.99	18.5	1.72E-06	1.038	1.78E-06	*
12/18/18	10	50	600	0.19	13.36	2.84	18.5	1.72E-06	1.038	1.78E-06	*
12/18/18	11	0	600	0.20	14.07	2.99	18.5	1.72E-06	1.038	1.78E-06	*

Reported Average Hydraulic Conductivity* 1.8E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-16 DUP		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C715

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	167.47	g
3. WT WET SOIL + TARE	288.85	g
4. WT DRY SOIL + TARE	256.56	g
5. WT WATER, Ww	32.29	g
6. WT DRY SOIL, Ws	89.09	g
7. MOISTURE CONTENT, W	**36.24**	**%**

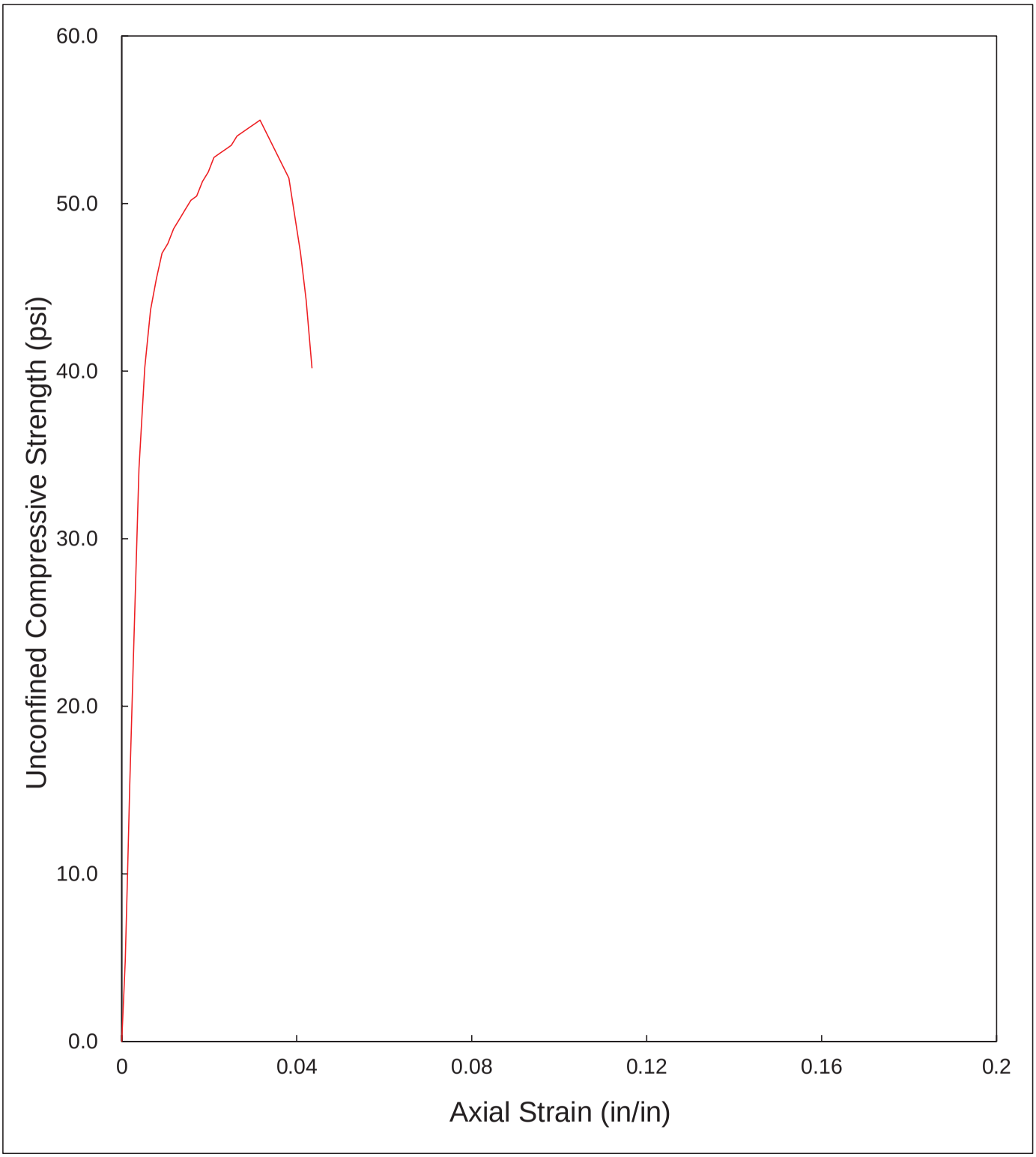
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.80	in.
No. 2	2.00	in.	3.80	in.
No. 3	1.98	in.	3.79	in.
Average	**1.99**	**in.**	**3.79**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***354.71***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	11.83	in^3
Initial Bulk Unit Weight,	114.2	lb/ft^3
Initial Dry Unit Weight	83.8	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	55.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.118	0.0000	0.0
15	0.003	0.003	3.120	0.0008	4.8
31	0.005	0.005	3.122	0.0013	9.9
48	0.007	0.007	3.123	0.0018	15.4
71	0.010	0.010	3.126	0.0026	22.7
107	0.015	0.015	3.130	0.0040	34.2
126	0.020	0.020	3.134	0.0053	40.2
137	0.025	0.025	3.138	0.0066	43.7
143	0.030	0.030	3.142	0.0079	45.5
148	0.035	0.035	3.147	0.0092	47.0
150	0.040	0.040	3.151	0.0105	47.6
153	0.045	0.045	3.155	0.0119	48.5
155	0.050	0.050	3.159	0.0132	49.1
157	0.055	0.055	3.163	0.0145	49.6
159	0.060	0.060	3.168	0.0158	50.2
160	0.065	0.065	3.172	0.0171	50.4
163	0.070	0.070	3.176	0.0184	51.3
165	0.075	0.075	3.180	0.0198	51.9
168	0.080	0.080	3.185	0.0211	52.8
169	0.085	0.085	3.189	0.0224	53.0
170	0.090	0.090	3.193	0.0237	53.2
171	0.095	0.095	3.198	0.0250	53.5
173	0.100	0.100	3.202	0.0264	54.0
175	0.110	0.110	3.211	0.0290	54.5
176	0.115	0.115	3.215	0.0303	54.7
177	0.120	0.120	3.219	0.0316	55.0
167	0.145	0.145	3.241	0.0382	51.5
160	0.150	0.150	3.246	0.0395	49.3
153	0.155	0.155	3.250	0.0409	47.1
144	0.160	0.160	3.255	0.0422	44.2
131	0.165	0.165	3.259	0.0435	40.2

UNCONFINED COMPRESSION TESTING

Sample No. BWM-16 DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-16 DUP		
TESTING DATE:	29-Nov-18	LOADING RATE:	0.0400 in./min
TESTED BY:	ICD	TRACKING CODE:	C715

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	36.2	**%**
BULK UNIT WEIGHT	114.2	lb/ft^3
DRY UNIT WEIGHT	83.8	lb/ft^3
UCS *	55.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	12/18/18
Checked By	

Client Pr. #	SH0682	Lab. PR. #	18131-04-1
Pr. Name	ACW	S. Type	Mold
Sample ID	29662/BWM-16 DUP	Depth/Elev.	-
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.121	in	5.39	cm
Diameter	2.971	in	7.55	cm
Area	6.93	in^2	44.73	cm^2
Volume	240.96	cm^3	0.0085	ft^3
Mass	445.40	g	0.98	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	85.8	pcf		

Moisture Content

Mass of wet sample & tare	445.40	g
Mass of dry sample & tare	331.20	g
Mass of tare	0.00	g
% Moisture	34.5	

Test Data

Speed	10	
Board Number	19	
Cell Number	9	
Flow Pump Number	2A	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	90.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	10.0	psi
Max Head	22.51	cm
Min Head	21.81	cm
Maximum Gradient	4.17	
Minimum Gradient	4.04	

Final Data (After Test)

Average Height of Sample			2.127	in	5.40 cm
Average Diameter of Sample			2.963	in	7.53 cm
Area	6.90	in^2	44.49	cm^2	
Volume	240.34	cm^3	0.0085	ft^3	
Mass	448.20	g	0.99	lb	

Dry Density	86.3	pcf
Vol. of Voids	117.20	cm^3
Vol. of Solids	123.13	cm^3
Void Ratio	0.95	
Saturation	98.8	%

Moisture Content

Mass of wet sample & tare	523.50	g
Mass of dry sample & tare	408.20	g
Mass of tare	77.00	g
% Moisture	34.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(^oC)	@ T_x	R_T	@ 20 ^oC	
12/18/18	10	0	-	0.32	22.51	4.17	18.5	-	-	-	
12/18/18	10	10	600	0.31	21.81	4.04	18.5	1.23E-06	1.038	1.27E-06	
12/18/18	10	20	600	0.32	22.51	4.17	18.5	1.23E-06	1.038	1.27E-06	
12/18/18	10	30	600	0.31	21.81	4.04	18.5	1.23E-06	1.038	1.27E-06	*
12/18/18	10	40	600	0.32	22.51	4.17	18.5	1.23E-06	1.038	1.27E-06	*
12/18/18	10	50	600	0.31	21.81	4.04	18.5	1.23E-06	1.038	1.27E-06	*
12/18/18	11	0	600	0.32	22.51	4.17	18.5	1.23E-06	1.038	1.27E-06	*

Reported Average Hydraulic Conductivity* 1.3E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

Appendix G:
Tier 2 Compatibility and Confirmation Testing Mixture Development Sheets

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-17
MIXING DATE:	22-Feb-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL		2,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	220.0 g
Wyoming Bentonite #807	3.00 %	66.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	858.0 g

OBSERVATIONS / NOTES

66 g of Bentonite was hydrated with 198 g of water on 1/22/19. On 1/23/19, 660 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to
the untreated soil.

Pocket Penetrometer @ 1, 3 and 5 days
UCS @ 28 day with duplicate
Hydraulic Conductivity @ 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	21	
PENETROMETER (tons/ft^2)	1.00	1.5	3.0	4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-18
MIXING DATE:	22-Feb-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL		2,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	10.00 %	220.0 g
Wyoming Bentonite #807	3.50 %	77.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	891.0 g

OBSERVATIONS / NOTES

77 g of Bentonite was hydrated with 231 g of water on 1/22/19. On 1/23/19, 660 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to
the untreated soil.

Pocket Penetrometer @ 1, 3 and 5 days
UCS @ 28 day with duplicate
Hydraulic Conductivity @ 28 day

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	5	21	
PENETROMETER (tons/ft^2)	1.25	1.75	3.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-23
MIXING DATE:	22-Feb-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		6,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	930.0 g
High Calcium Quicklime #1112	4.00 %	248.0 g
Wyoming Bentonite #807	3.50 %	217.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	2092.5 g

OBSERVATIONS / NOTES

217 g of Bentonite was hydrated with 651 g of water on 2/21/19. On 2/22/19, 248 g of High Calcium Quicklime was hydrated with 496.01 g of water 2 hours before mixing. Temperature of the hydrated lime: 98°C. 945.49 g of was added to the Portland cement, Bentonite and High Calcium Quicklime to create slurry. The Portland cement, Bentonite and High Calcium Quicklime slurry was added to the untreated soil.

Chemical Compatability	Thermal Compatability
PP @ 3, 5 and 7 day	UCS & HC @ 28 day (ambient)
UCS @ 28 day with duplicate test	UCS & HC @ 28 day (80C)
Hydraulic Conductivity @28 day with duplicate test	UCS & HC @ 28 day (100C)
	UCS & HC @ 28 day (125C)

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		>4.5	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-24
MIXING DATE:	22-Feb-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		NAPL
WEIGHT OF UNTREATED MATERIAL		6,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	930.0 g
Lime Kiln Dust #1054	8.00 %	496.0 g
Wyoming Bentonite #807	3.50 %	217.0 g
	%	0.0 g
	%	0.0 g
Water Addition	150 %	2464.5 g

OBSERVATIONS / NOTES

217 g of Bentonite was hydrated with 651 g of water on 2/21/19. On 2/22/19, 1,813.5 g of water was added to Portland cement, Bentonite and Lime Kiln Dust to create slurry. The Portland Cement, Bentonite and Lime Kiln Dust
and water slurry was added to the untreated soil.

Chemical Compatability	Thermal Compatability
PP @ 3, 5 and 7 day	UCS & HC @ 28 day (ambient)
UCS @ 28 day with duplicate test	UCS & HC @ 28 day (80C)
Hydraulic Conductivity @28 day with duplicate test	UCS & HC @ 28 day (100C)
	UCS & HC @ 28 day (125C)

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

PENETROMETER ANALYSES

CURE TIME (Days)		3	5	7	
PENETROMETER (tons/ft^2)		3.25	>4.5	>4.5	

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-29
MIXING DATE:	7-May-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL		2,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	12.50 %	275.0 g
Wyoming Bentonite #807	3.50 %	77.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	1056.0 g

OBSERVATIONS / NOTES

77 g of Bentonite was hydrated with 231 g of water on 5/6/19. On 5/7//19, 825 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to
the untreated soil.

UCS @ 7 day
UCS @ 28 day with duplicate
Hydraulic Conductivity @ 28 day with duplicate

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

MIX DEVELOPMENT DATA SHEET

PROJECT:	ACW	MIX No.	
PROJECT No.:	SH0682		BWM-30
MIXING DATE:	7-May-19	MIXED BY:	TNB

UNTREATED MATERIAL TYPE		75% Coarse Sand / 25% Fine Sand
WEIGHT OF UNTREATED MATERIAL		2,200 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement #842	15.00 %	330.0 g
Wyoming Bentonite #807	3.50 %	77.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	300 %	1221.0 g

OBSERVATIONS / NOTES

77 g of Bentonite was hydrated with 231 g of water on 5/6/19. On 5/7/19, 990 g of water was added to Portland cement and Bentonite to create slurry. The Portland Cement, Bentonite and water slurry was added to the untreated soil.

UCS @ 7 day
UCS @ 28 day with duplicate
Hydraulic Conductivity @ 28 day with duplicate

MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
MAXIMUM PID (ppm)					
Notes / Observations:					

Appendix H:
Tier 2 Compatibility and Confirmation Testing Physical Properties Data Sheets

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-017 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D098

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	171.40	g
3. WT WET SOIL + TARE	313.13	g
4. WT DRY SOIL + TARE	264.78	g
5. WT WATER, Ww	48.35	g
6. WT DRY SOIL, Ws	93.38	g
7. MOISTURE CONTENT, W	**51.78**	**%**

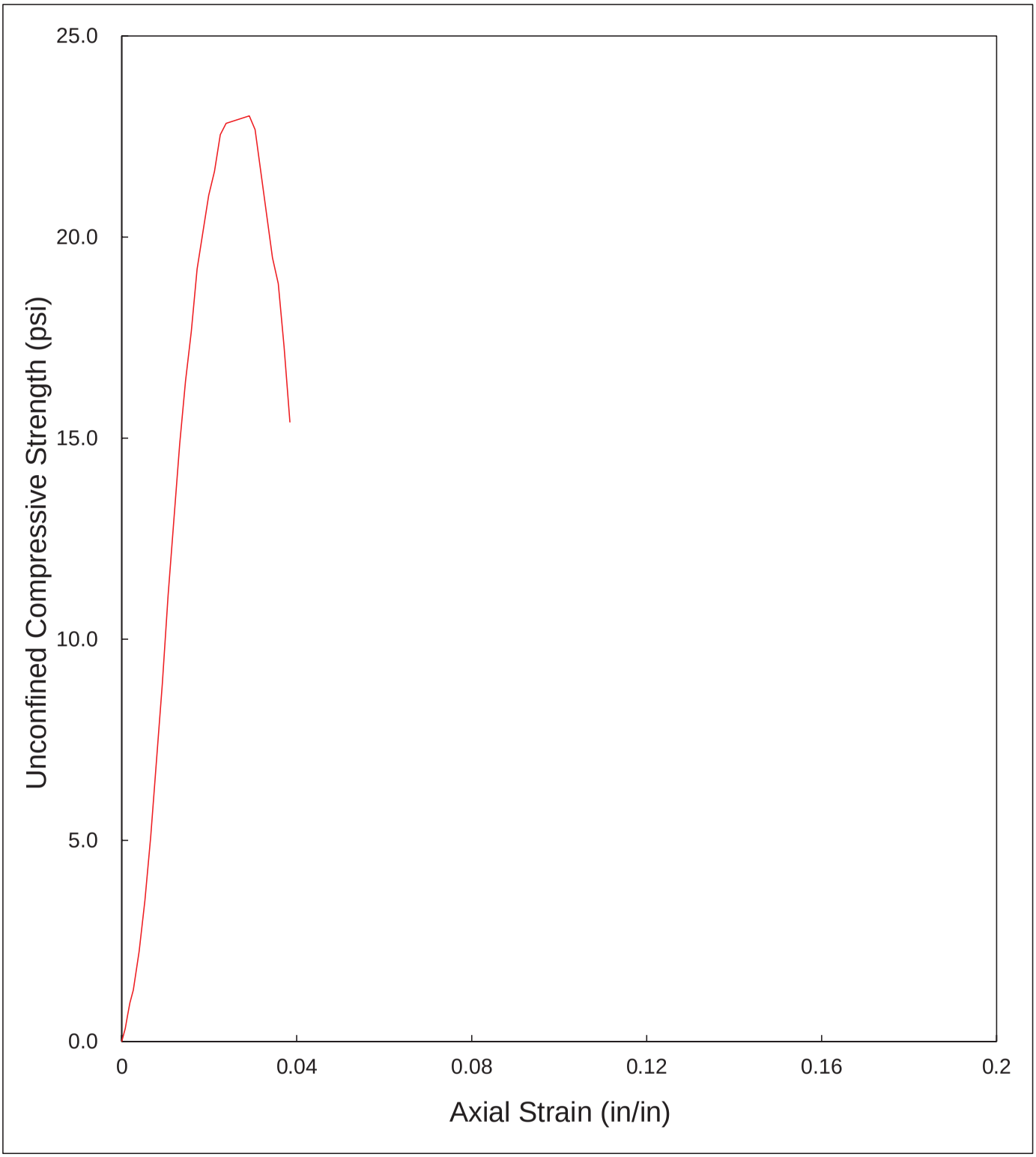
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.77	in.
No. 2	2.00	in.	3.74	in.
No. 3	1.98	in.	3.81	in.
Average	**1.99**	**in.**	**3.77**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***332.71***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	11.77	in^3
Initial Bulk Unit Weight,	107.6	lb/ft^3
Initial Dry Unit Weight	70.9	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	23.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.122	0.0000	0.0
1	0.003	0.003	3.124	0.0008	0.3
2	0.005	0.005	3.126	0.0013	0.6
3	0.007	0.007	3.128	0.0019	1.0
4	0.010	0.010	3.130	0.0027	1.3
7	0.015	0.015	3.134	0.0040	2.2
11	0.020	0.020	3.138	0.0053	3.5
16	0.025	0.025	3.143	0.0066	5.1
22	0.030	0.030	3.147	0.0080	7.0
28	0.035	0.035	3.151	0.0093	8.9
35	0.040	0.040	3.155	0.0106	11.1
41	0.045	0.045	3.159	0.0119	13.0
47	0.050	0.050	3.164	0.0133	14.9
52	0.055	0.055	3.168	0.0146	16.4
56	0.060	0.060	3.172	0.0159	17.7
61	0.065	0.065	3.176	0.0172	19.2
64	0.070	0.070	3.181	0.0186	20.1
67	0.075	0.075	3.185	0.0199	21.0
69	0.080	0.080	3.189	0.0212	21.6
72	0.085	0.085	3.194	0.0225	22.5
73	0.090	0.090	3.198	0.0239	22.8
74	0.110	0.110	3.216	0.0292	23.0
73	0.115	0.115	3.220	0.0305	22.7
63	0.130	0.130	3.233	0.0345	19.5
61	0.135	0.135	3.238	0.0358	18.8
56	0.140	0.140	3.242	0.0371	17.3
50	0.145	0.145	3.247	0.0384	15.4

UNCONFINED COMPRESSION TESTING

Sample No. 0682-017 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-017 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D098

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	51.8	**%**
BULK UNIT WEIGHT	107.6	lb/ft^3
DRY UNIT WEIGHT	70.9	lb/ft^3
UCS *	23.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	3/28/2019	Tested By:	jm
End Date:	3/30/2019	Checked By:	mcm
Boring	---	Test #:	K1
Sample #:	BWM-17		
Depth:	---		
Visual Description:	Moist, pale brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.10	2.10
Diameter, in	2.96	2.96
Area, in^2	6.88	6.88
Volume, in^3	14.5	14.5
Mass, g	406	406
Bulk Density, pcf	107	107
Moisture Content, %	48.3	48.2
Dry Density, pcf	72.1	72.1
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
3/29	1	104	80	76.9	76.1	0.8	120	14.4	8.5E-07	21	0.976	8.3E-07
3/29	2	104	80	76.1	74.5	1.6	240	14.3	8.7E-07	21	0.976	8.4E-07
3/29	3	104	80	74.5	72.4	2.1	300	14.0	9.3E-07	21	0.976	9.1E-07
3/29	4	104	80	72.4	71.2	1.2	180	13.6	9.1E-07	21	0.976	8.9E-07

PERMEABILITY AT 20° C: 8.7 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-017 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D099

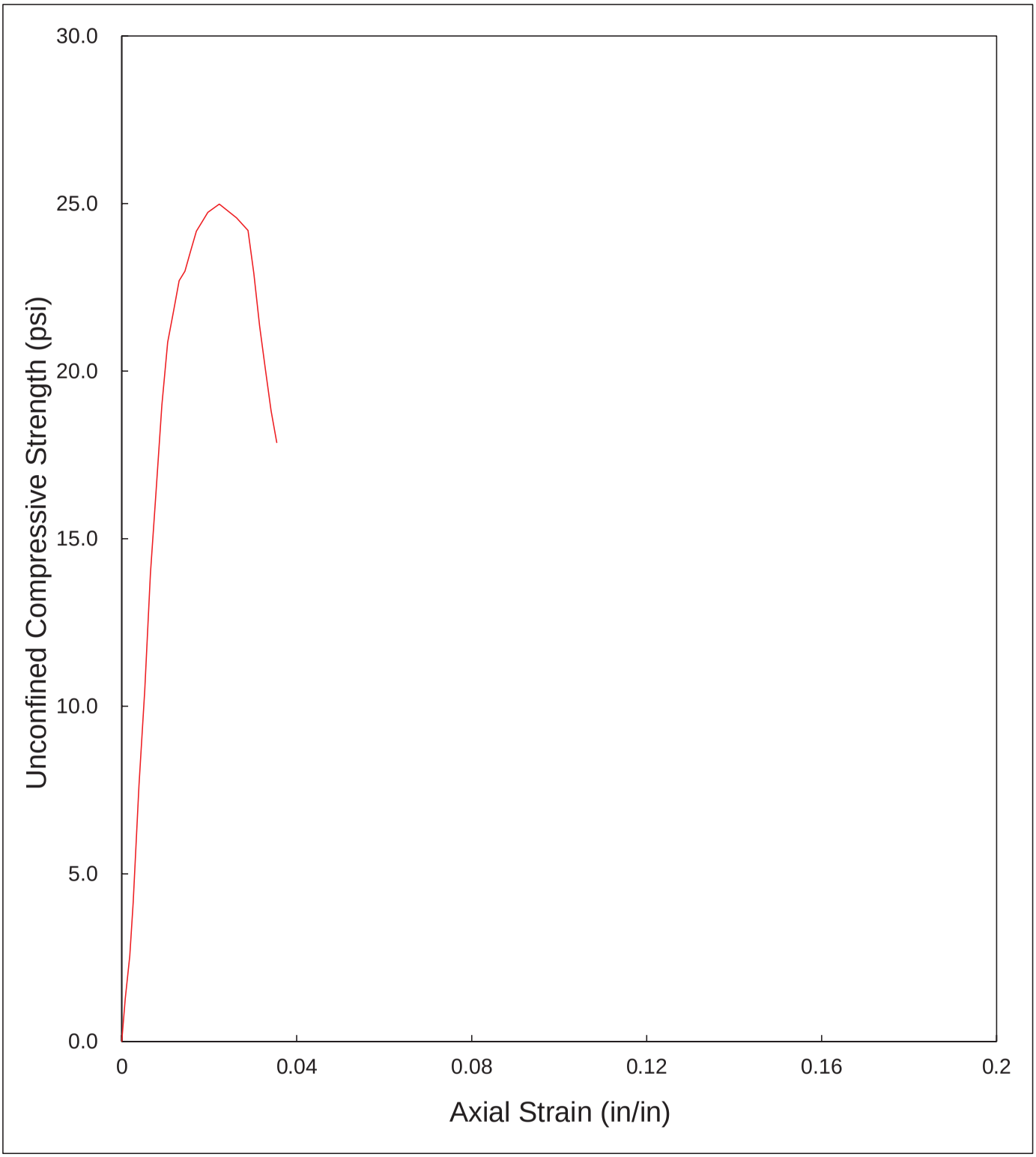
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	113.24	g
3. WT WET SOIL + TARE	277.11	g
4. WT DRY SOIL + TARE	214.83	g
5. WT WATER, Ww	62.28	g
6. WT DRY SOIL, Ws	101.59	g
7. MOISTURE CONTENT, W	**61.31**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.79	in.
No. 2	2.00	in.	3.75	in.
No. 3	2.00	in.	3.88	in.
Average	**2.00**	**in.**	**3.81**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***363.62***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	11.93	in^3
Initial Bulk Unit Weight,	116.2	lb/ft^3
Initial Dry Unit Weight	72.0	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	25.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.131	0.0000	0.0
4	0.003	0.003	3.133	0.0008	1.3
6	0.005	0.005	3.135	0.0013	1.9
8	0.007	0.007	3.136	0.0018	2.6
13	0.010	0.010	3.139	0.0026	4.1
24	0.015	0.015	3.143	0.0039	7.6
33	0.020	0.020	3.147	0.0053	10.5
44	0.025	0.025	3.151	0.0066	14.0
52	0.030	0.030	3.155	0.0079	16.5
60	0.035	0.035	3.160	0.0092	19.0
66	0.040	0.040	3.164	0.0105	20.9
69	0.045	0.045	3.168	0.0118	21.8
72	0.050	0.050	3.172	0.0131	22.7
73	0.055	0.055	3.176	0.0144	23.0
75	0.060	0.060	3.181	0.0158	23.6
77	0.065	0.065	3.185	0.0171	24.2
78	0.070	0.070	3.189	0.0184	24.5
79	0.075	0.075	3.193	0.0197	24.7
80	0.085	0.085	3.202	0.0223	25.0
79	0.100	0.100	3.215	0.0263	24.6
78	0.110	0.110	3.224	0.0289	24.2
74	0.115	0.115	3.228	0.0302	22.9
69	0.120	0.120	3.232	0.0315	21.3
65	0.125	0.125	3.237	0.0328	20.1
61	0.130	0.130	3.241	0.0341	18.8
58	0.135	0.135	3.246	0.0354	17.9

UNCONFINED COMPRESSION TESTING
Sample No0682-017 Dup (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-017 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D099

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	61.3	**%**
BULK UNIT WEIGHT	116.2	lb/ft^3
DRY UNIT WEIGHT	72.0	lb/ft^3
UCS *	25.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	3/28/2019	Tested By:	jm
End Date:	3/30/2019	Checked By:	mcm
Boring	---	Test #:	K2
Sample #:	BWM-17 (Dup)		
Depth:	---		
Visual Description:	Moist, pale brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K6

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.96	1.96
Diameter, in	2.91	2.91
Area, in^2	6.65	6.65
Volume, in^3	13.0	13.0
Mass, g	383	383
Bulk Density, pcf	112	112
Moisture Content, %	49.1	49.1
Dry Density, pcf	75.0	75.0
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
3/29	1	104	80	37.5	36.2	1.3	360	7.5	9.2E-07	21	0.976	9.0E-07
3/29	2	104	80	36.2	34.9	1.3	420	7.3	8.2E-07	21	0.976	8.0E-07
3/29	3	104	80	34.9	32.8	2.1	720	7.0	8.1E-07	21	0.976	7.9E-07
3/29	4	104	80	32.8	30.6	2.2	780	6.6	8.4E-07	21	0.976	8.2E-07

PERMEABILITY AT 20° C: 8.3 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-018 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D100

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	114.30	g
3. WT WET SOIL + TARE	308.06	g
4. WT DRY SOIL + TARE	251.76	g
5. WT WATER, Ww	56.30	g
6. WT DRY SOIL, Ws	137.46	g
7. MOISTURE CONTENT, W	**40.96**	**%**

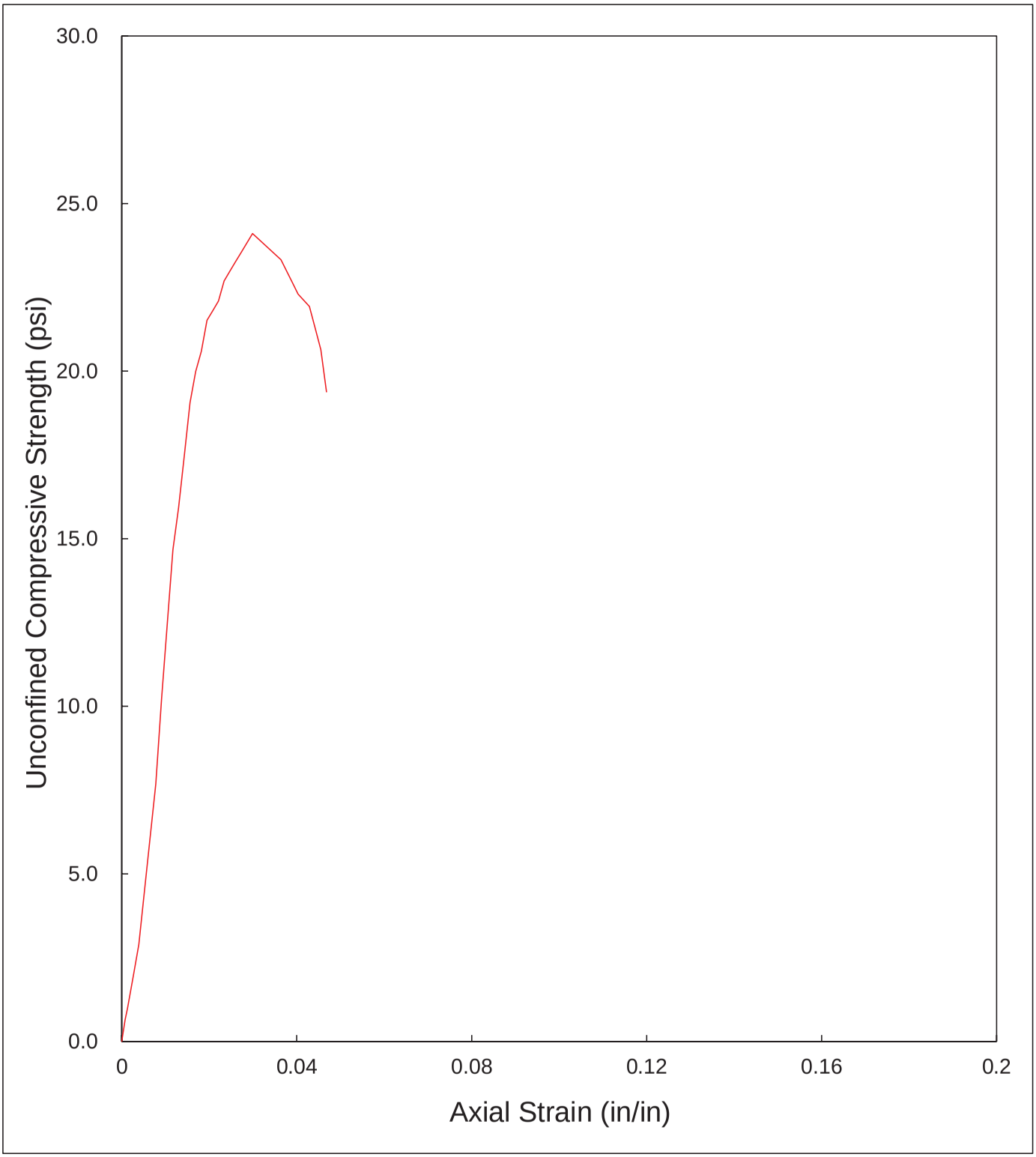
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.98	in.	3.87	in.
No. 2	1.99	in.	3.82	in.
No. 3	1.99	in.	3.85	in.
Average	**1.99**	**in.**	**3.85**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***343.84***	***g***
Initial Area, Ao	3.10	in^2
Initial Volume, Vo	11.92	in^3
Initial Bulk Unit Weight,	109.9	lb/ft^3
Initial Dry Unit Weight	78.0	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	24.1	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.099	0.0000	0.0
2	0.003	0.003	3.101	0.0008	0.6
3	0.005	0.005	3.103	0.0013	1.0
6	0.010	0.010	3.107	0.0026	1.9
9	0.015	0.015	3.111	0.0039	2.9
14	0.020	0.020	3.115	0.0052	4.5
19	0.025	0.025	3.119	0.0065	6.1
24	0.030	0.030	3.123	0.0078	7.7
32	0.035	0.035	3.127	0.0091	10.2
39	0.040	0.040	3.131	0.0104	12.5
46	0.045	0.045	3.135	0.0117	14.7
50	0.050	0.050	3.140	0.0130	15.9
55	0.055	0.055	3.144	0.0143	17.5
60	0.060	0.060	3.148	0.0156	19.1
63	0.065	0.065	3.152	0.0169	20.0
65	0.070	0.070	3.156	0.0182	20.6
68	0.075	0.075	3.160	0.0195	21.5
69	0.080	0.080	3.165	0.0208	21.8
70	0.085	0.085	3.169	0.0221	22.1
72	0.090	0.090	3.173	0.0234	22.7
73	0.095	0.095	3.177	0.0247	23.0
74	0.100	0.100	3.182	0.0260	23.3
75	0.105	0.105	3.186	0.0273	23.5
77	0.115	0.115	3.194	0.0299	24.1
75	0.140	0.140	3.216	0.0364	23.3
73	0.150	0.150	3.225	0.0390	22.6
72	0.155	0.155	3.229	0.0403	22.3
71	0.165	0.165	3.238	0.0429	21.9
69	0.170	0.170	3.242	0.0442	21.3
67	0.175	0.175	3.247	0.0455	20.6
63	0.180	0.180	3.251	0.0468	19.4

UNCONFINED COMPRESSION TESTING

Sample No. 0682-018 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-018 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D100

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.0	**%**
BULK UNIT WEIGHT	109.9	lb/ft^3
DRY UNIT WEIGHT	78.0	lb/ft^3
UCS *	24.1	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	3/28/2019	Tested By:	jm
End Date:	3/30/2019	Checked By:	mcm
Boring	---	Test #:	K3
Sample #:	BWM-18		
Depth:	---		
Visual Description:	Moist, pale brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P1

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.97	1.97
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	13.6	13.6
Mass, g	381	381
Bulk Density, pcf	106	106
Moisture Content, %	46.6	46.5
Dry Density, pcf	72.4	72.4
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
3/29	1	104	80	42.2	37.7	4.5	1380	8.4	7.4E-07	21	0.976	7.3E-07
3/29	2	104	80	37.7	36.5	1.2	420	7.5	7.0E-07	21	0.976	6.8E-07
3/29	3	104	80	36.5	31.9	4.6	1800	7.3	6.8E-07	21	0.976	6.6E-07
3/29	4	104	80	31.9	30.3	1.6	660	6.4	7.1E-07	21	0.976	6.9E-07

PERMEABILITY AT 20° C: 6.9 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-018 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D101

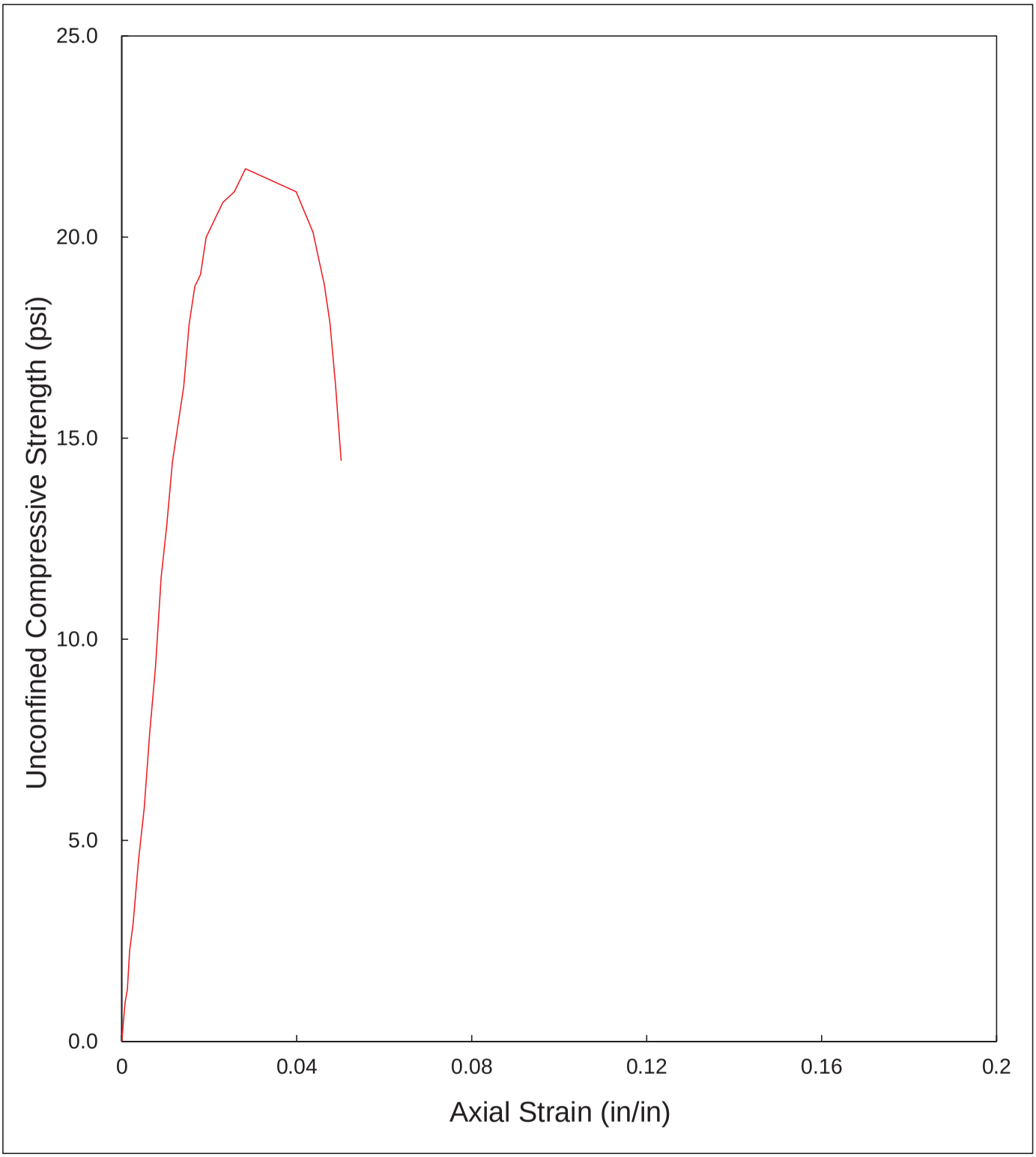
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	117.88	g
3. WT WET SOIL + TARE	289.47	g
4. WT DRY SOIL + TARE	232.56	g
5. WT WATER, Ww	56.91	g
6. WT DRY SOIL, Ws	114.68	g
7. MOISTURE CONTENT, W	**49.63**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.98	in.	3.89	in.
No. 2	1.99	in.	3.87	in.
No. 3	1.98	in.	3.90	in.
Average	**1.98**	**in.**	**3.89**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***363.06***	***g***
Initial Area, Ao	3.09	in^2
Initial Volume, Vo	12.01	in^3
Initial Bulk Unit Weight,	115.1	lb/ft^3
Initial Dry Unit Weight	76.9	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	21.7	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.090	0.0000	0.0
3	0.003	0.003	3.092	0.0008	1.0
4	0.005	0.005	3.094	0.0013	1.3
7	0.007	0.007	3.096	0.0018	2.3
9	0.010	0.010	3.098	0.0026	2.9
14	0.015	0.015	3.102	0.0039	4.5
18	0.020	0.020	3.106	0.0051	5.8
24	0.025	0.025	3.110	0.0064	7.7
29	0.030	0.030	3.114	0.0077	9.3
36	0.035	0.035	3.118	0.0090	11.5
40	0.040	0.040	3.122	0.0103	12.8
45	0.045	0.045	3.126	0.0116	14.4
48	0.050	0.050	3.130	0.0129	15.3
51	0.055	0.055	3.134	0.0141	16.3
56	0.060	0.060	3.138	0.0154	17.8
59	0.065	0.065	3.143	0.0167	18.8
60	0.070	0.070	3.147	0.0180	19.1
63	0.075	0.075	3.151	0.0193	20.0
65	0.085	0.085	3.159	0.0219	20.6
66	0.090	0.090	3.163	0.0231	20.9
67	0.100	0.100	3.172	0.0257	21.1
69	0.110	0.110	3.180	0.0283	21.7
68	0.155	0.155	3.218	0.0399	21.1
67	0.160	0.160	3.223	0.0412	20.8
66	0.165	0.165	3.227	0.0424	20.5
65	0.170	0.170	3.231	0.0437	20.1
63	0.175	0.175	3.236	0.0450	19.5
61	0.180	0.180	3.240	0.0463	18.8
58	0.185	0.185	3.244	0.0476	17.9
53	0.190	0.190	3.249	0.0489	16.3
47	0.195	0.195	3.253	0.0502	14.4

UNCONFINED COMPRESSION TESTING
Sample No0682-018 Dup (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-018 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D101

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	49.6	**%**
BULK UNIT WEIGHT	115.1	lb/ft^3
DRY UNIT WEIGHT	76.9	lb/ft^3
UCS *	21.7	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	3/29/2019	Tested By:	jm
End Date:	4/2/2019	Checked By:	mcm
Boring	---	Test #:	K4
Sample #:	BWM-18 (DUP)		
Depth:	---		
Visual Description:	Moist, pale brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K6

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.86	1.86
Diameter, in	2.95	2.95
Area, in^2	6.83	6.83
Volume, in^3	12.7	12.7
Mass, g	362	362
Bulk Density, pcf	108	108
Moisture Content, %	45.5	45.5
Dry Density, pcf	74.3	74.3
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
4/1	3	104	80	81.0	78.9	2.1	300	17.1	7.6E-07	21	0.976	7.4E-07
4/1	4	104	80	78.9	76.9	2.0	300	16.7	7.5E-07	21	0.976	7.3E-07
4/1	5	104	80	76.9	70.6	6.3	1140	16.3	6.5E-07	21	0.976	6.4E-07
4/1	6	104	80	70.6	61.3	9.3	1800	14.9	6.8E-07	21	0.976	6.7E-07

PERMEABILITY AT 20° C: 6.9 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-023 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D102

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	114.48	g
3. WT WET SOIL + TARE	269.77	g
4. WT DRY SOIL + TARE	224.73	g
5. WT WATER, Ww	45.04	g
6. WT DRY SOIL, Ws	110.25	g
7. MOISTURE CONTENT, W	**40.85**	**%**

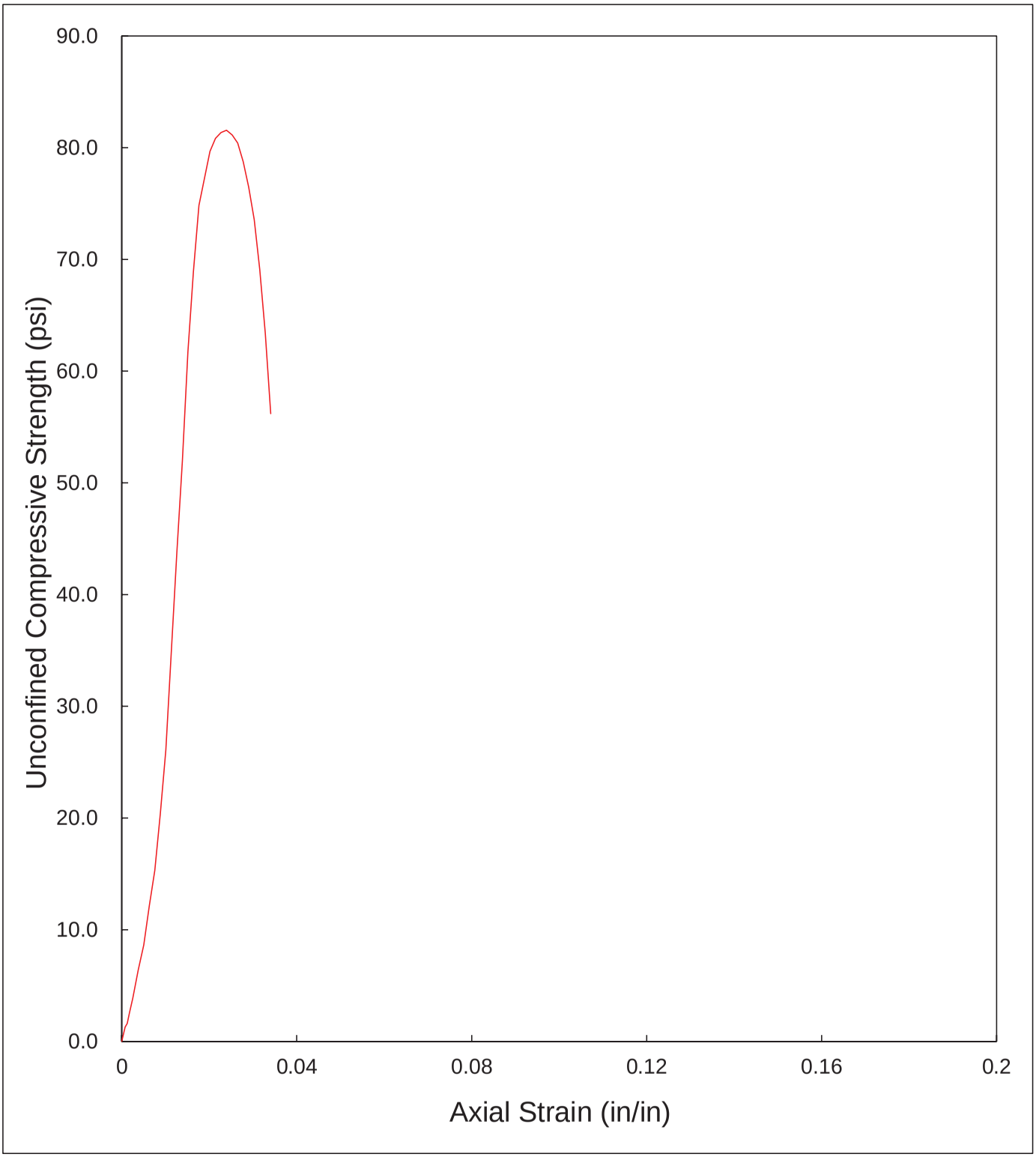
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.94	in.
No. 2	1.99	in.	3.97	in.
No. 3	1.99	in.	3.98	in.
Average	**1.99**	**in.**	**3.96**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***346.65***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	12.33	in^3
Initial Bulk Unit Weight,	107.1	lb/ft^3
Initial Dry Unit Weight	76.0	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	81.6	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.111	0.0000	0.0
4	0.003	0.003	3.114	0.0008	1.3
5	0.005	0.005	3.115	0.0013	1.6
8	0.007	0.007	3.117	0.0018	2.6
12	0.010	0.010	3.119	0.0025	3.8
20	0.015	0.015	3.123	0.0038	6.4
27	0.020	0.020	3.127	0.0050	8.6
38	0.025	0.025	3.131	0.0063	12.1
48	0.030	0.030	3.135	0.0076	15.3
64	0.035	0.035	3.139	0.0088	20.4
82	0.040	0.040	3.143	0.0101	26.1
110	0.045	0.045	3.147	0.0114	35.0
138	0.050	0.050	3.151	0.0126	43.8
164	0.055	0.055	3.155	0.0139	52.0
195	0.060	0.060	3.159	0.0151	61.7
218	0.065	0.065	3.163	0.0164	68.9
237	0.070	0.070	3.167	0.0177	74.8
245	0.075	0.075	3.171	0.0189	77.3
253	0.080	0.080	3.175	0.0202	79.7
257	0.085	0.085	3.179	0.0214	80.8
259	0.090	0.090	3.184	0.0227	81.4
260	0.095	0.095	3.188	0.0240	81.6
259	0.100	0.100	3.192	0.0252	81.1
257	0.105	0.105	3.196	0.0265	80.4
252	0.110	0.110	3.200	0.0278	78.7
245	0.115	0.115	3.204	0.0290	76.5
236	0.120	0.120	3.208	0.0303	73.6
222	0.125	0.125	3.213	0.0315	69.1
204	0.130	0.130	3.217	0.0328	63.4
181	0.135	0.135	3.221	0.0341	56.2

UNCONFINED COMPRESSION TESTING

Sample No. 0682-023 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-023 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D102

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	40.9	**%**
BULK UNIT WEIGHT	107.1	lb/ft^3
DRY UNIT WEIGHT	76.0	lb/ft^3
UCS *	81.6	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	3/29/2019	Tested By:	jm
End Date:	4/2/2019	Checked By:	mcm
Boring	---	Test #:	K5
Sample #:	BWM-23		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P12

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.80	2.80
Diameter, in	2.97	2.98
Area, in^2	6.93	6.97
Volume, in^3	19.4	19.5
Mass, g	571	570
Bulk Density, pcf	112	111
Moisture Content, %	41.2	40.8
Dry Density, pcf	79.3	78.8
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
4/1	2	104	80	28.8	28.5	0.3	3300	4.0	4.1E-08	21	0.976	4.0E-08
4/1	3	104	80	28.5	28.2	0.3	3780	4.0	3.6E-08	21	0.976	3.5E-08
4/1	4	104	80	28.2	27.7	0.5	5820	4.0	4.0E-08	21	0.976	3.9E-08
4/1	5	104	80	27.7	27.3	0.4	4800	3.9	3.9E-08	21	0.976	3.8E-08

PERMEABILITY AT 20° C: 3.8 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-023 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D103

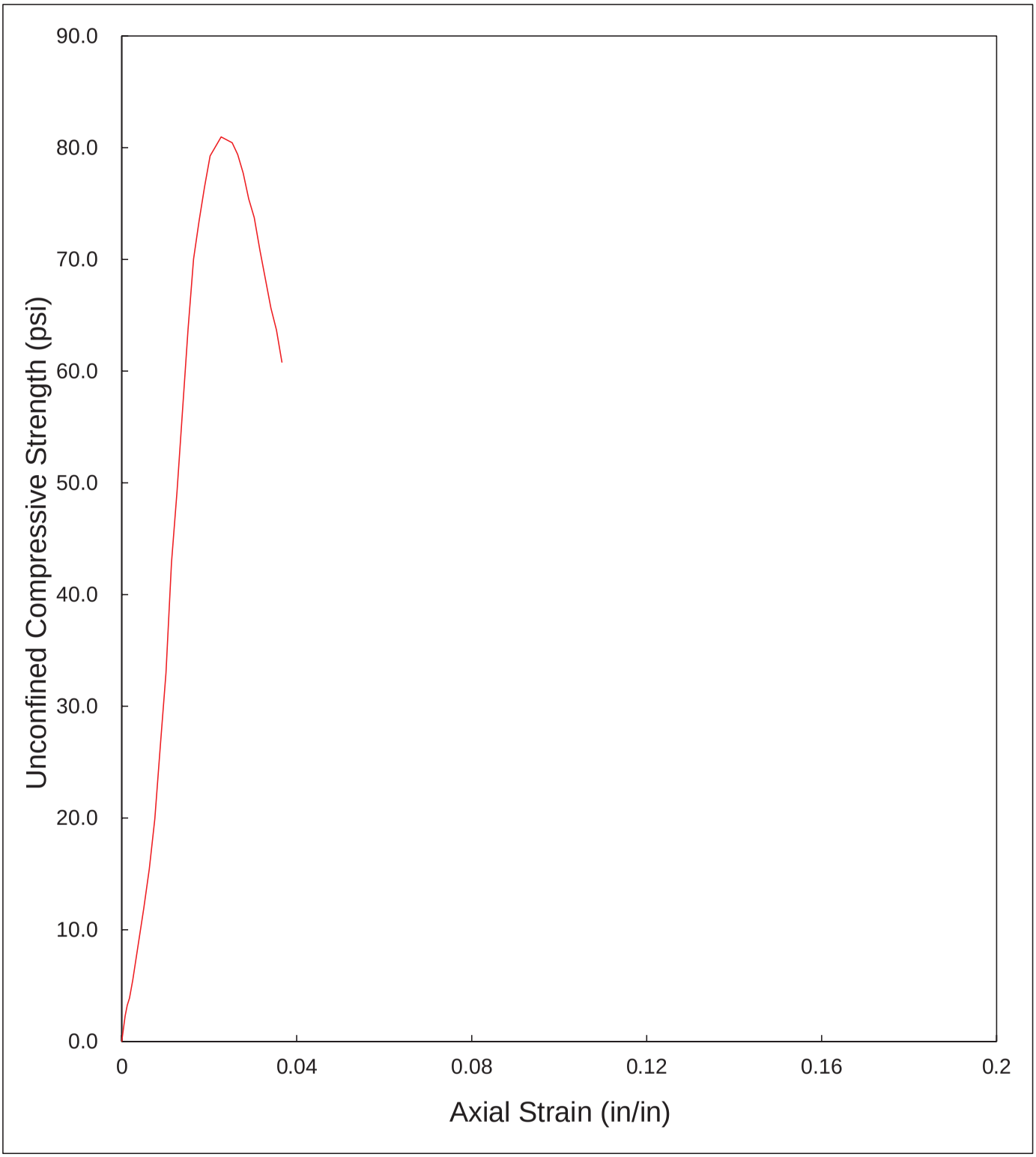
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	118.54	g
3. WT WET SOIL + TARE	248.27	g
4. WT DRY SOIL + TARE	213.27	g
5. WT WATER, Ww	35.00	g
6. WT DRY SOIL, Ws	94.73	g
7. MOISTURE CONTENT, W	**36.95**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.98	in.	3.97	in.
No. 2	1.99	in.	3.95	in.
No. 3	1.98	in.	3.96	in.
Average	**1.98**	**in.**	**3.96**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***344.31***	***g***
Initial Area, Ao	3.09	in^2
Initial Volume, Vo	12.24	in^3
Initial Bulk Unit Weight,	107.2	lb/ft^3
Initial Dry Unit Weight	78.3	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	81.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.090	0.0000	0.0
7	0.003	0.003	3.092	0.0008	2.3
10	0.005	0.005	3.094	0.0013	3.2
12	0.007	0.007	3.095	0.0018	3.9
17	0.010	0.010	3.098	0.0025	5.5
27	0.015	0.015	3.102	0.0038	8.7
37	0.020	0.020	3.106	0.0051	11.9
48	0.025	0.025	3.110	0.0063	15.4
62	0.030	0.030	3.114	0.0076	19.9
83	0.035	0.035	3.118	0.0088	26.6
103	0.040	0.040	3.122	0.0101	33.0
134	0.045	0.045	3.125	0.0114	42.9
154	0.050	0.050	3.129	0.0126	49.2
177	0.055	0.055	3.133	0.0139	56.5
200	0.060	0.060	3.138	0.0152	63.7
220	0.065	0.065	3.142	0.0164	70.0
231	0.070	0.070	3.146	0.0177	73.4
241	0.075	0.075	3.150	0.0189	76.5
250	0.080	0.080	3.154	0.0202	79.3
253	0.085	0.085	3.158	0.0215	80.1
256	0.090	0.090	3.162	0.0227	81.0
255	0.100	0.100	3.170	0.0253	80.4
252	0.105	0.105	3.174	0.0265	79.4
247	0.110	0.110	3.178	0.0278	77.7
240	0.115	0.115	3.182	0.0290	75.4
235	0.120	0.120	3.187	0.0303	73.7
226	0.125	0.125	3.191	0.0316	70.8
218	0.130	0.130	3.195	0.0328	68.2
210	0.135	0.135	3.199	0.0341	65.6
204	0.140	0.140	3.203	0.0354	63.7
195	0.145	0.145	3.207	0.0366	60.8

UNCONFINED COMPRESSION TESTING
Sample No0682-023 Dup (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-023 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D103

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	36.9	**%**
BULK UNIT WEIGHT	107.2	lb/ft^3
DRY UNIT WEIGHT	78.3	lb/ft^3
UCS *	81.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	3/29/2019	Tested By:	jm
End Date:	4/2/2019	Checked By:	mcm
Boring	---	Test #:	K6
Sample #:	BWM-23 (DUP)		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K9

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.94	2.94
Diameter, in	2.96	2.96
Area, in^2	6.88	6.88
Volume, in^3	20.2	20.2
Mass, g	578	592
Bulk Density, pcf	109	111
Moisture Content, %	35.8	39.0
Dry Density, pcf	80.1	80.1
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
4/1	2	104	80	46.8	46.4	0.4	3600	6.3	3.3E-08	21	0.976	3.2E-08
4/1	3	104	80	46.4	46.0	0.4	3840	6.2	3.1E-08	21	0.976	3.0E-08
4/1	4	104	80	46.0	45.3	0.7	5760	6.2	3.6E-08	21	0.976	3.6E-08
4/1	5	104	80	45.3	44.8	0.5	4200	6.1	3.6E-08	21	0.976	3.5E-08

PERMEABILITY AT 20° C: 3.3 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-024 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D104

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	111.58	g
3. WT WET SOIL + TARE	230.25	g
4. WT DRY SOIL + TARE	195.29	g
5. WT WATER, Ww	34.96	g
6. WT DRY SOIL, Ws	83.71	g
7. MOISTURE CONTENT, W	**41.76**	**%**

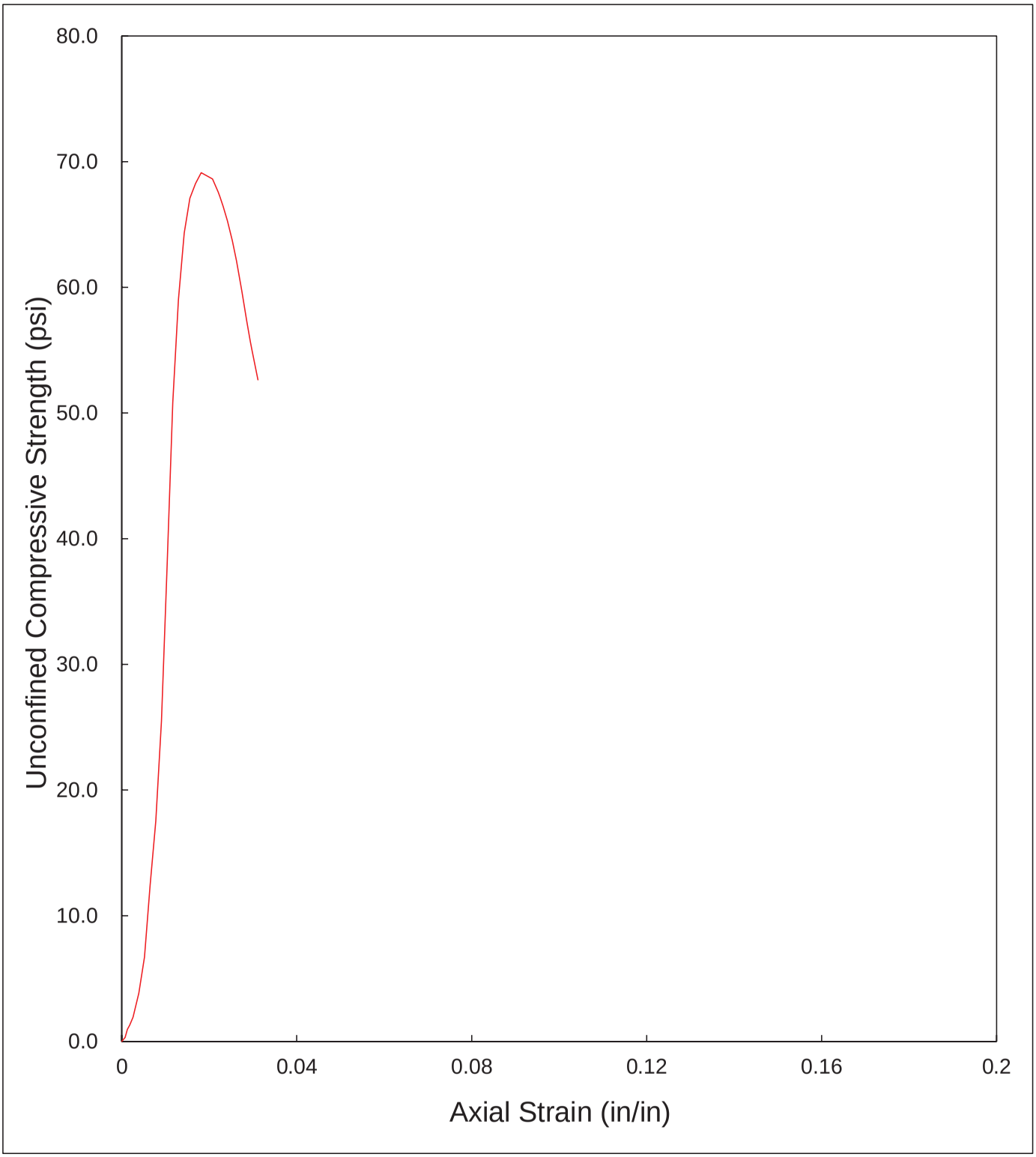
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.84	in.
No. 2	1.99	in.	3.86	in.
No. 3	1.98	in.	3.86	in.
Average	**1.99**	**in.**	**3.85**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***335.77***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	11.99	in^3
Initial Bulk Unit Weight,	106.7	lb/ft^3
Initial Dry Unit Weight	75.3	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	69.1	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.111	0.0000	0.0
1	0.003	0.003	3.113	0.0008	0.3
3	0.005	0.005	3.115	0.0013	1.0
4	0.007	0.007	3.116	0.0018	1.3
6	0.010	0.010	3.119	0.0026	1.9
12	0.015	0.015	3.123	0.0039	3.8
21	0.020	0.020	3.127	0.0052	6.7
39	0.025	0.025	3.131	0.0065	12.5
55	0.030	0.030	3.135	0.0078	17.5
80	0.035	0.035	3.139	0.0091	25.5
119	0.040	0.040	3.143	0.0104	37.9
160	0.045	0.045	3.148	0.0117	50.8
186	0.050	0.050	3.152	0.0130	59.0
203	0.055	0.055	3.156	0.0143	64.3
212	0.060	0.060	3.160	0.0156	67.1
216	0.065	0.065	3.164	0.0169	68.3
219	0.070	0.070	3.168	0.0182	69.1
218	0.080	0.080	3.177	0.0208	68.6
215	0.085	0.085	3.181	0.0221	67.6
211	0.090	0.090	3.185	0.0234	66.2
206	0.095	0.095	3.189	0.0247	64.6
200	0.100	0.100	3.194	0.0260	62.6
192	0.105	0.105	3.198	0.0272	60.0
184	0.110	0.110	3.202	0.0285	57.5
176	0.115	0.115	3.206	0.0298	54.9
169	0.120	0.120	3.211	0.0311	52.6

UNCONFINED COMPRESSION TESTING

Sample No. 0682-024 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-024 (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D104

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.8	**%**
BULK UNIT WEIGHT	106.7	lb/ft^3
DRY UNIT WEIGHT	75.3	lb/ft^3
UCS *	69.1	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	4/1/2019	Tested By:	jm
End Date:	4/3/2019	Checked By:	mcm
Boring	---	Test #:	K7
Sample #:	BWM-24		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P13

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.78	2.78
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	19.4	19.4
Mass, g	557	557
Bulk Density, pcf	109	109
Moisture Content, %	40.6	40.6
Dry Density, pcf	77.6	77.6
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
4/2	3	104	80	114.1	113.5	0.6	1380	16.2	4.9E-08	21	0.976	4.8E-08
4/2	4	104	80	113.5	112.3	1.2	3000	16.1	4.5E-08	21	0.976	4.4E-08
4/2	5	104	80	112.3	110.3	2.0	4800	15.9	4.8E-08	21	0.976	4.7E-08
4/2	6	104	80	110.3	107.6	2.7	6120	15.6	5.2E-08	21	0.976	5.0E-08

PERMEABILITY AT 20° C: 4.7 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-024 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D105

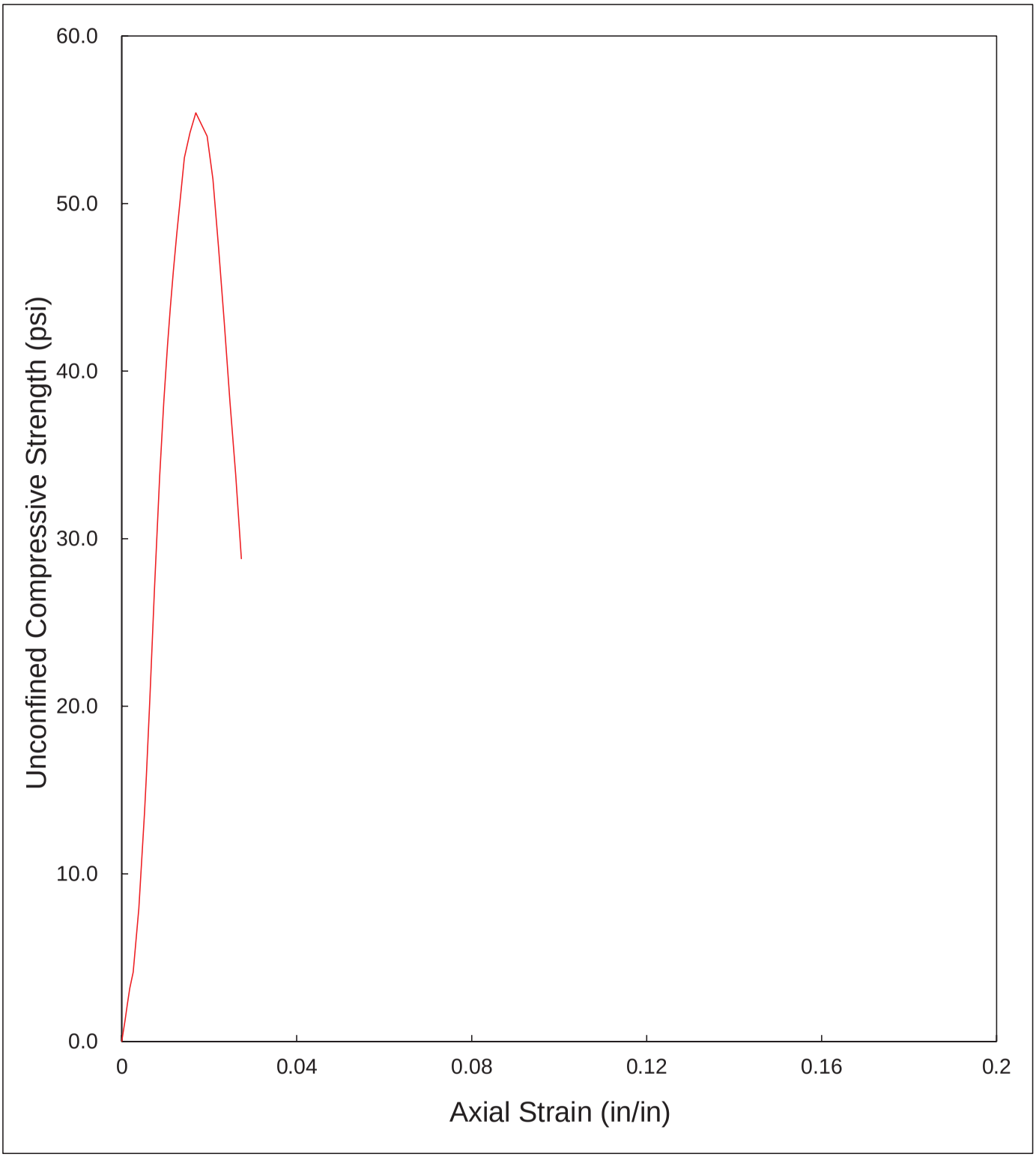
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	116.10	g
3. WT WET SOIL + TARE	254.52	g
4. WT DRY SOIL + TARE	220.70	g
5. WT WATER, Ww	33.82	g
6. WT DRY SOIL, Ws	104.60	g
7. MOISTURE CONTENT, W	**32.33**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.83	in.
No. 2	2.00	in.	3.85	in.
No. 3	1.99	in.	3.84	in.
Average	**2.00**	**in.**	**3.84**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***334.71***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	12.06	in^3
Initial Bulk Unit Weight,	105.8	lb/ft^3
Initial Dry Unit Weight	79.9	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	55.4	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.140	0.0000	0.0
4	0.003	0.003	3.142	0.0008	1.3
7	0.005	0.005	3.144	0.0013	2.2
10	0.007	0.007	3.146	0.0018	3.2
13	0.010	0.010	3.148	0.0026	4.1
25	0.015	0.015	3.152	0.0039	7.9
43	0.020	0.020	3.156	0.0052	13.6
66	0.025	0.025	3.161	0.0065	20.9
92	0.030	0.030	3.165	0.0078	29.1
114	0.035	0.035	3.169	0.0091	36.0
131	0.040	0.040	3.173	0.0104	41.3
145	0.045	0.045	3.177	0.0117	45.6
157	0.050	0.050	3.181	0.0130	49.3
168	0.055	0.055	3.186	0.0143	52.7
173	0.060	0.060	3.190	0.0156	54.2
177	0.065	0.065	3.194	0.0169	55.4
173	0.075	0.075	3.203	0.0195	54.0
165	0.080	0.080	3.207	0.0208	51.5
152	0.085	0.085	3.211	0.0221	47.3
138	0.090	0.090	3.215	0.0234	42.9
123	0.095	0.095	3.220	0.0247	38.2
109	0.100	0.100	3.224	0.0260	33.8
93	0.105	0.105	3.228	0.0273	28.8

UNCONFINED COMPRESSION TESTING
Sample No0682-024 Dup (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	0682-024 Dup (28 Day)		
TESTING DATE:	22-Mar-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D105

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	32.3	**%**
BULK UNIT WEIGHT	105.8	lb/ft^3
DRY UNIT WEIGHT	79.9	lb/ft^3
UCS *	55.4	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	4/1/2019	Tested By:	jm
End Date:	4/3/2019	Checked By:	mcm
Boring	---	Test #:	K8
Sample #:	BWM-24 (DUP)		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K4

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	3.12	3.12
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	21.6	21.6
Mass, g	615	623
Bulk Density, pcf	108	109
Moisture Content, %	38.8	40.4
Dry Density, pcf	78.0	78.0
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
4/2	2	104	80	114.1	113.5	0.6	1800	14.4	4.2E-08	21	0.976	4.1E-08
4/2	3	104	80	113.5	112.3	1.2	3600	14.3	4.3E-08	21	0.976	4.2E-08
4/2	4	104	80	112.3	110.3	2.0	6000	14.2	4.4E-08	21	0.976	4.3E-08
4/2	5	104	80	110.3	107.6	2.7	7200	13.9	5.0E-08	21	0.976	4.8E-08

PERMEABILITY AT 20° C: 4.3 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-29 (7 DAY)		
TESTING DATE:	14-May-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D269

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	116.08	g
3. WT WET SOIL + TARE	285.64	g
4. WT DRY SOIL + TARE	216.11	g
5. WT WATER, Ww	69.53	g
6. WT DRY SOIL, Ws	100.03	g
7. MOISTURE CONTENT, W	**69.51**	**%**

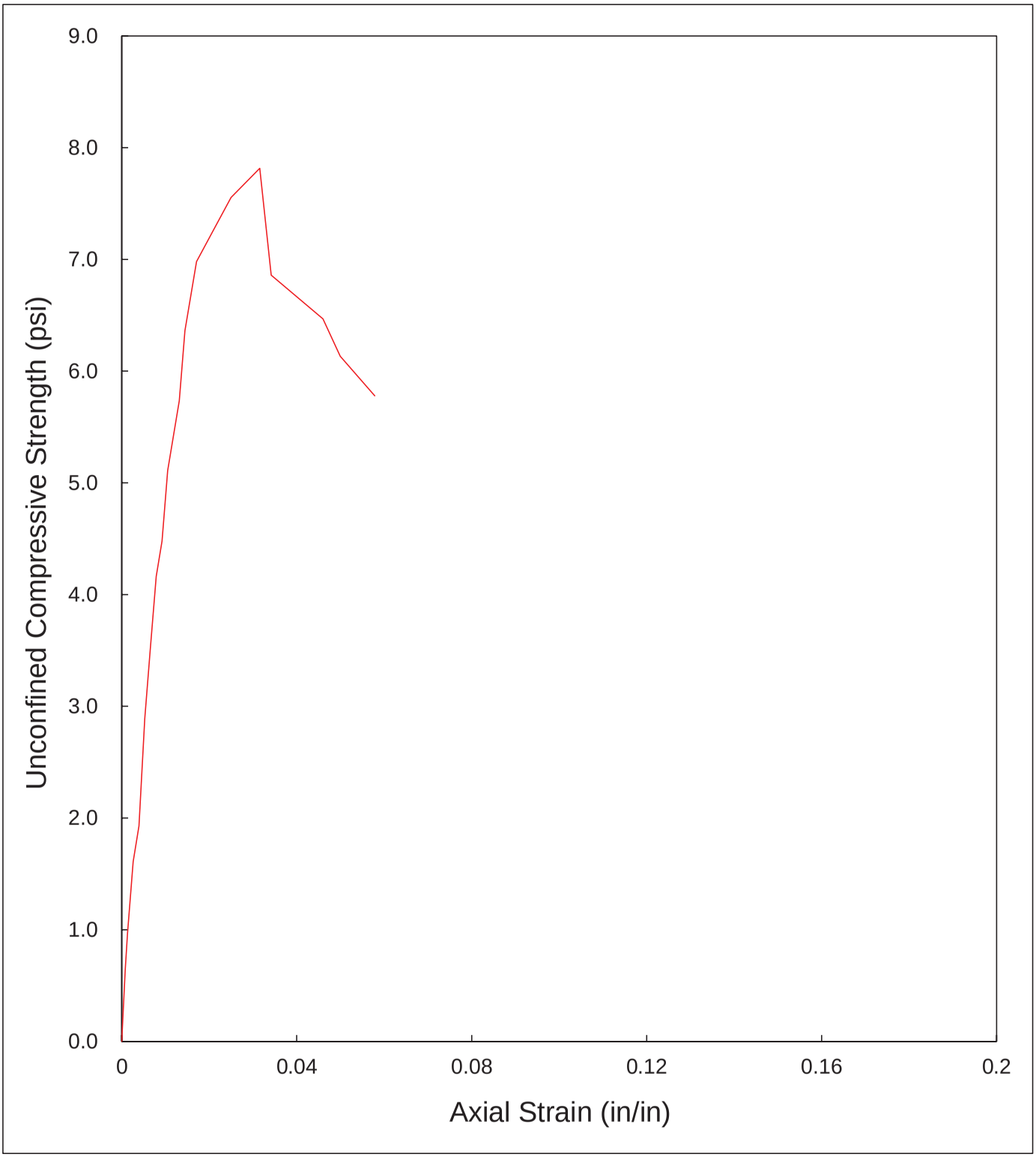
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.98	in.	3.81	in.
No. 2	2.00	in.	3.79	in.
No. 3	1.98	in.	3.81	in.
Average	**1.99**	**in.**	**3.80**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***279.45***	***g***
Initial Area, Ao	3.10	in^2
Initial Volume, Vo	11.78	in^3
Initial Bulk Unit Weight,	90.4	lb/ft^3
Initial Dry Unit Weight	53.3	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	7.8	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.098	0.0000	0.0
2	0.003	0.003	3.100	0.0008	0.6
3	0.005	0.005	3.102	0.0013	1.0
5	0.010	0.010	3.106	0.0026	1.6
6	0.015	0.015	3.110	0.0039	1.9
9	0.020	0.020	3.114	0.0053	2.9
11	0.025	0.025	3.118	0.0066	3.5
13	0.030	0.030	3.122	0.0079	4.2
14	0.035	0.035	3.127	0.0092	4.5
16	0.040	0.040	3.131	0.0105	5.1
17	0.045	0.045	3.135	0.0118	5.4
18	0.050	0.050	3.139	0.0131	5.7
20	0.055	0.055	3.143	0.0145	6.4
21	0.060	0.060	3.147	0.0158	6.7
22	0.065	0.065	3.152	0.0171	7.0
23	0.080	0.080	3.164	0.0210	7.3
24	0.095	0.095	3.177	0.0250	7.6
25	0.120	0.120	3.199	0.0316	7.8
22	0.130	0.130	3.207	0.0342	6.9
21	0.175	0.175	3.247	0.0460	6.5
20	0.190	0.190	3.261	0.0500	6.1
19	0.220	0.220	3.288	0.0578	5.8

UNCONFINED COMPRESSION TESTING

Sample No. BWM-29 (7 DAY)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-29 (7 DAY)		
TESTING DATE:	14-May-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D269

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	69.5	**%**
BULK UNIT WEIGHT	90.4	lb/ft^3
DRY UNIT WEIGHT	53.3	lb/ft^3
UCS *	7.8	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-30 (7 DAY)		
TESTING DATE:	14-May-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D270

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	115.96	g
3. WT WET SOIL + TARE	269.78	g
4. WT DRY SOIL + TARE	214.59	g
5. WT WATER, Ww	55.19	g
6. WT DRY SOIL, Ws	98.63	g
7. MOISTURE CONTENT, W	**55.96**	**%**

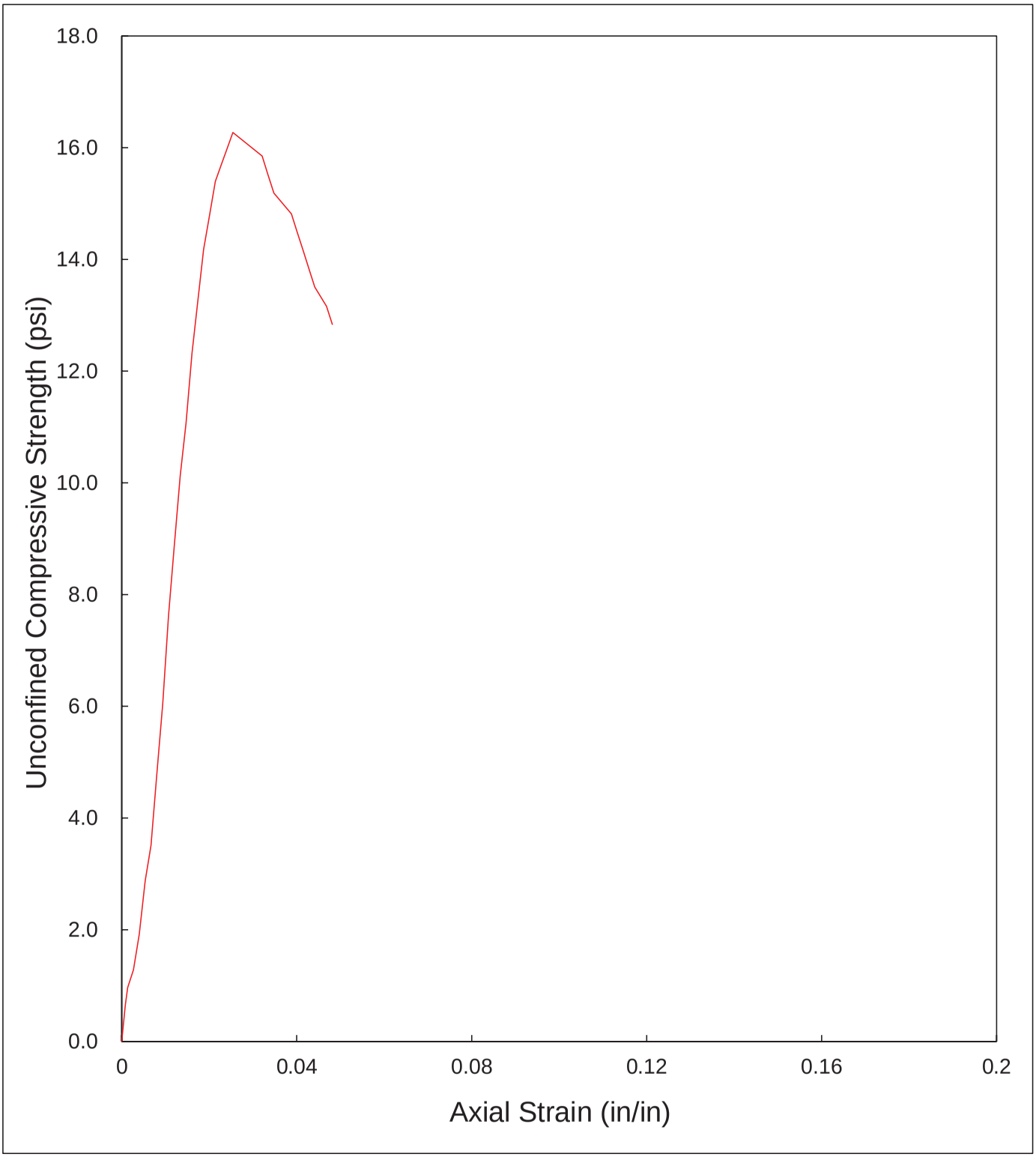
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.75	in.
No. 2	2.00	in.	3.74	in.
No. 3	1.99	in.	3.73	in.
Average	**1.99**	**in.**	**3.74**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***341.20***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	11.64	in^3
Initial Bulk Unit Weight,	111.6	lb/ft^3
Initial Dry Unit Weight	71.6	lb/ft^3
15 % Strain (0.15 Lo)	0.56	in.
UCS	16.3	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.114	0.0000	0.0
2	0.003	0.003	3.117	0.0008	0.6
3	0.005	0.005	3.119	0.0013	1.0
4	0.010	0.010	3.123	0.0027	1.3
6	0.015	0.015	3.127	0.0040	1.9
9	0.020	0.020	3.131	0.0053	2.9
11	0.025	0.025	3.135	0.0067	3.5
15	0.030	0.030	3.140	0.0080	4.8
19	0.035	0.035	3.144	0.0094	6.0
24	0.040	0.040	3.148	0.0107	7.6
28	0.045	0.045	3.152	0.0120	8.9
32	0.050	0.050	3.157	0.0134	10.1
35	0.055	0.055	3.161	0.0147	11.1
39	0.060	0.060	3.165	0.0160	12.3
42	0.065	0.065	3.170	0.0174	13.3
45	0.070	0.070	3.174	0.0187	14.2
47	0.075	0.075	3.178	0.0201	14.8
49	0.080	0.080	3.183	0.0214	15.4
50	0.085	0.085	3.187	0.0227	15.7
51	0.090	0.090	3.191	0.0241	16.0
52	0.095	0.095	3.196	0.0254	16.3
51	0.120	0.120	3.218	0.0321	15.8
50	0.125	0.125	3.222	0.0334	15.5
49	0.130	0.130	3.227	0.0348	15.2
48	0.145	0.145	3.240	0.0388	14.8
47	0.150	0.150	3.245	0.0401	14.5
46	0.155	0.155	3.249	0.0415	14.2
45	0.160	0.160	3.254	0.0428	13.8
44	0.165	0.165	3.258	0.0441	13.5
43	0.175	0.175	3.267	0.0468	13.2
42	0.180	0.180	3.272	0.0481	12.8

UNCONFINED COMPRESSION TESTING

Sample No. BWM-30 (7 DAY)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-30 (7 DAY)		
TESTING DATE:	14-May-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D270

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	56.0	**%**
BULK UNIT WEIGHT	111.6	lb/ft^3
DRY UNIT WEIGHT	71.6	lb/ft^3
UCS *	16.3	lb/in^2

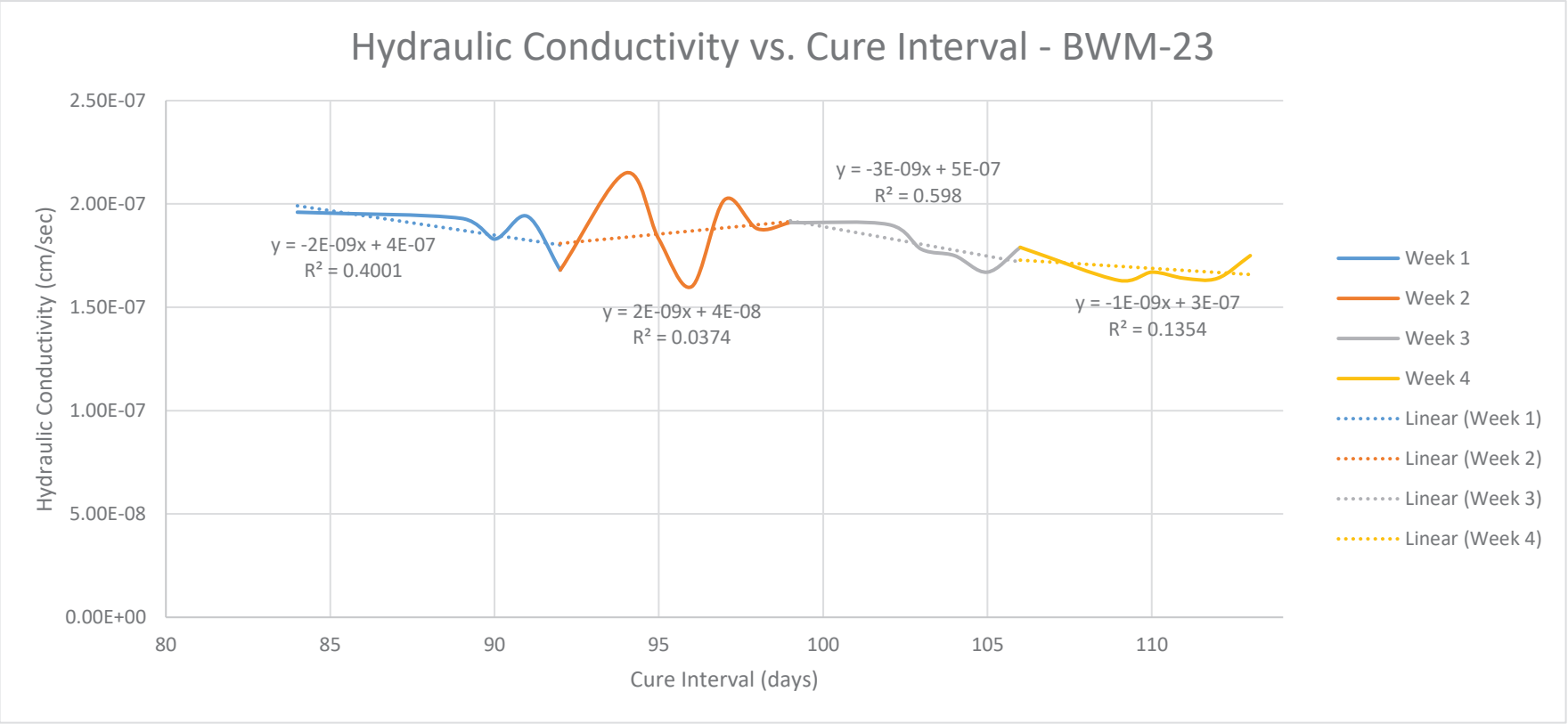
* UCS - UNCONFINED COMPRESSIVE STRENGTH

Appendix I:
Tier 2 Long Term Hydraulic Conductivity Testing Graphs

BLACK & VEATCH
AMERICAN CREOSOTE ISS
KEMRON PROJECT No. SH0682

Figure 1

Hydraulic Conductivity versus Cure Interval - BWM-23



Notes:
cm/sec = centimeters per second

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		

MOISTURE CONTENT (Dry Basis)	***INITIAL***	***FINAL***
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	315.13 ***g***
3. WT WET SOIL + TARE	356.85 ***g***	684.70 ***g***
4. WT DRY SOIL + TARE	267.25 ***g***	582.38 ***g***
5. WT WATER, Ww	89.60 g	102.32 g
6. WT DRY SOIL, Ws	267.25 g	267.25 g
7. MOISTURE CONTENT, W	33.53 %	38.29 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	***DIAMETER***		***HEIGHT***	
ANALYSES	***INITIAL***	***FINAL***	***INITIAL***	***FINAL***
No. 1	***2.98 in.***	***2.97 in.***	***1.86 in.***	***1.86 in.***
No. 2	***2.97 in.***	***2.97 in.***	***1.85 in.***	***1.85 in.***
No. 3	***2.97 in.***	***2.97 in.***	***1.86 in.***	***1.85 in.***
Average	2.97 in.	2.97 in.	1.86 in.	1.85 in.

SPECIMEN CONDITIONS	***INITIAL***	***FINAL***
Specimen WT, Wo	***356.85 g***	***369.57 g***
Area, Ao	6.94 in^2	6.93 in^2
Volume, Vo	12.87 in^3	12.85 in^3
Bulk Unit Weight	105.6 lb/ft^3	109.6 lb/ft^3
Dry Unit Weight	79.1 lb/ft^3	79.3 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
05/13/19	11 : 19	TNB	7.0	5.0	4.7				
05/13/19	13 : 44	TNB	17.0	15.0	13.8	9.7	10.0	5.0	0.50
05/13/19	14 : 18	TNB	27.0	25.0	23.1	20.1	10.0	6.3	0.63
05/13/19	15 : 26	TNB	37.0	35.0	32.3	30.7	10.0	7.6	0.76
05/13/19	16 : 11	TNB	47.0	45.0	41.7	39.9	10.0	7.6	0.76
05/14/19	7 : 50	TNB	57.0	55.0	50.9	50.2	10.0	8.5	0.85
05/14/19	9 : 58	TNB	67.0	65.0	60.6	59.5	10.0	8.6	0.86
05/14/19	11 : 16	TNB	77.0	75.0	69.3	69.8	10.0	9.2	0.92
05/14/19	14 : 7	TNB	87.0	85.0	78.6	78.6	10.0	9.3	0.93
05/14/19	15 : 17	TNB	97.0	95.0	*	88.1	10.0	9.5	0.95
05/14/19	15 : 17	TNB	107.0	105.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		

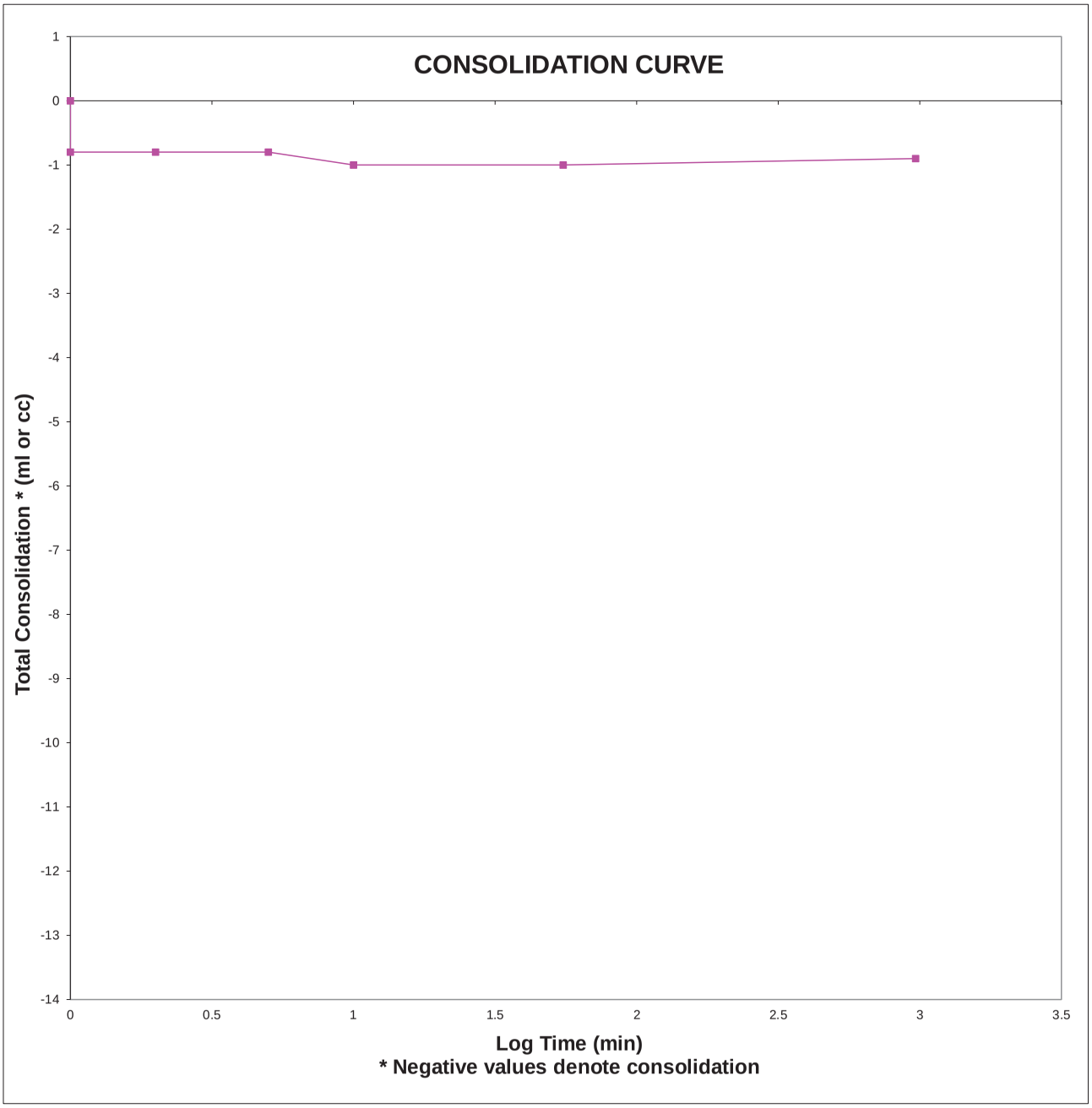
CELL PRESSURE: 109 psi **BACK PRESSURE:** 85 psi **EFFECTIVE STRESS:** 24 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
5 / 16 / 2019	TNB	14 : 58	0	0	0	25.0	25.0	0.0
5 / 16 / 2019	TNB	14 : 59	1	1	0.00	24.6	24.6	0.8
5 / 16 / 2019	TNB	15 : 0	1	2	0.30	24.6	24.6	0.8
5 / 16 / 2019	TNB	15 : 3	3	5	0.70	24.6	24.6	0.8
5 / 16 / 2019	TNB	15 : 8	5	10	1.00	24.5	24.5	1.0
5 / 16 / 2019	TNB	15 : 53	45	55	1.74	24.5	24.5	1.0
5 / 17 / 2019	TNB	7 : 4	911	966	2.98	24.5	24.6	0.9

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
5 / 17 / 19	TNB	7 : 8	0	0.0	25.0	20.0	109.0	85.0	85.0
5 / 17 / 19	TNB	10 : 22	194	0.5	24.5	20.0	109.0	85.0	85.0
5 / 17 / 19	TNB	13 : 33	191	1.0	24.0	20.0	109.0	85.0	85.0
5 / 20 / 19	TNB	10 : 49	4156	7.5	17.5	20.0	109.0	85.0	85.0
5 / 20 / 19	TNB	15 : 21	RESET	0.0	25.0	20.0	109.0	85.0	85.0
5 / 21 / 19	TNB	8 : 19	1018	2.5	22.5	20.0	109.0	85.0	85.0
5 / 21 / 19	TNB	11 : 47	208	3.0	22.0	20.0	109.0	85.0	85.0
5 / 22 / 19	TNB	8 : 52	1265	5.2	19.8	20.0	109.0	85.0	85.0
5 / 22 / 19	TNB	15 : 22	RESET	0.0	25.0	20.0	109.0	85.0	85.0
5 / 23 / 19	TNB	8 : 15	1013	2.5	22.5	20.0	109.0	85.0	85.0
5 / 24 / 19	TNB	13 : 0	1725	5.8	20.2	20.0	109.0	85.0	85.0
5 / 26 / 19	TNB	10 : 34	2734	8.8	16.2	20.0	109.0	85.0	85.0
5 / 26 / 19	TNB	10 : 35	RESET	0.0	25.0	20.0	109.0	85.0	85.0
5 / 27 / 19	TNB	13 : 51	1636	3.6	21.4	20.0	109.0	85.0	85.0
5 / 28 / 19	TNB	8 : 4	1093	5.2	19.8	20.0	109.0	85.0	85.0
5 / 28 / 19	TNB	14 : 36	RESET	0.0	25.0	20.0	109.0	85.0	85.0
5 / 29 / 19	TNB	7 : 34	1018	2.6	22.4	20.0	109.0	85.0	85.0
5 / 29 / 19	TNB	11 : 28	234	3.1	21.9	20.0	109.0	85.0	85.0
5 / 30 / 19	TNB	7 : 12	1184	5.2	19.8	20.0	109.0	85.0	85.0
5 / 30 / 19	TNB	12 : 52	340	5.7	19.3	20.0	109.0	85.0	85.0
5 / 31 / 19	TNB	8 : 1	1149	7.2	17.8	20.0	109.0	85.0	85.0
6 / 3 / 19	TNB	7 : 36	4295	10.4	14.6	20.0	109.0	85.0	85.0
6 / 3 / 19	TNB	8 : 14	RESET	0.0	25.0	20.0	109.0	85.0	85.0
6 / 4 / 19	TNB	8 : 40	1466	3.2	21.8	20.0	109.0	85.0	85.0
6 / 5 / 19	TNB	7 : 18	RESET	0.0	25.0	20.0	109.0	85.0	85.0
6 / 5 / 19	TNB	14 : 17	419	1.0	24.0	20.0	109.0	85.0	85.0
6 / 6 / 19	TNB	8 : 3	1066	3.1	21.9	20.0	109.0	85.0	85.0
6 / 7 / 19	TNB	9 : 24	1521	5.6	19.4	20.0	109.0	85.0	85.0
6 / 10 / 19	TNB	7 : 9	RESET	0.0	25.0	20.0	109.0	85.0	85.0
6 / 10 / 19	TNB	10 : 49	220	0.5	24.5	20.0	109.0	85.0	85.0
6 / 11 / 19	TNB	8 : 18	1289	3.1	21.9	20.0	109.0	85.0	85.0
6 / 12 / 19	TNB	8 : 7	1429	5.3	19.7	20.0	109.0	85.0	85.0
6 / 13 / 19	TNB	8 : 10	1443	7.0	18.0	20.0	109.0	85.0	85.0
6 / 14 / 19	TNB	8 : 51	1481	8.4	16.6	20.0	109.0	85.0	85.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				5.306		
194	0.5	0.5	1.00	5.094	1.85E-07	1.85E-07
191	0.5	0.5	1.00	4.881	1.95E-07	1.96E-07
4156	6.5	6.5	1.00	2.122	1.76E-07	1.77E-07
RESET				5.306		
1018	2.5	2.5	1.00	4.245	1.92E-07	1.93E-07
208	0.5	0.5	1.00	4.033	2.16E-07	2.17E-07
1265	2.2	2.2	1.00	3.099	1.83E-07	1.83E-07
RESET				5.306		
1013	2.5	2.5	1.00	4.245	1.93E-07	1.94E-07
1725	3.3	2.3	0.70	3.056	1.67E-07	1.68E-07
2734	3.0	4.0	1.33	1.571	2.14E-07	2.15E-07
RESET				5.306		
1636	3.6	3.6	1.00	3.778	1.82E-07	1.83E-07
1093	1.6	1.6	1.00	3.099	1.59E-07	1.60E-07
RESET				5.306		
1018	2.6	2.6	1.00	4.202	2.01E-07	2.02E-07
234	0.5	0.5	1.00	3.990	1.94E-07	1.95E-07
1184	2.1	2.1	1.00	3.099	1.87E-07	1.88E-07
340	0.5	0.5	1.00	2.886	1.83E-07	1.84E-07
1149	1.5	1.5	1.00	2.250	1.90E-07	1.91E-07
4295	3.2	3.2	1.00	0.891	1.89E-07	1.90E-07
RESET				5.306		
1466	3.2	3.2	1.00	3.948	1.77E-07	1.78E-07
RESET				5.306		
419	1.0	1.0	1.00	4.881	1.75E-07	1.75E-07
1066	2.1	2.1	1.00	3.990	1.66E-07	1.67E-07
1521	2.5	2.5	1.00	2.929	1.78E-07	1.79E-07
RESET				5.306		
220	0.5	0.5	1.00	5.094	1.63E-07	1.63E-07
1289	2.6	2.6	1.00	3.990	1.66E-07	1.67E-07
1429	2.2	2.2	1.00	3.056	1.64E-07	1.64E-07
1443	1.7	1.7	1.00	2.335	1.64E-07	1.64E-07
1481	1.4	1.4	1.00	1.740	1.74E-07	1.75E-07

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

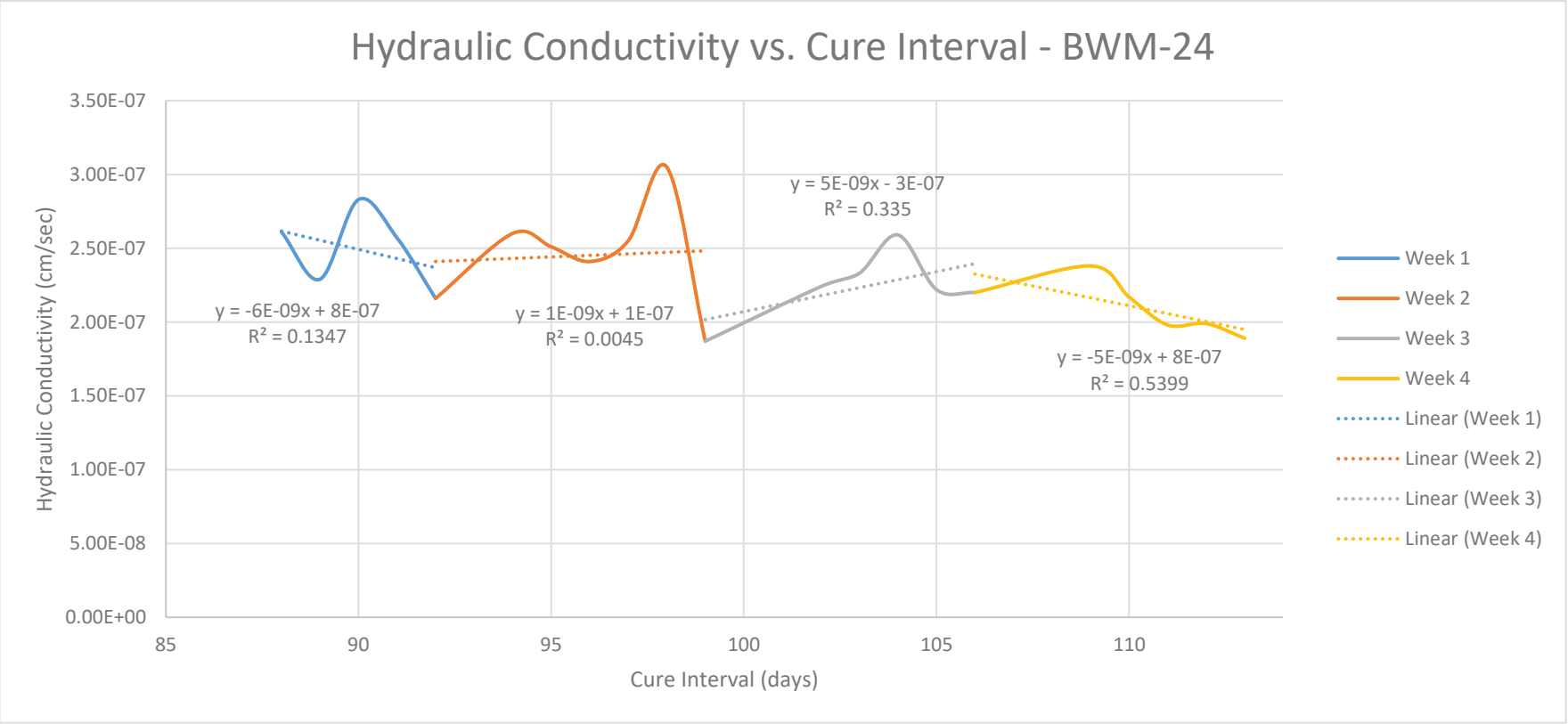
PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D267
SAMPLE No.:	BWM-23	EQUIPMENT No.:	3
TEST DATE:	5/13/19		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	105.6 lb/ft³	109.6 lb/ft³
DRY UNIT WEIGHT	79.1 lb/ft³	79.3 lb/ft³
MOISTURE CONTENT	33.5 %	38.3 %
PERMEABILITY @ 20°C	1.9E-07 cm/sec	

BLACK & VEATCH
AMERICAN CREOSOTE ISS
KEMRON PROJECT No. SH0682

Figure 1

Hydraulic Conductivity versus Cure Interval - BWM-24



Notes:
cm/sec = centimeters per second

PERMEABILITY ASTM D5084

SPECIMEN CONDITIONS

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		

MOISTURE CONTENT (Dry Basis)	***INITIAL***	***FINAL***
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	0.00 ***g***	297.46 ***g***
3. WT WET SOIL + TARE	566.55 ***g***	865.90 ***g***
4. WT DRY SOIL + TARE	405.84 ***g***	703.30 ***g***
5. WT WATER, Ww	160.71 g	162.60 g
6. WT DRY SOIL, Ws	405.84 g	405.84 g
7. MOISTURE CONTENT, W	39.60 %	40.07 %

SOIL SPECIMEN DIMENSIONS				
TRIPLICATE	***DIAMETER***		***HEIGHT***	
ANALYSES	***INITIAL***	***FINAL***	***INITIAL***	***FINAL***
No. 1	***2.98 in.***	***2.97 in.***	***2.84 in.***	***2.85 in.***
No. 2	***2.97 in.***	***2.97 in.***	***2.88 in.***	***2.85 in.***
No. 3	***2.97 in.***	***2.97 in.***	***2.86 in.***	***2.85 in.***
Average	2.98 in.	2.97 in.	2.86 in.	2.85 in.

SPECIMEN CONDITIONS	***INITIAL***	***FINAL***
Specimen WT, Wo	***566.55 g***	***568.44 g***
Area, Ao	6.95 in^2	6.93 in^2
Volume, Vo	19.89 in^3	19.76 in^3
Bulk Unit Weight	108.5 lb/ft^3	109.6 lb/ft^3
Dry Unit Weight	77.7 lb/ft^3	78.2 lb/ft^3

PERMEABILITY ASTM D5084

BACK-PRESSURE SATURATION

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		

TEST	TIME	TESTED	TEST PRESSURES (psi)						
			APPLIED		PORE		PRESSURE CHANGE		
DATE	(military)	BY	CELL	BACK	SAT.	TEST	CELL	PORE	B-Value
05/15/19	10 : 37	TNB	7.0	5.0	4.7				
05/15/19	11 : 40	TNB	17.0	15.0	13.8	12.4	10.0	7.7	0.77
05/15/19	13 : 37	TNB	27.0	25.0	23.0	22.1	10.0	8.3	0.83
05/15/19	14 : 8	TNB	37.0	35.0	32.2	31.8	10.0	8.8	0.88
05/15/19	15 : 31	TNB	47.0	45.0	41.6	41.1	10.0	8.9	0.89
05/16/19	7 : 57	TNB	57.0	55.0	50.8	50.7	10.0	9.1	0.91
05/16/19	9 : 14	TNB	67.0	65.0	60.2	60.0	10.0	9.2	0.92
05/16/19	13 : 4	TNB	77.0	75.0	69.4	69.4	10.0	9.2	0.92
05/16/19	14 : 11	TNB	87.0	85.0	78.5	78.6	10.0	9.2	0.92
05/16/19	14 : 51	TNB	97.0	95.0	*	88.0	10.0	9.5	0.95
05/16/19	14 : 51	TNB	107.0	105.0	*	*	*	*	*

* Saturation check - no data available.

PERMEABILITY ASTM D5084

SPECIMEN CONSOLIDATION

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		

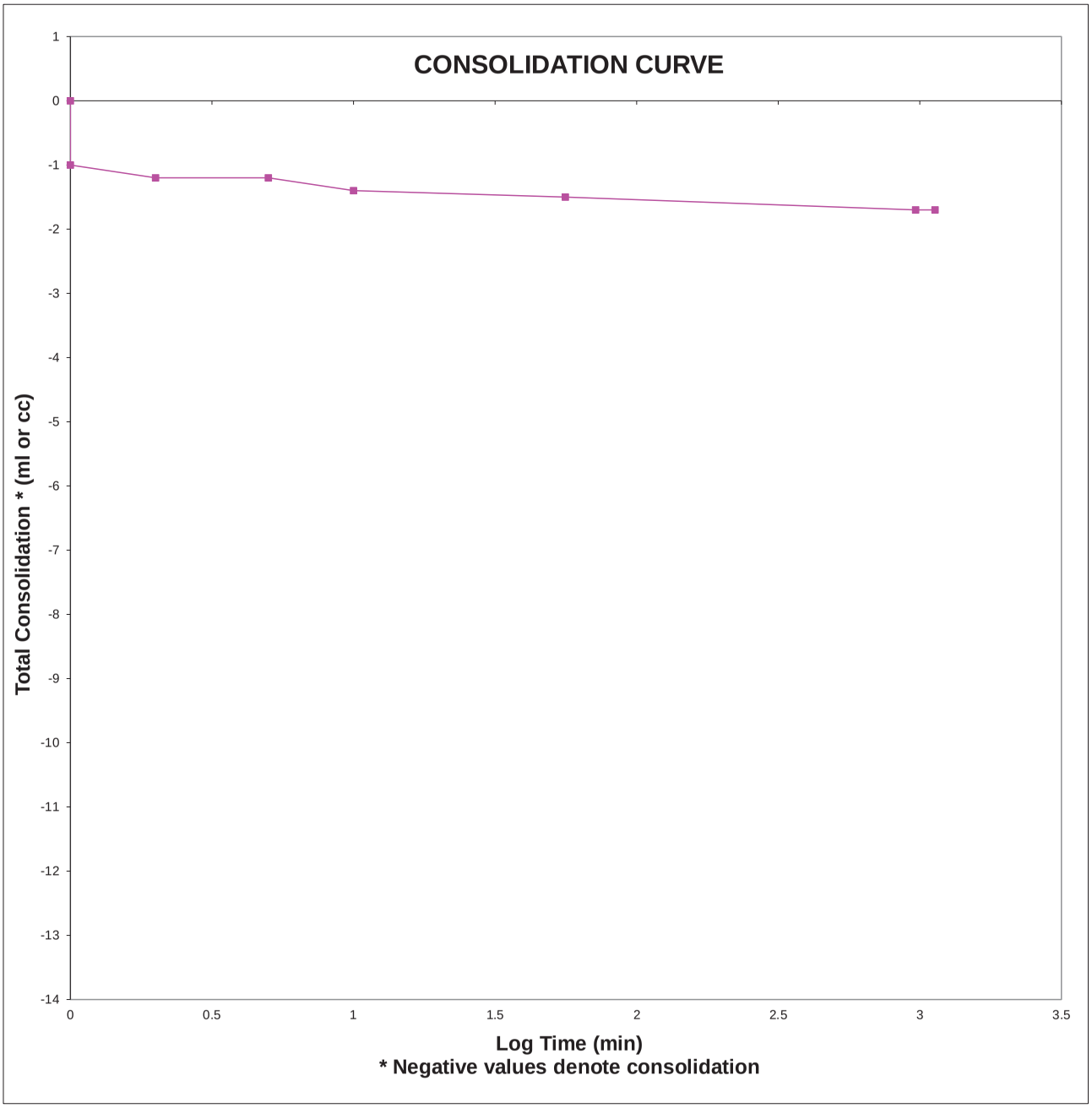
CELL PRESSURE: psi **BACK PRESSURE:** psi **EFFECTIVE STRESS:** 0 psi

TEST DATE	*TESTED BY*	*TIME (Military)*	*ELAPSED TIME (minutes)*	*TOTAL TIME (minutes)*	*TOTAL TIME (Log)*	*SPECIMEN CONSOLIDATION (ML)*		
						READING		*ACTUAL*
						BOTTOM	*TOP*	*TOTAL (Ct)*
5 / 16 / 2019	TNB	14 : 59	0	0	0	24.0	24.0	0.0
5 / 16 / 2019	TNB	15 : 0	1	1	0.00	23.5	23.5	1.0
5 / 16 / 2019	TNB	15 : 1	1	2	0.30	23.4	23.4	1.2
5 / 16 / 2019	TNB	15 : 4	3	5	0.70	23.4	23.4	1.2
5 / 16 / 2019	TNB	15 : 9	5	10	1.00	23.3	23.3	1.4
5 / 16 / 2019	TNB	15 : 55	46	56	1.75	23.4	23.1	1.5
5 / 17 / 2019	TNB	7 : 5	910	966	2.98	23.0	23.3	1.7
5 / 17 / 2019	TNB	9 : 51	166	1132	3.05	23.0	23.3	1.7

PERMEABILITY ASTM D5084

CONSOLIDATION CURVE

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		



PERMEABILITY ASTM D5084

TEST DATA

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		

DATE	TESTED BY	TIME (military)	ELAPSED TIME (minutes)	HYDRAULIC HEAD (cm)		TEMP. C°	GAUGE PRESSURE (psi)		
				INFLUENT	EFFLUENT		CELL	INFLUENT	EFFLUENT
5 / 17 / 19	TNB	9 : 55	0	1.0	24.0	20.0	109.0	85.0	85.0
5 / 17 / 19	TNB	13 : 0	185	1.5	23.5	20.0	109.0	85.0	85.0
5 / 20 / 19	TNB	10 : 51	RESET	1.0	24.0	20.0	109.0	85.0	85.0
5 / 20 / 19	TNB	14 : 42	231	1.5	23.5	20.0	109.0	85.0	85.0
5 / 21 / 19	TNB	8 : 19	1057	3.3	21.7	20.0	109.0	85.0	85.0
5 / 21 / 19	TNB	15 : 31	432	3.8	21.2	20.0	109.0	85.0	85.0
5 / 22 / 19	TNB	8 : 53	1042	5.5	19.5	20.0	109.0	85.0	85.0
5 / 22 / 19	TNB	15 : 26	RESET	1.0	24.0	20.0	109.0	85.0	85.0
5 / 23 / 19	TNB	8 : 13	1007	3.0	22.0	20.0	109.0	85.0	85.0
5 / 23 / 19	TNB	13 : 6	293	3.5	21.5	20.0	109.0	85.0	85.0
5 / 24 / 19	TNB	8 : 8	1142	5.0	20.0	20.0	109.0	85.0	85.0
5 / 26 / 19	TNB	10 : 36	3028	8.3	16.7	20.0	109.0	85.0	85.0
5 / 26 / 19	TNB	10 : 37	RESET	1.0	24.0	20.0	109.0	85.0	85.0
5 / 27 / 19	TNB	13 : 53	1636	4.0	21.0	20.0	109.0	85.0	85.0
5 / 28 / 19	TNB	8 : 5	1092	5.5	19.5	20.0	109.0	85.0	85.0
5 / 28 / 19	TNB	14 : 37	RESET	1.0	24.0	20.0	109.0	85.0	85.0
5 / 29 / 19	TNB	7 : 34	1017	3.0	22.0	20.0	109.0	85.0	85.0
5 / 29 / 19	TNB	12 : 35	301	3.5	21.5	20.0	109.0	85.0	85.0
5 / 30 / 19	TNB	7 : 13	1118	5.1	19.1	20.0	109.0	85.0	85.0
5 / 31 / 19	TNB	7 : 59	1486	6.8	18.2	20.0	109.0	85.0	85.0
6 / 3 / 19	TNB	7 : 36	4297	9.7	15.3	20.0	109.0	85.0	85.0
6 / 3 / 19	TNB	8 : 14	RESET	1.0	24.0	20.0	109.0	85.0	85.0
6 / 3 / 19	TNB	13 : 11	297	1.5	23.5	20.0	109.0	85.0	85.0
6 / 4 / 19	TNB	8 : 40	1169	3.5	21.5	20.0	109.0	85.0	85.0
6 / 5 / 19	TNB	7 : 18	RESET	1.0	24.0	20.0	109.0	85.0	85.0
6 / 5 / 19	TNB	11 : 11	233	1.5	23.5	20.0	109.0	85.0	85.0
6 / 6 / 19	TNB	13 : 27	1576	4.0	21.0	20.0	109.0	85.0	85.0
6 / 7 / 19	TNB	9 : 25	1198	5.5	19.5	20.0	109.0	85.0	85.0
6 / 10 / 19	TNB	7 : 9	RESET	1.0	24.0	20.0	109.0	85.0	85.0
6 / 10 / 19	TNB	11 : 22	253	1.5	23.5	20.0	109.0	85.0	85.0
6 / 11 / 19	TNB	8 : 15	1253	3.5	21.5	20.0	109.0	85.0	85.0
6 / 12 / 19	TNB	8 : 6	1431	5.2	19.8	20.0	109.0	85.0	85.0
6 / 13 / 19	TNB	10 : 16	1570	6.7	18.3	20.0	109.0	85.0	85.0
6 / 14 / 19	TNB	8 : 52	1356	7.7	17.3	20.0	109.0	85.0	85.0

PERMEABILITY ASTM D5084

TEST DATA (continued)

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		

ELAPSED TIME (minutes)	*HYDRAULIC HEAD DIFFERENCE (cm)*		*EFFLUENT - INFLUENT RATIO*	*HYDRAULIC GRADIENT (cm/cm)*	*HYDRAULIC CONDUCTIVITY (cm/sec)*	
	INFLUENT	*EFFLUENT*			*@ Temp.*	*@ 20° C*
0				3.166		
185	0.5	0.5	1.00	3.028	3.24E-07	3.26E-07
RESET				3.166		
231	0.5	0.5	1.00	3.028	2.60E-07	2.61E-07
1057	1.8	1.8	1.00	2.533	2.28E-07	2.29E-07
432	0.5	0.5	1.00	2.395	1.75E-07	1.75E-07
1042	1.7	1.7	1.00	1.927	2.82E-07	2.83E-07
RESET				3.166		
1007	2.0	2.0	1.00	2.615	2.56E-07	2.57E-07
293	0.5	0.5	1.00	2.478	2.49E-07	2.50E-07
1142	1.5	1.5	1.00	2.065	2.15E-07	2.16E-07
3028	3.3	3.3	1.00	1.156	2.58E-07	2.60E-07
RESET				3.166		
1636	3.0	3.0	1.00	2.340	2.49E-07	2.51E-07
1092	1.5	1.5	1.00	1.927	2.40E-07	2.41E-07
RESET				3.166		
1017	2.0	2.0	1.00	2.615	2.54E-07	2.55E-07
301	0.5	0.5	1.00	2.478	2.42E-07	2.44E-07
1118	1.6	2.4	1.50	1.927	3.03E-07	3.05E-07
1486	1.7	0.9	0.53	1.569	1.87E-07	1.87E-07
4297	2.9	2.9	1.00	0.771	2.23E-07	2.24E-07
RESET				3.166		
297	0.5	0.5	1.00	3.028	2.02E-07	2.03E-07
1169	2.0	2.0	1.00	2.478	2.32E-07	2.33E-07
RESET				3.166		
233	0.5	0.5	1.00	3.028	2.57E-07	2.59E-07
1576	2.5	2.5	1.00	2.340	2.21E-07	2.22E-07
1198	1.5	1.5	1.00	1.927	2.19E-07	2.20E-07
RESET				3.166		
253	0.5	0.5	1.00	3.028	2.37E-07	2.38E-07
1253	2.0	2.0	1.00	2.478	2.16E-07	2.17E-07
1431	1.7	1.7	1.00	2.010	1.97E-07	1.98E-07
1570	1.5	1.5	1.00	1.597	1.98E-07	1.99E-07
1356	1.0	1.0	1.00	1.321	1.88E-07	1.89E-07

PERMEABILITY ASTM D5084

SUMMARY OF RESULTS

PROJECT:	ACW	TESTED BY:	TNB
PROJECT No.:	SH0682	TRACKING CODE:	D268
SAMPLE No.:	BWM-24	EQUIPMENT No.:	2
TEST DATE:	5/15/19		

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	108.5 lb/ft³	109.6 lb/ft³
DRY UNIT WEIGHT	77.7 lb/ft³	78.2 lb/ft³
MOISTURE CONTENT	39.6 %	40.1 %
PERMEABILITY @ 20°C	2.4E-07 cm/sec	

Appendix J:
Thermal Compatibility Testing Data Sheets

THERMAL DESORPTION DATA

PROJECT:	ACW	TESTING DATE:	5/8/2019
PROJECT No:	SH0682	TESTED BY:	MTC
MATERIAL TYPE	BWM-23 & BWM-24 80C	TRACKING CODE:	D395

SET-UP, MONITORING, and TESTING INFORMATION (Reactor 1)		
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (MINIMUM SUBMERSION LEVEL)	7505.0	g
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (2ND SUBMERSION LEVEL)	7947.0	g
LENGTH OF TREATMENT	28 days	

2"X4" SOIL SPECIMEN DIMENSIONS

SAMPLE NAME	BWM-23 80C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0085	in.	3.9595	in	1.9985	in	3.9450	in
No. 2	2.0040	in.	3.9495	in	1.9960	in	3.9670	in
No. 3	1.9850	in.	3.9290	in	1.9875	in	3.9635	in
Average	1.9992	in.	3.9460	in	1.9940	in	3.9585	in
Speciment WT	345.80	g			352.69	g		

SAMPLE NAME	BWM-23 80C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0150	in.	3.9815	in	1.9980	in	3.9990	in
No. 2	2.0030	in.	3.9570	in	1.9995	in	3.9620	in
No. 3	1.9885	in.	3.9620	in	1.9895	in	3.9675	in
Average	2.0022	in.	3.9668	in	1.9957	in	3.9762	in
Speciment WT	347.22	g			353.89	g		

SAMPLE NAME	BWM-24 80C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	1.9975	in.	3.8215	in	2.0105	in	3.8490	in
No. 2	1.9900	in.	3.8250	in	2.0005	in	3.8620	in
No. 3	1.9860	in.	3.8260	in	1.9955	in	3.8440	in
Average	1.9912	in.	3.8242	in	2.0022	in	3.8517	in
Speciment WT	335.10	g			338.61	g		

SAMPLE NAME	BWM-24 80C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0030	in.	3.7945	in	2.0100	in	3.8475	in
No. 2	2.0045	in.	3.8220	in	1.9920	in	3.8025	in
No. 3	1.9885	in.	3.8030	in	1.9820	in	3.8420	in
Average	1.9987	in.	3.8065	in	1.9947	in	3.8307	in
Speciment WT	334.58	g			339.08	g		

KEMRON ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	ACW	TESTING DATE:	5/8/2019
PROJECT No:	SH0682	TESTED BY:	MTC
MATERIAL TYPE	BWM-23 & BWM-24 80C	TRACKING CODE:	D395

SET-UP, MONITORING, and TESTING INFORMATION (Reactor 2)		
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (MINIMUM SUBMERSION LEVEL)	7888.5	g
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (2ND SUBMERSION LEVEL)	7927.0	g
LENGTH OF TREATMENT	28 days	

3"X6" SOIL SPECIMEN DIMENSIONS

SAMPLE NAME	BWM-23 80C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9780	in.	1.3665	in	2.9795	in	1.3630	in
No. 2	2.9770	in.	1.3350	in	2.9730	in	1.3275	in
No. 3	2.9660	in.	1.3610	in	2.9705	in	1.3430	in
Average	2.9737	in.	1.3542	in	2.9743	in	1.3445	in
Speciment WT	263.87	g			270.30	g		

SAMPLE NAME	BWM-23 80C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9705	in.	1.3900	in	2.9740	in	1.3830	in
No. 2	2.9725	in.	1.3880	in	2.9710	in	1.3920	in
No. 3	2.9695	in.	1.4055	in	2.9705	in	1.4095	in
Average	2.9708	in.	1.3945	in	2.9718	in	1.3948	in
Speciment WT	271.56	g			276.16	g		

SAMPLE NAME	BWM-24 80C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9750	in.	1.3885	in	2.9755	in	1.3785	in
No. 2	2.9800	in.	1.3525	in	2.9740	in	1.3445	in
No. 3	2.9710	in.	1.3450	in	2.9750	in	1.3650	in
Average	2.9753	in.	1.3620	in	2.9748	in	1.3627	in
Speciment WT	271.26	g			262.61	g		

SAMPLE NAME	BWM-24 80C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9725	in.	1.3955	in	2.9810	in	1.4140	in
No. 2	2.9700	in.	1.4165	in	2.9745	in	1.3795	in
No. 3	2.9700	in.	1.3920	in	2.9715	in	1.4140	in
Average	2.9708	in.	1.4013	in	2.9757	in	1.4025	in
Speciment WT	278.81	g			278.85	g		

VISUAL OBSERVATIONS - BEFORE TREATMENT

Pressure Check: Maintained 30 psi for 10 minutes

VISUAL OBSERVATIONS - AFTER TREATMENT

Particles from samples have settled on the bottom of the reactor
Faint chemical odor
Samples have slightly darkened in color; No oily sheen on water surface
Slight deterioration on edges

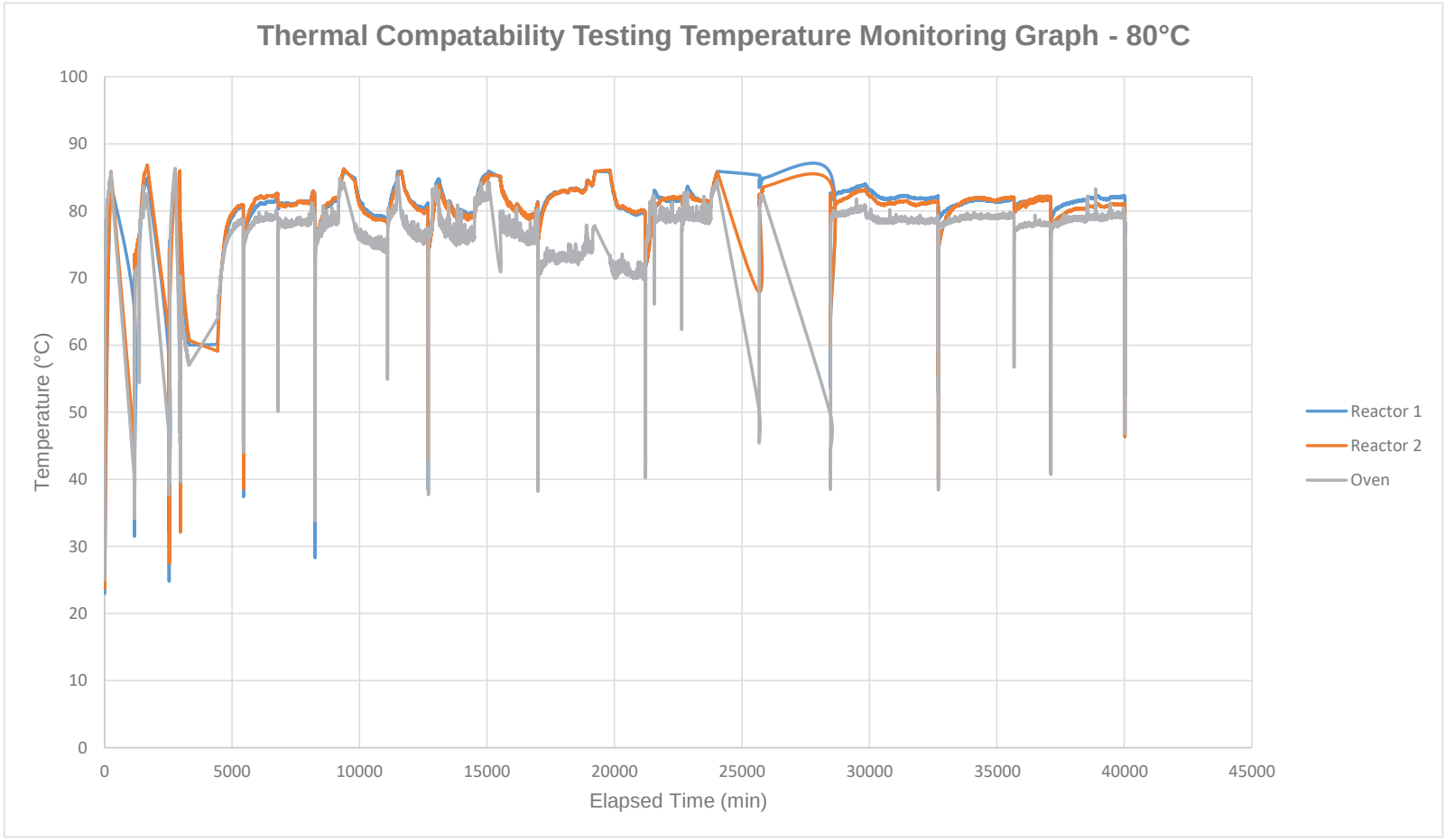
Notes:

2"X4" samples were place in reactor 1 and 3"X6" samples were placed in reactor 2
https://atl.kemron.com/se/ATG/Projects/SH0682 BV American Creosote (ACW) ISS/Data Sheets/D395_TDD Thermal

BLACK & VEATCH
AMERICAL CREOSOTE ISS
KEMRON Project No. SH0682

Figure 1

Thermal Compatability Testing Temperature Monitoring Graph - 80°C



Notes:
The decrease in temperature occurred when reactor was removed from oven to ne weighed or when additional DI water was added to the reactors

KEMRON ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	ACW	TESTING DATE:	5/8/2019
PROJECT No:	SH0682	TESTED BY:	ISM
MATERIAL TYPE	BWM-23 & BWM-24 100C	TRACKING CODE:	D396

SET-UP, MONITORING, and TESTING INFORMATION		
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (MINIMUM SUBMERSION LEVEL)	11.0	lbs
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (2ND SUBMERSION LEVEL)	11.0	lbs
LENGTH OF TREATMENT	28 days	

2"X4" SOIL SPECIMEN DIMENSIONS

SAMPLE NAME	BWM-23 100 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	1.9995	in.	3.9080	in	2.0210	in	3.9780	in
No. 2	1.9990	in.	3.9520	in	2.0030	in	3.9285	in
No. 3	1.9875	in.	3.9140	in	1.9880	in	3.9195	in
Average	1.9953	in.	3.9247	in	2.0040	in	3.9420	in
Speciment WT			343.55	g			350.04	g

SAMPLE NAME	BWM-23 100 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	1.9980	in.	3.9075	in	2.0095	in	3.9680	in
No. 2	1.9995	in.	3.9410	in	2.0005	in	3.9265	in
No. 3	1.9850	in.	3.9265	in	1.9890	in	3.9125	in
Average	1.9942	in.	3.9250	in	1.9997	in	3.9357	in
Speciment WT			341.87	g			350.95	g

SAMPLE NAME	BWM-24 100 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	1.9805	in.	3.8240	in	1.9855	in	3.8415	in
No. 2	1.9920	in.	3.8505	in	1.9910	in	3.8300	in
No. 3	1.9875	in.	3.8500	in	1.9885	in	3.8330	in
Average	1.9867	in.	3.8415	in	1.9883	in	3.8348	in
Speciment WT			341.89	g			342.44	g

SAMPLE NAME	BWM-24 100 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0015	in.	3.8490	in	1.9995	in	3.8195	in
No. 2	2.0035	in.	3.8225	in	1.9980	in	3.8355	in
No. 3	1.9815	in.	3.8500	in	1.9890	in	3.8350	in
Average	1.9955	in.	3.8405	in	1.9955	in	3.8300	in
Speciment WT			338.51	g			339.32	g

THERMAL DESORPTION DATA

PROJECT:	ACW	TESTING DATE:	5/8/2019
PROJECT No:	SH0682	TESTED BY:	ISM
MATERIAL TYPE	BWM-23 & BWM-24 100C	TRACKING CODE:	D396

3"X6" SOIL SPECIMEN DIMENSIONS

SAMPLE NAME	BWM-23 100 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9780	in.	1.3570	in	2.9735	in	1.3630	in
No. 2	2.9690	in.	1.3640	in	2.9725	in	1.3420	in
No. 3	2.9720	in.	1.3425	in	2.9760	in	1.3615	in
Average	2.9730	in.	1.3545	in	2.9740	in	1.3555	in
Speciment WT			263.86	g			266.7	g

SAMPLE NAME	BWM-23 100 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9720	in.	1.2475	in	2.9780	in	1.2695	in
No. 2	2.9655	in.	1.2615	in	2.9725	in	1.2730	in
No. 3	2.9710	in.	1.2430	in	2.9730	in	1.2540	in
Average	2.9695	in.	1.2507	in	2.9745	in	1.2655	in
Speciment WT			244.66	g			251.36	g

SAMPLE NAME	BWM-24 100 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9780	in.	1.4020	in	2.9830	in	1.4105	in
No. 2	2.9695	in.	1.4050	in	2.9735	in	1.3975	in
No. 3	2.9725	in.	1.3895	in	2.9700	in	1.3870	in
Average	2.9733	in.	1.3988	in	2.9755	in	1.3983	in
Speciment WT			279.51	g			277.12	g

SAMPLE NAME	BWM-24 100 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9710	in.	1.2585	in	2.9735	in	1.2650	in
No. 2	2.9680	in.	1.2835	in	2.9700	in	1.2630	in
No. 3	2.9715	in.	1.2565	in	2.9785	in	1.2550	in
Average	2.9702	in.	1.2662	in	2.9740	in	1.2610	in
Speciment WT			253.45	g			247.03	g

VISUAL OBSERVATIONS - BEFORE TREATMENT

Pressure Check: Maintained 30 psi for 10 minutes

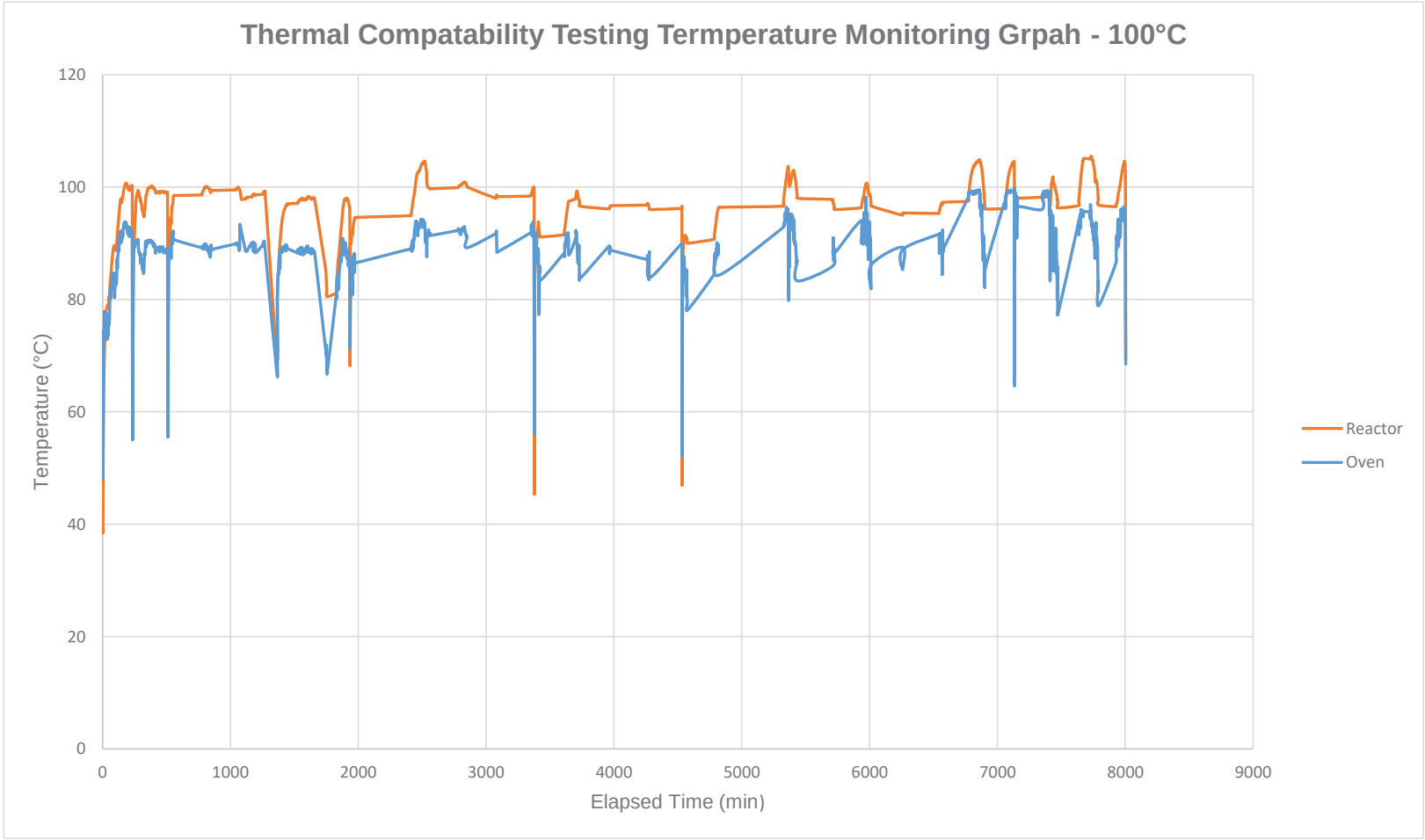
VISUAL OBSERVATIONS - AFTER TREATMENT

Particles from samples have settled on the bottom of the reactor
Faint chemical odor
Samples have slightly darkened in color; No oily sheen on water surface
Slight deterioration on edges

BLACK & VEATCH
AMERICAL CREOSOTE ISS
KEMRON Project No. SH0682

Figure 2

Thermal Compatability Testing Temperature Monitoring Graph - 100°C



Notes:
The decrease in temperature occurred when reactor was removed from oven to be weighed or when additional DI water was added to the reactors

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	ACW	TESTING DATE:	5/9/2019
PROJECT No:	SH0682	TESTED BY:	CCN
MATERIAL TYPE	BWM-23 & BWM-24 125C	TRACKING CODE:	D397

SET-UP, MONITORING, and TESTING INFORMATION		
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (MINIMUM SUBMERSION LEVEL)	12227.0	g
WEIGHT OF UNTREATED SAMPLES + TARE + WATER (2ND SUBMERSION LEVEL)	12540.5	g
LENGTH OF TREATMENT	28 days	

2"X4" SOIL SPECIMEN DIMENSIONS

SAMPLE NAME	BWM-23 125 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0130	in.	3.9685	in	2.0115	in	4.0100	in
No. 2	2.0150	in.	3.9420	in	2.0050	in	3.9935	in
No. 3	1.9860	in.	3.9470	in	1.9925	in	3.9780	in
Average	2.0047	in.	3.9525	in	2.0030	in	3.9938	in
Speciment WT			347.37	g			353.77	g

SAMPLE NAME	BWM-23 125 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	1.9830	in.	3.9755	in	1.9980	in	3.9875	in
No. 2	1.9915	in.	3.9600	in	1.9985	in	3.9655	in
No. 3	1.9860	in.	3.9415	in	1.9945	in	3.9690	in
Average	1.9868	in.	3.9590	in	1.9970	in	3.9740	in
Speciment WT			346.45	g			353.65	g

SAMPLE NAME	BWM-24 125 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0020	in.	3.8350	in	2.0130	in	3.8535	in
No. 2	2.0050	in.	3.8560	in	2.0015	in	3.8365	in
No. 3	1.9875	in.	3.8375	in	1.9925	in	3.8495	in
Average	1.9982	in.	3.8428	in	2.0023	in	3.8465	in
Speciment WT			335.35	g			338.02	g

SAMPLE NAME	BWM-24 125 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.0100	in.	3.8065	in	2.0130	in	3.8195	in
No. 2	2.0230	in.	3.8240	in	2.0080	in	3.8300	in
No. 3	1.9875	in.	3.8275	in	1.9935	in	3.8500	in
Average	2.0068	in.	3.8193	in	2.0048	in	3.8332	in
Speciment WT			338.95	g			340.69	g

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	ACW	TESTING DATE:	5/8/2019
PROJECT No:	SH0682	TESTED BY:	CCN
MATERIAL TYPE	BWM-23 & BWM-24 125C	TRACKING CODE:	D397

3"X6" SOIL SPECIMEN DIMENSIONS

SAMPLE NAME	BWM-23 125 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9725	in.	1.5120	in	2.9745	in	1.5060	in
No. 2	2.9735	in.	1.4905	in	2.9920	in	1.4770	in
No. 3	2.9715	in.	1.4995	in	2.9730	in	1.4795	in
Average	2.9725	in.	1.5007	in	2.9798	in	1.4875	in
Speciment WT			293.44	g			297.26	g

SAMPLE NAME	BWM-23 125 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9760	in.	1.2295	in	2.9800	in	1.2045	in
No. 2	2.9720	in.	1.2545	in	2.9750	in	1.2550	in
No. 3	2.9685	in.	1.2380	in	2.9755	in	1.2335	in
Average	2.9722	in.	1.2407	in	2.9768	in	1.2310	in
Speciment WT			244.58	g			247.01	g

SAMPLE NAME	BWM-24 125 C							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9755	in.	1.3295	in	2.9760	in	1.3130	in
No. 2	2.9730	in.	1.3125	in	2.9730	in	1.3680	in
No. 3	2.9665	in.	1.3185	in	2.9785	in	1.3375	in
Average	2.9717	in.	1.3202	in	2.9758	in	1.3395	in
Speciment WT			264.55	g			265.88	g

SAMPLE NAME	BWM-24 125 C DUP							
	INITIAL				FINAL			
	DIAMETER		LENGTH		DIAMETER		LENGTH	
No. 1	2.9725	in.	1.3245	in	2.9765	in	1.3195	in
No. 2	2.9705	in.	1.3400	in	2.9800	in	1.3175	in
No. 3	2.9695	in.	1.3490	in	2.9755	in	1.3500	in
Average	2.9708	in.	1.3378	in	2.9773	in	1.3290	in
Speciment WT			271.3	g			260.65	g

VISUAL OBSERVATIONS - BEFORE TREATMENT

Pressure Check: Manintained 30 psi for 10 minutes

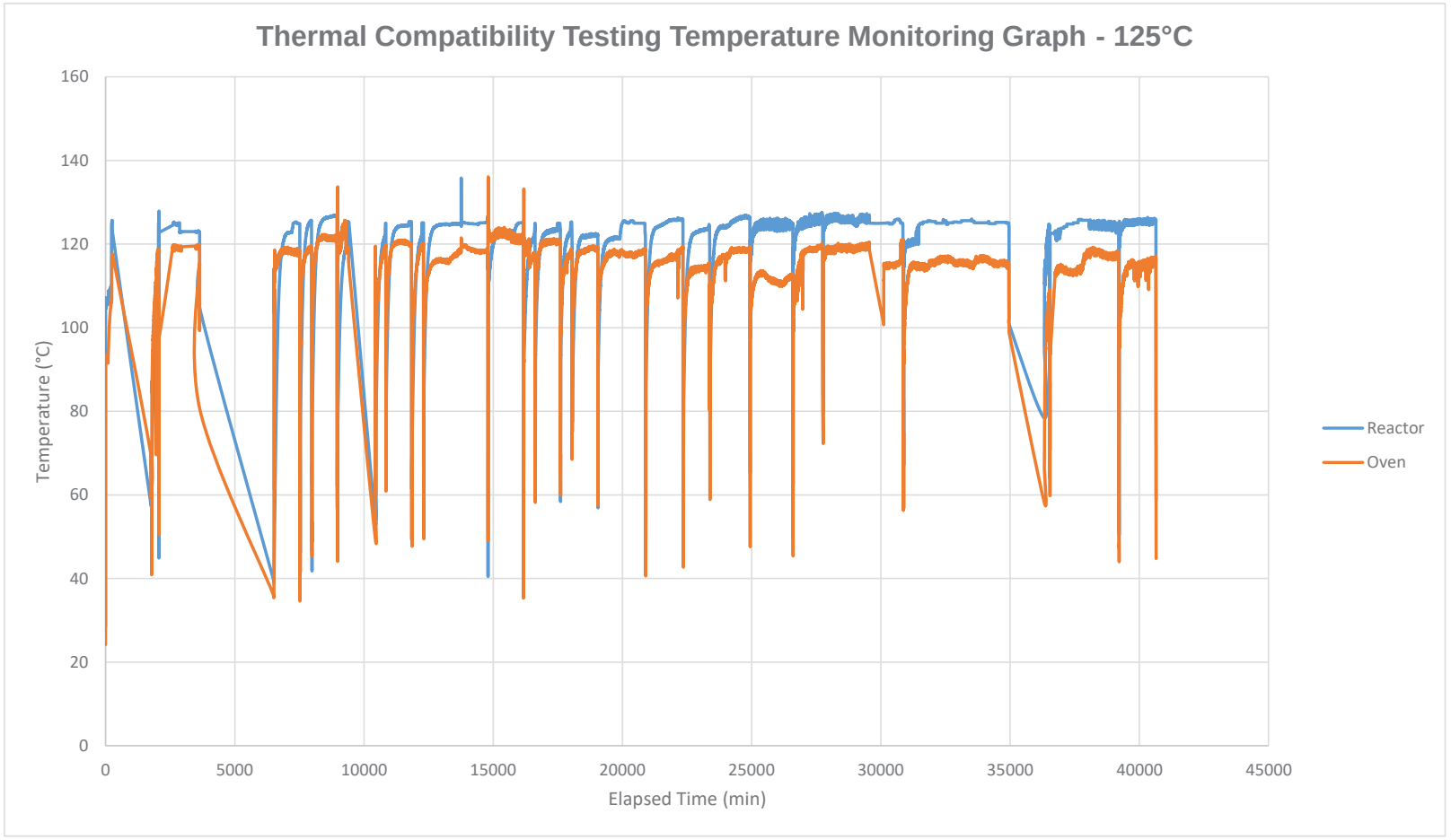
VISUAL OBSERVATIONS - AFTER TREATMENT

Particles from samples have settled on the bottom of the reactor
Faint chemical odor
Samples have slightly darkened in color; No oily sheen on water surface
Slight deterioration on edges

BLACK & VEATCH
AMERICAN CREOSOTE ISS
KEMRON Project No. SH0682

Figure 3

Thermal Compatability Testing Temperature Monitoring Graph - 125°C



Notes:
The decrease in temperature occurred when reactor was removed from oven to ne weighed or when additional DI water was added to the reactors

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D363

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	224.67	g
3. WT WET SOIL + TARE	375.61	g
4. WT DRY SOIL + TARE	335.88	g
5. WT WATER, Ww	39.73	g
6. WT DRY SOIL, Ws	111.21	g
7. MOISTURE CONTENT, W	**35.73**	**%**

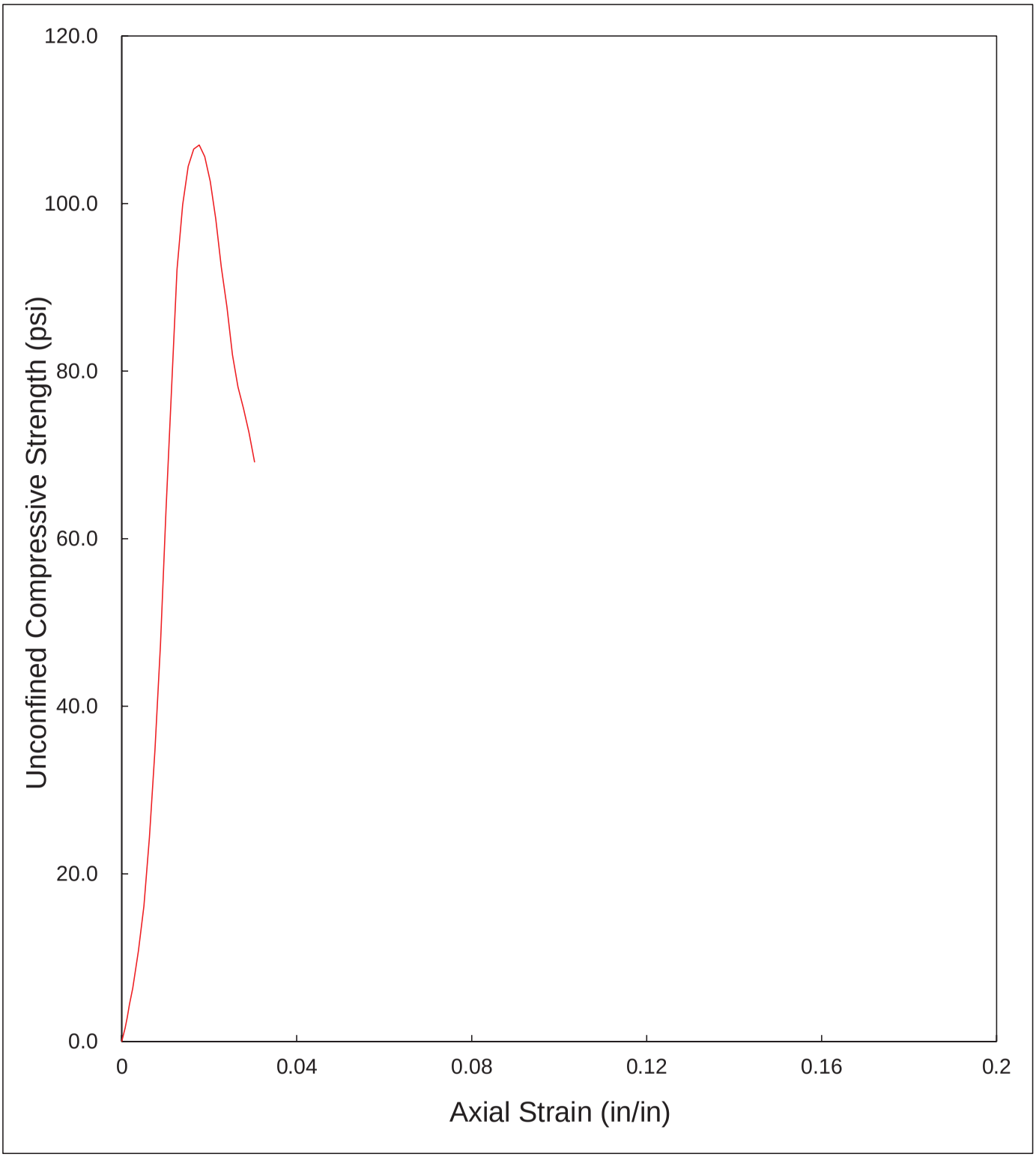
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.95	in.
No. 2	2.00	in.	3.94	in.
No. 3	1.99	in.	3.97	in.
Average	**2.00**	**in.**	**3.95**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***343.43***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	12.41	in^3
Initial Bulk Unit Weight,	105.4	lb/ft^3
Initial Dry Unit Weight	77.7	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	107.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.140	0.0000	0.0
5	0.003	0.003	3.142	0.0008	1.6
9	0.005	0.005	3.144	0.0013	2.9
14	0.007	0.007	3.146	0.0018	4.5
20	0.010	0.010	3.148	0.0025	6.4
34	0.015	0.015	3.152	0.0038	10.8
51	0.020	0.020	3.156	0.0051	16.2
77	0.025	0.025	3.160	0.0063	24.4
110	0.030	0.030	3.164	0.0076	34.8
150	0.035	0.035	3.168	0.0089	47.3
201	0.040	0.040	3.172	0.0101	63.4
247	0.045	0.045	3.176	0.0114	77.8
293	0.050	0.050	3.180	0.0127	92.1
318	0.055	0.055	3.184	0.0139	99.9
333	0.060	0.060	3.188	0.0152	104.4
340	0.065	0.065	3.193	0.0164	106.5
342	0.070	0.070	3.197	0.0177	107.0
338	0.075	0.075	3.201	0.0190	105.6
329	0.080	0.080	3.205	0.0202	102.7
315	0.085	0.085	3.209	0.0215	98.2
297	0.090	0.090	3.213	0.0228	92.4
282	0.095	0.095	3.217	0.0240	87.6
264	0.100	0.100	3.222	0.0253	81.9
252	0.105	0.105	3.226	0.0266	78.1
244	0.110	0.110	3.230	0.0278	75.5
235	0.115	0.115	3.234	0.0291	72.7
224	0.120	0.120	3.238	0.0304	69.2

UNCONFINED COMPRESSION TESTING

Sample No. BWM-23 (20C)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D363

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	35.7	**%**
BULK UNIT WEIGHT	105.4	lb/ft^3
DRY UNIT WEIGHT	77.7	lb/ft^3
UCS *	107.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K21
Sample #:	BWM-23 20C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.24	1.24
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	8.6	8.6
Mass, g	240	248
Bulk Density, pcf	106	110
Moisture Content, %	33.5	37.8
Dry Density, pcf	79.6	79.6
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
7/3	3	104	80	143.7	142.7	1.0	600	45.6	6.7E-08	21	0.976	6.5E-08
7/3	4	104	80	142.7	138.0	4.7	3000	45.3	6.4E-08	21	0.976	6.2E-08
7/3	5	104	80	138.0	137.2	0.8	540	43.8	6.2E-08	21	0.976	6.0E-08
7/3	6	104	80	137.2	136.6	0.6	360	43.6	7.0E-08	21	0.976	6.8E-08

PERMEABILITY AT 20° C: 6.4 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 DUP (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D364

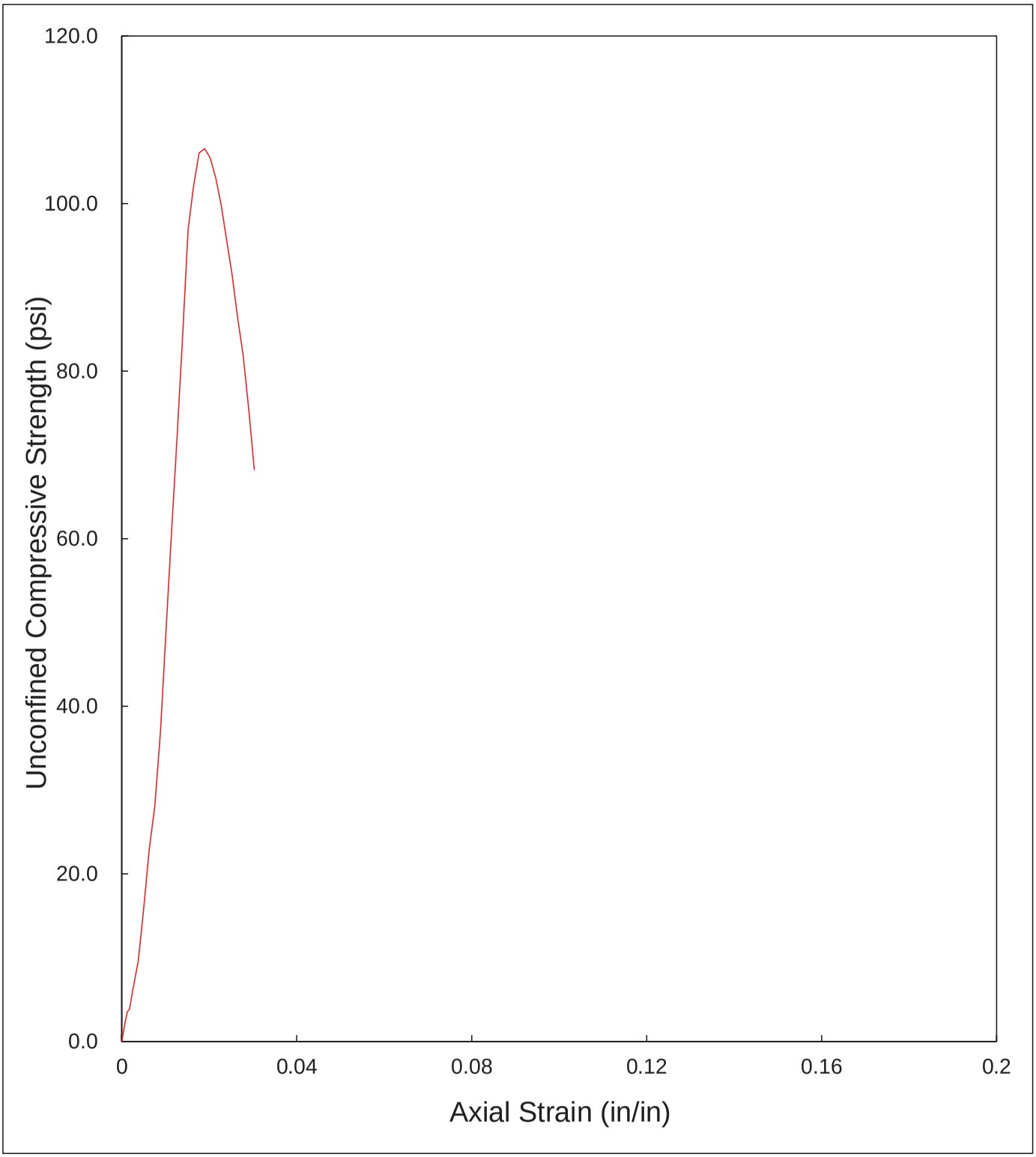
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	221.44	g
3. WT WET SOIL + TARE	356.14	g
4. WT DRY SOIL + TARE	322.32	g
5. WT WATER, Ww	33.82	g
6. WT DRY SOIL, Ws	100.88	g
7. MOISTURE CONTENT, W	**33.52**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.99	in.	3.98	in.
No. 2	1.99	in.	3.94	in.
No. 3	1.99	in.	3.96	in.
Average	**1.99**	**in.**	**3.96**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***338.56***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	12.32	in^3
Initial Bulk Unit Weight,	104.7	lb/ft^3
Initial Dry Unit Weight	78.4	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	106.5	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.112	0.0000	0.0
7	0.003	0.003	3.115	0.0008	2.2
11	0.005	0.005	3.116	0.0013	3.5
12	0.007	0.007	3.118	0.0018	3.8
19	0.010	0.010	3.120	0.0025	6.1
30	0.015	0.015	3.124	0.0038	9.6
50	0.020	0.020	3.128	0.0051	16.0
72	0.025	0.025	3.132	0.0063	23.0
88	0.030	0.030	3.136	0.0076	28.1
116	0.035	0.035	3.140	0.0088	36.9
154	0.040	0.040	3.144	0.0101	49.0
191	0.045	0.045	3.148	0.0114	60.7
227	0.050	0.050	3.152	0.0126	72.0
265	0.055	0.055	3.156	0.0139	84.0
306	0.060	0.060	3.160	0.0152	96.8
323	0.065	0.065	3.164	0.0164	102.1
336	0.070	0.070	3.168	0.0177	106.0
338	0.075	0.075	3.172	0.0189	106.5
335	0.080	0.080	3.177	0.0202	105.5
328	0.085	0.085	3.181	0.0215	103.1
318	0.090	0.090	3.185	0.0227	99.9
305	0.095	0.095	3.189	0.0240	95.6
292	0.100	0.100	3.193	0.0253	91.5
276	0.105	0.105	3.197	0.0265	86.3
262	0.110	0.110	3.201	0.0278	81.8
242	0.115	0.115	3.205	0.0290	75.5
219	0.120	0.120	3.210	0.0303	68.2

UNCONFINED COMPRESSION TESTING
Sample No. BWM-23 DUP (20C)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 DUP (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D364

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	33.5	**%**
BULK UNIT WEIGHT	104.7	lb/ft^3
DRY UNIT WEIGHT	78.4	lb/ft^3
UCS *	106.5	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K22
Sample #:	BWM-23 DUP 20C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.51	1.51
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	10.5	10.5
Mass, g	295	304
Bulk Density, pcf	107	111
Moisture Content, %	33.4	37.4
Dry Density, pcf	80.5	80.5
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
7/3	2	104	80	132.2	131.1	1.1	600	34.5	9.7E-08	21	0.976	9.5E-08
7/3	3	104	80	131.1	130.2	0.9	600	34.2	8.0E-08	21	0.976	7.8E-08
7/3	4	104	80	130.2	129.0	1.2	780	33.9	8.3E-08	21	0.976	8.1E-08
7/3	5	104	80	129.0	123.1	5.9	3600	33.6	9.1E-08	21	0.976	8.9E-08

PERMEABILITY AT 20° C: 8.6 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 80C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D318

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	114.36	g
3. WT WET SOIL + TARE	244.67	g
4. WT DRY SOIL + TARE	206.85	g
5. WT WATER, Ww	37.82	g
6. WT DRY SOIL, Ws	92.49	g
7. MOISTURE CONTENT, W	**40.89**	**%**

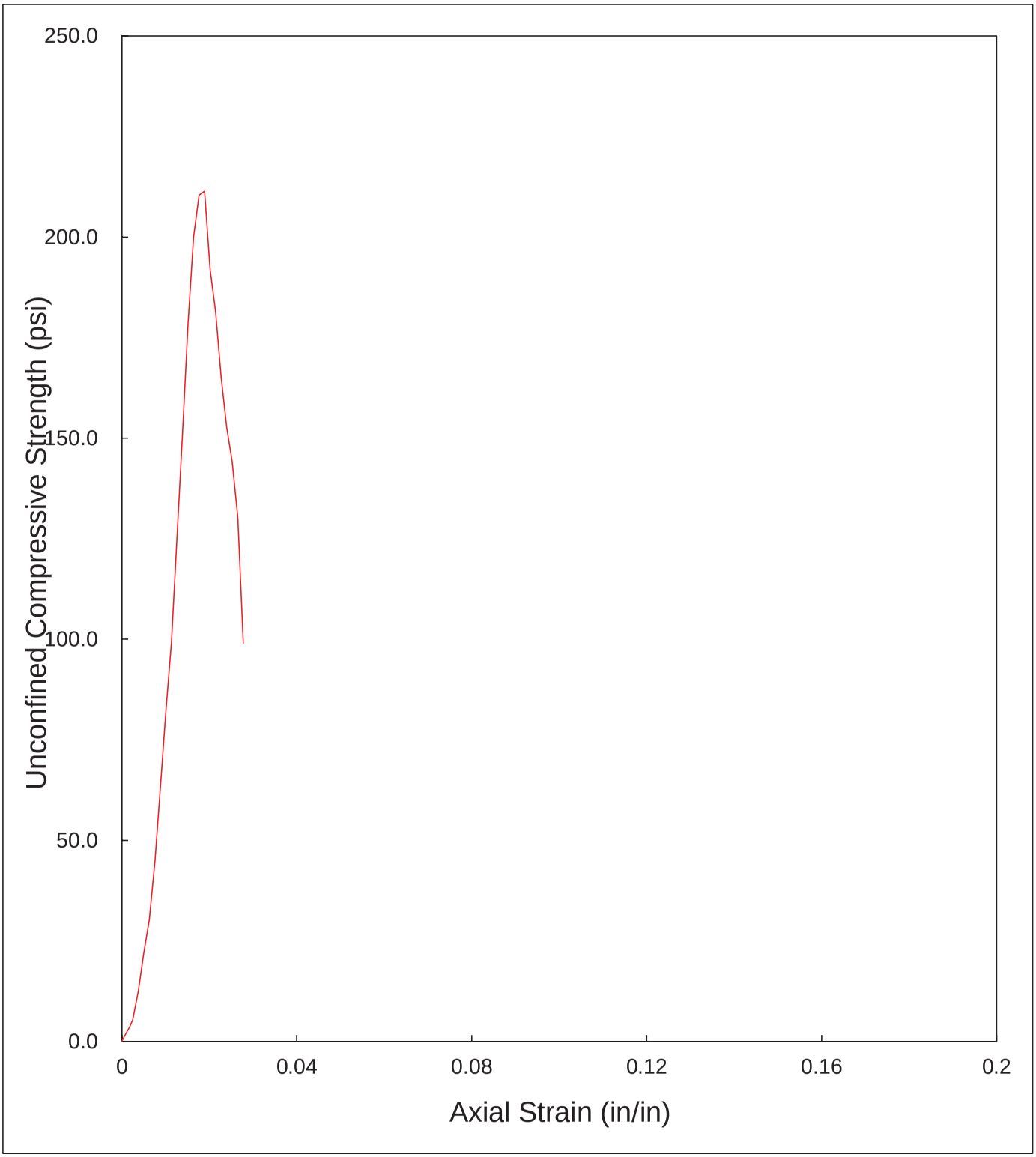
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.95	in.
No. 2	2.00	in.	3.97	in.
No. 3	1.99	in.	3.96	in.
Average	**1.99**	**in.**	**3.96**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***352.69***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	12.36	in^3
Initial Bulk Unit Weight,	108.7	lb/ft^3
Initial Dry Unit Weight	77.1	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	211.4	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.123	0.0000	0.0
5	0.003	0.003	3.125	0.0008	1.6
8	0.005	0.005	3.127	0.0013	2.6
11	0.007	0.007	3.128	0.0018	3.5
17	0.010	0.010	3.131	0.0025	5.4
39	0.015	0.015	3.135	0.0038	12.4
69	0.020	0.020	3.139	0.0051	22.0
95	0.025	0.025	3.143	0.0063	30.2
141	0.030	0.030	3.147	0.0076	44.8
200	0.035	0.035	3.151	0.0088	63.5
260	0.040	0.040	3.155	0.0101	82.4
314	0.045	0.045	3.159	0.0114	99.4
397	0.050	0.050	3.163	0.0126	125.5
479	0.055	0.055	3.167	0.0139	151.3
566	0.060	0.060	3.171	0.0152	178.5
635	0.065	0.065	3.175	0.0164	200.0
669	0.070	0.070	3.179	0.0177	210.4
673	0.075	0.075	3.183	0.0189	211.4
612	0.080	0.080	3.187	0.0202	192.0
579	0.085	0.085	3.191	0.0215	181.4
528	0.090	0.090	3.195	0.0227	165.2
489	0.095	0.095	3.200	0.0240	152.8
462	0.100	0.100	3.204	0.0253	144.2
418	0.105	0.105	3.208	0.0265	130.3
318	0.110	0.110	3.212	0.0278	99.0

UNCONFINED COMPRESSION TESTING

Sample No. BWM-23 80C



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 80C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D318

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	40.9	**%**
BULK UNIT WEIGHT	108.7	lb/ft^3
DRY UNIT WEIGHT	77.1	lb/ft^3
UCS *	211.4	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K9
Sample #:	BWM-23 80C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.33	1.33
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	9.3	9.3
Mass, g	270	270
Bulk Density, pcf	110	111
Moisture Content, %	36.7	37.2
Dry Density, pcf	80.8	80.8
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
6/18	1	104	80	187.3	186.3	1.0	1080	55.4	3.0E-08	21	0.976	3.0E-08
6/18	2	104	80	186.3	184.8	1.5	1380	55.1	3.6E-08	21	0.976	3.5E-08
6/18	3	104	80	184.8	180.8	4.0	4000	54.7	3.3E-08	21	0.976	3.3E-08
6/18	4	104	80	180.8	175.5	5.3	6600	53.5	2.8E-08	21	0.976	2.7E-08

PERMEABILITY AT 20° C: 3.1 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 80C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D319

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	114.50	g
3. WT WET SOIL + TARE	293.65	g
4. WT DRY SOIL + TARE	242.13	g
5. WT WATER, Ww	51.52	g
6. WT DRY SOIL, Ws	127.63	g
7. MOISTURE CONTENT, W	**40.37**	**%**

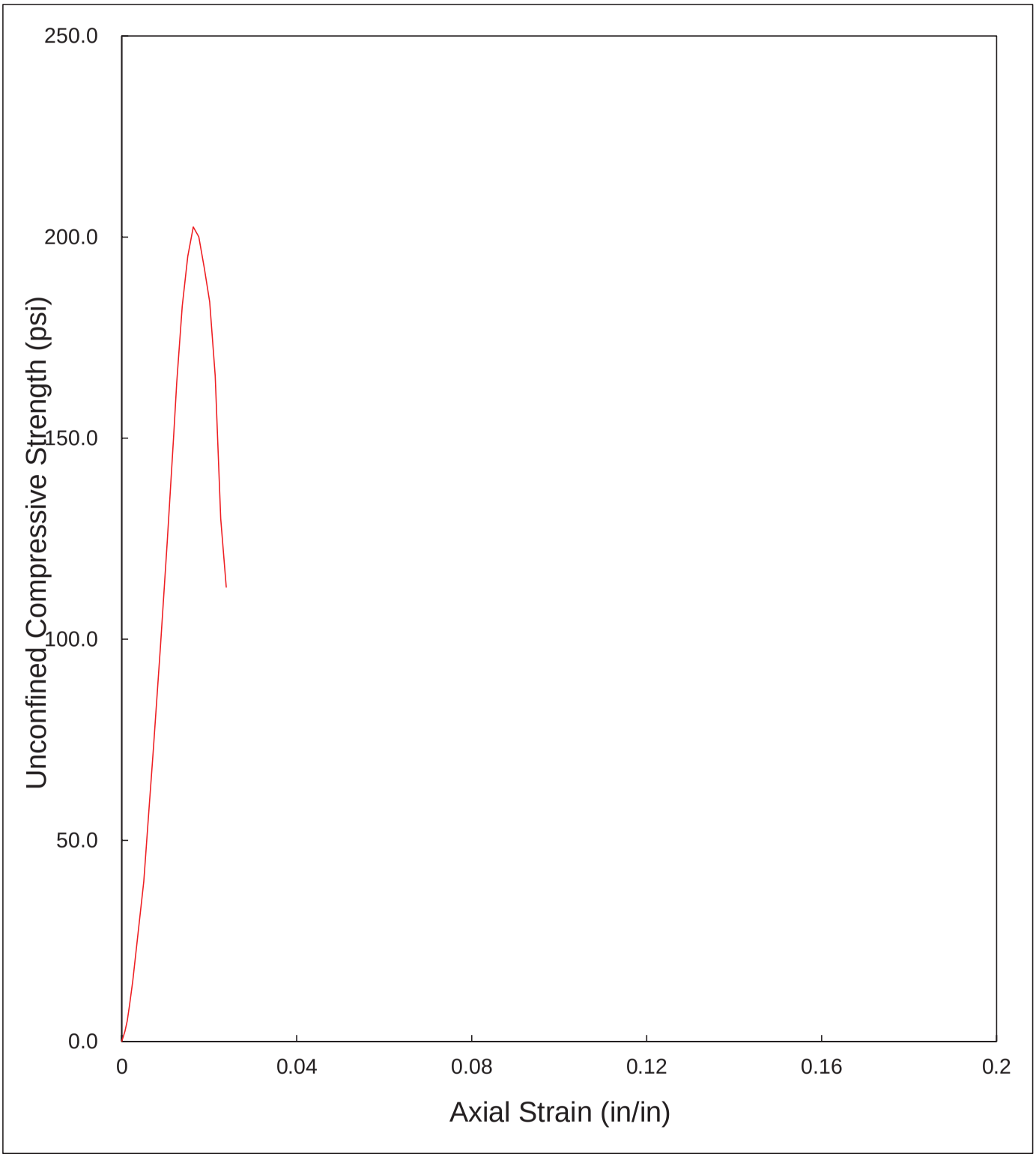
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	4.00	in.
No. 2	2.00	in.	3.96	in.
No. 3	1.99	in.	3.97	in.
Average	**2.00**	**in.**	**3.98**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***353.89***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	12.44	in^3
Initial Bulk Unit Weight,	108.4	lb/ft^3
Initial Dry Unit Weight	77.2	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	202.5	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.128	0.0000	0.0
8	0.003	0.003	3.130	0.0008	2.6
16	0.005	0.005	3.132	0.0013	5.1
28	0.007	0.007	3.134	0.0018	8.9
47	0.010	0.010	3.136	0.0025	15.0
86	0.015	0.015	3.140	0.0038	27.4
125	0.020	0.020	3.144	0.0050	39.8
185	0.025	0.025	3.148	0.0063	58.8
243	0.030	0.030	3.152	0.0075	77.1
309	0.035	0.035	3.156	0.0088	97.9
374	0.040	0.040	3.160	0.0101	118.4
443	0.045	0.045	3.164	0.0113	140.0
519	0.050	0.050	3.168	0.0126	163.8
580	0.055	0.055	3.172	0.0138	182.9
620	0.060	0.060	3.176	0.0151	195.2
644	0.065	0.065	3.180	0.0163	202.5
637	0.070	0.070	3.184	0.0176	200.1
613	0.075	0.075	3.188	0.0189	192.3
587	0.080	0.080	3.192	0.0201	183.9
529	0.085	0.085	3.196	0.0214	165.5
416	0.090	0.090	3.200	0.0226	130.0
362	0.095	0.095	3.205	0.0239	113.0

UNCONFINED COMPRESSION TESTING

Sample No. BWM-23 80C DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 80C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D319

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	40.4	**%**
BULK UNIT WEIGHT	108.4	lb/ft^3
DRY UNIT WEIGHT	77.2	lb/ft^3
UCS *	202.5	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K10
Sample #:	BWM-23 80C-DUP		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.39	1.39
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	9.6	9.6
Mass, g	275	277
Bulk Density, pcf	108	109
Moisture Content, %	38.4	39.7
Dry Density, pcf	78.3	78.3
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/18	1	104	80	200.9	200.4	0.5	1320	56.9	1.2E-08	21	0.976	1.2E-08
6/18	2	104	80	200.4	199.9	0.5	1200	56.8	1.3E-08	21	0.976	1.3E-08
6/18	3	104	80	199.9	199.4	0.5	1200	56.6	1.3E-08	21	0.976	1.3E-08
6/18	4	104	80	199.4	197.6	1.8	4800	56.5	1.2E-08	21	0.976	1.2E-08

PERMEABILITY AT 20° C: 1.3 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 100C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D322

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	116.03	g
3. WT WET SOIL + TARE	200.74	g
4. WT DRY SOIL + TARE	175.98	g
5. WT WATER, Ww	24.76	g
6. WT DRY SOIL, Ws	59.95	g
7. MOISTURE CONTENT, W	**41.30**	**%**

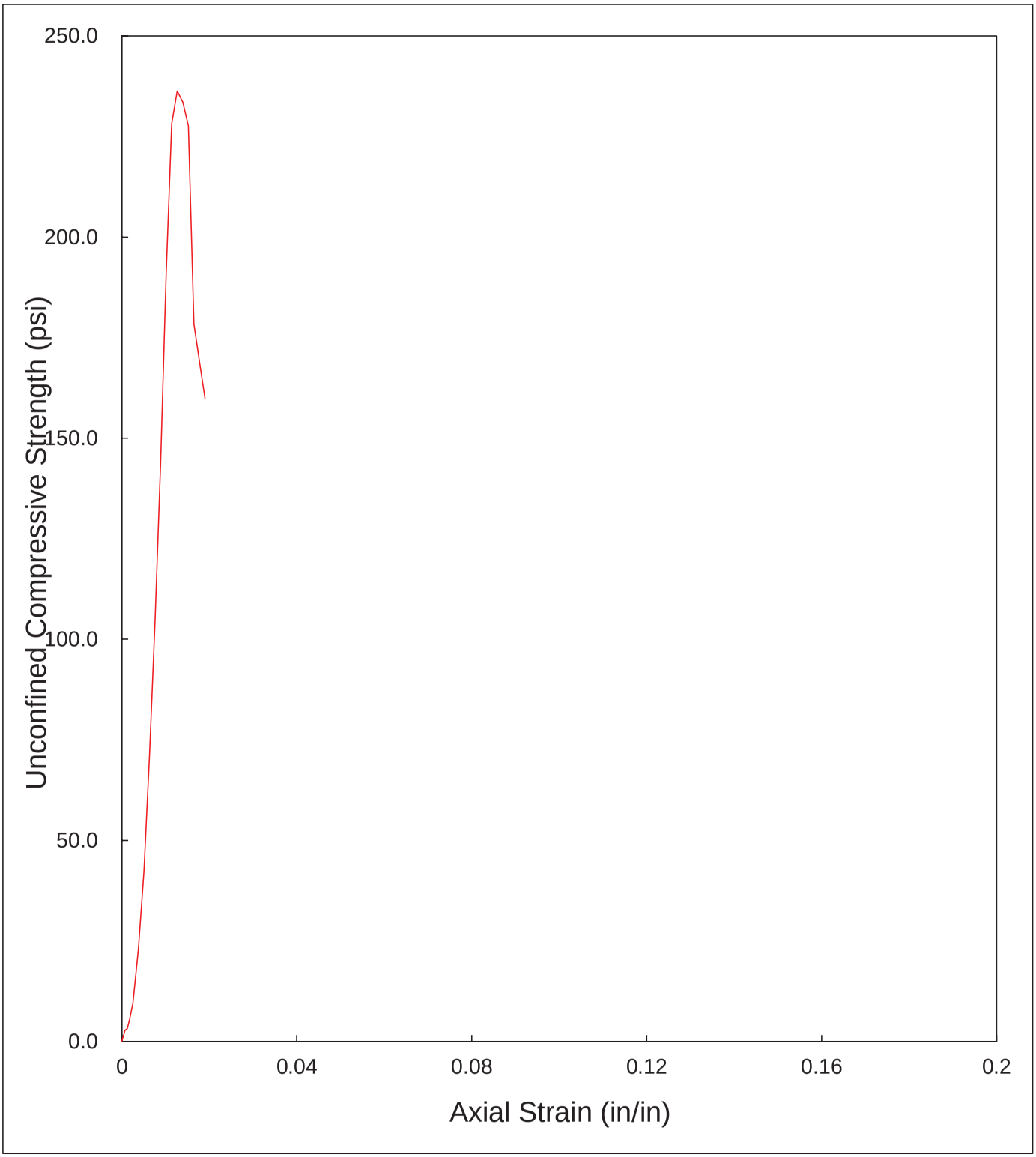
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.02	in.	3.98	in.
No. 2	2.00	in.	3.93	in.
No. 3	1.99	in.	3.92	in.
Average	**2.00**	**in.**	**3.94**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***350.04***	***g***
Initial Area, Ao	3.15	in^2
Initial Volume, Vo	12.43	in^3
Initial Bulk Unit Weight,	107.2	lb/ft^3
Initial Dry Unit Weight	75.9	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	236.3	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.154	0.0000	0.0
9	0.003	0.003	3.157	0.0008	2.9
10	0.005	0.005	3.158	0.0013	3.2
17	0.007	0.007	3.160	0.0018	5.4
30	0.010	0.010	3.162	0.0025	9.5
73	0.015	0.015	3.166	0.0038	23.1
134	0.020	0.020	3.170	0.0051	42.3
225	0.025	0.025	3.174	0.0063	70.9
334	0.030	0.030	3.178	0.0076	105.1
459	0.035	0.035	3.182	0.0089	144.2
609	0.040	0.040	3.187	0.0101	191.1
728	0.045	0.045	3.191	0.0114	228.2
755	0.050	0.050	3.195	0.0127	236.3
747	0.055	0.055	3.199	0.0140	233.5
729	0.060	0.060	3.203	0.0152	227.6
572	0.065	0.065	3.207	0.0165	178.4
543	0.070	0.070	3.211	0.0178	169.1
514	0.075	0.075	3.215	0.0190	159.9

UNCONFINED COMPRESSION TESTING

Sample No. BWM-23 100C



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 100C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D322

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.3	**%**
BULK UNIT WEIGHT	107.2	lb/ft^3
DRY UNIT WEIGHT	75.9	lb/ft^3
UCS *	236.3	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/14/2019	Tested By:	jm
End Date:	6/18/2019	Checked By:	mcm
Boring	---	Test #:	K11
Sample #:	BWM-23 100C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K3

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.34	1.34
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	9.3	9.3
Mass, g	266	267
Bulk Density, pcf	108	109
Moisture Content, %	39.6	40.2
Dry Density, pcf	77.6	77.6
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/17	2	104	80	198.4	198.1	0.3	240	58.3	3.9E-08	21	0.976	3.8E-08
6/17	3	104	80	198.1	197.6	0.5	420	58.2	3.7E-08	21	0.976	3.6E-08
6/17	4	104	80	197.6	195.3	2.3	1800	58.1	4.0E-08	21	0.976	3.9E-08
6/17	5	104	80	195.3	193.5	1.8	1800	57.4	3.2E-08	21	0.976	3.1E-08

PERMEABILITY AT 20° C: 3.6 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 100C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D323

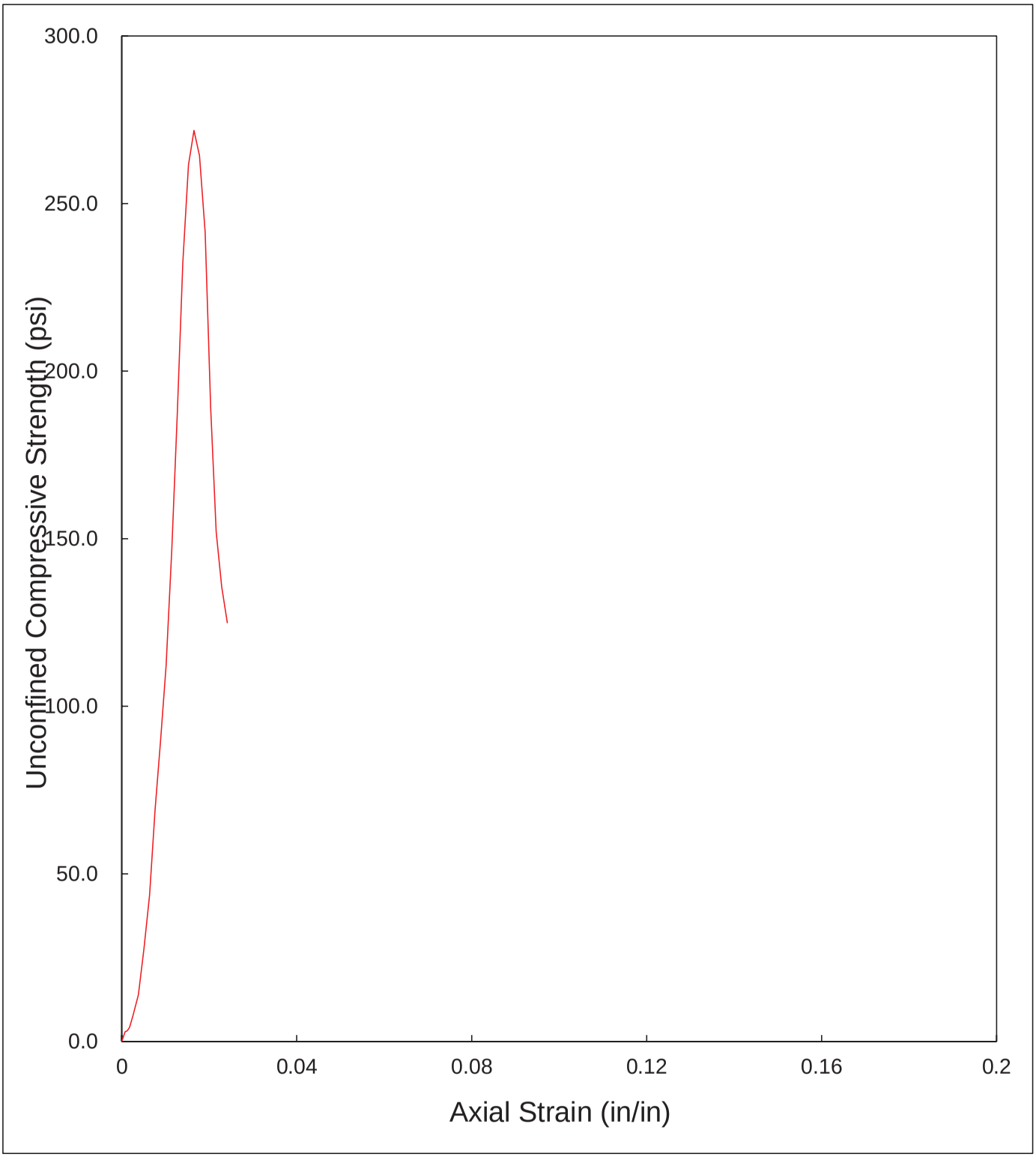
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	113.30	g
3. WT WET SOIL + TARE	212.90	g
4. WT DRY SOIL + TARE	183.84	g
5. WT WATER, Ww	29.06	g
6. WT DRY SOIL, Ws	70.54	g
7. MOISTURE CONTENT, W	**41.20**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.97	in.
No. 2	2.00	in.	3.93	in.
No. 3	1.99	in.	3.91	in.
Average	**2.00**	**in.**	**3.94**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***350.95***	***g***
Initial Area, Ao	3.14	in^2
Initial Volume, Vo	12.36	in^3
Initial Bulk Unit Weight,	108.2	lb/ft^3
Initial Dry Unit Weight	76.6	lb/ft^3
15 % Strain (0.15 Lo)	0.59	in.
UCS	271.8	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.141	0.0000	0.0
9	0.003	0.003	3.143	0.0008	2.9
10	0.005	0.005	3.145	0.0013	3.2
13	0.007	0.007	3.146	0.0018	4.1
24	0.010	0.010	3.149	0.0025	7.6
44	0.015	0.015	3.153	0.0038	14.0
87	0.020	0.020	3.157	0.0051	27.6
138	0.025	0.025	3.161	0.0064	43.7
219	0.030	0.030	3.165	0.0076	69.2
285	0.035	0.035	3.169	0.0089	89.9
356	0.040	0.040	3.173	0.0102	112.2
466	0.045	0.045	3.177	0.0114	146.7
596	0.050	0.050	3.181	0.0127	187.4
740	0.055	0.055	3.185	0.0140	232.3
834	0.060	0.060	3.189	0.0152	261.5
868	0.065	0.065	3.193	0.0165	271.8
845	0.070	0.070	3.197	0.0178	264.3
773	0.075	0.075	3.202	0.0191	241.4
606	0.080	0.080	3.206	0.0203	189.0
488	0.085	0.085	3.210	0.0216	152.0
436	0.090	0.090	3.214	0.0229	135.7
402	0.095	0.095	3.218	0.0241	124.9

UNCONFINED COMPRESSION TESTING
Sample No. BWM-23 100C DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-23 100C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D323

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.2	**%**
BULK UNIT WEIGHT	108.2	lb/ft^3
DRY UNIT WEIGHT	76.6	lb/ft^3
UCS *	271.8	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/14/2019	Tested By:	jm
End Date:	6/18/2019	Checked By:	mcm
Boring	---	Test #:	K12
Sample #:	BWM-23 100C-DUP		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K9

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.26	1.26
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	8.8	8.8
Mass, g	251	252
Bulk Density, pcf	109	109
Moisture Content, %	38.8	39.5
Dry Density, pcf	78.2	78.2
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/17	3	104	80	194.8	194.0	0.8	600	60.9	4.0E-08	21	0.976	3.9E-08
6/17	4	104	80	194.0	192.0	2.0	1800	60.6	3.4E-08	21	0.976	3.3E-08
6/17	5	104	80	192.0	190.1	1.9	1440	60.0	4.0E-08	21	0.976	3.9E-08
6/17	6	104	80	190.1	182.3	7.8	6660	59.4	3.6E-08	21	0.976	3.6E-08

PERMEABILITY AT 20° C: 3.7 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-23 125C		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D326

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	111.65	g
3. WT WET SOIL + TARE	275.15	g
4. WT DRY SOIL + TARE	226.36	g
5. WT WATER, Ww	48.79	g
6. WT DRY SOIL, Ws	114.71	g
7. MOISTURE CONTENT, W	**42.53**	**%**

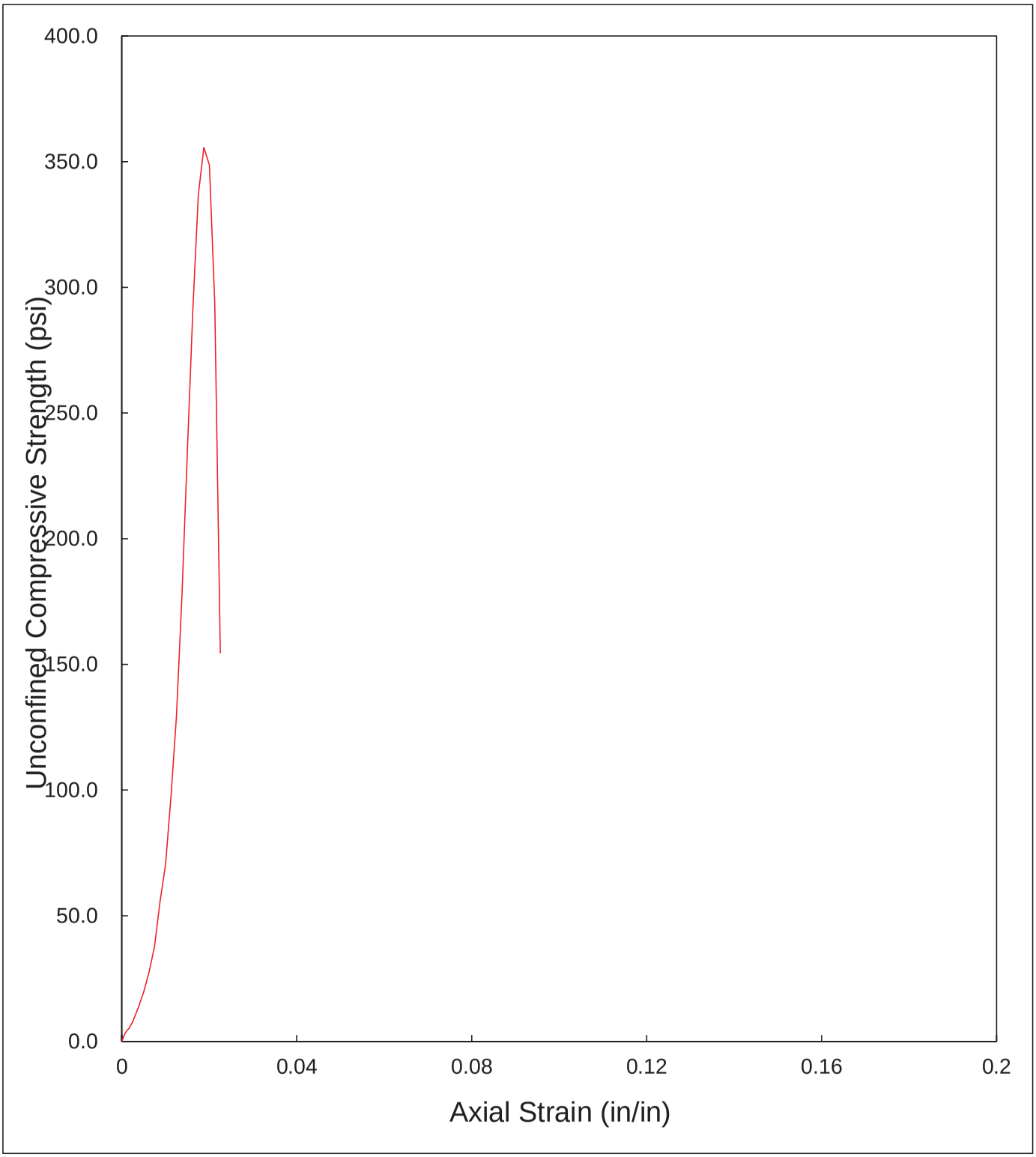
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	4.01	in.
No. 2	2.01	in.	3.99	in.
No. 3	1.99	in.	3.98	in.
Average	**2.00**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***353.77***	***g***
Initial Area, Ao	3.15	in^2
Initial Volume, Vo	12.58	in^3
Initial Bulk Unit Weight,	107.1	lb/ft^3
Initial Dry Unit Weight	75.1	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	355.6	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.151	0.0000	0.0
10	0.003	0.003	3.153	0.0008	3.2
14	0.005	0.005	3.155	0.0013	4.4
17	0.007	0.007	3.157	0.0018	5.4
25	0.010	0.010	3.159	0.0025	7.9
42	0.015	0.015	3.163	0.0038	13.3
62	0.020	0.020	3.167	0.0050	19.6
88	0.025	0.025	3.171	0.0063	27.8
120	0.030	0.030	3.175	0.0075	37.8
177	0.035	0.035	3.179	0.0088	55.7
224	0.040	0.040	3.183	0.0100	70.4
312	0.045	0.045	3.187	0.0113	97.9
413	0.050	0.050	3.191	0.0125	129.4
567	0.055	0.055	3.195	0.0138	177.5
755	0.060	0.060	3.199	0.0150	236.0
937	0.065	0.065	3.203	0.0163	292.5
1081	0.070	0.070	3.207	0.0175	337.1
1142	0.075	0.075	3.211	0.0188	355.6
1121	0.080	0.080	3.215	0.0200	348.6
945	0.085	0.085	3.220	0.0213	293.5
498	0.090	0.090	3.224	0.0225	154.5

UNCONFINED COMPRESSION TESTING

Sample No. BWM-23 125C



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-23 125C		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D326

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	42.5	**%**
BULK UNIT WEIGHT	107.1	lb/ft^3
DRY UNIT WEIGHT	75.1	lb/ft^3
UCS *	355.6	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/14/2019	Tested By:	jm
End Date:	6/18/2019	Checked By:	mcm
Boring	---	Test #:	K13
Sample #:	BWM-23 125C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P11

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.51	1.51
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	10.5	10.5
Mass, g	296	299
Bulk Density, pcf	107	108
Moisture Content, %	40.3	41.4
Dry Density, pcf	76.2	76.2
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/17	1	104	80	200.9	200.1	0.8	5400	52.4	5.1E-09	21	0.976	5.0E-09
6/17	2	104	80	200.1	199.2	0.9	7200	52.2	4.3E-09	21	0.976	4.2E-09
6/17	3	104	80	199.2	198.2	1.0	7260	51.9	4.8E-09	21	0.976	4.7E-09
6/17	4	104	80	198.2	197.1	1.1	7800	51.7	4.9E-09	21	0.976	4.8E-09

PERMEABILITY AT 20° C: 4.7 x 10^{-9} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-23 125C DUP		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D327

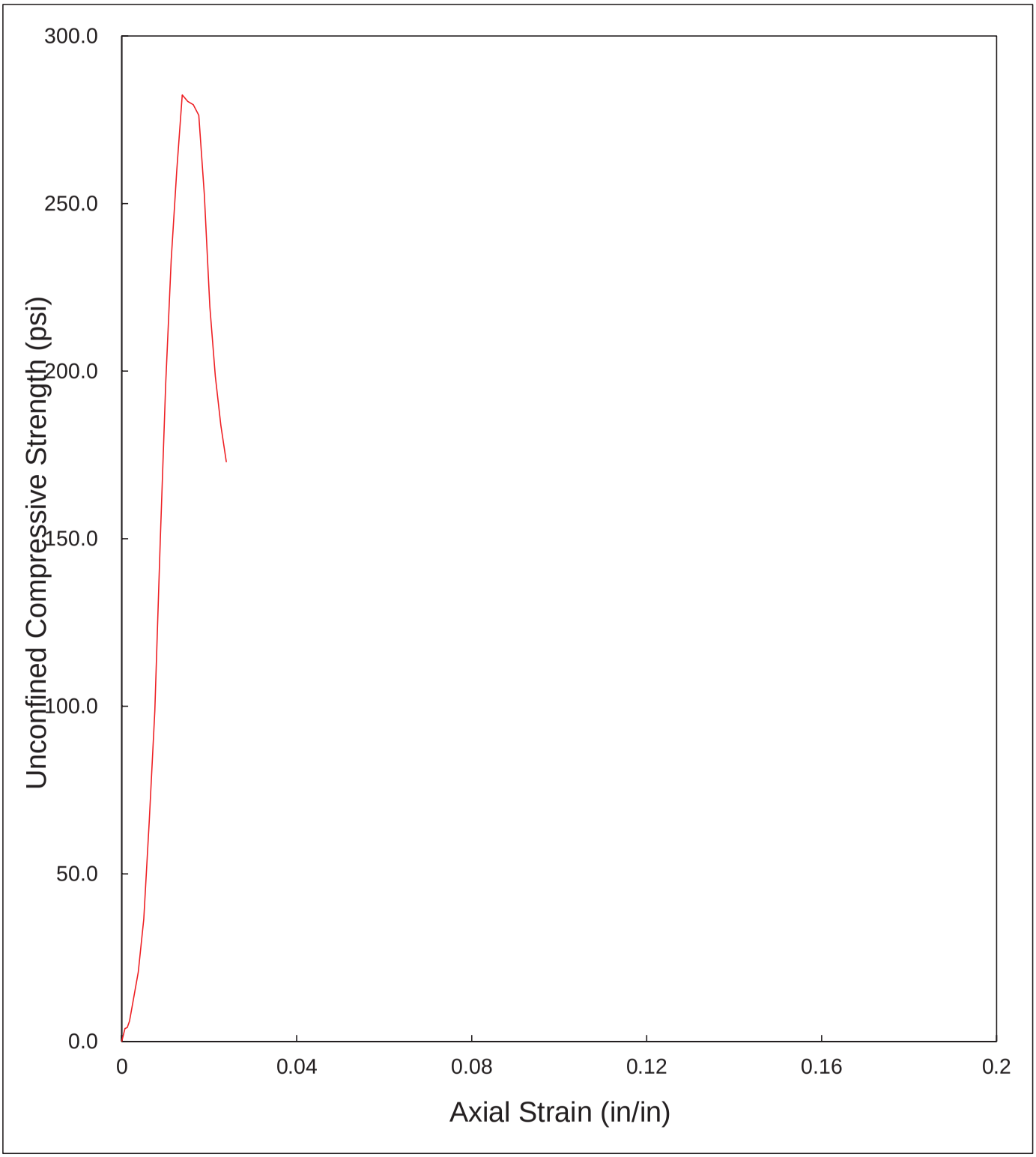
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	113.34	g
3. WT WET SOIL + TARE	243.47	g
4. WT DRY SOIL + TARE	204.40	g
5. WT WATER, Ww	39.07	g
6. WT DRY SOIL, Ws	91.06	g
7. MOISTURE CONTENT, W	**42.91**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.99	in.
No. 2	2.00	in.	3.97	in.
No. 3	1.99	in.	3.97	in.
Average	**2.00**	**in.**	**3.97**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***353.65***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	12.45	in^3
Initial Bulk Unit Weight,	108.2	lb/ft^3
Initial Dry Unit Weight	75.7	lb/ft^3
15 % Strain (0.15 Lo)	0.60	in.
UCS	282.4	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.132	0.0000	0.0
12	0.003	0.003	3.135	0.0008	3.8
13	0.005	0.005	3.136	0.0013	4.1
19	0.007	0.007	3.138	0.0018	6.1
36	0.010	0.010	3.140	0.0025	11.5
65	0.015	0.015	3.144	0.0038	20.7
115	0.020	0.020	3.148	0.0050	36.5
208	0.025	0.025	3.152	0.0063	66.0
311	0.030	0.030	3.156	0.0075	98.5
474	0.035	0.035	3.160	0.0088	150.0
621	0.040	0.040	3.164	0.0101	196.3
739	0.045	0.045	3.168	0.0113	233.3
824	0.050	0.050	3.172	0.0126	259.8
897	0.055	0.055	3.176	0.0138	282.4
892	0.060	0.060	3.180	0.0151	280.5
890	0.065	0.065	3.184	0.0164	279.5
881	0.070	0.070	3.188	0.0176	276.3
807	0.075	0.075	3.192	0.0189	252.8
701	0.080	0.080	3.197	0.0201	219.3
635	0.085	0.085	3.201	0.0214	198.4
589	0.090	0.090	3.205	0.0226	183.8
555	0.095	0.095	3.209	0.0239	173.0

UNCONFINED COMPRESSION TESTING
Sample No. BWM-23 125C DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-23 125C DUP		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D327

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	42.9	**%**
BULK UNIT WEIGHT	108.2	lb/ft^3
DRY UNIT WEIGHT	75.7	lb/ft^3
UCS *	282.4	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K14
Sample #:	BWM-23 125C-DUP		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K3

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.24	1.24
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	8.6	8.6
Mass, g	246	248
Bulk Density, pcf	109	110
Moisture Content, %	37.1	38.2
Dry Density, pcf	79.4	79.4
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/19	1	104	80	198.2	197.9	0.3	2400	62.9	3.6E-09	21	0.976	3.5E-09
6/19	2	104	80	197.9	197.4	0.5	4000	62.8	3.6E-09	21	0.976	3.5E-09
6/19	3	104	80	197.4	197.2	0.2	1920	62.7	3.0E-09	21	0.976	3.0E-09
6/19	4	104	80	197.2	196.4	0.8	6120	62.6	3.8E-09	21	0.976	3.7E-09

PERMEABILITY AT 20° C: 3.4 x 10^{-9} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D365

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	230.71	g
3. WT WET SOIL + TARE	367.26	g
4. WT DRY SOIL + TARE	327.25	g
5. WT WATER, Ww	40.01	g
6. WT DRY SOIL, Ws	96.54	g
7. MOISTURE CONTENT, W	**41.44**	**%**

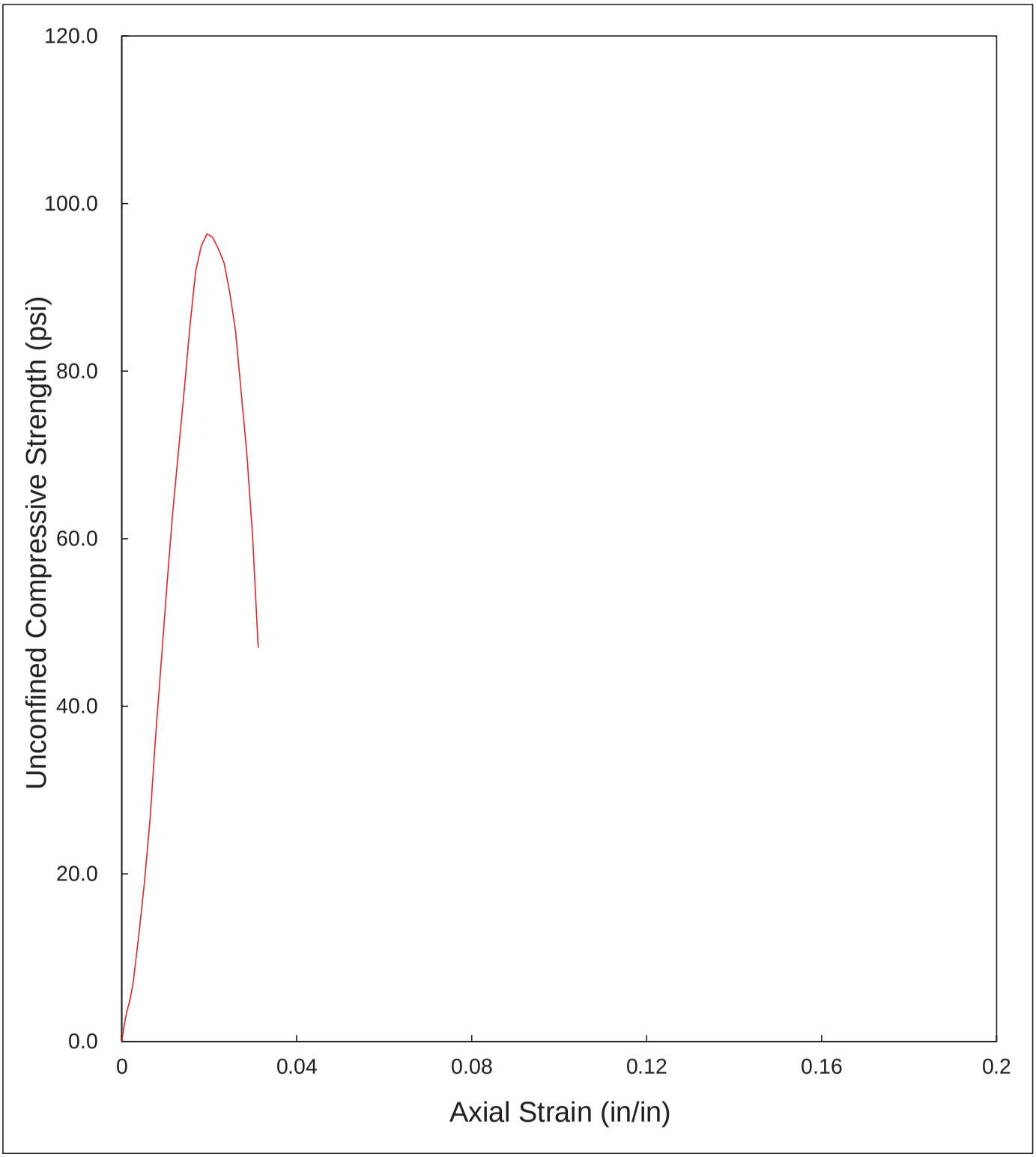
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.85	in.
No. 2	2.00	in.	3.84	in.
No. 3	1.99	in.	3.85	in.
Average	**2.00**	**in.**	**3.85**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***332.45***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	12.05	in^3
Initial Bulk Unit Weight,	105.1	lb/ft^3
Initial Dry Unit Weight	74.3	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	96.4	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.133	0.0000	0.0
8	0.003	0.003	3.135	0.0008	2.6
12	0.005	0.005	3.137	0.0013	3.8
15	0.007	0.007	3.138	0.0018	4.8
22	0.010	0.010	3.141	0.0026	7.0
40	0.015	0.015	3.145	0.0039	12.7
60	0.020	0.020	3.149	0.0052	19.1
84	0.025	0.025	3.153	0.0065	26.6
116	0.030	0.030	3.157	0.0078	36.7
145	0.035	0.035	3.161	0.0091	45.9
174	0.040	0.040	3.166	0.0104	55.0
201	0.045	0.045	3.170	0.0117	63.4
224	0.050	0.050	3.174	0.0130	70.6
247	0.055	0.055	3.178	0.0143	77.7
272	0.060	0.060	3.182	0.0156	85.5
293	0.065	0.065	3.187	0.0169	91.9
303	0.070	0.070	3.191	0.0182	95.0
308	0.075	0.075	3.195	0.0195	96.4
307	0.080	0.080	3.199	0.0208	96.0
303	0.085	0.085	3.203	0.0221	94.6
298	0.090	0.090	3.208	0.0234	92.9
287	0.095	0.095	3.212	0.0247	89.4
273	0.100	0.100	3.216	0.0260	84.9
250	0.105	0.105	3.221	0.0273	77.6
226	0.110	0.110	3.225	0.0286	70.1
195	0.115	0.115	3.229	0.0299	60.4
152	0.120	0.120	3.234	0.0312	47.0

UNCONFINED COMPRESSION TESTING

Sample No. BWM-24 (20C)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D365

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.4	**%**
BULK UNIT WEIGHT	105.1	lb/ft^3
DRY UNIT WEIGHT	74.3	lb/ft^3
UCS *	96.4	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K23
Sample #:	BWM-24 20C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.62	1.62
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	11.2	11.2
Mass, g	328	337
Bulk Density, pcf	111	114
Moisture Content, %	28.6	32.2
Dry Density, pcf	86.3	86.3
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
7/5	2	104	80	188.2	187.3	0.9	300	45.7	1.2E-07	21	0.976	1.2E-07
7/5	3	104	80	187.3	186.4	0.9	300	45.5	1.2E-07	21	0.976	1.2E-07
7/5	4	104	80	186.4	185.4	1.0	360	45.3	1.1E-07	21	0.976	1.1E-07
7/5	5	104	80	185.4	183.4	2.0	840	45.0	9.7E-08	21	0.976	9.4E-08

PERMEABILITY AT 20° C: 1.1 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 DUP (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D366

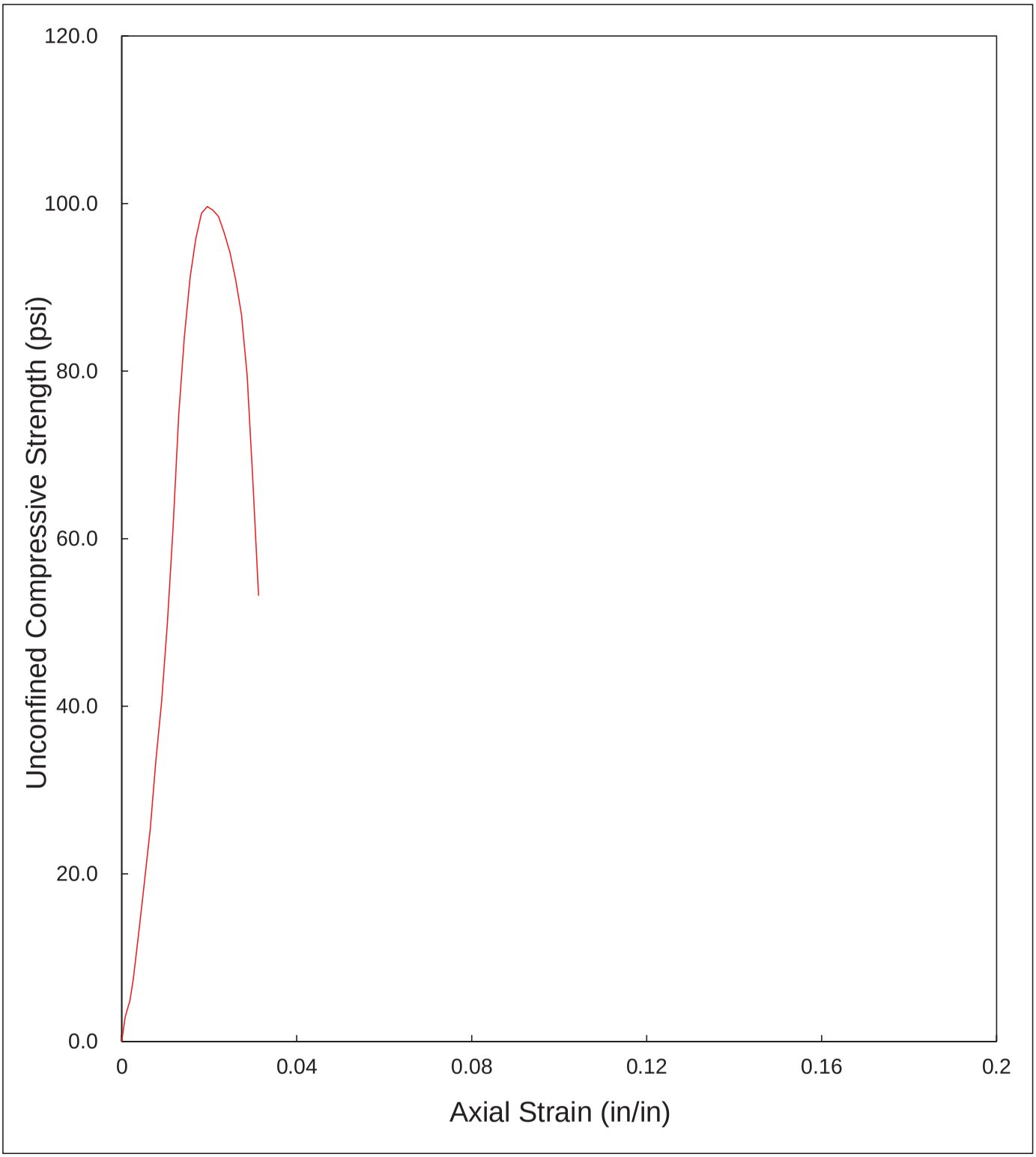
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	226.69	g
3. WT WET SOIL + TARE	338.76	g
4. WT DRY SOIL + TARE	306.00	g
5. WT WATER, Ww	32.76	g
6. WT DRY SOIL, Ws	79.31	g
7. MOISTURE CONTENT, W	**41.31**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.84	in.
No. 2	2.00	in.	3.84	in.
No. 3	1.99	in.	3.83	in.
Average	**2.00**	**in.**	**3.84**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***331.03***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	12.01	in^3
Initial Bulk Unit Weight,	105.0	lb/ft^3
Initial Dry Unit Weight	74.3	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	99.6	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.129	0.0000	0.0
9	0.003	0.003	3.131	0.0008	2.9
12	0.005	0.005	3.133	0.0013	3.8
15	0.007	0.007	3.135	0.0018	4.8
23	0.010	0.010	3.137	0.0026	7.3
41	0.015	0.015	3.141	0.0039	13.1
60	0.020	0.020	3.145	0.0052	19.1
80	0.025	0.025	3.150	0.0065	25.4
106	0.030	0.030	3.154	0.0078	33.6
128	0.035	0.035	3.158	0.0091	40.5
158	0.040	0.040	3.162	0.0104	50.0
194	0.045	0.045	3.166	0.0117	61.3
237	0.050	0.050	3.170	0.0130	74.8
267	0.055	0.055	3.175	0.0143	84.1
290	0.060	0.060	3.179	0.0156	91.2
305	0.065	0.065	3.183	0.0169	95.8
315	0.070	0.070	3.187	0.0182	98.8
318	0.075	0.075	3.191	0.0195	99.6
317	0.080	0.080	3.196	0.0208	99.2
315	0.085	0.085	3.200	0.0222	98.4
309	0.090	0.090	3.204	0.0235	96.4
302	0.095	0.095	3.208	0.0248	94.1
292	0.100	0.100	3.213	0.0261	90.9
279	0.105	0.105	3.217	0.0274	86.7
256	0.110	0.110	3.221	0.0287	79.5
216	0.115	0.115	3.226	0.0300	67.0
172	0.120	0.120	3.230	0.0313	53.2

UNCONFINED COMPRESSION TESTING
Sample No. BWM-24 DUP (20C)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 DUP (20C)		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D366

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.3	**%**
BULK UNIT WEIGHT	105.0	lb/ft^3
DRY UNIT WEIGHT	74.3	lb/ft^3
UCS *	99.6	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/17/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K24
Sample #:	BWM-24 DUP 20C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.41	1.41
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	9.8	9.8
Mass, g	292	299
Bulk Density, pcf	114	116
Moisture Content, %	28.9	31.7
Dry Density, pcf	88.3	88.3
Degree of Saturation, %	---	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
7/5	3	104	80	187.7	187.1	0.6	180	52.4	1.2E-07	21	0.976	1.1E-07
7/5	4	104	80	187.1	186.5	0.6	180	52.2	1.2E-07	21	0.976	1.1E-07
7/5	5	104	80	186.5	185.8	0.7	180	52.1	1.4E-07	21	0.976	1.3E-07
7/5	6	104	80	185.8	184.0	1.8	480	51.9	1.3E-07	21	0.976	1.3E-07

PERMEABILITY AT 20° C: 1.2 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 80C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D320

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	106.60	g
3. WT WET SOIL + TARE	284.09	g
4. WT DRY SOIL + TARE	230.53	g
5. WT WATER, Ww	53.56	g
6. WT DRY SOIL, Ws	123.93	g
7. MOISTURE CONTENT, W	**43.22**	**%**

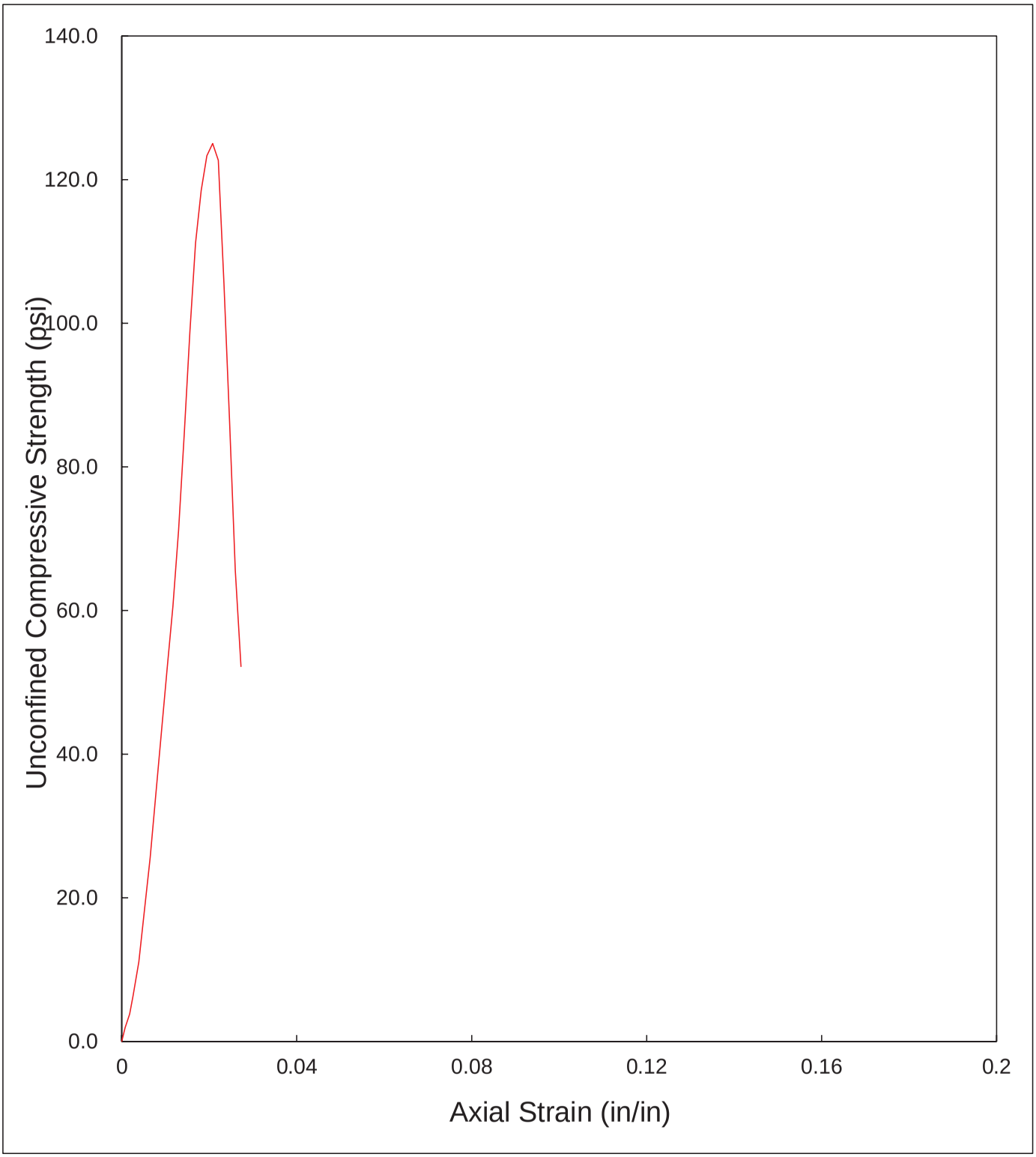
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.85	in.
No. 2	2.00	in.	3.86	in.
No. 3	2.00	in.	3.84	in.
Average	**2.00**	**in.**	**3.85**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***338.61***	***g***
Initial Area, Ao	3.15	in^2
Initial Volume, Vo	12.13	in^3
Initial Bulk Unit Weight,	106.4	lb/ft^3
Initial Dry Unit Weight	74.3	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	125.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.148	0.0000	0.0
6	0.003	0.003	3.151	0.0008	1.9
9	0.005	0.005	3.152	0.0013	2.9
12	0.007	0.007	3.154	0.0018	3.8
20	0.010	0.010	3.157	0.0026	6.3
35	0.015	0.015	3.161	0.0039	11.1
58	0.020	0.020	3.165	0.0052	18.3
81	0.025	0.025	3.169	0.0065	25.6
109	0.030	0.030	3.173	0.0078	34.4
137	0.035	0.035	3.177	0.0091	43.1
165	0.040	0.040	3.181	0.0104	51.9
193	0.045	0.045	3.186	0.0117	60.6
227	0.050	0.050	3.190	0.0130	71.2
270	0.055	0.055	3.194	0.0143	84.5
316	0.060	0.060	3.198	0.0156	98.8
356	0.065	0.065	3.202	0.0169	111.2
380	0.070	0.070	3.207	0.0182	118.5
396	0.075	0.075	3.211	0.0195	123.3
402	0.080	0.080	3.215	0.0208	125.0
395	0.085	0.085	3.219	0.0221	122.7
340	0.090	0.090	3.224	0.0234	105.5
278	0.095	0.095	3.228	0.0247	86.1
212	0.100	0.100	3.232	0.0260	65.6
169	0.105	0.105	3.237	0.0273	52.2

UNCONFINED COMPRESSION TESTING

Sample No. BWM-24 80C



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 80C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D320

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	43.2	**%**
BULK UNIT WEIGHT	106.4	lb/ft^3
DRY UNIT WEIGHT	74.3	lb/ft^3
UCS *	125.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/18/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K15
Sample #:	BWM-24 80C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P1

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.30	1.30
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	9.0	9.0
Mass, g	262	263
Bulk Density, pcf	110	111
Moisture Content, %	36.0	36.8
Dry Density, pcf	81.2	81.2
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/19	1	104	80	199.6	196.9	2.7	960	60.4	8.5E-08	21	0.976	8.3E-08
6/19	2	104	80	196.9	195.5	1.4	540	59.6	7.9E-08	21	0.976	7.7E-08
6/19	3	104	80	195.5	194.7	0.8	300	59.2	8.1E-08	21	0.976	7.9E-08
6/19	4	104	80	194.7	193.1	1.6	660	59.0	7.5E-08	21	0.976	7.3E-08

PERMEABILITY AT 20° C: 7.8 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 80C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D321

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	116.14	g
3. WT WET SOIL + TARE	339.01	g
4. WT DRY SOIL + TARE	276.08	g
5. WT WATER, Ww	62.93	g
6. WT DRY SOIL, Ws	159.94	g
7. MOISTURE CONTENT, W	**39.35**	**%**

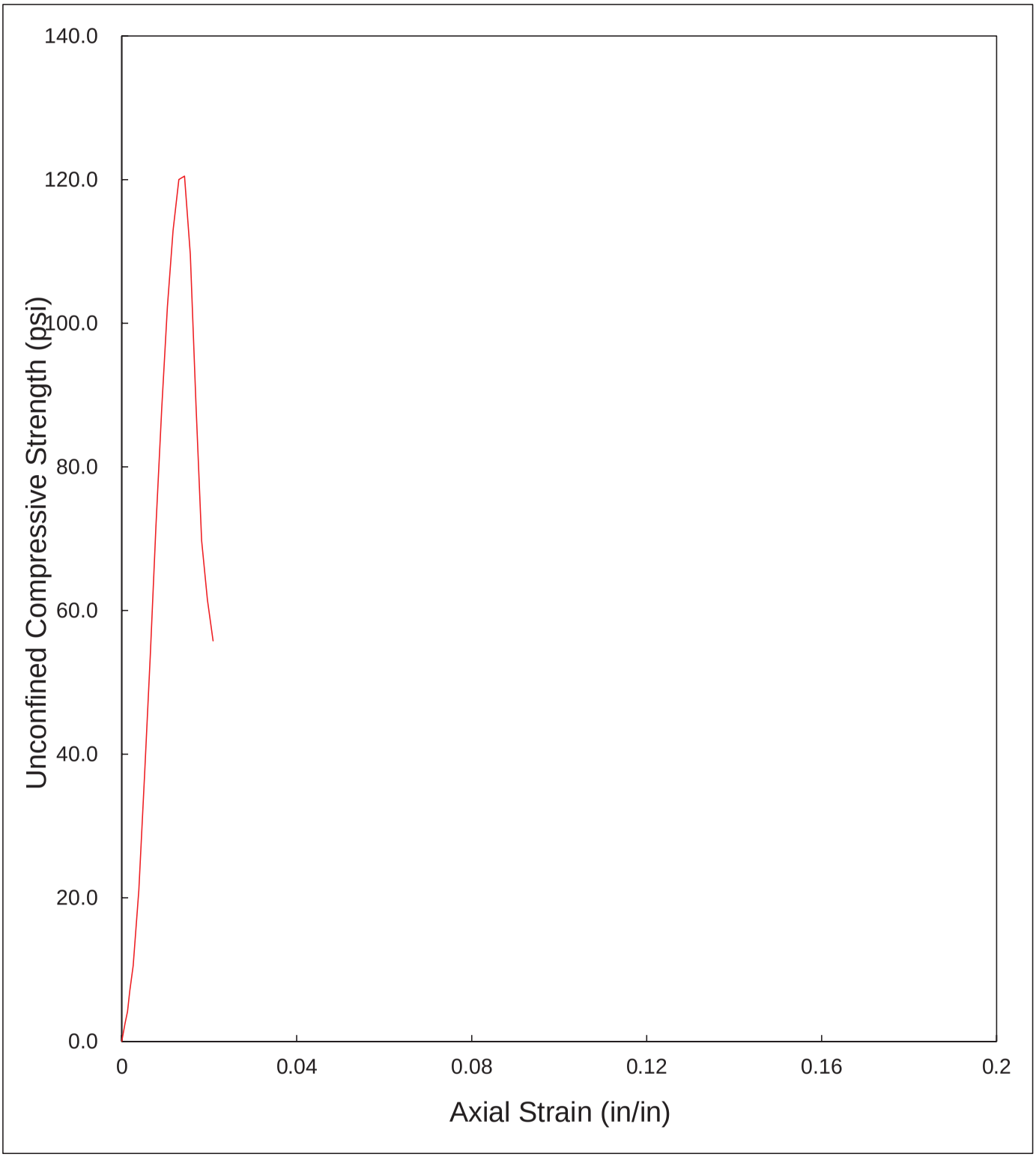
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.85	in.
No. 2	1.99	in.	3.80	in.
No. 3	1.98	in.	3.84	in.
Average	**1.99**	**in.**	**3.83**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***339.08***	***g***
Initial Area, Ao	3.12	in^2
Initial Volume, Vo	11.97	in^3
Initial Bulk Unit Weight,	107.9	lb/ft^3
Initial Dry Unit Weight	77.4	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	120.5	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.125	0.0000	0.0
8	0.003	0.003	3.127	0.0008	2.6
13	0.005	0.005	3.129	0.0013	4.2
22	0.007	0.007	3.131	0.0018	7.0
33	0.010	0.010	3.133	0.0026	10.5
66	0.015	0.015	3.137	0.0039	21.0
117	0.020	0.020	3.141	0.0052	37.2
169	0.025	0.025	3.145	0.0065	53.7
226	0.030	0.030	3.150	0.0078	71.8
278	0.035	0.035	3.154	0.0091	88.2
323	0.040	0.040	3.158	0.0104	102.3
357	0.045	0.045	3.162	0.0117	112.9
380	0.050	0.050	3.166	0.0131	120.0
382	0.055	0.055	3.170	0.0144	120.5
348	0.060	0.060	3.175	0.0157	109.6
282	0.065	0.065	3.179	0.0170	88.7
222	0.070	0.070	3.183	0.0183	69.7
196	0.075	0.075	3.187	0.0196	61.5
178	0.080	0.080	3.192	0.0209	55.8

UNCONFINED COMPRESSION TESTING

Sample No. BWM-24 80C DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 80C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D321

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	39.3	**%**
BULK UNIT WEIGHT	107.9	lb/ft^3
DRY UNIT WEIGHT	77.4	lb/ft^3
UCS *	120.5	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/18/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K16
Sample #:	BWM-24 80C-DUP		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P1

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.39	1.39
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	9.7	9.7
Mass, g	278	280
Bulk Density, pcf	109	110
Moisture Content, %	38.1	39.0
Dry Density, pcf	79.0	79.0
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/19	2	104	80	197.6	196.2	1.4	480	56.0	9.4E-08	21	0.976	9.2E-08
6/19	3	104	80	196.2	191.0	5.2	1740	55.6	9.8E-08	21	0.976	9.6E-08
6/19	4	104	80	191.0	187.5	3.5	1200	54.1	9.8E-08	21	0.976	9.6E-08
6/19	5	104	80	187.5	184.7	2.8	1020	53.1	9.4E-08	21	0.976	9.2E-08

PERMEABILITY AT 20° C: 9.4 x 10^{-8} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 100C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D324

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	114.55	g
3. WT WET SOIL + TARE	217.41	g
4. WT DRY SOIL + TARE	186.98	g
5. WT WATER, Ww	30.43	g
6. WT DRY SOIL, Ws	72.43	g
7. MOISTURE CONTENT, W	**42.01**	**%**

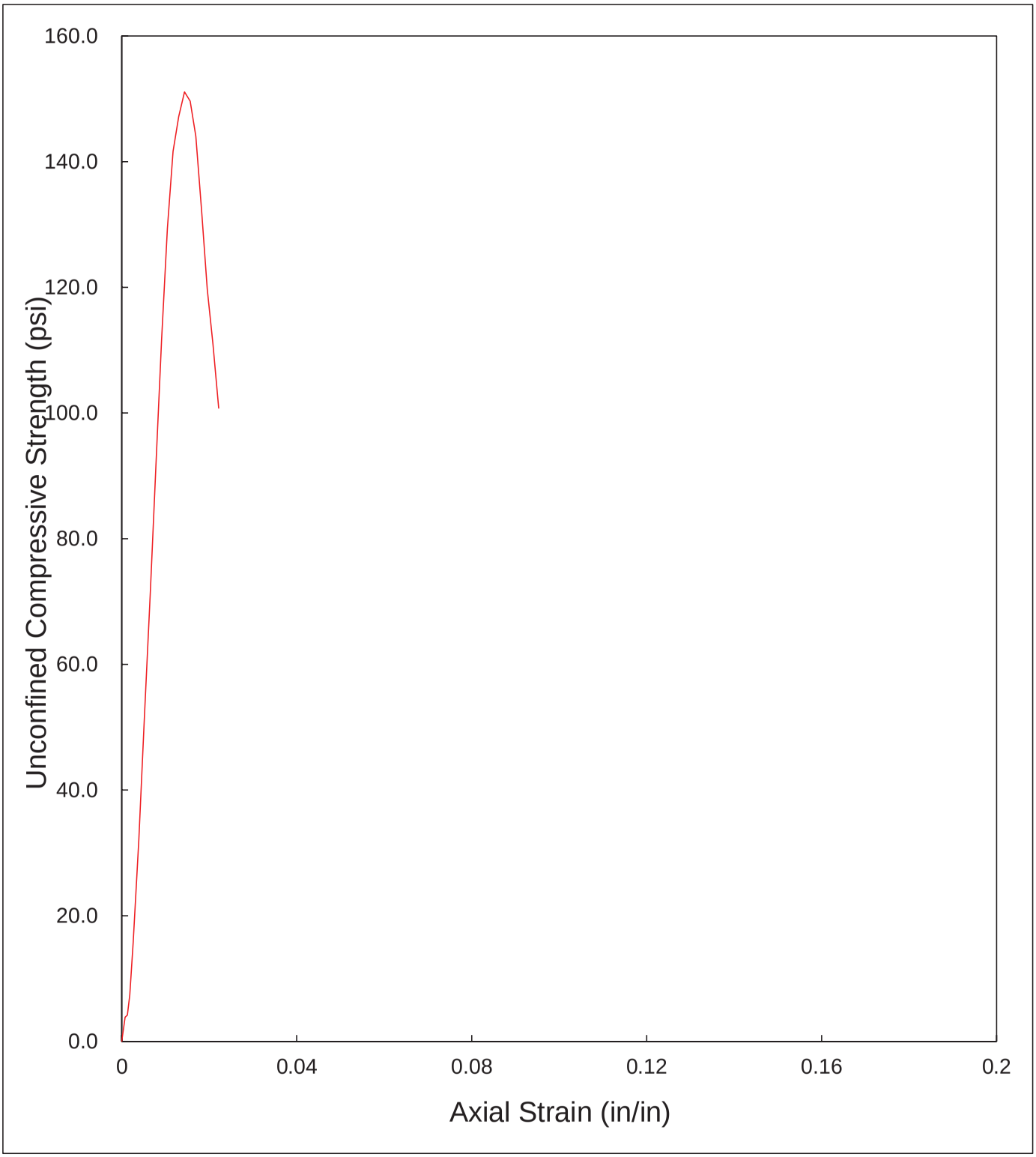
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	1.99	in.	3.84	in.
No. 2	1.99	in.	3.83	in.
No. 3	1.99	in.	3.83	in.
Average	**1.99**	**in.**	**3.83**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***342.44***	***g***
Initial Area, Ao	3.11	in^2
Initial Volume, Vo	11.91	in^3
Initial Bulk Unit Weight,	109.6	lb/ft^3
Initial Dry Unit Weight	77.1	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	151.1	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.105	0.0000	0.0
12	0.003	0.003	3.107	0.0008	3.9
13	0.005	0.005	3.109	0.0013	4.2
23	0.007	0.007	3.111	0.0018	7.4
49	0.010	0.010	3.113	0.0026	15.7
100	0.015	0.015	3.117	0.0039	32.1
162	0.020	0.020	3.121	0.0052	51.9
223	0.025	0.025	3.125	0.0065	71.4
287	0.030	0.030	3.130	0.0078	91.7
350	0.035	0.035	3.134	0.0091	111.7
406	0.040	0.040	3.138	0.0104	129.4
445	0.045	0.045	3.142	0.0117	141.6
463	0.050	0.050	3.146	0.0130	147.2
476	0.055	0.055	3.150	0.0143	151.1
472	0.060	0.060	3.154	0.0156	149.6
455	0.065	0.065	3.159	0.0169	144.1
418	0.070	0.070	3.163	0.0183	132.2
379	0.075	0.075	3.167	0.0196	119.7
352	0.080	0.080	3.171	0.0209	111.0
320	0.085	0.085	3.175	0.0222	100.8

UNCONFINED COMPRESSION TESTING

Sample No. BWM-24 100C



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 100C		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D324

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	42.0	**%**
BULK UNIT WEIGHT	109.6	lb/ft^3
DRY UNIT WEIGHT	77.1	lb/ft^3
UCS *	151.1	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/18/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K17
Sample #:	BWM-24 100C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K3

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.38	1.38
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	9.6	9.6
Mass, g	276	278
Bulk Density, pcf	109	110
Moisture Content, %	37.3	38.3
Dry Density, pcf	79.4	79.4
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/19	1	104	80	186.4	183.3	3.1	720	53.2	1.5E-07	21	0.976	1.4E-07
6/19	2	104	80	183.3	182.2	1.1	300	52.3	1.3E-07	21	0.976	1.2E-07
6/19	3	104	80	182.2	180.3	1.9	540	52.0	1.2E-07	21	0.976	1.2E-07
6/19	4	104	80	180.3	169.7	10.6	2520	51.4	1.5E-07	21	0.976	1.5E-07

PERMEABILITY AT 20° C: 1.3 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 100C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D325

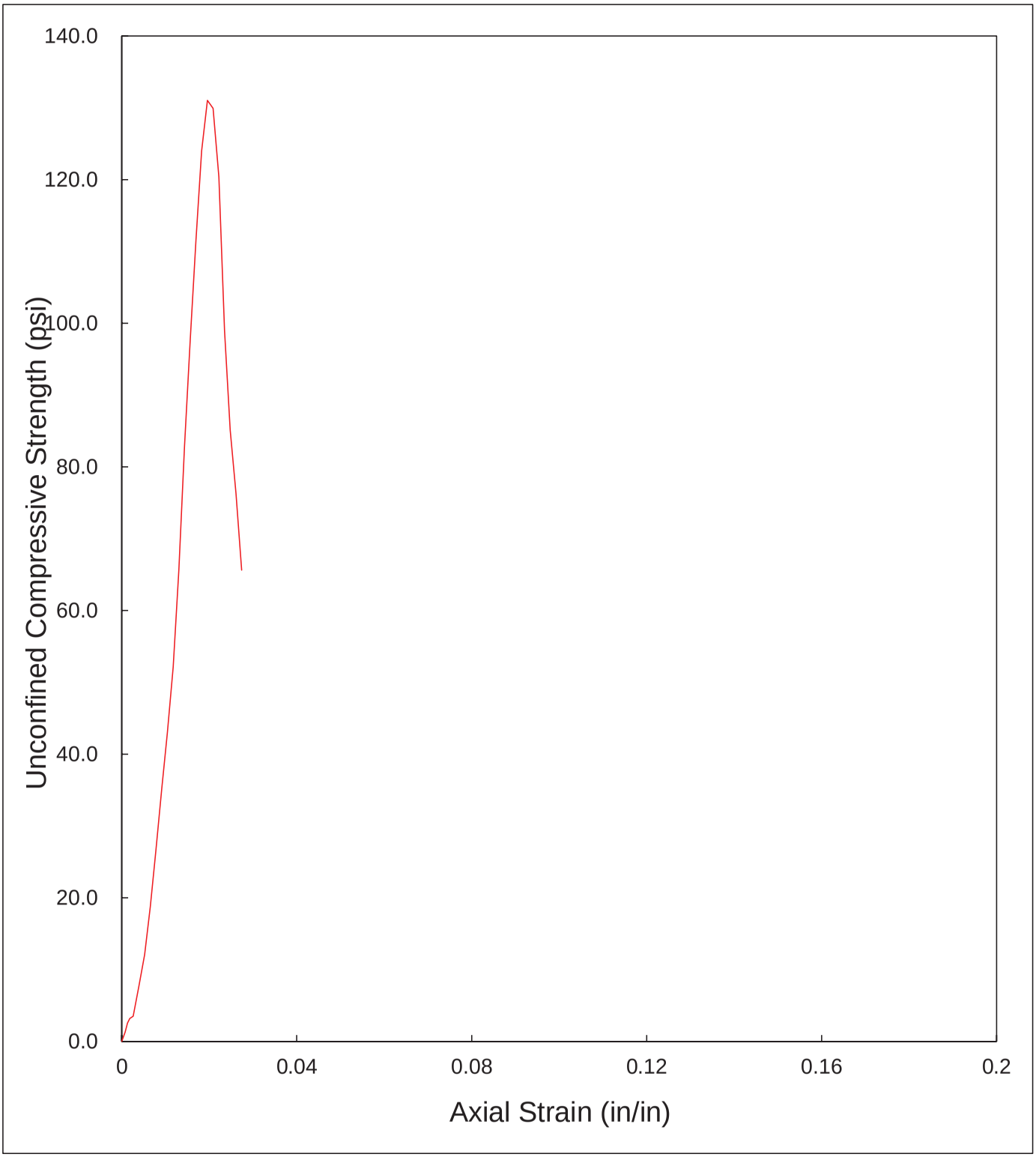
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	117.95	g
3. WT WET SOIL + TARE	262.09	g
4. WT DRY SOIL + TARE	218.51	g
5. WT WATER, Ww	43.58	g
6. WT DRY SOIL, Ws	100.56	g
7. MOISTURE CONTENT, W	**43.34**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.82	in.
No. 2	2.00	in.	3.84	in.
No. 3	1.99	in.	3.84	in.
Average	**2.00**	**in.**	**3.83**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***339.32***	***g***
Initial Area, Ao	3.13	in^2
Initial Volume, Vo	11.98	in^3
Initial Bulk Unit Weight,	107.9	lb/ft^3
Initial Dry Unit Weight	75.3	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	131.0	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.127	0.0000	0.0
4	0.003	0.003	3.130	0.0008	1.3
8	0.005	0.005	3.132	0.0013	2.6
10	0.007	0.007	3.133	0.0018	3.2
11	0.010	0.010	3.136	0.0026	3.5
24	0.015	0.015	3.140	0.0039	7.6
38	0.020	0.020	3.144	0.0052	12.1
59	0.025	0.025	3.148	0.0065	18.7
84	0.030	0.030	3.152	0.0078	26.6
111	0.035	0.035	3.156	0.0091	35.2
136	0.040	0.040	3.160	0.0104	43.0
165	0.045	0.045	3.165	0.0117	52.1
208	0.050	0.050	3.169	0.0131	65.6
263	0.055	0.055	3.173	0.0144	82.9
311	0.060	0.060	3.177	0.0157	97.9
355	0.065	0.065	3.181	0.0170	111.6
395	0.070	0.070	3.186	0.0183	124.0
418	0.075	0.075	3.190	0.0196	131.0
415	0.080	0.080	3.194	0.0209	129.9
385	0.085	0.085	3.198	0.0222	120.4
317	0.090	0.090	3.203	0.0235	99.0
273	0.095	0.095	3.207	0.0248	85.1
245	0.100	0.100	3.211	0.0261	76.3
211	0.105	0.105	3.216	0.0274	65.6

UNCONFINED COMPRESSION TESTING
Sample No. BWM-24 100C DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SH0682		
SAMPLE No.:	BWM-24 100C DUP		
TESTING DATE:	5-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D325

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	43.3	**%**
BULK UNIT WEIGHT	107.9	lb/ft^3
DRY UNIT WEIGHT	75.3	lb/ft^3
UCS *	131.0	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/18/2019	Tested By:	jm
End Date:	6/20/2019	Checked By:	mcm
Boring	---	Test #:	K18
Sample #:	BWM-24 100C-DUP		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P17

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.23	1.23
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	8.5	8.5
Mass, g	246	248
Bulk Density, pcf	110	111
Moisture Content, %	37.6	38.5
Dry Density, pcf	79.8	79.8
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/19	1	104	80	199.8	196.0	3.8	360	63.9	3.0E-07	21	0.976	3.0E-07
6/19	2	104	80	196.0	187.0	9.0	780	62.7	3.4E-07	21	0.976	3.3E-07
6/19	3	104	80	187.0	182.8	4.2	420	59.8	3.1E-07	21	0.976	3.0E-07
6/19	4	104	80	182.8	180.0	2.8	300	58.5	2.9E-07	21	0.976	2.9E-07

PERMEABILITY AT 20° C: 3.0 x 10^{-7} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-24 125C		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D328

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	115.07	g
3. WT WET SOIL + TARE	295.19	g
4. WT DRY SOIL + TARE	242.05	g
5. WT WATER, Ww	53.14	g
6. WT DRY SOIL, Ws	126.98	g
7. MOISTURE CONTENT, W	**41.85**	**%**

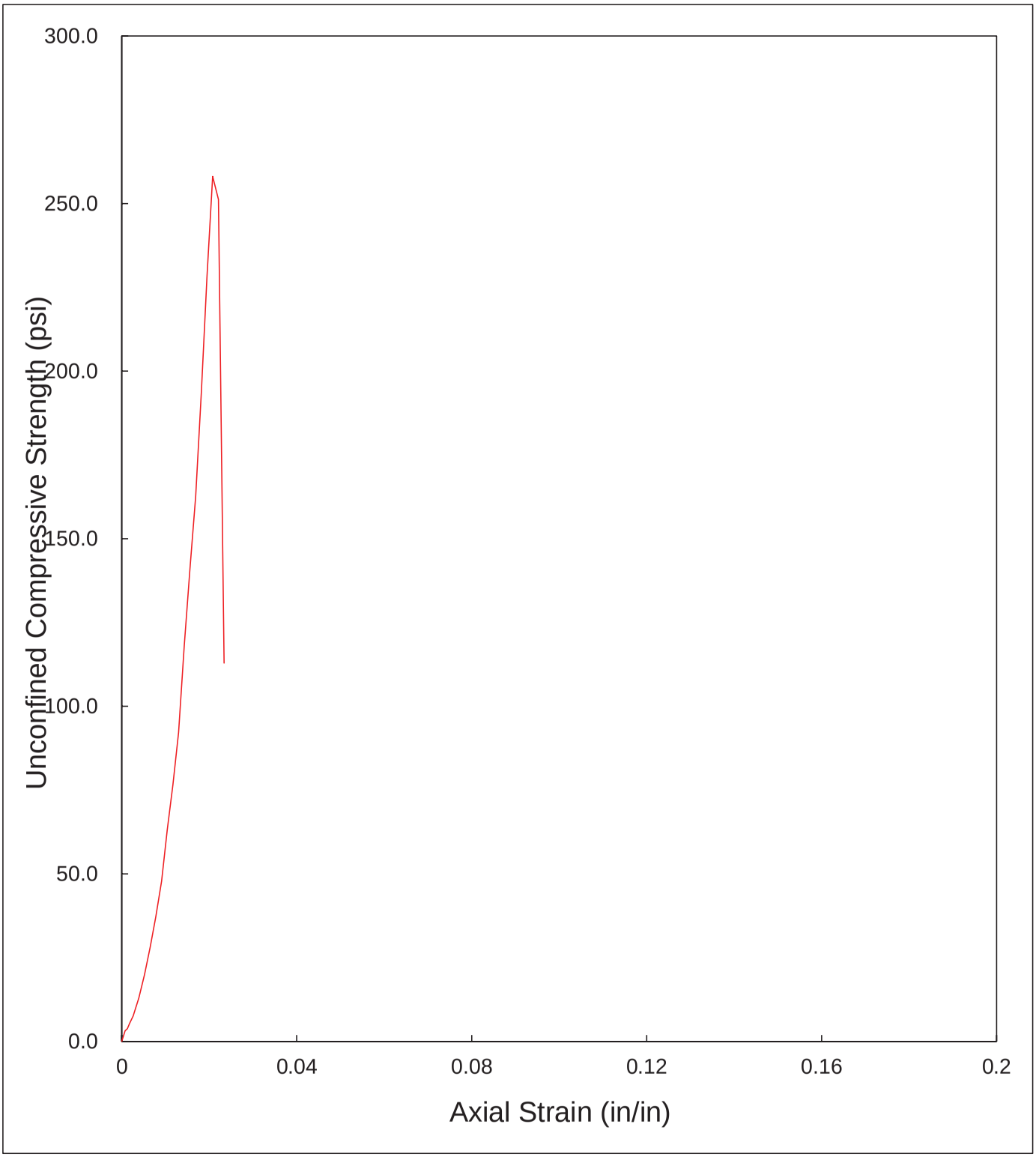
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.85	in.
No. 2	2.00	in.	3.84	in.
No. 3	1.99	in.	3.85	in.
Average	**2.00**	**in.**	**3.85**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***338.02***	***g***
Initial Area, Ao	3.15	in^2
Initial Volume, Vo	12.11	in^3
Initial Bulk Unit Weight,	106.3	lb/ft^3
Initial Dry Unit Weight	74.9	lb/ft^3
15 % Strain (0.15 Lo)	0.58	in.
UCS	258.1	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.149	0.0000	0.0
10	0.003	0.003	3.151	0.0008	3.2
12	0.005	0.005	3.153	0.0013	3.8
17	0.007	0.007	3.155	0.0018	5.4
24	0.010	0.010	3.157	0.0026	7.6
41	0.015	0.015	3.161	0.0039	13.0
63	0.020	0.020	3.165	0.0052	19.9
89	0.025	0.025	3.170	0.0065	28.1
118	0.030	0.030	3.174	0.0078	37.2
152	0.035	0.035	3.178	0.0091	47.8
201	0.040	0.040	3.182	0.0104	63.2
244	0.045	0.045	3.186	0.0117	76.6
294	0.050	0.050	3.190	0.0130	92.2
377	0.055	0.055	3.195	0.0143	118.0
452	0.060	0.060	3.199	0.0156	141.3
521	0.065	0.065	3.203	0.0169	162.7
621	0.070	0.070	3.207	0.0182	193.6
733	0.075	0.075	3.212	0.0195	228.2
830	0.080	0.080	3.216	0.0208	258.1
809	0.085	0.085	3.220	0.0221	251.2
364	0.090	0.090	3.224	0.0234	112.9

UNCONFINED COMPRESSION TESTING

Sample No. BWM-24 125C



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-24 125C		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D328

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	41.8	**%**
BULK UNIT WEIGHT	106.3	lb/ft^3
DRY UNIT WEIGHT	74.9	lb/ft^3
UCS *	258.1	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/19/2019	Tested By:	jm
End Date:	6/21/2019	Checked By:	mcm
Boring	---	Test #:	K19
Sample #:	BWM-24 125C		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.34	1.34
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	9.3	9.3
Mass, g	265	268
Bulk Density, pcf	108	110
Moisture Content, %	36.7	38.6
Dry Density, pcf	79.3	79.3
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/20	1	104	80	88.9	87.3	1.6	60	26.1	1.9E-06	21	0.976	1.8E-06
6/20	2	104	80	87.3	85.9	1.4	60	25.6	1.7E-06	21	0.976	1.6E-06
6/20	3	104	80	85.9	82.2	3.7	180	25.2	1.5E-06	21	0.976	1.5E-06
6/20	4	104	80	82.2	78.8	3.4	180	24.2	1.5E-06	21	0.976	1.4E-06

PERMEABILITY AT 20° C: 1.6 x 10^{-6} cm/sec (@ 24 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-24 125C DUP		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D329

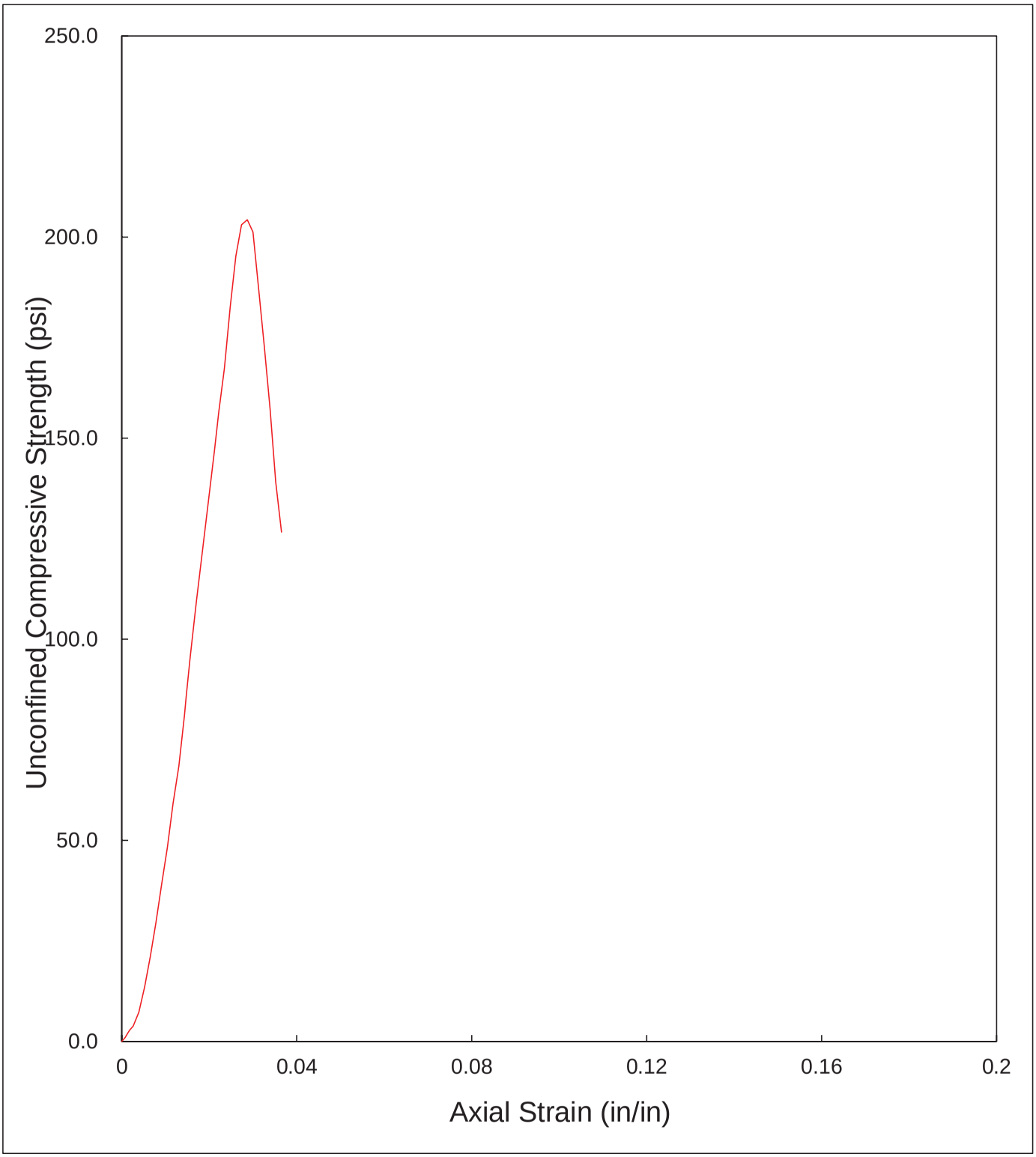
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	111.95	g
3. WT WET SOIL + TARE	206.12	g
4. WT DRY SOIL + TARE	175.56	g
5. WT WATER, Ww	30.56	g
6. WT DRY SOIL, Ws	63.61	g
7. MOISTURE CONTENT, W	**48.04**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	3.82	in.
No. 2	2.01	in.	3.83	in.
No. 3	1.99	in.	3.85	in.
Average	**2.00**	**in.**	**3.83**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***340.69***	***g***
Initial Area, Ao	3.16	in^2
Initial Volume, Vo	12.10	in^3
Initial Bulk Unit Weight,	107.3	lb/ft^3
Initial Dry Unit Weight	72.5	lb/ft^3
15 % Strain (0.15 Lo)	0.57	in.
UCS	204.3	lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	3.157	0.0000	0.0
3	0.003	0.003	3.159	0.0008	0.9
6	0.005	0.005	3.161	0.0013	1.9
9	0.007	0.007	3.163	0.0018	2.8
12	0.010	0.010	3.165	0.0026	3.8
23	0.015	0.015	3.169	0.0039	7.3
43	0.020	0.020	3.173	0.0052	13.6
67	0.025	0.025	3.178	0.0065	21.1
94	0.030	0.030	3.182	0.0078	29.5
125	0.035	0.035	3.186	0.0091	39.2
154	0.040	0.040	3.190	0.0104	48.3
189	0.045	0.045	3.194	0.0117	59.2
219	0.050	0.050	3.199	0.0130	68.5
260	0.055	0.055	3.203	0.0143	81.2
306	0.060	0.060	3.207	0.0157	95.4
348	0.065	0.065	3.211	0.0170	108.4
387	0.070	0.070	3.216	0.0183	120.4
426	0.075	0.075	3.220	0.0196	132.3
463	0.080	0.080	3.224	0.0209	143.6
505	0.085	0.085	3.228	0.0222	156.4
541	0.090	0.090	3.233	0.0235	167.4
591	0.095	0.095	3.237	0.0248	182.6
633	0.100	0.100	3.241	0.0261	195.3
659	0.105	0.105	3.246	0.0274	203.0
664	0.110	0.110	3.250	0.0287	204.3
655	0.115	0.115	3.254	0.0300	201.3
610	0.120	0.120	3.259	0.0313	187.2
563	0.125	0.125	3.263	0.0326	172.5
514	0.130	0.130	3.268	0.0339	157.3
455	0.135	0.135	3.272	0.0352	139.1
415	0.140	0.140	3.276	0.0365	126.7

UNCONFINED COMPRESSION TESTING
Sample No. BWM-24 125C DUP



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	ACW		
PROJECT No.:	SHO682		
SAMPLE No.:	BWM-24 125C DUP		
TESTING DATE:	6-Jun-19	LOADING RATE:	0.0400 in./min
TESTED BY:	MTC	TRACKING CODE:	D329

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	48.0	**%**
BULK UNIT WEIGHT	107.3	lb/ft^3
DRY UNIT WEIGHT	72.5	lb/ft^3
UCS *	204.3	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	ACW		
Project Location:	---		
GTX #:	309722		
Start Date:	6/19/2019	Tested By:	jm
End Date:	6/21/2019	Checked By:	mcm
Boring	---	Test #:	K20
Sample #:	BWM-24 125C-DUP		
Depth:	---		
Visual Description:	Moist, dark yellowish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.32	1.32
Diameter, in	2.98	2.98
Area, in^2	6.97	6.97
Volume, in^3	9.2	9.2
Mass, g	260	262
Bulk Density, pcf	107	108
Moisture Content, %	41.1	42.3
Dry Density, pcf	76.0	76.0
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
6/20	2	104	80	84.0	82.1	1.9	60	25.1	2.3E-06	21	0.976	2.3E-06
6/20	3	104	80	82.1	80.3	1.8	60	24.5	2.2E-06	21	0.976	2.2E-06
6/20	4	104	80	80.3	77.3	3.0	120	24.0	1.9E-06	21	0.976	1.9E-06
6/20	5	104	80	77.3	74.0	3.3	120	23.1	2.2E-06	21	0.976	2.2E-06

PERMEABILITY AT 20° C: 2.1 x 10^{-6} cm/sec (@ 24 psi effective stress)

Appendix K:
Thermal Compatibility Testing
Photographic Log

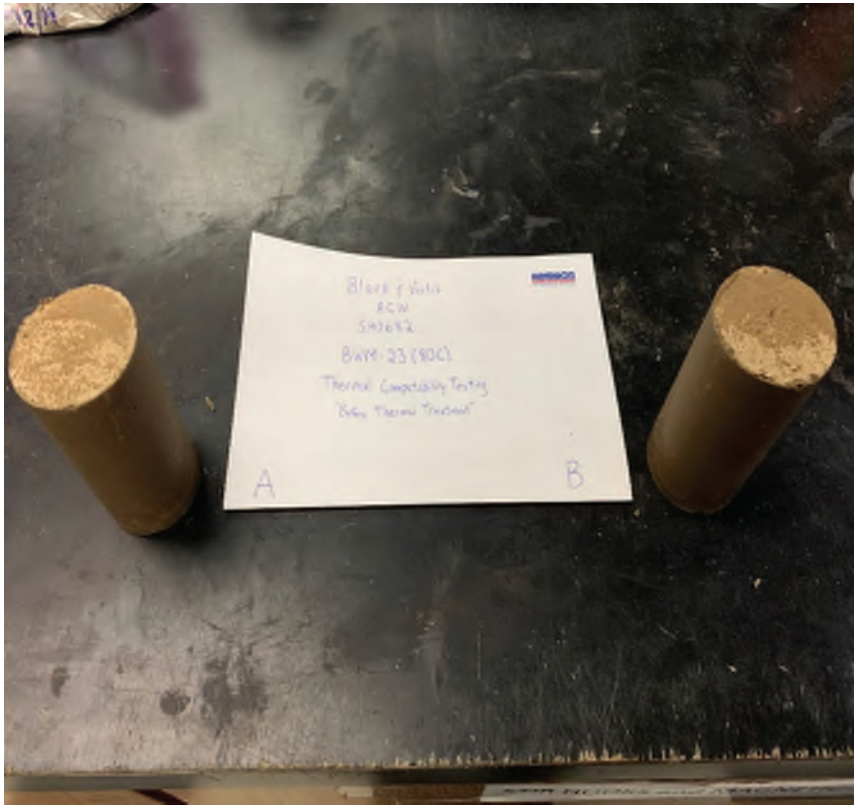
KEMRON
ENVIRONMENTAL SERVICES

American Creosote Works

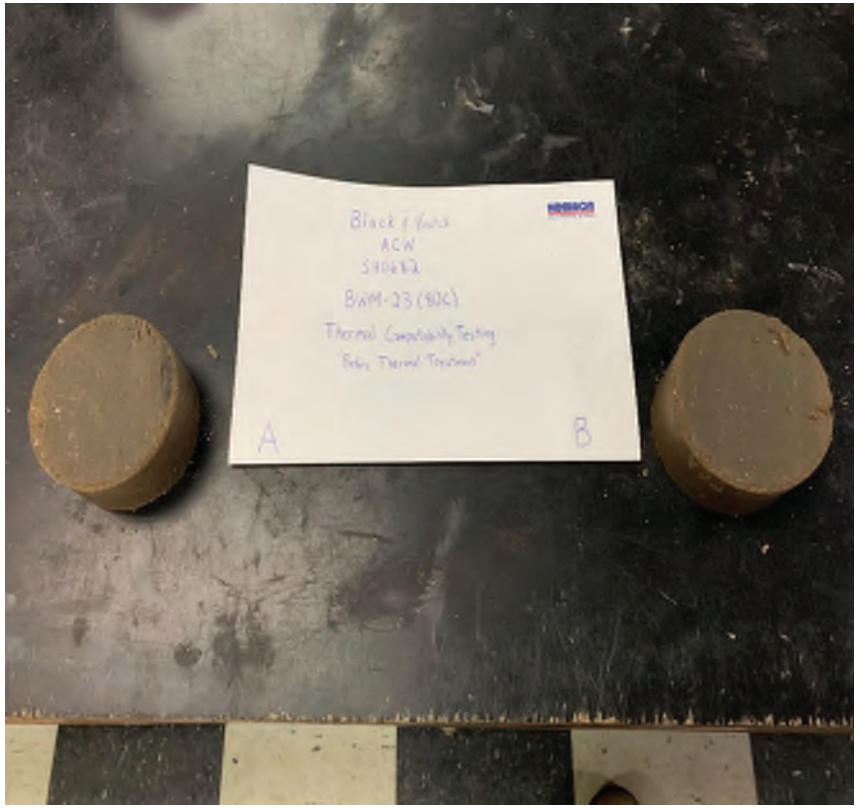
Barrier Wall Bench Scale Treatability Study

Thermal Compatibility Testing

BWM-23 and BWM-23 DUP
Pre Thermal Testing at 80°C

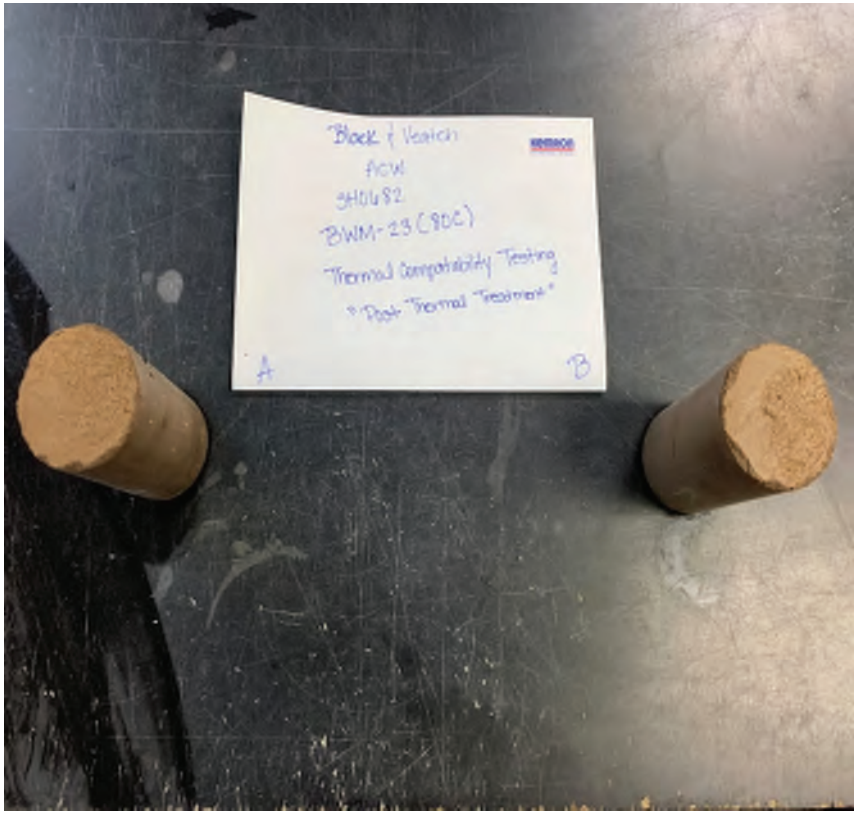


BWM-23 and BWM-23 DUP
UCS sample before testing



BWM-23 and BWM-23 DUP
Hydraulic Conductivity sample before testing

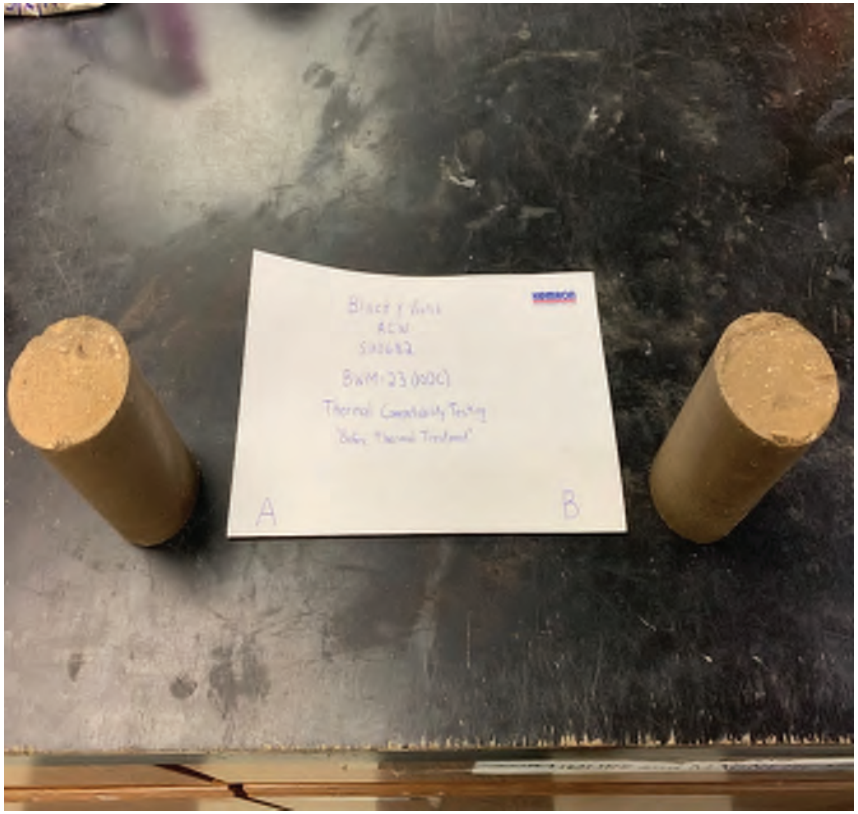
BWM-23 and BWM-23 DUP
Post Thermal Testing at 80°C



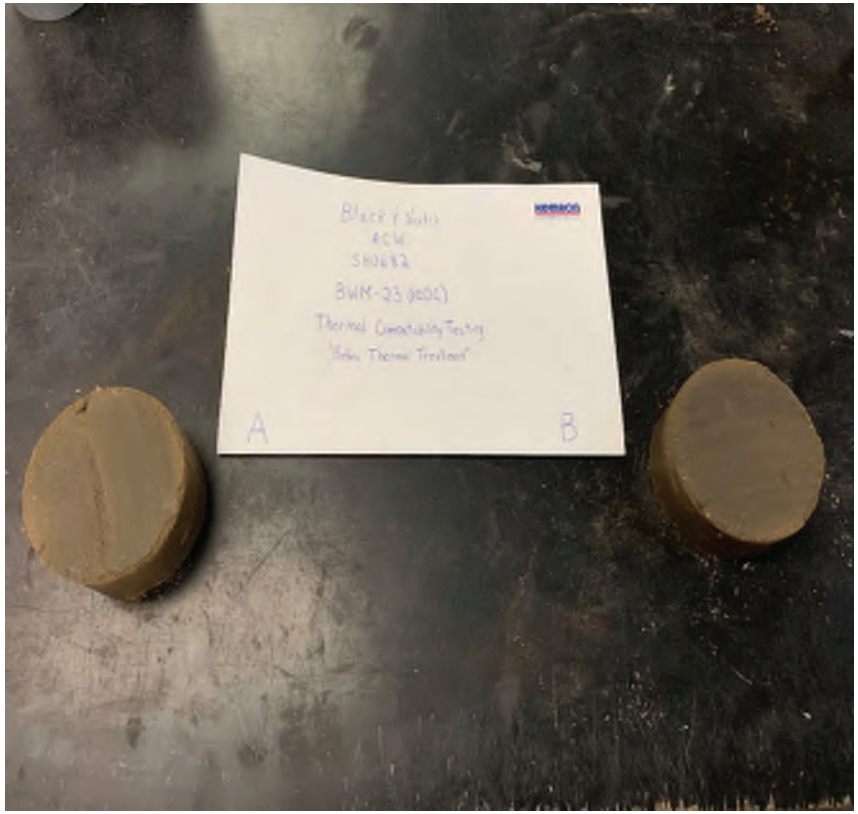
BWM-23 and BWM-23 DUP
UCS sample after testing

BWM-23 and BWM-23 DUP
Hydraulic Conductivity sample after testing

BWM-23 and BWM-23 DUP
Pre Thermal Testing at 100°C

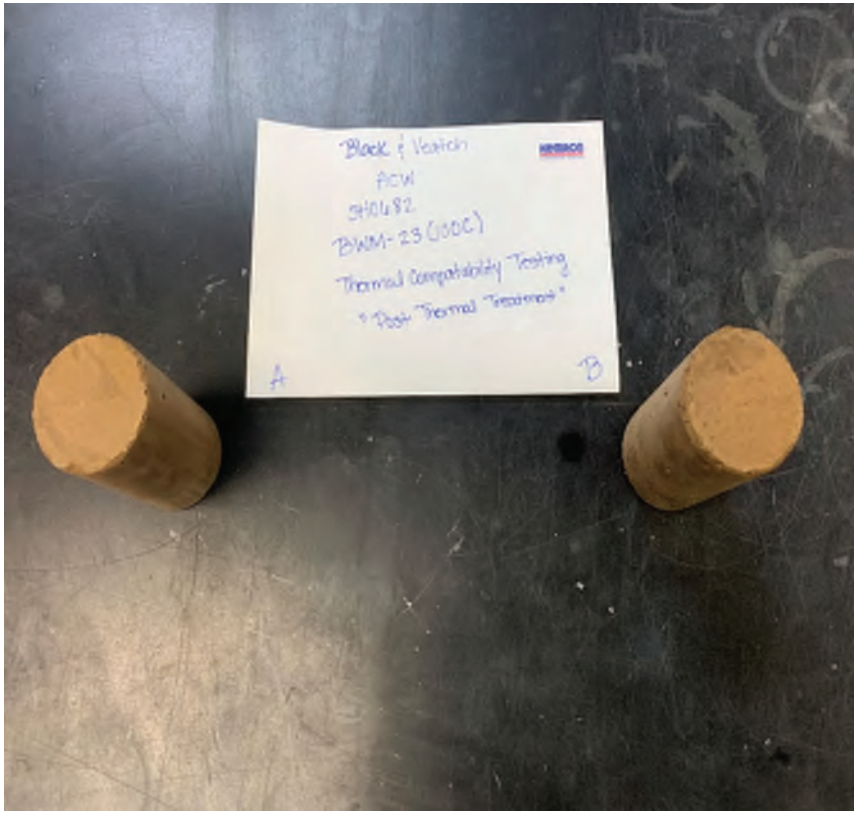


BWM-23 and BWM-23 DUP
UCS sample before testing



BWM-23 and BWM-23 DUP
Hydraulic Conductivity sample before testing

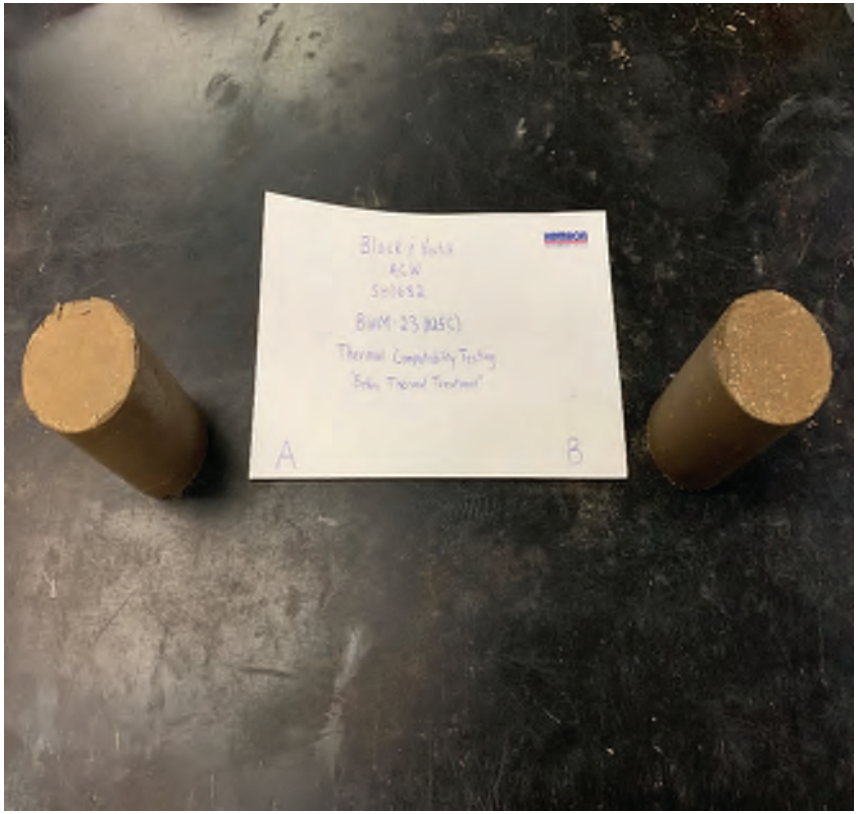
BWM-23 and BWM-23 DUP
Post Thermal Testing at 100°C



BWM-23 and BWM-23 DUP
UCS sample after testing

BWM-23 and BWM-23 DUP
Hydraulic Conductivity sample after testing

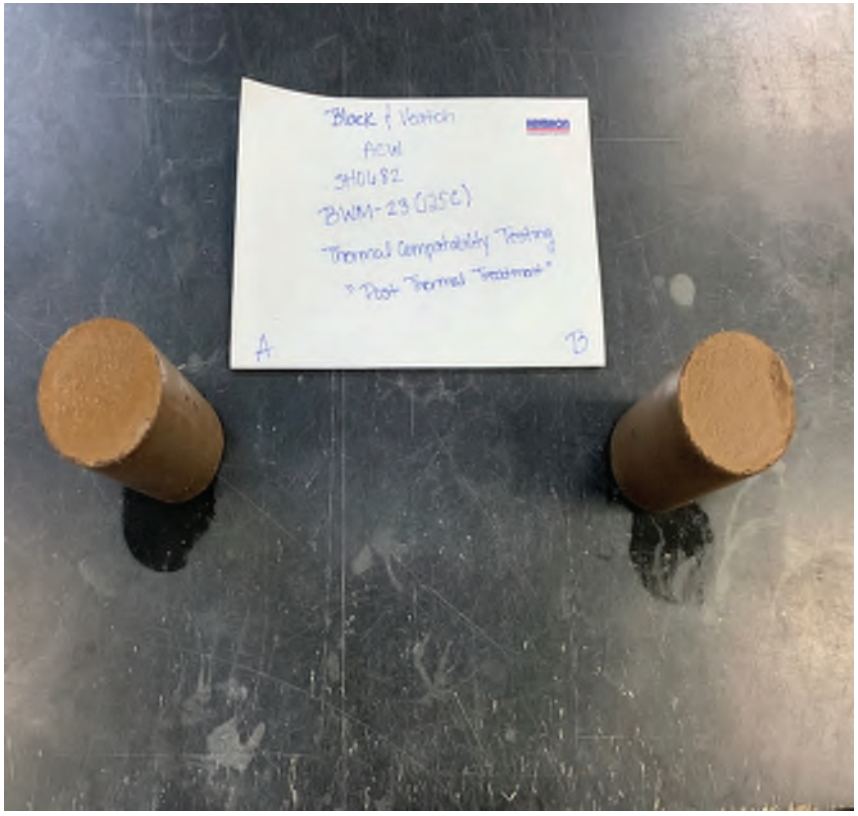
BWM-23 and BWM-23 DUP
Pre Thermal Testing at 125°C



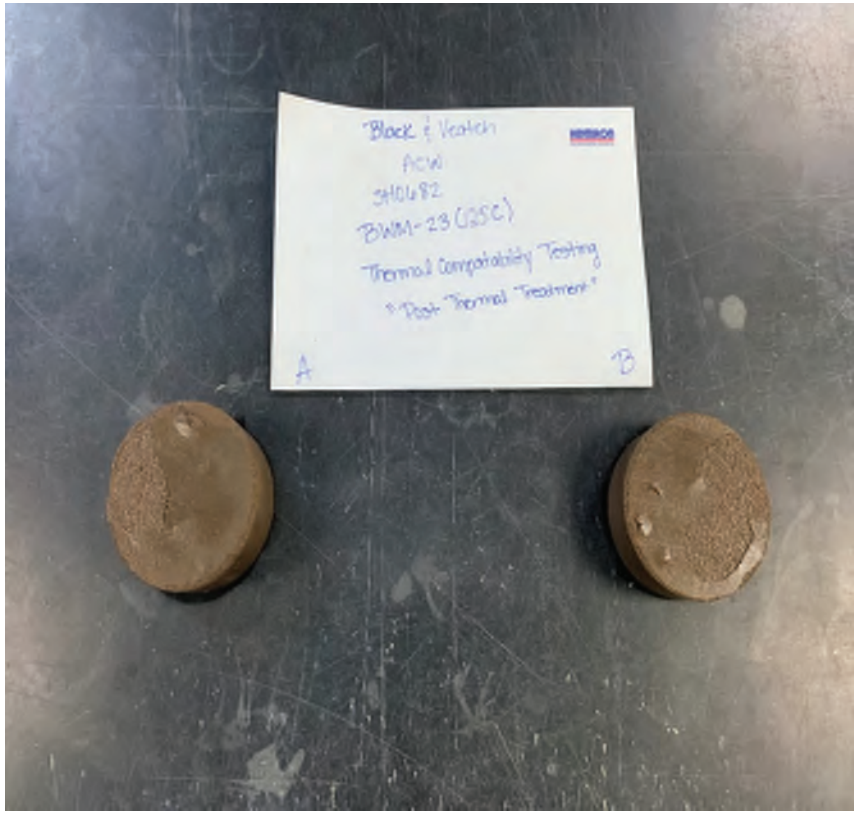
BWM-23 and BWM-23 DUP
UCS sample before testing

BWM-23 and BWM-23 DUP
Hydraulic Conductivity sample before testing

BWM-23 and BWM-23 DUP
Post Thermal Testing at 125°C



BWM-23 and BWM-23 DUP
UCS sample after testing



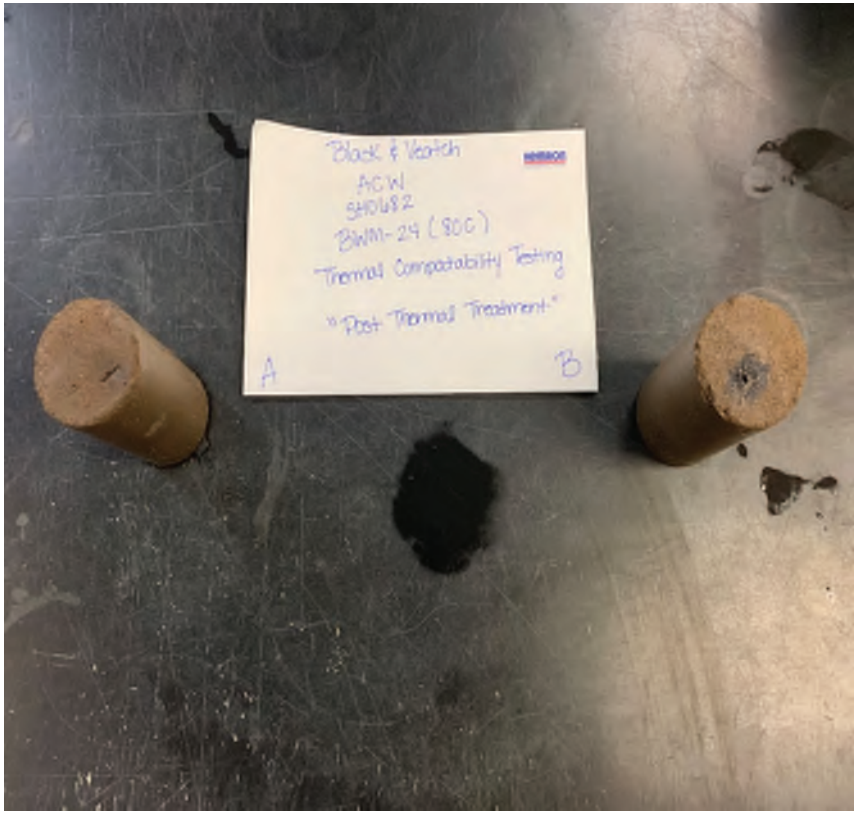
BWM-23 and BWM-23 DUP
Hydraulic Conductivity sample after testing

BWM-24 and BWM-24 DUP
Pre Thermal Testing at 80°C

BWM-24 and BWM-24 DUP
UCS sample before testing

BWM-24 and BWM-24 DUP
Hydraulic Conductivity sample before testing

BWM-24 and BWM-24 DUP
Post Thermal Testing at 80°C

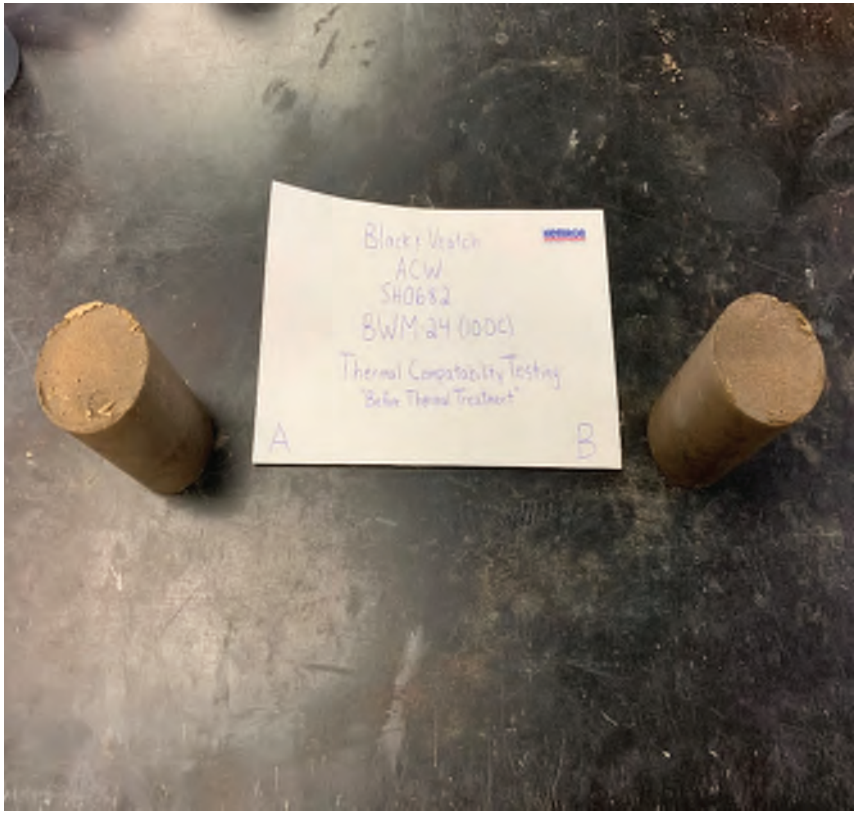


BWM-24 and BWM-24 DUP
UCS sample after testing

BWM-24 and BWM-24 DUP

Hydraulic Conductivity sample after testing. The thermocouple may have caused a fracture in sample A which may have caused the large void on the side of the sample

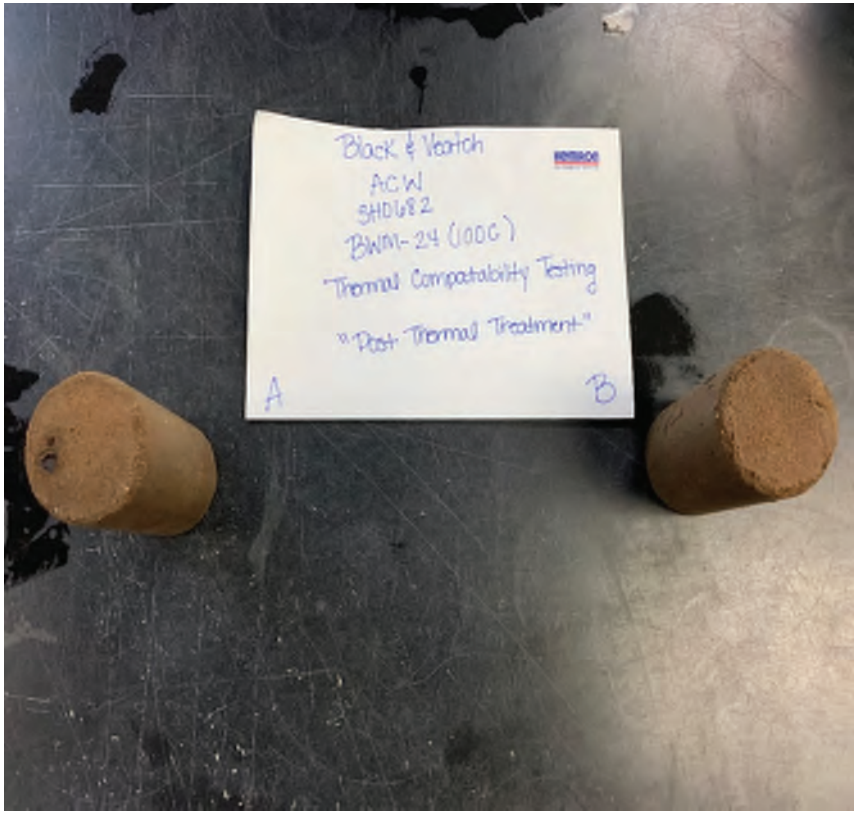
BWM-24 and BWM-24 DUP
Pre Thermal Testing at 100°C



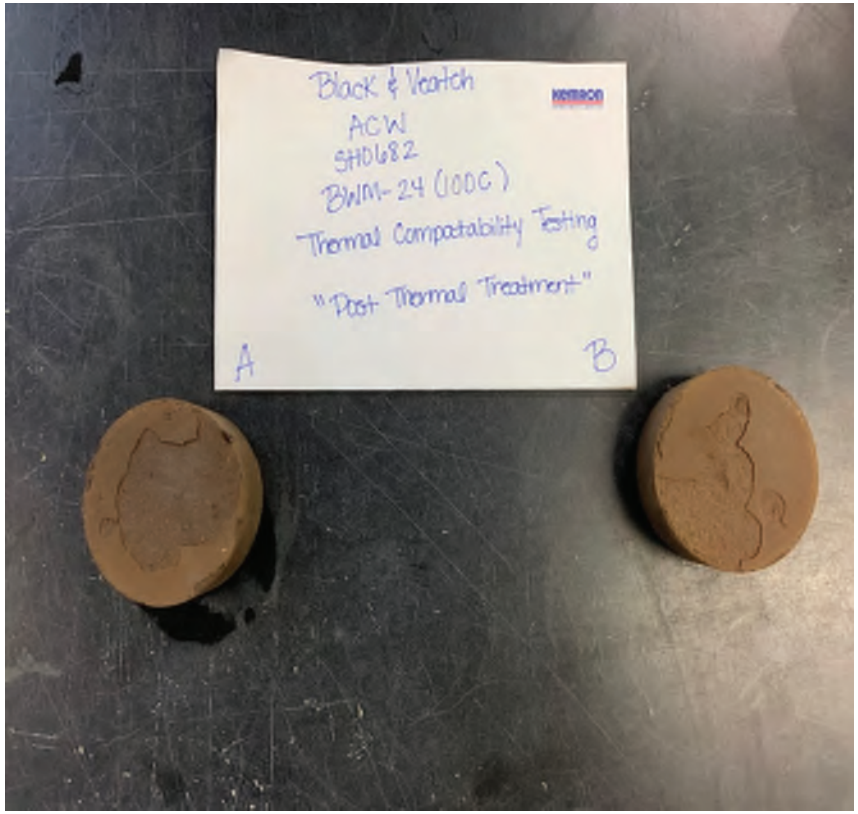
BWM-24 and BWM-24 DUP
UCS sample before testing

BWM-24 and BWM-24 DUP
Hydraulic Conductivity sample before testing

BWM-24 and BWM-24 DUP
Post Thermal Testing at 100°C

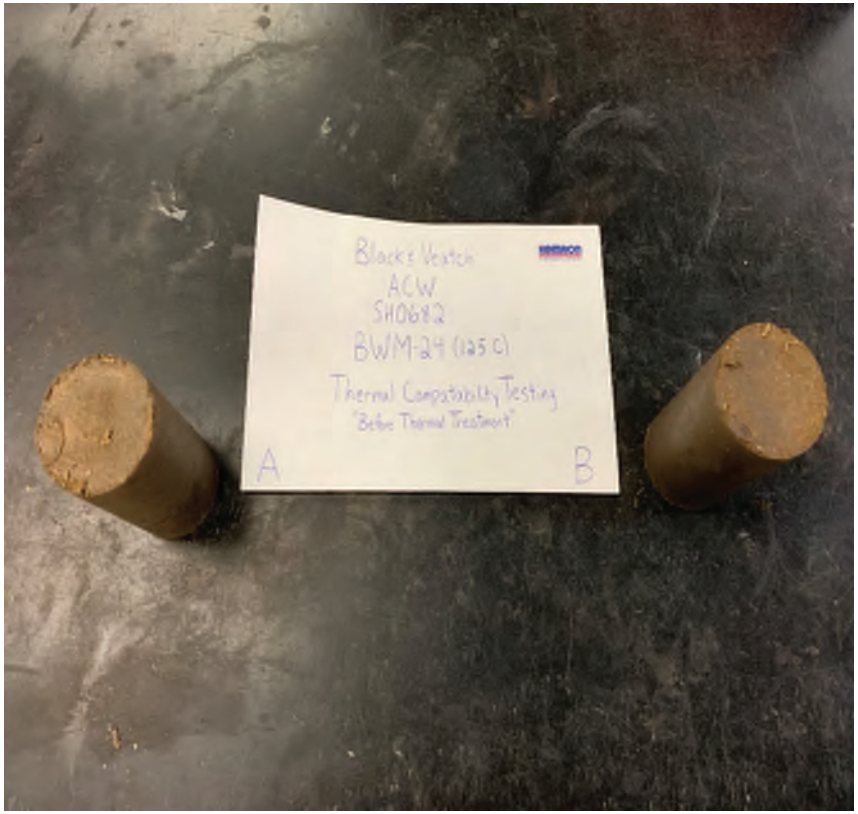


BWM-24 and BWM-24 DUP
UCS sample after testing



BWM-24 and BWM-24 DUP
Hydraulic Conductivity sample after testing

BWM-24 and BWM-24 DUP
Pre Thermal Testing at 125°C

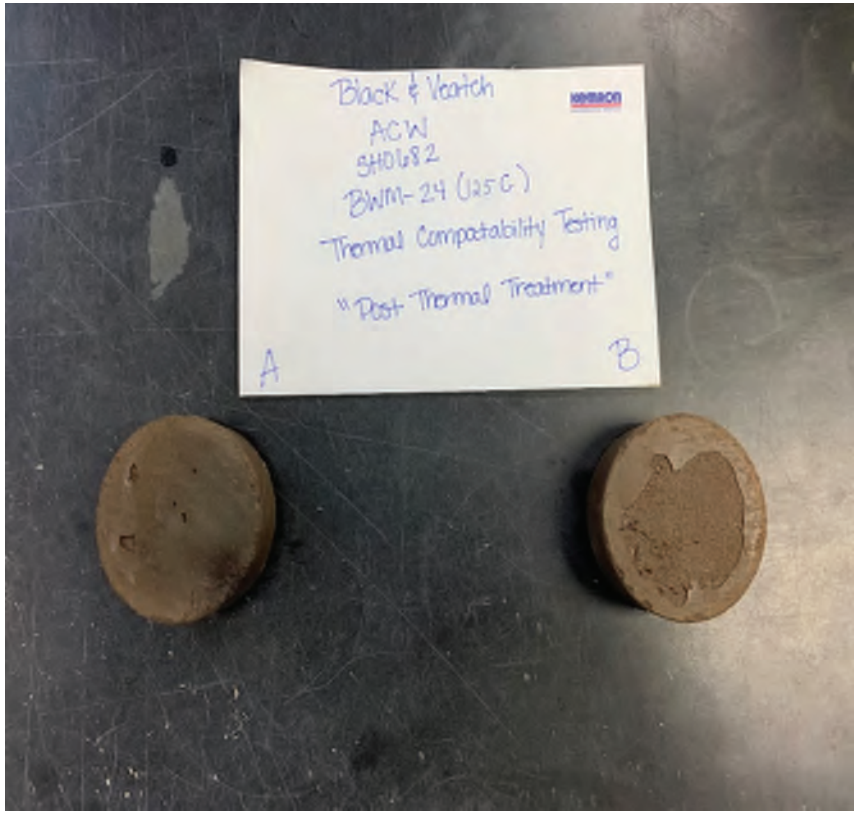


BWM-24 and BWM-24 DUP
UCS sample before testing

BWM-24 and BWM-24 DUP
Hydraulic Conductivity sample before testing

BWM-24 and BWM-24 DUP
Post Thermal Testing at 125°C

BWM-24 and BWM-24 DUP
UCS sample after testing



BWM-24 and BWM-24 DUP
Hydraulic Conductivity sample after testing

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Table D-1
Untreated Physical Properties Testing
American Creosote Works
Pensacola, Escambia County, Florida

Testing Parameter	Test Method	Unit	Untreated Material								
			Coarse Sand A	Coarse Sand B	Coarse Sand C	Fine Sand A	Fine Sand B	Fine Sand C	NAPL A	NAPL B	NAPL C
Particle Size Distribution	ASTM D422										
Gravel		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sand		%	93.9	94.2	95.2	92.6	92.7	89.1	97.1	97.3	96.3
Silt		%	5.4	4.9	3.9	6.3	4.9	9.8	2.5	1.2	2.0
Clay		%	0.7	0.9	0.9	1.1	2.4	1.1	0.4	1.5	1.7
Sample Description	ASTM D2487		Light brown poorly graded sand with silt	Light brown poorly graded sand with silt	Light brown poorly graded sand	Tan poorly graded sand with silt	Tan poorly graded sand with silt	Tan poorly graded sand with silt	Black poorly graded sand	Black poorly graded sand	Black poorly graded sand
Atterburg Limits	ASTM D4317										
LL			NA	NA	NV	NA	NA	NA	NA	NA	NA
PL			NP	NP	NP	NP	NP	NP	NP	NP	NP
PI			NP	NP	NP	NP	NP	NP	NP	NP	NP
USCS Classification	ASTM D2487		SP-SM	SP-SM	SP	SP-SM	SP-SM	SP-SM	SP	SP	SP
Moisture Content	ASTM D2216										
Average ASTM Moisture Content		%	14.54	9.33	8.77	19.48	18.80	19.02	19.26	19.10	19.47
Average Percent Solids		%	87.35	91.47	91.94	83.70	84.18	84.02	83.85	83.96	83.71
Loss on Ignition	ASTM D2974										
ASTM Moisture Content		%	12.09	11.88	12.25	19.55	19.21	19.74	18.11	18.35	18.31
Average Loss on Ignition @ 440°C		%	0.06	0.12	0.15	0.09	0.06	0.29	3.37	3.23	3.28

Notes:

ASTM = American Society for Testing and Materials

LL = Liquid Limit

PL = Plastic Limit

PI = Plasticity Index

NV = Non viscous

NP = Non plastic

NT = Not tested

NA = not applicable

SP-SM = poorly graded sand with silt

SM = silty sand

NAPL = non-aqueous phase liquid

°C = degree Celcius

% = Percent

Sample descriptions based on the Unified Classification System.

Sample color determined by the Munsell Soil Color Charts.

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Table D-2
Basal Clay Layer Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

Sample ID	Depth (Feet)	Description	Sample Type	Hydraulic Conductivity ASTM D5084			
				Moisture Content (%)	Dry Density (pcf)	Wet Density (pcf)	K (cm/s)
BW 03	111	Moist greyish brown clay	UD	37.2	82.0	113	1.1×10^{-9}
BW 05	111	Moist greyish brown clay	UD	38.7	81.0	112	2.0×10^{-9}
BW 08	111.8	Moist greyish brown clay	UD	37.5	83.0	114	1.4×10^{-9}
BW 13	111	Moist greyish brown clay	UD	35.3	82.4	112	1.5×10^{-9}

Notes:
ASTM - American Society for Testing and Materials
UD= Undisturbed Sample (Shelby Tube)
pcf = pounds per cubic foot
cm/sec = centemeter per sec
% = percent
BW = barrier wall
k = hydraulic conductivity

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Table D-3
Tier 1 Admixture Testing
Mixture Designs, Pocket Penotrometer, Unconfined Compressive Strength, and Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water Addition % by Reagent wt.	Pocket Penotrometer (TSF)				Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-01	Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	3.0/2.0	300.0	1.25	2.75	>4.5	>4.5	7	22.05	122.7	100.6	26.0	22.7	121.0	98.3	1.2×10^{-7}
									28	21.63	121.2	99.7	35.3	22.6	119.0	97.4	8.0×10^{-8}
BWM-02	Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	4.0/2.0	300.0	1.25	2.25	>4.5	>4.5	7	22.87	118.4	96.3	27.2	23.8	122.0	98.9	2.4 x 10-7
									28	22.14	121.3	99.3	49.0	23.7	119.0	96.6	5.1×10^{-8}
BWM-03	Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	5.0/2.0	300.0	0.50	2.75	>4.5	>4.5	7	26.53	120.2	95.0	32.1	26.2	121.0	96.1	2.1 x 10-7
									28	25.07	121.2	96.9	44.3	26.2	120.0	94.8	9.1×10^{-8}
BWM-04	Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	6.0/3.0	300.0	0.00	2.00	4.25	>4.5	7	30.18	115.5	88.7	32.2	30.7	117.0	89.9	1.1 x 10-7
									28	30.06	116.2	89.3	39.8	30.5	118.0	90.2	6.0×10^{-8}
BWM-05	Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	8.0/4.0	300.0	0.00	1.25	3.00	4.00	7	39.00	112.7	81.1	27.3	38.1	113.0	82.1	1.3 x 10-7
									28	38.18	112.2	81.2	47.7	37.6	110.0	80.1	8.7×10^{-8}

Notes:
% = Percent
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
TSF = Tons per square foot
Wt = weight
cm/sec = centimeters per second
BWM = barrier wall mix
k = hydraulic conductivity

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Table D-4
Tier 2A NAPL Admixture Chemical Compatibility Testing
Mixture Designs, Pocket Penotrometer,Unconfined Compressive Strength, and Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [(1)] Addition % by Reagent wt.	Pocket Penotrometer (TSF)			Cure Day
					4 Day	7 Day	14 Day	
BWM-06	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel	4.0/2.0	300.0	0.00	0.00	0.00	28
BWM-06 DUP	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel	4.0/2.0	300.0	0.00	0.00	0.00	28
BWM-07	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel	5.0/2.0	300.0	0.00	0.00	0.00	28
BWM-07 DUP	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel	5.0/2.0	300.0	0.00	0.00	0.00	28

Notes:

ASTM = American Society for Testing and Materials

TSF = Tons per square foot

UCS = Unconfined Compressive Strength

Wt= Weight

% = Percent

lb/ft^3 = pounds per cubic foot

lb/in^2 = pounds per square inch

BWM = barrier wall mix

NAPL = non-aqueous phase liquid

DUP = duplicate

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Table D-5
Experimental Soil Admixture Chemical Compatibility Testing
Mixture Designs & Pocket Penotrometer
American Creosote Works
KEMRON Project No. SH0682

Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water Addition % by Reagent wt.	Pocket Penotrometer (TSF)			
					3 Day	5 Day	7 Day	14 Day
EXP-001	50%NAPL/50% Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	5.0/2.0	300.0	1.50	2.50	2.75	2.75
EXP-002	50%NAPL/50% Coarse Sand	Type I Portland Cement / Wyoming Bentonite Hydrogel	4.0/8.0	300.0	3.50	4.00	4.00	4.00
EXP-003	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel / GGBFS	3.0/2.0/6.0	300.0	0.00	0.00	0.00	0.00
EXP-004	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel / GGBFS	4.0/2.0/8.0	300.0	0.00	0.00	0.00	0.00
EXP-005	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel / GGBFS	6.0/2.0/6.0	300.0	0.00	0.00	0.00	0.00
EXP-006	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel / GGBFS / Ag Dolomite	4.0/2.0/6.0/10.0	300.0	0.00	0.00	0.00	0.00
EXP-007	NAPL	Type I Portland Cement / Wyoming Bentonite Hydrogel / Ag Dolomite	6.0/2.0/10.0	300.0	0.00	0.00	0.00	0.00
EXP-008	NAPL	Type I/II Portland Cement / Wyoming Bentonite Hydrogel	10.0/2.0	150.0	0.00	0.00	0.00	
EXP-009	NAPL	Type I/IIPortland Cement / Hydrated CaO (quick lime) / Wyoming Bentonite Hydrogel	8.0/4.0/2.0	200.0	1.00	1.25	2.00	
EXP-010	NAPL	Type I/IIPortland Cement / Lime Kiln Dust / Wyoming Bentonite Hydrogel	8.0/8.0/2.0	200.0	0.00	1.00	1.00	
EXP-011	NAPL	Type I/IIPortland Cement / Hydrated CaO (quicklime) / Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0	3.25	>4.5	>4.5	
EXP-012	NAPL	Type I/IIPortland Cement / Lime Kiln Dust / Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0	1.25	3.75	4.50	
EXP-013	50%NAPL/25% Coarse/25%Fine	Type I/IIPortland Cement / Wyoming Bentonite Hydrogel	10.0/2.0	150.0	4.50	>4.5	>4.5	
EXP-014	50%NAPL/25% Coarse/25%Fine	Type I/IIPortland Cement / Hydrated CaO (quick lime) / Wyoming Bentonite Hydrogel	10.0/4.0/2.0	200.0	0.25	0.75	1.00	
EXP-015	50%NAPL/25% Coarse/25%Fine	Type I/IIPortland Cement / Lime Kiln Dust / Wyoming Bentonite Hydrogel	8.0/8.0/2.0	150.0	1.75	2.00	2.50	
EXP-016	50%NAPL/25% Coarse/25%Fine	Type I/IIPortland Cement / Hydrated CaO (quicklime) / Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0	>4.5	>4.5	>4.5	
EXP-017	50%NAPL/25% Coarse/25%Fine	Type I/IIPortland Cement / Lime Kiln Dust / Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0	2.50	3.25	>4.5	

Notes:

TSF = Tons per square foot
Wt= Weight
% = Percent
NAPL = non-aqueous phase liquid
Shaded areas not tested

EXP = Experimental
CaO = Calcium oxide
GGBFS = Ground Granulated Blast Furnace Slag
Ag = Silver

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Table D-6
Tier 2 Admixture Testing
Mixture Designs, Pocket Penotrometer,Unconfined Compressive Strength, and Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water Addition % by Reagent wt.	Pocket Penotrometer (TSF)					Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day	14 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-03 DUP (A)	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	1.75	4.25	>4.50			28	23.80	122.7	99.10	35.5				
BWM-03 DUP (B)	Coarse Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0	1.75	4.50	>4.50			28	24.51	122.0	98.00	35.8				
BWM-08	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		3.25	3.50	4.25		28	35.95	106.5	78.30	47.6	34.97	107.6	79.7	3.59E-07
BWM-08 DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		3.50	3.75	4.50		28	35.82	106.4	78.30	56.4	34.03	107.2	80.0	2.40E-07
BWM-09	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		2.50	3.25	>4.5		28	37.49	105.1	76.50	39.2	32.43	112.1	84.6	1.76E-06
BWM-09 DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		2.50	3.75	>4.5		28	42.13	104.2	73.30	39.9	33.89	111.1	83.0	2.51E-06
BWM-10	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0		0.75	1.00	1.25	2.25	7	38.62	112.8	81.40	14.1				
BWM-10 DUP	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	5.0/2.0	300.0		0.75	1.00	1.25	2.00	7	38.61	111.1	80.10	14.0				
BWM-11	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0						28	38.96	110.2	79.30	42.0	34.98	111.7	82.8	1.02E-06
BWM-12	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0						28	41.14	107.2	76.00	30.8	33.93	112.3	83.8	2.03E-06
BWM-13	Fine Material	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-13 DUP	Fine Material	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-14	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		>4.5	>4.5	>4.5		28								
BWM-14 DUP	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/2.0	150.0		>4.5	>4.5	>4.5		28								

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Table D-6
Tier 2 Admixture Testing
Mixture Designs, Pocket Penotrometer,Unconfined Compressive Strength, and Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water Addition % by Reagent wt.	Pocket Penotrometer (TSF)					Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day	14 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-15	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/2.0	150.0		>4.5	>4.5	>4.5		28	40.70	112.1	79.7	46.9	36.3	114.6	84.1	8.10E-07
BWM-15 DUP	Fine Material	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/2.0	150.0		>4.5	>4.5	>4.5		28	37.45	113.0	82.2	52.7	37.6	113.3	82.3	8.50E-07
BWM-16	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	8.0/4.0/2.0	150.0		3.25	4.25	>4.5		28	38.80	114.6	82.6	45.5	34.8	114.2	84.7	1.80E-06
BWM-16 DUP	Fine Material	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	8.0/4.0/2.0	150.0		3.25	4.50	>4.5		28	36.24	114.2	83.8	55.0	34.5	115.4	85.8	1.30E-06

Notes:
TSF = Tons per square foot
Wt= Weight
% = Percent
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
cm/sec = centimeters per second
NAPL = non-aqueous phase liquid
DUP = duplicate
BWM = barrier wall mix

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Table D-7
Tier 2 Supplemental Evaluations
Mixture Designs and Pocket Penotrometer
American Creosote Works
Pensacola, Escambia County, Florida

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water Addition % by Reagent wt.	Pocket Penetrometer (TSF)	
					7 Day	14Day
BWM-17 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.0	300.0	4.25	>4.5
BWM-18 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.5	300.0	4.00	4.50
BWM-19 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	12.5/3.0	300.0	3.00	4.00
BWM-20 EXP	75%Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	12.5/3.5	300.0	2.50	3.25
BWM-21 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/ Wyoming Bentonite Hydrogel	15.0/4.0/3.0	150.0	>4.5	>4.5
BWM-22 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/ Wyoming Bentonite Hydrogel	15.0/8.0/3.0	150.0	3.00	>4.5
BWM-23 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/ Wyoming Bentonite Hydrogel	15.0/4.0/3.5	150.0	>4.5	>4.5
BWM-24 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/ Wyoming Bentonite Hydrogel	15.0/8.0/3.5	150.0	3.50	>4.5
BWM-25 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/ Wyoming Bentonite Hydrogel	17.5/4.0/3.0	150.0	4.50	4.50
BWM-26 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/ Wyoming Bentonite Hydrogel	17.5/8.0/3.0	150.0	2.75	4.00
BWM-27 EXP	NAPL	Type I Portland Cement/High Calcium Quicklime/ Wyoming Bentonite Hydrogel	17.5/4.0/3.5	150.0	>4.5	>4.5
BWM-28 EXP	NAPL	Type I Portland Cement/Lime Kiln Dust/ Wyoming Bentonite Hydrogel	17.5/8.0/3.5	150.0	1.25	2.00

Notes:
TSF = Tons per square foot
Wt= Weight
% = Percent
NAPL = non-aqueous phase liquid
EXP = Experimental
BWM = barrier wall mix

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Checked by: M.Randolph 8/16/19

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Table D-8
Tier 2 Compatability Testing
Mixture Designs, Pocket Penotrometer, Unconfined Compressive Strength, and Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Pocket Penetrometer (TSF)					Cure Day	Unconfined Compressive Strength ASTM 2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	5 Day	7 Day	21 Day		Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BWM-17	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.0	300.0	1.00	1.50	3.00		4.50	28	51.78	107.6	70.9	23.0	48.3	107.0	72.1	8.7×10^{-7}
BWM-17 DUP	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.0	300.0						28	61.31	116.2	72.0	25.0	49.1	112.0	75	8.3×10^{-7}
BWM-18	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.5	300.0	1.25	1.75	3.50		>4.5	28	40.96	109.9	78.0	24.1	46.6	106.0	72.4	6.9×10^{-7}
BWM-18 DUP	75% Coarse Sand/25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	10.0/3.5	300.0						28	49.63	115.1	76.9	21.7	45.5	108.0	74.3	6.9×10^{-7}
BWM-23	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/3.5	150.0		>4.5	>4.5	>4.5	>4.5	28	40.85	107.1	76.0	81.6	41.2	112.0	79.3	3.8×10^{-8}
BWM-23 DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.0/3.5	150.0						28	36.95	107.2	78.3	81.0	35.8	109.0	80.1	3.3×10^{-8}
BWM-24	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/3.5	150.0		3.25	>4.5	>4.5	>4.5	28	41.76	106.7	75.3	69.1	40.6	109.0	77.6	4.7×10^{-8}
BWM-24 DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.0/3.5	150.0						28	32.33	105.8	82.2	55.4	38.8	108.0	78	4.3×10^{-8}

Notes:

Type I/II Portland Cement #842

Wyoming Bentonite #807

High Calcium Quicklime #1112

Lime Kiln Dust#1054

TSF = Tons per square foot

Wt= Weight

% = Percent

lb/ft^3 = pounds per cubic foot

lb/in^2 = pounds per square inch

cm/sec = centemeter per sec

BW = barrier wall

k = hydraulic conductivity

NAPL = non-aqueous phase liquid

Each mixtures were prepared as one batch. UCS and Hydraulic Conductivity testing were performed in duplicate tests.

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Checked by: M.Randolph 8/16/19

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Table D-9
Confirmation Testing
Mixture Designs and Unconfined Compressive Strength
American Creosote Works
Pensacola, Escambia County, Florida

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [1] Addition % by Reagent wt.	Cure Day	Unconfined Compressive Strength ASTM D2166			
						Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)
BWM-29	75% Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	12.5/3.5	300.0	7	69.51	90.4	53.3	7.8
BWM-30	75% Coarse Sand/ 25% Fine Sand	Type I Portland Cement/Wyoming Bentonite Hydrogel	15.0/3.5	300.0	7	55.96	111.6	71.6	16.3

Notes:

Type I/II Portland Cement #842

Wyoming Bentonite #807

Wt= Weight

% = Percent

lb/ft^3 = pounds per cubic foot

lb/in^2 = pounds per square inch

BWM = barrier wall mix

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Checked by: M. Randolph 8/16/19

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Table D-10
Thermal Compatibility Testing
Mixture Designs, Unconfined Compressive Strength, and Hydraulic Conductivity
American Creosote Works
Pensacola, Escambia County, Florida

KEMRON Sample Number	Untreated Material Type	Reagent Type and Identification Number(s)	Reagent Addition % by Wet Soil wt.	Water [(1)] Addition % by Reagent wt.	Cure Day	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
						Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
BMW-23 20C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	35.73	105.4	77.7	107.0	33.5	106	79.6	6.4×10^{-8}
BMW-23 20C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	33.52	104.7	78.4	106.5	33.4	107	80.5	8.6×10^{-8}
BWM-23 80C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	40.89	108.7	77.1	211.4	36.7	110	80.8	3.1×10^{-8}
BWM-23 80C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	40.37	108.4	77.2	202.5	38.4	108	78.3	1.3×10^{-8}
BWM-23 100C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	41.30	107.2	75.9	236.3	39.6	108	77.6	3.6×10^{-8}
BWM-23 100C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	103	41.20	108.2	76.6	271.8	38.8	109	78.2	3.7×10^{-8}
BWM-23 125C	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	104	42.53	107.1	75.1	355.6	40.3	107	76.2	4.7×10^{-9}
BWM-23 125C DUP	NAPL	Type I Portland Cement/High Calcium Quicklime/Wyoming Bentonite Hydrogel	15.0/4.00/3.50	150.0	104	42.91	108.2	75.7	282.4	37.1	109	79.4	3.4×10^{-9}
BWM-24 20C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	41.44	105.1	74.3	96.4	28.6	111	86.3	1.1×10^{-7}
BWM-24 20C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	41.31	105.0	74.3	99.6	28.9	114	88.3	3.1×10^{-7}
BWM-24 80C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	43.22	106.4	74.3	125.0	36	110	81.2	7.8×10^{-8}
BWM-24 80C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	39.35	107.9	77.4	120.5	38.1	109	79.0	9.4×10^{-8}
BWM-24 100C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	42.01	109.6	77.1	151.1	37.3	109	79.4	1.3×10^{-7}
BWM-24 100C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	103	43.34	107.9	75.3	131.0	37.6	110	79.8	3.0×10^{-7}
BWM-24 125C	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	104	41.85	106.3	74.9	258.1	36.7	108	79.3	1.6×10^{-6}
BWM-24 125C DUP	NAPL	Type I Portland Cement/Lime Kiln Dust/Wyoming Bentonite Hydrogel	15.0/8.00/3.50	150.0	104	48.04	107.3	72.5	204.3	41.1	107	76.0	2.1×10^{-6}

Notes:

Type I Portland Cement #842
Wyoming Bentonite #807
High Calcium Quicklime #1112
Lime Kiln Dust #1054
Wt= Weight
NAPL = non-aqueous phase liquid
DUP = duplicate

% = Percent
lb/ft^3 = pounds per cubic foot
lb/in^2 = pounds per square inch
103/104 day UCS and Hydraulic Conductivity testing were performed in duplicate tests.
k = hydraulic conductivity
cm/sec = centimeters per second

Created by: James Moyer 7/22/19
Checked by: Morgan Randolph 8/16/19

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Appendix E. Civil Design

E1 – Tax Assessor Information – CD- Only

E2 – Calculations

E3 – Stormwater Modeling – CD Only

E4 – Best Management Practices Summary

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Appendix E1 – Tax Assessor Information – CD Only

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Escambia County-Pensacola, FL

Account: 153620000
Refno: 000S009080001162
OName1: GEORGE RICHARD C
MailingAddr: 1905 W GIMBLE ST+PENSACOLA, FL 32501
Situs: 1907 W GIMBLE ST
LastSale: 3/29/2011
LastSalePr: 100
DORCd: STORE/OFFICE/SFR
acreage: 0.8256
BldCnt: 3
TotHeatArea: 3817
SecMapId: CA119
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: C-3
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 3
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

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Escambia County-Pensacola, FL

Account: 153760500
Refno: 000S009080030184
OName1: LUNDQUIST RICHARD K &
MailingAddr: 8121 GIBSON RD+MOLINO, FL 32577
Situs: 600 BLK S L ST
LastSale: 11/20/2012
LastSalePr: 100
DORCd: VACANT RESIDENTIAL
acreage: 0.2400
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 0
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

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Escambia County-Pensacola, FL

Account: 153751000
Refno: 000S009080001184
OName1: LUNDQUIST RICHARD K &
MailingAddr: 8121 GIBSON RD+MOLINO, FL 32577
Situs: 701 S L ST
LastSale: 11/20/2012
LastSalePr: 100
DORCd: AUTO REPAIR
acreage: 0.4400
BldCnt: 2
TotHeatArea: 2580
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: C-3
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153755000
Refno: 000S009080013184
OName1: MCKENZIE ERAENA A
MailingAddr: 716 SOUTH M ST+PENSACOLA, FL 32501
Situs: 716 S M ST
LastSale: 11/20/2012
LastSalePr: 169900
DORCd: SINGLE FAMILY RESID
acreage: 0.4000
BldCnt: 1
TotHeatArea: 1869
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153758500
Refno: 000S009080021184
OName1: FIRESIDE PROMENADE LLC
MailingAddr: 3811 IDLEWOOD DR+PENSACOLA, FL 32505
Situs: 1800 BLK CYPRESS ST
LastSale: 1/24/2012
LastSalePr: 100
DORCd: VACANT RESIDENTIAL
acreage: 0.0811
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 0
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153758000
Refno: 000S009080019184
OName1: STARK GRANT M
MailingAddr: 1441 CANYON DEL REY BLVD+SEASIDE, CA 93955-4729
Situs: 1802 CYPRESS ST
LastSale: 5/2007
LastSalePr: 145000
DORCd: SINGLE FAMILY RESID
acreage: 0.1497
BldCnt: 1
TotHeatArea: 1798
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153747500
Refno: 000S009080002183
OName1: BROWN LOUIS C & CAROLE S
MailingAddr: 801 SOUTH K ST+PENSACOLA, FL 32501
Situs: 801 S K ST
LastSale: 11/1980
LastSalePr: 2800
DORCd: SINGLE FAMILY RESID
acreage: 0.4000
BldCnt: 1
TotHeatArea: 1653
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153750000
Refno: 000S0090800024183
OName1: BRUSH PAULA JEAN &
MailingAddr: 851 SOUTH K ST+PENSACOLA, FL 32502
Situs: 851 S K ST
LastSale: 9/19/2011
LastSalePr: 26700
DORCd: SINGLE FAMILY RESID
acreage: 0.3099
BldCnt: 1
TotHeatArea: 1068
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153748020
Refno: 000S009080020183
OName1: PHILLIPS LEVINE DYLAN J &
MailingAddr: 1804 W CYPRESS ST+PENSACOLA, FL 32502
Situs: 1804 CYPRESS ST
LastSale: 10/2/2015
LastSalePr: 325000
DORCd: SINGLE FAMILY RESID
acreage: 0.0900
BldCnt: 1
TotHeatArea: 2820
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153748000
Refno: 000S009080019183
OName1: HELM BRIDGET N
MailingAddr: 1806 W CYPRESS ST+PENSACOLA, FL 32502
Situs: 1806 CYPRESS ST
LastSale: 7/31/2015
LastSalePr: 310000
DORCd: SINGLE FAMILY RESID
acreage: 0.0900
BldCnt: 1
TotHeatArea: 2820
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153744500
Refno: 000S009080022182
OName1: MORSE JOSEPH J &
MailingAddr: 1025 SAGEBRUSH TRL+PENSACOLA, FL 32534
Situs: 700 BLK S J ST
LastSale: 10/4/2011
LastSalePr: 15000
DORCd: VACANT RESIDENTIAL
acreage: 0.0826
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 0
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153737000
Refno: 000S009080001182
OName1: NORTHWEST FLORIDA LEGAL SERVICES INC
MailingAddr: 701 SOUTH J ST+PENSACOLA, FL 32502
Situs: 701 S J ST
LastSale: 8/2001
LastSalePr: 280000
DORCd: OFFICE, 1 STORY
acreage: 0.7200
BldCnt: 1
TotHeatArea: 5628
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153741000
Refno: 000S009080014182
OName1: STEWART STEPHEN V &
MailingAddr: 820 SOUTH K ST+PENSACOLA, FL 32501
Situs: 820 S K ST
LastSale: 12/1994
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.4304
BldCnt: 2
TotHeatArea: 2440
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 2
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153739000
Refno: 000S009080006182
OName1: KINTZ ROBERT C
MailingAddr: 836 SOUTH K ST+PENSACOLA, FL 32501
Situs: 836 S K ST
LastSale: 1/1971
LastSalePr: 800
DORCd: SINGLE FAMILY RESID
acreage: 0.3500
BldCnt: 1
TotHeatArea: 1144
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153740000
Refno: 000S009080011182
OName1: HEBB DANIEL L
MailingAddr: 850 SOUTH K ST+PENSACOLA, FL 32501
Situs: 850 S K ST
LastSale: 2/2004
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.3099
BldCnt: 1
TotHeatArea: 1770
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153743000
Refno: 000S009080019182
OName1: STEWART STEPHEN V &
MailingAddr: 820 SOUTH K ST+PENSACOLA, FL 32502
Situs: 1700 BLK CYPRESS ST
LastSale: 7/18/2008
LastSalePr: 59000
DORCd: VACANT RESIDENTIAL
acreage: 0.1722
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 0
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

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Escambia County-Pensacola, FL

Account: 153744000
Refno: 000S009080021182
OName1: MORSE JOSEPH J &
MailingAddr: 1025 SAGEBRUSH TRL+PENSACOLA, FL 32534
Situs: 1700 CYPRESS ST
LastSale: 12/9/2011
LastSalePr: 60000
DORCd: VACANT RESIDENTIAL
acreage: 0.1756
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 0
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

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Escambia County-Pensacola, FL

Account:153729025
Refno: 000S009080001181
OName1: HAGEN KELLY ANN &
MailingAddr: 705 SOUTH I ST+PENSACOLA, FL 32502
Situs: 705 S I ST
LastSale: 3/2/2017
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.3600
BldCnt: 1
TotHeatArea: 1750
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153736200
Refno: 000S009080024181
OName1: WILKINSON MIKE L &
MailingAddr: 709 SOUTH I ST+PENSACOLA, FL 32501
Situs: 709 S I ST
LastSale: 11/22/2011
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.6198
BldCnt: 1
TotHeatArea: 1464
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153731500
Refno: 000S009080017181
OName1: KARIHER CHRISTOPHER HUNTER
MailingAddr: 3727 CEYLON COVE+GULF BREEZE, FL 32563
Situs: 1600 BLK CYPRESS ST
LastSale: 8/30/2017
LastSalePr: 55000
DORCd: SINGLE FAMILY RESID
acreage: 0.1550
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

Disclaimer:

Escambia County-Pensacola, FL

Account:153732500
Refno: 000S009080021181
OName1: PAYNE LINDA
MailingAddr: 1555 BAYOU BLVD+PENSACOLA, FL 32503
Situs: 1600 BLK CYPRESS ST
LastSale: 10/19/2011
LastSalePr: 22500
DORCd: VACANT RESIDENTIAL
acreage: 0.1435
BldCnt: 0
TotHeatArea: 0
SecMapId: CA120
ComplexType:
ComplexDscr:
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt:
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

Disclaimer:

Escambia County-Pensacola, FL

Account: 153736000
Refno: 000S009080022181
OName1: KELSON KENNETH J SR LIFE EST
MailingAddr: 1600 W CYPRESS ST+PENSACOLA, FL 32501
Situs: 1600 CYPRESS ST
LastSale: 8/14/2017
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.1722
BldCnt: 1
TotHeatArea: 2024
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153732000
Refno: 000S009080019181
OName1: EVERETT RICHARD M III &
MailingAddr: 526 W LEE ST+PENSACOLA, FL 32501
Situs: 1608 CYPRESS ST
LastSale:12/18/2009
LastSalePr: 154857
DORCd: SINGLE FAMILY RESID
acreage: 0.1320
BldCnt: 1
TotHeatArea: 1632
SecMapId: CA120
ComplexType: S
ComplexDscr:
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153734000
Refno: 000S009080014181
OName1: DUBOSE JULIA B
MailingAddr: 3420 SUMMIT BLVD+PENSACOLA, FL 32503
Situs: 1620 CYPRESS ST
LastSale: 12/1988
LastSalePr: 23000
DORCd: SINGLE FAMILY RESID
acreage: 0.2583
BldCnt: 1
TotHeatArea: 1827
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153721000
Refno: 000S009080008180
OName1: HONE DENNIS
MailingAddr: 586 MARLESTA RD+PINOLE, CA 94564
Situs: 700 S I ST
LastSale: 11/2005
LastSalePr: 130000
DORCd: SINGLE FAMILY RESID
acreage: 0.2583
BldCnt: 1
TotHeatArea: 1282
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153722000
Refno: 000S009080011180
OName1: SMITH JUANITA
MailingAddr: 704 SOUTH I ST+PENSACOLA, FL 32501
Situs: 704 S I ST
LastSale: 1/1975
LastSalePr: 400
DORCd: SINGLE FAMILY RESID
acreage: 0.1550
BldCnt: 1
TotHeatArea: 1080
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153720000
Refno: 000S009080002180
OName1: BROWN ROBERT H
MailingAddr: 705 SOUTH H ST+PENSACOLA, FL 32501
Situs:705 S H ST
LastSale: 1/1978
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.1653
BldCnt: 1
TotHeatArea: 1248
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153724250
Refno: 000S009080014180
OName1: VILLENEUVE BROWN MIRIAM BELINDA
MailingAddr: 710 SOUTH I ST+PENSACOLA, FL 32501
Situs: 710 S I ST
LastSale: 12/2006
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.3271
BldCnt: 2
TotHeatArea: 2504
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153729000
Refno: 000S009080024180
OName1: CAMPBELL FRED J
MailingAddr: 729 S H ST+PENSACOLA, FL 32502
Situs: 729 S H ST
LastSale: 7/10/2017
LastSalePr: 242000
DORCd: SINGLE FAMILY RESID
acreage: 0.2066
BldCnt: 1
TotHeatArea: 1688
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153728000
Refno: 000S009080022180
OName1: POWELL ROBERT J &
MailingAddr: 1500 CYPRESS ST+PENSACOLA, FL 32501
Situs: 1500 CYPRESS ST
LastSale: 4/18/2013
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.2135
BldCnt: 1
TotHeatArea: 1667
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153727000
Refno: 000S009080020180
OName1: JOHNSON PATRICK W &
MailingAddr: 1504 W CYPRESS ST+PENSACOLA, FL 32501
Situs: 1504 CYPRESS ST
LastSale: 6/16/2010
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.1601
BldCnt: 1
TotHeatArea: 876
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153726000
Refno: 000S009080019180
OName1: WISE TRACY A
MailingAddr: 1218 W GIMBLE ST+PENSACOLA, FL 32502
Situs:1508 CYPRESS ST
LastSale: 3/11/2011
LastSalePr: 50000
DORCd: SINGLE FAMILY RESID
acreage: 0.1601
BldCnt: 1
TotHeatArea: 904
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153724500
Refno: 000S009080016180
OName1: BROWN ROBERT H
MailingAddr: 1510 W CYPRESS ST+PENSACOLA, FL 32501
Situs:1512 CYPRESS ST
LastSale: 10/1993
LastSalePr: 100
DORCd: MULTI-FAMILY <=9
acreage: 0.2583
BldCnt: 2
TotHeatArea: 2901
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153708000
Refno: 000S009080007179
OName1: MUJBEGOVIC NEDIM
MailingAddr: 700 SOUTH H ST+PENSACOLA, FL 32502
Situs: 700 S H ST
LastSale: 12/2005
LastSalePr: 62500
DORCd: SINGLE FAMILY RESID
acreage: 0.1439
BldCnt: 1
TotHeatArea: 528
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153709000
Refno: 000S009080009179
OName1: BOSSO STEPHEN C
MailingAddr: 1200 W GIMBLE ST+PENSACOLA, FL 32501
Situs: 706 S H ST
LastSale: 2/1982
LastSalePr: 5000
DORCd: SINGLE FAMILY RESID
acreage: 0.1439
BldCnt: 1
TotHeatArea: 540
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153706000
Refno: 000S009080001179
OName1: SCAPIN DOROTHY EMMA
MailingAddr: 707 SOUTH G ST+PENSACOLA, FL 32501
Situs: 707 S G ST
LastSale: 1/1972
LastSalePr: 11000
DORCd: SINGLE FAMILY RESID
acreage: 0.3512
BldCnt: 1
TotHeatArea: 1422
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153707000
Refno: 000S009080006179
OName1: KNOX MICHELLE C
MailingAddr: 708 S H ST+PENSACOLA, FL 32501
Situs: 708 S H ST
LastSale: 7/6/2016
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.1439
BldCnt: 1
TotHeatArea: 912
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153718000
Refno: 000S009080026179
OName1: HOMMELAND D HAROLD JR 2/3
MailingAddr: 708 SOUTH G ST+PENSACOLA, FL 32501
Situs: 709 S G ST
LastSale: 4/1998
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.1928
BldCnt: 1
TotHeatArea: 1140
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account:153696000
Refno: 000S009080001178
OName1: SMITH SHARON F
MailingAddr: 701 SOUTH F ST+PENSACOLA, FL 32501
Situs: 701 S F ST
LastSale: 3/1982
LastSalePr: 40000
DORCd: SINGLE FAMILY RESID
acreage: 0.3400
BldCnt: 1
TotHeatArea: 1728
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153697000
Refno: 000S009080002178
OName1: GARLAND JOSEPH D
MailingAddr: PO BOX 12821+PENSACOLA, FL 32591-2821
Situs: 707 S F ST
LastSale: 5/1997
LastSalePr: 11500
DORCd: SINGLE FAMILY RESID
acreage: 0.3100
BldCnt: 1
TotHeatArea: 1361
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153701500
Refno: 000S009080010178
OName1: HOMMELAND DONALD H JR
MailingAddr: 708 SOUTH G ST+PENSACOLA, FL 32501
Situs: 708 S G ST
LastSale: 4/1995
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.6198
BldCnt: 2
TotHeatArea: 2184
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Escambia County-Pensacola, FL

Account: 153702000
Refno: 000S009080012178
OName1: TORIBIO EVETTE B &
MailingAddr: 712 SOUTH G ST+PENSACOLA, FL 32502
Situs: 712 S G ST
LastSale: 10/1/2007
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.2583
BldCnt: 1
TotHeatArea: 1964
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

Disclaimer:

Account: 153703000
Refno: 000S009080014178
OName1: BRITTON CHARLES A JR
MailingAddr: 1314 W CYPRESS ST+PENSACOLA, FL 32501
Situs: 1314 CYPRESS ST
LastSale: 4/1994
LastSalePr: 40000
DORCd: SINGLE FAMILY RESID
acreage: 0.2582
BldCnt: 1
TotHeatArea: 3248
SecMapId: CA101
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153673000
Refno: 000S009080004174
OName1: WILLIAMS ALLEN C FAMILY PARTNERSHIP
MailingAddr: PO BOX 1643+PENSACOLA, FL 32591-1643
Situs:
LastSale: 12/1997
LastSalePr: 100
DORCd: VACANT COMMERCIAL
acreage: 16.2761
BldCnt:
TotHeatArea: 0
SecMapId: CA100
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2A
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

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Escambia County-Pensacola, FL

Account: 153788000
Refno: 000S009080006188
OName1: PENSACOLA YACHT CLUB INC
MailingAddr: PO BOX 989+PENSACOLA, FL 32591-0989
Situs: 1897 CYPRESS ST
LastSale: 5/2002
LastSalePr: 100
DORCd: CLUB, LODGE, HALL
acreage: 21.4604
BldCnt: 5
TotHeatArea: 22049
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 3
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153797000
Refno: 000S009080026191
OName1: ANDERSON RICHARD J LIFE EST &
MailingAddr: 805 SOUTH J ST+PENSACOLA, FL 32501
Situs: 805 S J ST
LastSale: 12/8/2008
LastSalePr: 100
DORCd: MULTI-FAMILY <=9
acreage: 0.1550
BldCnt: 1
TotHeatArea: 1904
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153791500
Refno: 000S009080008191
OName1: STEWART STEVE
MailingAddr: 820 SOUTH K ST+PENSACOLA, FL 32502
Situs: 900 S K ST
LastSale: 9/12/2013
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.2583
BldCnt: 1
TotHeatArea: 1349
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 0
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View: NA

Disclaimer:

Escambia County-Pensacola, FL

Account: 153792000
Refno: 000S009080011191
OName1: STRAUS JACINTA
MailingAddr: 940 SOUTH K ST+PENSACOLA, FL 32501
Situs: 940 S K ST
LastSale: 1/1975
LastSalePr: 10000
DORCd: SINGLE FAMILY RESID
acreage: 0.4821
BldCnt: 1
TotHeatArea: 2210
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153789000
Refno: 000S009080001191
OName1: PARKER RICHARD E
MailingAddr: 1701 W CYPRESS ST+PENSACOLA, FL 32501
Situs: 1701 CYPRESS ST
LastSale: 5/2002
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.1722
BldCnt: 1
TotHeatArea: 896
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153790000
Refno: 000S009080003191
OName1: ZIMMERMAN SILVIA R
MailingAddr: 9 KENNETH ST+MOBILE, AL 36607
Situs: 1703 CYPRESS ST
LastSale: 8/10/2018
LastSalePr: 145000
DORCd: SINGLE FAMILY RESID
acreage: 0.2296
BldCnt: 1
TotHeatArea: 1506
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153790500
Refno: 000S009080006191
OName1: STEWART CLARA JEAN
MailingAddr: 1709 W CYPRESS ST+PENSACOLA, FL 32501
Situs: 1709 CYPRESS ST
LastSale: 1/31/2017
LastSalePr: 100
DORCd: SINGLE FAMILY RESID
acreage: 0.2009
BldCnt: 1
TotHeatArea: 1150
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-1AA
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153853000
Refno: 000S009080001203
OName1: ZELICA GROTTO MOVPER INC
MailingAddr: 1000 S K ST+PENSACOLA, FL 32502
Situs: 1000 S K ST
LastSale: 4/1993
LastSalePr: 40000
DORCd: CLUB, LODGE, HALL
acreage: 1.4800
BldCnt: 1
TotHeatArea: 13608
SecMapId: CA120
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: R-2
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link : http://www.escpa.org/ecpamap/

Street View:

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Escambia County-Pensacola, FL

Account: 153583000
Refno: 000S009080001155
OName1: 1810 BARRANCAS LLC
MailingAddr: PO BOX 1313+PENSACOLA, FL 32591
Situs: 1810 BARRANCAS AVE
LastSale: 10/26/2012
LastSalePr: 285000
DORCd: LIGHT MANUFACTURING
acreage: 3.2100
BldCnt: 1
TotHeatArea: 16560
SecMapId: CA119
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: C-3
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link: http://www.escpa.org/ecpamap/

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Escambia County-Pensacola, FL

Account: 153583000
Refno: 000S009080001155
OName1: 1810 BARRANCAS LLC
MailingAddr: PO BOX 1313+PENSACOLA, FL 32591
Situs: 1810 BARRANCAS AVE
LastSale: 10/26/2012
LastSalePr: 285000
DORCd: LIGHT MANUFACTURING
acreage: 3.2100
BldCnt: 1
TotHeatArea: 16560
SecMapId: CA119
ComplexType: S
ComplexDscr: MAXENT TRACT PDB 14 P 365
Zoned: C-3
TaxAuth: PENSACOLA CITY LIMITS
PicCnt: 1
Assessor Website Link: http://www.escpa.org/ecpamap/

Street View

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Appendix E2 – Calculations

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Table E2a
Soil Excavation Volume Calculations CMZ-4B
(Limits of Excavation Based on Exposure Units and Sample Results)
American Creosote Works Site
Pensacola, Escambia County, Florida

	Escambia County Appraiser Records			Area Calculation			Volume Calculation (ft^3)			
A1	1905, 1907 W Gimble Street	000S009080001162	1.17	37,598	1,212	29,637		29,637		1,098
A1					1,336					0
A1	1901 W Gimble Street	000S009080001162			1,800					0
D1	701 South L Street	000S009080001184	0.44	19,166	1,580	17,586			35,173	1,303
D6	600 South L Street BLK	000S009080030184	0.24	10,454	0	10,454	5,227			194
D4*	1800 BLK Cypress St	000S009080021184	0.081	3,533	0	1,762		1,762		65
D3	1802 Cypress Street	000S009080019184	0.15	6,534	2,653	2,456		2,456		91
D2	716 South M Street	000S009080013184	0.56	24,394	6,206	18,188	9,094			337
E1	801 South K Street	000S009080002183	0.4	17,424	2,088	15,336		15,336		568
E3	851 South K Street	000S009080024183	0.31	13,504	1,554	11,950		11,950		443
E2(0-2')*	1806 West Cypress Street	000S009080019183	0.43	18,731	0	12,851			25,702	952
F2	836 South K Street	000S009080006182	0.35	15,246	1,144	14,102	7,051			261
F1	701 South J Street	000S009080001182	0.72	31,363	6,122	25,241	12,621			467
F7	700 South J Street BLK	000S009080022182	0.0826	3,598	0	3,598			7,196	267
F6(0-1')	1700 Cypress Street	000S009080021182	0.18	7,841	1,732	1,391		1,391		52
F6(0-0.5')	1700 Cypress Street	000S009080021182	0.18			4,527	2,263			84
F5F(0-0.5')	1700 Cypress Street BLK	000S009080019182	0.1722	7,501	0	3,751	1,875			69
F5R(0-1')	1700 Cypress Street BLK	000S009080019182	0.1722		0	3,751		3,751		139
F4	820 South K Street, 1710 W. Cypress Street	000S009080014182	0.43	18,731	5,889	12,842		12,842		476
F3	850 South K Street	000S009080011182	0.31	13,504	2,384	11,120	6,752			250

Table E2a
Soil Excavation Volume Calculations CMZ-4B
(Limits of Excavation Based on Exposure Units and Sample Results)
American Creosote Works Site
Pensacola, Escambia County, Florida

	Escambia County Appraiser Records			Area Calculation			Volume Calculation (ft^3)			
G4(0-0.5')	1608 CYPRESS ST	000S009080019181	0.132	5,750	1,228	1,633	817			30
G1(0-2')	705 South I Street	000S009080001181	0.16	18,750		6,875			13,750	509
G1(0-1')	705 South I Street	000S009080001181	0.34		2,161	12,839		12,839		476
G1(0-0.5')	705 South I Street	000S009080001181	0.36			15,625	7,813			289
G6(LB)	709 South I Street	000S009080024181	0.62	27,000	1,756	25,244	12,622			467
G7(0-0.5')	1600 Cypress Street	000S009080022181	0.17	7,405	2,400	5,005	2,503			93
G3(0-1')*	1600 BLK CYPRESS ST	000S009080017181	0.155	6,752	0	3,376		3,376		125
G5(0-0.5')*	1600 BLK CYPRESS ST	000S009080021181	0.1435	6,251	0	6,251	3,126			116
G2(0-0.5')*	1620 CYPRESS ST	000S009080014181	0.26	11,326	1,165	10,161	5,080			188
H3(0-0.5')	700 South I Street	000S009080008180	0.26	11,326		5,663	2,831			105
H3(0-1')	700 South I Street	000S009080008180	0.26		1,730	3,933		3,933		146
H1(Assuming 2')	701 South H Street	000S009080001180	0.44	13,929	1,265	12,664			25,328	938
H2(LB)	705 South H Street	000S009080002180	0.17	7,405	1,425	5,980	2,990			111
H10	729 South H Street	000S009080024180	0.21	9,148	1,464	7,684	3,842			142
H9	1500 Cypress Street	000S009080022180	0.21	9,148	2,343	6,805	3,402			126
H8	1504 Cypress Street	000S009080020180	0.16	6,970	1,036	5,934	2,967			110
H7(0-0.5')*	1508 Cypress Street	000S009080019180	0.16	6,970	1,064	2,450	1,225			45
H6	1510, 1512 W. Cypress Street	000S009080016180	0.26	11,326 0	1,606 1,370	8,350	4,175			155
H5(0-0.5')	710 South I Street	000S009080014180	0.33	14,375	5,082	9,293	4,646			172
H4	704 South I Street	000S009080011180	0.15	6,534	1,238	5,296		5,296		196

Table E2a
Soil Excavation Volume Calculations CMZ-4B
(Limits of Excavation Based on Exposure Units and Sample Results)
American Creosote Works Site
Pensacola, Escambia County, Florida

	Escambia County Appraiser Records			Area Calculation			Volume Calculation (ft^3)			
I3	700 South H Street	000S009080007179	0.14	6,224	612	5,612		5,612		208
I1	707 South G Street	000S009080001179	0.35	6,116	1,918	4,198	2,099			78
I5	709 South G Street	000S009080026179	0.18	7,841	1,252	6,589	3,295			122
I4(0-1')	706 South H Street	000S009080009179	0.14	6,098	603	2,498		2,498		93
I4(0-0.5')	706 South H Street	000S009080009179	0.14	6,098	0	3,168	1,584			59
I2(0-1')	708 South H Street	000S009080006179	0.14	6,098	996	2,126		2,126		79
I2(0-0.5')	708 South H Street	000S009080006179	0.14	6,098		3,087	1,544			57
J3	708 South G Street	000S009080010178	0.62	27,007	700	26,307	13,154			487
J1(SS1038)	701 South F Street	000S009080001178	0.34	14,810	2,080	7,597			15,193	563
J1(SS1066)						7,050	3,525			131
J2	707 South F Street	000S009080002178	0.31	13,504	2,010	11,494		11,494		426
J4	712 South G Street	000S009080012178	0.26	11,326	2,412	8,914	4,457			165
J6(no excavation)	1310 Cypress Street	000S009080017178	0.26	11,326	3,955	NE				0
J5	1314 Cypress Street	000S009080014178	0.26	11,234	3,870	7,364		7,364		273

Table E2a
Soil Excavation Volume Calculations CMZ-4B
(Limits of Excavation Based on Exposure Units and Sample Results)
American Creosote Works Site
Pensacola, Escambia County, Florida

	Escambia County Appraiser Records			Area Calculation			Volume Calculation (ft^3)			
L1	No Data	000S009080004174	All the SS10 areas below are subdivisions of L1							
SS1043	No Data	000S009080004174		24,701		27,120.81		27,121		1,004
SS1044(no excavation)	No Data	000S009080004174				NE				0
SS1045	No Data	000S009080004174				17,021.01			34,042	1,261
SS1046	No Data	000S009080004174				20,077.19		20,077		744
SE Ditch						35,510		35,510		1,315
M(SS1047)	1897 Cypress Street	000S009080006188	1.31	57,064	19,167	57,064	10,829			401
M(SS1064)	1897 Cypress Street								71,021	2,630
N4(0-1')	900 South K Street	000S009080008191	0.26	11,250		5,698		5,698		211
N4(0-0.5')	900 South K Street	000S009080008191	0.26		1,477	4,074	2,037			75
N1	1701 Cypress Street	000S009080001191	0.17	7,405	1,100	6,305	3,153			117
N2(0-1')*	1703 Cypress Street	000S009080003191	0.23	10,019	1,722	4,149		4,149		154
N3(0-1')	1709 W Cypress Street	000S009080006191	0.2	8,712	1,272	7,440		8,076		299
N3(0-2')	1709 W Cypress Street	000S009080006191							16,152	598
N5	940 South K Street (North 1/2 of this property)	000S009080011191	0.48	20,909	2,592	18,317	9,158			339
N7	805 South J Street	000S009080026191	0.15	6,534	2,192	4,342		4,342		161
N6(No excavation)	811 South J Street	000S009080024191	0.15	6,534		NE				0

Table E2a
Soil Excavation Volume Calculations CMZ-4B
(Limits of Excavation Based on Exposure Units and Sample Results)
American Creosote Works Site
Pensacola, Escambia County, Florida

	Escambia County Appraiser Records			Area Calculation			Volume Calculation (ft^3)			
T1	1000 S K Street (west 1/2 of this parcel)	000S009080001203	1.48	64,500		33,843.38			67,687	2,507
Z1	1810 Barrancas Ave	000S009080001155	3.208	139,751	17,450	13,254		13,254		491
Z3	655 S I ST	000S009080017154	0.470	20,473	8,390	12,083			24,166	895
Z2	653 S I Street; Total Block Z (south 2 corners of this parcel)	000S009080011154		18,000	7,920	10,080		10,080		373
Street	East boundary of OU1 excavation to F Street	NA		17,506		17,506			35,012	1,297
Street		w/ strip btwn 521 & 601		27,001						
Street	West of OU1 Excavation and Between G and F St	NA		57,104		104,172			93,325	3,456
								57,510		2,130

Notes:

yellow	complete
grey	6 inches
blue	1 foot
green	2 feet

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Table E2b
Soil Excavation Volumes Calculations
American Creosote Works Site
Pensacola, Escambia County, Florida

Area and Volume Summary

Assumptions

Swell factor	1.15		assumed swell factor for silt and sand
Barrier Wall Area:	190,012	ft^2	
	4.36	acre	
Barrier Wall Average Depth:	115	ft	
Volume Inside Barrier Wall:	809,310	bcy	(1,770-ft perimeter)

4.36 acre Barrier Wall Containment	**Contaminated Area**		**Average Thickness**	**Contaminated Volume***	**Overburden/ Sidewall Volume†**	**Total Volume**	**Swell Factor**	**Total Volume**
	(ft^2)	**(acre)**	**(ft bls)**	**(bcy)**	**(bcy)**	**(bcy)**		**(lcy)**
PHASE 1 - EXCAVATION OF CMZ-4B OFFSITE SOILS AND ON SITE STOCKPILING								
CMZ-4B Off Facility Surface Soil	-	-	varies	34,900	0	34,900	1.15	40,135
PHASE 2A - BARRIER WALL CONSTRUCTION								
CMZ-1 Soil Beyond Barrier Wall Extent (1 - 3 ft bls)	31,843	0.73	2.00	2,359	1,179	3,538	1.15	4,069
Spoils Return from Barrrier Wall Construction			-	3,000	-	3,000	1.15	3,450
Barrier Wall Leveling	76,270	1.75	1.31	3,700	-	3,700	1.15	4,255
Total Earthwork Volume - Barrier Wall Containment:				**43,959**	**1,179**	**45,138**	1.15	**51,909**

5.33 acre Engineered Containment Cell	**Contaminated Area**		**Average Thickness**	**Contaminated Volume***	**Overburden/ Sidewall Volume†**	**Total Volume**	**Swell Factor**	**Total Volume**
	(ft^2)	**(acre)**	**(ft bls)**	**(bcy)**	**(bcy)**	**(bcy)**		**(lcy)**
PHASE 2B - SURFACE SOIL EXCAVATION, GRADING ECC SURFACE, & INSTALLATION OF ECC BOTTOM LINER								
Excavation of engineered containment cell			3.00	51,047	0	51,047	1.15	58,704
PHASE 2C - CONTAMINATED SOIL PLACEMENT, CAP CONSTRUCTION								
CMZ-2A/CMZ-4A/PYC Dredging Spoils Pile & Stockpile (45k CY)			3.00	111,295	0	111,295	1.15	127,989
Cap Construction			3.00	44,060	0	44,060	1.15	50,669
PHASE 2D - FINISH GRADING, STORM DRAINAGE, POND CONSTRUCTION								
Detention Pond Soil			1.50	4,725	0	4,725	1.15	5,434
Total Earthwork Volume - Engineered Containment Cell[1]:				**211,127**	**0**	**211,127**	1.15	**242,796**

Notes:

* CAD Take-off

† Above existing land surface

ft^2 - square foot

ft^3 - cubic foot

bcy - bank cubic yard

bls - below land surface

lcy - loose cubic yards

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Appendix E3 – Stormwater Modeling – CD Only

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 ******************************************************************************
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 **                                                                          **
 **                                                                          **
 **               HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
 **                                                                          **
 **               HELP Version 3.95 D          (10 August 2012)             **
 **                              developed at                                **
 **        Institute of Soil Science, University of Hamburg, Germany         **
 **                                based on                                  **
 **               US HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)              **
 **                   DEVELOPED BY ENVIRONMENTAL LABORATORY                  **
 **                     USAE WATERWAYS EXPERIMENT STATION                    **
 **              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY             **
 **                                                                          **
 **                                                                          **
 ******************************************************************************
 ******************************************************************************


 TIME:  10.07     DATE:   7.05.2019


 PRECIPITATION DATA FILE:      C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACWPrec.d4
 TEMPERATURE DATA FILE:        C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACW
Temperature Data.d7
 SOLAR RADIATION DATA FILE:    C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACW Solar
radiation Data.d13
 EVAPOTRANSPIRATION DATA F. 1: C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACW
Evapotranspiration Parameters.d11
 SOIL AND DESIGN DATA FILE  1: C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACW BW Soil
and Design Data_Prescriptive Cap.d10
 OUTPUT DATA FILE:             C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACW
90RD_Prescriptive Cap.out
 YEARLY OUTPUT DATA FILE:      C:\Users\som10688\Documents\My Personal Files\ACW HELP\ACW
90RD_Prescriptive Cap.YR

 COLUMNS OF YEARLY OUTPUT DATA FILE:

      1    DATE OF ULTIMO (yyyy1231, years 2101 to 2200 from weather generator)
      2    PRECIPITATION (INCH)
      3    RUNOFF (INCH)
      4    POTENTIAL EVAPOTRANSPIRATION (INCH)
      5    ACTUAL EVAPOTRANSPIRATION (INCH)
      6    DRAIN #1: LATERAL DRAINAGE FROM LAYER  3 (WITHOUT RECIRC.) (INCH)
      7    RECIRC#1: LAT. DRAINAGE RECIRCULATED FROM LAYER  3 INTO L.  1 (INCH)
      8    LEAK  #1: PERCOLATION/LEAKAGE THROUGH LAYER  5 (INCH)
      9    LEAK  #2: PERCOLATION/LEAKAGE THROUGH LAYER  6 (INCH)
     10    CHANGE IN TOTAL WATER STORAGE (INCH)
     11    CHANGE IN SOIL WATER STORAGE (INCH)
     12    CHANGE IN INTERCEPTION WATER STORAGE (INCH)
     13    CHANGE IN SNOW WATER STORAGE (INCH)
     14    ANNUAL WATER BUDGET BALANCE (INCH)


 ******************************************************************************

      TITLE:  ACW BW 90 RD_Prescriptive Soil Cap

 ******************************************************************************


                            WEATHER DATA SOURCES
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           NOTE:  PRECIPITATION DATA FOR     MOBILE              ALABAMA
                    WAS ENTERED BY THE USER.


           NOTE:  TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
                    COEFFICIENTS FOR    MOBILE              ALABAMA

               NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

      JAN/JUL     FEB/AUG     MAR/SEP     APR/OCT     MAY/NOV     JUN/DEC
      -------     -------     -------     -------     -------     -------
       50.80       53.60       60.10       68.00       74.90       80.50
       82.20       81.80       78.20       68.50       58.60       53.10
```

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MOBILE ALABAMA
AND STATION LATITUDE = 30.41 DEGREES

****

LAYER DATA 1

VALID FOR 30 YEARS

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 21

THICKNESS	=	6.00	INCHES
POROSITY	=	0.3970	VOL/VOL
FIELD CAPACITY	=	0.0320	VOL/VOL
WILTING POINT	=	0.0130	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0173	VOL/VOL
EFFECTIVE SAT. HYD. CONDUCT.	=	0.3000	CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 4.90
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	18.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3822	VOL/VOL
EFFECTIVE SAT. HYD. CONDUCT.	=	0.1900E-04	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.30	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0353	VOL/VOL
EFFECTIVE SAT. HYD. CONDUCT.	=	10.00	CM/SEC
SLOPE	=	1.85	PERCENT
DRAINAGE LENGTH	=	162.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.04	INCHES
EFFECTIVE SAT. HYD. CONDUCT.	=	0.4000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.25 INCHES
POROSITY	=	0.7500 VOL/VOL
FIELD CAPACITY	=	0.7470 VOL/VOL
WILTING POINT	=	0.4000 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7500 VOL/VOL
EFFECTIVE SAT. HYD. CONDUCT.	=	0.3000E-08 CM/SEC

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	84.00 INCHES
POROSITY	=	0.5010 VOL/VOL
FIELD CAPACITY	=	0.2840 VOL/VOL
WILTING POINT	=	0.1350 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2840 VOL/VOL
EFFECTIVE SAT. HYD. CONDUCT.	=	0.7000E-06 CM/SEC

****

GENERAL DESIGN AND EVAPORATIVE ZONE DATA 1

VALID FOR 30 YEARS

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 2.% AND A SLOPE LENGTH OF 162. FEET.

SCS RUNOFF CURVE NUMBER	=	87.68	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	4.350	ACRES
EVAPORATIVE ZONE DEPTH	=	12.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.239	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	5.388	INCHES
FIELD CAPACITY OF EVAPORATIVE ZONE	=	1.896	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.888	INCHES
SOIL EVAPORATION ZONE DEPTH	=	6.000	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL INTERCEPTION WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	31.037	INCHES
TOTAL INITIAL WATER	=	31.037	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

****

EVAPOTRANSPIRATION DATA 1

VALID FOR 30 YEARS

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
MOBILE ALABAMA

STATION LATITUDE	=	30.41 DEGREES
MAXIMUM LEAF AREA INDEX	=	4.00
START OF GROWING SEASON (JULIAN DATE)	=	39
END OF GROWING SEASON (JULIAN DATE)	=	351
EVAPORATIVE ZONE DEPTH	=	12.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	9.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	70.0 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	72.0 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	77.0 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	73.0 %

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.07	901163.750	100.00
RUNOFF	5.069	80042.047	8.88
POTENTIAL EVAPOTRANSPIRATION	60.156	949893.562	
ACTUAL EVAPOTRANSPIRATION	33.313	526028.938	58.37
DRAINAGE COLLECTED FROM LAYER 3	18.6924	295161.844	32.75
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.080	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0079		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.080	0.00
CHANGE IN WATER STORAGE	-0.004	-68.850	-0.01
SOIL WATER AT START OF YEAR	31.037	490089.125	
SOIL WATER AT END OF YEAR	31.033	490020.281	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.271	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	73.98	1168181.250	100.00
RUNOFF	13.015	205511.641	17.59
POTENTIAL EVAPOTRANSPIRATION	60.020	947737.938	
ACTUAL EVAPOTRANSPIRATION	31.775	501742.031	42.95
DRAINAGE COLLECTED FROM LAYER 3	26.9460	425490.469	36.42
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.084	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0114		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.084	0.00
CHANGE IN WATER STORAGE	2.244	35436.945	3.03
SOIL WATER AT START OF YEAR	31.033	490020.281	
SOIL WATER AT END OF YEAR	33.277	525457.188	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.060	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	70.88	1119230.375	100.00
RUNOFF	8.999	142101.297	12.70
POTENTIAL EVAPOTRANSPIRATION	60.387	953547.250	
ACTUAL EVAPOTRANSPIRATION	36.963	583661.375	52.15
DRAINAGE COLLECTED FROM LAYER 3	26.2247	414101.281	37.00
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0110		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	-1.307	-20633.291	-1.84
SOIL WATER AT START OF YEAR	33.277	525457.188	
SOIL WATER AT END OF YEAR	31.970	504823.906	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.301	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.54	971747.438	100.00
RUNOFF	5.783	91312.562	9.40
POTENTIAL EVAPOTRANSPIRATION	60.417	954010.500	
ACTUAL EVAPOTRANSPIRATION	34.674	547515.688	56.34
DRAINAGE COLLECTED FROM LAYER 3	21.7455	343371.750	35.34
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.079	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0092		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.079	0.00
CHANGE IN WATER STORAGE	-0.662	-10452.810	-1.08
SOIL WATER AT START OF YEAR	31.970	504823.906	
SOIL WATER AT END OF YEAR	31.308	494371.125	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.030	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.47	1144337.375	100.00
RUNOFF	10.824	170919.203	14.94
POTENTIAL EVAPOTRANSPIRATION	59.565	940558.500	
ACTUAL EVAPOTRANSPIRATION	34.342	542281.000	47.39
DRAINAGE COLLECTED FROM LAYER 3	27.4032	432709.500	37.81
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.085	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0117		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.085	0.00
CHANGE IN WATER STORAGE	-0.100	-1572.159	-0.14
SOIL WATER AT START OF YEAR	31.308	494371.125	
SOIL WATER AT END OF YEAR	31.209	492798.969	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.241	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	69.50	1097439.750	100.00
RUNOFF	7.890	124590.523	11.35
POTENTIAL EVAPOTRANSPIRATION	60.690	958321.250	
ACTUAL EVAPOTRANSPIRATION	35.265	556859.688	50.74
DRAINAGE COLLECTED FROM LAYER 3	26.8136	423400.250	38.58
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.083	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0114		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.083	0.00
CHANGE IN WATER STORAGE	-0.469	-7410.531	-0.68

SOIL WATER AT START OF YEAR	31.209	492798.969	
SOIL WATER AT END OF YEAR	30.739	485388.406	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.331	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	63.55	1003486.188	100.00
RUNOFF	7.485	118190.719	11.78
POTENTIAL EVAPOTRANSPIRATION	60.203	950630.000	
ACTUAL EVAPOTRANSPIRATION	31.227	493083.156	49.14
DRAINAGE COLLECTED FROM LAYER 3	24.6568	389343.406	38.80
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0105		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	0.182	2868.799	0.29
SOIL WATER AT START OF YEAR	30.739	485388.406	
SOIL WATER AT END OF YEAR	30.921	488257.250	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	60.94	962272.812	100.00
RUNOFF	5.959	94100.508	9.78
POTENTIAL EVAPOTRANSPIRATION	61.052	964041.438	
ACTUAL EVAPOTRANSPIRATION	31.462	496794.125	51.63
DRAINAGE COLLECTED FROM LAYER 3	22.3580	353043.875	36.69
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00

PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.083	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0095		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.083	0.00
CHANGE IN WATER STORAGE	1.161	18334.447	1.91
SOIL WATER AT START OF YEAR	30.921	488257.250	
SOIL WATER AT END OF YEAR	32.082	506591.656	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.211	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.40	906374.562	100.00
RUNOFF	4.964	78380.453	8.65
POTENTIAL EVAPOTRANSPIRATION	61.149	965578.438	
ACTUAL EVAPOTRANSPIRATION	31.126	491490.531	54.23
DRAINAGE COLLECTED FROM LAYER 3	20.3841	321875.469	35.51
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.077	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0087		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.077	0.00
CHANGE IN WATER STORAGE	0.926	14628.126	1.61
SOIL WATER AT START OF YEAR	32.082	506591.656	
SOIL WATER AT END OF YEAR	33.008	521219.781	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.060	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	66.29	1046752.062	100.00
RUNOFF	8.923	140905.281	13.46

POTENTIAL EVAPOTRANSPIRATION	60.641	957554.562	
ACTUAL EVAPOTRANSPIRATION	32.667	515821.031	49.28
DRAINAGE COLLECTED FROM LAYER 3	26.7869	422977.844	40.41
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.083	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0113		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.083	0.00
CHANGE IN WATER STORAGE	-2.087	-32952.090	-3.15
SOIL WATER AT START OF YEAR	33.008	521219.781	
SOIL WATER AT END OF YEAR	30.922	488267.719	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.030	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	68.39	1079912.125	100.00
RUNOFF	7.027	110956.227	10.27
POTENTIAL EVAPOTRANSPIRATION	60.244	951287.938	
ACTUAL EVAPOTRANSPIRATION	32.673	515925.844	47.77
DRAINAGE COLLECTED FROM LAYER 3	27.9347	441103.531	40.85
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.086	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0118		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.086	0.00
CHANGE IN WATER STORAGE	0.755	11926.362	1.10
SOIL WATER AT START OF YEAR	30.922	488267.719	
SOIL WATER AT END OF YEAR	31.677	500194.094	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.090	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.84	771208.000	100.00
RUNOFF	5.082	80246.188	10.41
POTENTIAL EVAPOTRANSPIRATION	60.646	957624.188	
ACTUAL EVAPOTRANSPIRATION	29.075	459110.594	59.53
DRAINAGE COLLECTED FROM LAYER 3	16.0650	253673.641	32.89
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0068		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	-1.382	-21822.410	-2.83
SOIL WATER AT START OF YEAR	31.677	500194.094	
SOIL WATER AT END OF YEAR	30.295	478371.656	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.060	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	69.22	1093018.375	100.00
RUNOFF	10.084	159230.188	14.57
POTENTIAL EVAPOTRANSPIRATION	60.903	961683.000	
ACTUAL EVAPOTRANSPIRATION	31.056	490397.531	44.87
DRAINAGE COLLECTED FROM LAYER 3	26.7454	422322.719	38.64
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.084	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0115		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.084	0.00
CHANGE IN WATER STORAGE	1.334	21067.955	1.93
SOIL WATER AT START OF YEAR	30.295	478371.656	
SOIL WATER AT END OF YEAR	31.629	499439.625	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.060	0.00

ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.31	873372.312	100.00
RUNOFF	10.457	165123.578	18.91
POTENTIAL EVAPOTRANSPIRATION	60.827	960492.500	
ACTUAL EVAPOTRANSPIRATION	23.674	373824.750	42.80
DRAINAGE COLLECTED FROM LAYER 3	21.5464	340228.719	38.96
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.083	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0092		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.083	0.00
CHANGE IN WATER STORAGE	-0.368	-5804.881	-0.66
SOIL WATER AT START OF YEAR	31.629	499439.625	
SOIL WATER AT END OF YEAR	31.262	493634.750	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.030	0.00

ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.38	906059.000	100.00
RUNOFF	5.838	92180.188	10.17
POTENTIAL EVAPOTRANSPIRATION	61.541	971764.750	
ACTUAL EVAPOTRANSPIRATION	33.634	531092.500	58.62
DRAINAGE COLLECTED FROM LAYER 3	17.9217	282992.594	31.23
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.080	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0076		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.080	0.00
CHANGE IN WATER STORAGE	-0.013	-206.429	-0.02
SOIL WATER AT START OF YEAR	31.262	493634.750	
SOIL WATER AT END OF YEAR	31.248	493428.281	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	

INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.090	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.30	904795.500	100.00
RUNOFF	7.022	110883.969	12.26
POTENTIAL EVAPOTRANSPIRATION	61.985	978769.938	
ACTUAL EVAPOTRANSPIRATION	27.204	429567.281	47.48
DRAINAGE COLLECTED FROM LAYER 3	22.7238	358820.125	39.66
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0096		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	0.350	5524.000	0.61
SOIL WATER AT START OF YEAR	31.248	493428.281	
SOIL WATER AT END OF YEAR	31.598	498952.281	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.030	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	88.59	1398880.625	100.00
RUNOFF	18.638	294296.875	21.04
POTENTIAL EVAPOTRANSPIRATION	60.799	960047.000	
ACTUAL EVAPOTRANSPIRATION	37.205	587482.750	42.00
DRAINAGE COLLECTED FROM LAYER 3	31.3929	495709.469	35.44
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000006	0.088	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0133		
PERC./LEAKAGE THROUGH LAYER 6	0.000006	0.088	0.00

CHANGE IN WATER STORAGE	1.355	21390.939	1.53
SOIL WATER AT START OF YEAR	31.598	498952.281	
SOIL WATER AT END OF YEAR	32.953	520343.250	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.663	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	58.62	925639.062	100.00
RUNOFF	6.495	102561.867	11.08
POTENTIAL EVAPOTRANSPIRATION	60.784	959804.562	
ACTUAL EVAPOTRANSPIRATION	28.329	447327.344	48.33
DRAINAGE COLLECTED FROM LAYER 3	23.4113	369676.625	39.94
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0099		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	0.385	6073.112	0.66
SOIL WATER AT START OF YEAR	32.953	520343.250	
SOIL WATER AT END OF YEAR	33.338	526416.375	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.120	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	79.46	1254713.125	100.00
RUNOFF	7.207	113807.656	9.07
POTENTIAL EVAPOTRANSPIRATION	58.081	917135.562	
ACTUAL EVAPOTRANSPIRATION	35.931	567369.438	45.22
DRAINAGE COLLECTED FROM LAYER 3	38.6681	610589.312	48.66

RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000006	0.090	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0164		
PERC./LEAKAGE THROUGH LAYER 6	0.000006	0.090	0.00
CHANGE IN WATER STORAGE	-2.347	-37053.078	-2.95
SOIL WATER AT START OF YEAR	33.338	526416.375	
SOIL WATER AT END OF YEAR	30.991	489363.281	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.361	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	66.69	1053068.375	100.00
RUNOFF	8.393	132527.359	12.58
POTENTIAL EVAPOTRANSPIRATION	63.151	997181.688	
ACTUAL EVAPOTRANSPIRATION	33.647	531300.938	50.45
DRAINAGE COLLECTED FROM LAYER 3	24.4164	385547.781	36.61
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0104		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	0.234	3692.405	0.35
SOIL WATER AT START OF YEAR	30.991	489363.281	
SOIL WATER AT END OF YEAR	31.225	493055.719	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.211	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	62.16	981537.500	100.00

RUNOFF	5.178	81763.992	8.33
POTENTIAL EVAPOTRANSPIRATION	61.041	963866.312	
ACTUAL EVAPOTRANSPIRATION	35.010	552828.562	56.32
DRAINAGE COLLECTED FROM LAYER 3	21.4749	339099.812	34.55
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.078	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0091		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.078	0.00
CHANGE IN WATER STORAGE	0.497	7845.435	0.80
SOIL WATER AT START OF YEAR	31.225	493055.719	
SOIL WATER AT END OF YEAR	31.722	500901.125	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.392	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.03	1137389.625	100.00
RUNOFF	8.285	130829.367	11.50
POTENTIAL EVAPOTRANSPIRATION	59.772	943825.562	
ACTUAL EVAPOTRANSPIRATION	33.597	530505.812	46.64
DRAINAGE COLLECTED FROM LAYER 3	29.5780	467051.281	41.06
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.085	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0125		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.085	0.00
CHANGE IN WATER STORAGE	0.570	9003.110	0.79
SOIL WATER AT START OF YEAR	31.722	500901.125	
SOIL WATER AT END OF YEAR	32.292	509904.250	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.120	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	77.32	1220921.375	100.00
RUNOFF	8.752	138192.422	11.32
POTENTIAL EVAPOTRANSPIRATION	60.103	949054.312	
ACTUAL EVAPOTRANSPIRATION	35.694	563620.500	46.16
DRAINAGE COLLECTED FROM LAYER 3	32.5876	514573.906	42.15
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000006	0.089	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0138		
PERC./LEAKAGE THROUGH LAYER 6	0.000006	0.089	0.00
CHANGE IN WATER STORAGE	0.287	4534.805	0.37
SOIL WATER AT START OF YEAR	32.292	509904.250	
SOIL WATER AT END OF YEAR	32.579	514439.031	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.241	0.00

ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.35	968747.062	100.00
RUNOFF	5.788	91398.430	9.43
POTENTIAL EVAPOTRANSPIRATION	61.332	968462.688	
ACTUAL EVAPOTRANSPIRATION	33.556	529870.688	54.70
DRAINAGE COLLECTED FROM LAYER 3	22.9918	363051.781	37.48
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.080	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0097		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.080	0.00
CHANGE IN WATER STORAGE	-0.986	-15573.892	-1.61
SOIL WATER AT START OF YEAR	32.579	514439.031	
SOIL WATER AT END OF YEAR	31.593	498865.156	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	-0.090	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	68.30	1078491.375	100.00
RUNOFF	7.147	112848.055	10.46
POTENTIAL EVAPOTRANSPIRATION	60.310	952328.812	
ACTUAL EVAPOTRANSPIRATION	32.748	517112.000	47.95
DRAINAGE COLLECTED FROM LAYER 3	28.0851	443478.031	41.12
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.083	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0120		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.083	0.00
CHANGE IN WATER STORAGE	0.320	5052.534	0.47
SOIL WATER AT START OF YEAR	31.593	498865.156	
SOIL WATER AT END OF YEAR	31.913	503917.656	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.572	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	69.76	1101544.750	100.00
RUNOFF	11.729	185209.516	16.81
POTENTIAL EVAPOTRANSPIRATION	61.656	973581.188	
ACTUAL EVAPOTRANSPIRATION	28.793	454651.719	41.27
DRAINAGE COLLECTED FROM LAYER 3	29.7266	469397.406	42.61
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.086	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0126		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.086	0.00
CHANGE IN WATER STORAGE	-0.488	-7713.518	-0.70
SOIL WATER AT START OF YEAR	31.913	503917.656	
SOIL WATER AT END OF YEAR	31.424	496204.156	

INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.452	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	59.59	940955.938	100.00
RUNOFF	4.741	74860.336	7.96
POTENTIAL EVAPOTRANSPIRATION	61.455	970399.188	
ACTUAL EVAPOTRANSPIRATION	33.233	524771.875	55.77
DRAINAGE COLLECTED FROM LAYER 3	19.9775	315455.344	33.52
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.079	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0085		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.079	0.00
CHANGE IN WATER STORAGE	1.638	25868.219	2.75
SOIL WATER AT START OF YEAR	31.424	496204.156	
SOIL WATER AT END OF YEAR	33.062	522072.375	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.090	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	63.40	1001117.500	100.00
RUNOFF	9.079	143354.078	14.32
POTENTIAL EVAPOTRANSPIRATION	59.173	934363.812	
ACTUAL EVAPOTRANSPIRATION	29.557	466712.969	46.62
DRAINAGE COLLECTED FROM LAYER 3	24.2474	382879.250	38.25
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.082	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0102		

PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.082	0.00
CHANGE IN WATER STORAGE	0.517	8171.191	0.82
SOIL WATER AT START OF YEAR	33.062	522072.375	
SOIL WATER AT END OF YEAR	33.580	530243.562	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.030	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.57	972220.812	100.00
RUNOFF	4.736	74777.398	7.69
POTENTIAL EVAPOTRANSPIRATION	59.720	943003.438	
ACTUAL EVAPOTRANSPIRATION	31.150	491873.031	50.59
DRAINAGE COLLECTED FROM LAYER 3	28.1457	444434.875	45.71
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.083	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0119		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.083	0.00
CHANGE IN WATER STORAGE	-2.461	-38864.074	-4.00
SOIL WATER AT START OF YEAR	33.580	530243.562	
SOIL WATER AT END OF YEAR	31.119	491379.500	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.482	0.00

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.73	769471.062	100.00
RUNOFF	5.197	82064.219	10.67
POTENTIAL EVAPOTRANSPIRATION	60.594	956815.438	
ACTUAL EVAPOTRANSPIRATION	26.425	417266.625	54.23

DRAINAGE COLLECTED FROM LAYER 3	16.7510	264505.969	34.38
RECIRC. FROM LAYER 3 INTO L. 1	0.000000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.079	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0072		
PERC./LEAKAGE THROUGH LAYER 6	0.000005	0.079	0.00
CHANGE IN WATER STORAGE	0.357	5634.232	0.73
SOIL WATER AT START OF YEAR	31.119	491379.500	
SOIL WATER AT END OF YEAR	31.475	497013.750	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.030	0.00

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FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	0.0780	0.0130
2	7.3329	0.4074
3	0.0211	0.0704
4	0.0000	0.0000
5	0.1875	0.7500
6	23.8560	0.2840
TOTAL WATER IN LAYERS	31.475	
SNOW WATER	0.000	
INTERCEPTION WATER	0.000	
TOTAL FINAL WATER	31.475	

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	11.80	186327.891
RUNOFF	9.095	143609.8594
DRAINAGE COLLECTED FROM LAYER 3	1.16839	18449.43164
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000000	0.00122
AVERAGE HEAD ON TOP OF LAYER 4	0.181	
MAXIMUM HEAD ON TOP OF LAYER 4	0.348	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	5.9 FEET	

PERCOLATION/LEAKAGE THROUGH LAYER 6 0.000000 0.00122

SNOW WATER 2.24 35354.0820

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4247

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0740

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.94	4.83	6.18	5.25	4.99	5.93
	7.66	6.67	7.26	2.49	3.16	6.56
STD. DEVIATIONS	1.89	2.30	3.07	3.34	3.26	2.70
	3.23	2.73	2.46	1.50	1.65	3.32
RUNOFF						
TOTALS	0.285	0.494	0.881	1.192	0.726	0.458
	0.856	0.667	1.031	0.133	0.225	0.911
STD. DEVIATIONS	0.433	0.724	0.931	1.808	0.980	0.494
	0.993	0.574	0.784	0.328	0.298	0.871
POTENTIAL EVAPOTRANSPIRATION						
TOTALS	2.756	3.043	4.570	5.856	7.259	7.650
	7.324	6.796	5.382	4.396	3.093	2.488
STD. DEVIATIONS	0.174	0.190	0.272	0.285	0.309	0.290
	0.363	0.298	0.264	0.245	0.201	0.199
ACTUAL EVAPOTRANSPIRATION						
TOTALS	1.152	1.291	1.705	2.860	3.191	4.476
	5.194	4.480	3.922	1.788	0.948	1.161
STD. DEVIATIONS	0.324	0.418	0.505	0.700	1.265	1.072
	1.055	1.409	1.050	0.458	0.306	0.301
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	2.7872	2.9786	3.4696	2.7441	1.3103	0.9320
	1.3461	1.4672	1.8473	1.2276	1.0826	3.6877
STD. DEVIATIONS	1.6127	1.4633	1.5897	1.5673	1.2995	0.6729
	1.1977	1.2391	1.4190	1.1268	1.1377	1.7429
LATERAL DRAINAGE RECIRCULATED FROM LAYER 3 INTO L. 1						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0139	0.0163	0.0173	0.0141	0.0065	0.0048
	0.0067	0.0073	0.0095	0.0061	0.0056	0.0184
STD. DEVIATIONS	0.0080	0.0080	0.0079	0.0081	0.0065	0.0035
	0.0060	0.0062	0.0073	0.0056	0.0059	0.0087

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES		CU. FEET	PERCENT
PRECIPITATION	64.92	(8.748)	1025134.8	100.00
RUNOFF	7.860	(3.0038)	124105.54	12.106
POTENTIAL EVAPOTRANSPIRATION	60.613	(0.9244)	957112.19	
ACTUAL EVAPOTRANSPIRATION	32.167	(3.1753)	507929.66	49.548
LATERAL DRAINAGE COLLECTED FROM LAYER 3	24.88008	(4.96794)	392868.875	38.32363
DRAINAGE RECIRCULATED FROM LAYER 3 INTO L. 1	0.00000	(0.00000)	0.000	0.00000
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00001	(0.00000)	0.083	0.00001
AVERAGE HEAD ON TOP OF LAYER 4	0.011	(0.002)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00001	(0.00000)	0.083	0.00001
CHANGE IN WATER STORAGE	0.015	(1.1321)	230.82	0.023

Appendix E4 – Best Management Practices Summary

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Appendix E4
American Creosote Works Site
Barrier Wall and Excavation Remedial Design
Best Management Practices Evaluated for Use in the Remedial Action

Best Management Practice	Applicability
Materials	
For landfill covers and other plant-based systems, use organic material such as compost instead of chemical fertilizers t+3:9o	A vegetative layer will be installed on the cap. Compost may be considered to amend the soil rather than chemical fertilizers.
For landfill covers, use minimum slope while maintaining proper drainage to reduce the volume of fill material required.	Fill material used in ECC and Barrier Wall Cap consruction will be minimized and generally limited to topsoil for the vegetative layer. The subgrade for the closure cap will consist of the excavated and compacted wastes from onsite.
Maximize the reuse of existing wells for sampling, injections, or extractions, where appropriate, and/or design wells for future reuse.	While some of the existing wells will require abandonment due to construction activities, some of the wells are anticipated to be reused for sampling in the remedial action.
Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures. Explore the GSA Sustainable Facilities tool at https:// sftool.gov/ for a list of greener options.	When ordering products the GSA Sustainable Facility tool can be used to find a list of greener options.
Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment.	Equipment will be steam cleaned and phosphate-free detergents will be used in sampling equipment decontamination. Other equipment will be decontaminated at
Use biobased products to reduce petroleum use or enhance degradation of material. For example, use biodegradable seed matting, or erosion control fabrics containing agricultural by-products; use algae-based oils, soybean oil, or waste/by-products from forestries, plant nurseries, or food processing/retail industries as a substrate for bioremediation.	Biodegradable seed matting of erosion control fabrics containing agricultural by-products can be considered for vegatation restoration.
Use by-products, waste, or less refined materials in place of refined chemicals or materials (for example, cheese whey, molasses, compost, or off-spec food products for inducing anaerobic conditions; limestone in place of concentrated sodium hydroxide for neutralization; fly ash or slag as a component in concrete).	Fly ash will be used in stabilizing barrier wall spoils.
Use materials with recycled content (for example, concrete and/or asphalt from recycled crushed concrete and/or asphalt; plastic made from recycled plastic; geotextile fabrics/tarps made with recycled contents).	Geotextiles could be made with recycled contents.
Power and Fuel	
Use biodiesel produced from waste or cellulose-based products to power equipment.	Biodiesel could be used to power large equipment, depending on availability and equipment compatability.
Use gravity flow wherever feasible instead of additional pumps to transfer water after subsurface extraction.	Gravity flow will be considered in design of the head maintenance system.
Use solar power pack system for low-power system demands (for example, security lighting, system telemetry).	Solar power could be considered for security/work lighting.

Appendix E4
American Creosote Works Site
Barrier Wall and Excavation Remedial Design
Best Management Practices Evaluated for Use in the Remedial Action

Best Management Practice	Applicability
Project Planning and Team Management	
Buy carbon offset credits (for example, for airline flights) when in person meetings are required.	In person meetings will be minimized.
Choose equipment and product vendors with production and distribution centers near the Site to minimize fuel consumption associated with delivery.	Vendors near the Site could be used to minimize fuel consumption.
Choose suppliers that will take back scraps or unused materials.	Some subcontractors will take backscraps and recycle them.
Contract a laboratory that uses green practices and/or chemicals.	Groundwater samples could be sent to a lab that uses green practices.
Designate collection points for compostable materials and routine recycling of single-use items such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally.	Collection points for compostable material and recycling materials could be designated so that they may be properly recycled.
Select facilities with green policies for worker accommodations and periodic meetings.	Facilities with green policies could be selected for worker accomodations.
Select local waste disposal and recycling facilities to minimize transportation impacts.	Local waste and recycling facilities will be used.
Use a local laboratory to minimize transportation impacts.	If possible, local laboratories could be used to minimize transportation impacts.
Use local staff (including subcontractors) when possible to minimize transportation impacts.	Local subcontractors could be used, when possible, to minimize transportation impacts. This is more likely for non-specialized activities, such as pre-construction and Site preparation work.
Residual Solid and Liquid Waste	
For PRBs, use existing excavation, deep soil mixing, injection or other subsurface infrastructure to minimize volume of excavated soil.	Although not a PRB, the barrier wall construction design includes use of in situ cutter soil mixer technology which minimizes excavated soil.
Reuse or recycle recovered product (such as resale of captured petroleum products, precipitated metals) and materials (for example, cardboard, plastics, asphalt, concrete).	Products and materials could be reused after decontamination.
Reuse or reinject treated or uncontaminated groundwater to the subsurface to recharge an aquifer rather than discharging (for example, NPDES or POTW) as permissible. For example, use water for irrigation, dust control, or to amend wetlands.	Reuse of treated groundwater to recharge aquifer could be considered, rather than discharging.
Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed off-site; collect needed analytical data to make onsite reuse decisions.	Designated clean soil can be stockpiled in areas of uncontaminated material.
Sampling and Analysis	
Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.	Reusable/dedicated sampling equipment could be used for groundwater performance monitoring.
Use drilling methods which minimize the generation and disposal of cuttings (for example, sonic technology).	If borings/wells are to be installed, sonic drilling could be considered to minimize cutting generation.

Appendix E4
American Creosote Works Site
Barrier Wall and Excavation Remedial Design
Best Management Practices Evaluated for Use in the Remedial Action

Best Management Practice	Applicability
Use non-invasive techniques to avoid cover damage when monitoring landfill cover integrity; for example, use open path spectroscopy techniques to periodically confirm no escape of landfill gas.	Non-invasive technologies would be used to monitor ECC and cap integrity.
Site Preparation and Land Restoration	
Cover filled excavations with biodegradable fabric to control erosion and serve as a substrate for ecosystems.	Filled excavations off-site of outside of the cap/ECC footprint could be covered with biodegradable fabric as a substrate for ecosystems.
For landfill covers, use lower permeability soils than required by regulation when soils are available locally to reduce the amount of leachate generated.	The soil cover over the cap will be obtained locally and may be blended to achieve and optimum composition. A lower permeability composition could be designed.
For restoration use a suitable mix of trees, shrubs, grasses, etc. to preserve or improve biodiversity and related ecosystem services.	After remediation, the Site is planned for a park where a mix of vegetation could be planted. The off-site areas will have a suitable mix replaced and larger trees are to be preserved.
If grass is required, use no- or low-mowing species to minimize mowing.	Excavation and cap areas planned to be seeded. Where possible, no- or low-mowing species could be used.
Minimize clearing of trees and other vegetation throughout investigation and cleanup.	If feasible, larger trees will be preserved during cleanup.
Restore and/or maintain ecosystems in ways that mirror natural conditions.	The former industrial Site will be reused as a park, returning the area back to more natural conditions.
Restrict traffic to confined corridors to minimize soil compaction and land disturbance during Site activities.	Access to the Site and off-facility construction areas will be strictly controlled. Temporary access roads on-facility will be constructed.
Reuse onsite or local clean materials (for example, shredded tires, crushed concrete) rather than importing borrow for fill.	Site soils and local material are expected to be used for backfill.
Select pre-existing, native and non-invasive vegetation for phytoremediation or restoration activities to minimize use of water and amendments.	Native and non-invasive vegetation could be selected for revegetation of the Site and off-site areas to minimize use of water and amendments.
Use an integrated pest management plan or green alternatives (for example, non-chemical solarizing technique) to minimize use of chemical pesticides.	Green pest management alternatives could be considered for the Site after revegetated.
Use crushed concrete as a construction aggregate for road base, pipe bedding, or landscaping.	Crushed concrete could be considered in access road construction.
Use excavated areas to serve as retention basins in final storm water control plans.	Detention pond is expected to be constructed in clean fill excavation area.
Use reclaimed asphalt pavement as a granular base for new roads.	Reclaimed asphalt pavement could be considered in access road construction.
Use silica-based spent foundry sands from iron, steel, and aluminum foundries in soil-related applications such as manufactured soils and roadway sub- base.	Silica-based spent foundry sands could be considered in access road construction.
Surface and Storm Water	
Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, or other uses.	Detention pond water could be used for irrigation or other uses.

Appendix E4
American Creosote Works Site
Barrier Wall and Excavation Remedial Design
Best Management Practices Evaluated for Use in the Remedial Action

Best Management Practice	Applicability
Vehicles and Equipment	
When using large equipment, employ auxiliary power units to power cab heating and air conditioning when a machine/vehicle is not operating (such as SmartWay generator or plug in outlet) to reduce idling.	Equipment not in use should be turned off to reduce idling.
Implement an idle reduction plan.	An idle reduction plan could be created.
Use biodegradable hydraulic fluids on hydraulic equipment such as drill rigs.	Biodegradable hydraulic fluids should be used on hydraulic equipment such as drill rigs and excavators, loaders, etc. as possible based on subcontractor.
Use electric, hybrid, ethanol, or compressed natural gas vehicles instead of conventional vehicles.	Equipment is usually deisel but some contractors may have electric, hybrid, ethanol, or compressed natural gas vehicles.
Use retrofitted engines that use ultra-low, low sulfur diesel, or alternative fuels; or filter/treatment devices to achieve BACT or MACT.	Some contractors may have equipment with retrofitted engines that use ultra-low, low sulfur diesel, or alternative fuels.
Use SmartWay transportation retrofits (for example skirts, air tabs) on tractor-trailers whenever possible.	SmartWay transportation retrofits could be used on tractor-trailers transporting excavators, loaders, etc. to the Site.

Notes:

BACT - best available control technology
ECC - engineered containment cell
GSA - General Services Adiministration
MACT - maximum achievable control technology
NPDES - National Pollutant Discharge Elimination System
POTW - publicly owned treament works
PRB - permeable reactive barrier

Appendix F. Part 1 Construction Quality Assurance Plan (CQAP)

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PART 1 - CONSTRUCTION QUALITY ASSURANCE PLAN

REVISION 1

American Creosote Works Site

Pensacola, Escambia County, Florida

Prepared Under:
U.S. EPA Contract No. EP-S4-09-02
U.S. EPA Task Order No. 089-RDRD-0445
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Prepared For:
U.S. Environmental Protection Agency Region 4
Superfund Division
Atlanta, Georgia

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Acronyms and Abbreviations

ACW	American Creosote Works
amsl	above mean sea level
ARAR	Applicable or Relevant and Appropriate Requirements
ASTM	American Society of Testing and Materials
Black & Veatch	Black & Veatch Special Projects Corp.
bls	below land surface
CM	Construction Manager
CMZ	Contaminated Media Zone
COC	chemical of concern
CQA	Construction Quality Assurance
CQAO	Construction Quality Assurance Officer
CQAP	Construction Quality Assurance Plan
CQC	construction quality control
CQCI	Construction Quality Control Inspector
CQCP	Construction Quality Control Plan
CTL	Cleanup Target Level
cy	cubic yards
DNAPL	dense non-aqueous phase liquid
ECC	engineered contaminant cell
EPA	U.S. Environmental Protection Agency
ESCP	Erosion and Sedimentation Control Plan
°F	degrees Fahrenheit
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FL	Florida
ft	feet
GCL	geosynthetic clay liner
HDPE	high-density polyethylene
HSP	Health and Safety Plan
IC	institutional control
ISCO	in situ chemical oxidation
LDPE	low-density polyethylene
LS	Lower Sand
NAPL	non-aqueous phase liquid
NCP	National Contingency Plan
O&M	operations and maintenance
PCP	pentachlorophenol

pH	hydrogen ion concentration
PTW	Principal Threat Waste
PYC	Pensacola Yacht Club
QA	Quality Assurance
QC	Quality Control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RE	Resident Engineer
ROD	Record of Decision
SCB	soil-cement bentonite
Site	ACW Superfund Site
SOW	Scope of Work
SMP	Site Management Plan
SVOC	semi-volatile organic compound
US	Upper Sand
USACE	U.S. Army Corps of Engineers

1.0 Introduction

Black & Veatch Special Projects, Inc. (Black & Veatch) has prepared this Construction Quality Assurance Plan (CQAP) for the American Creosote Works (ACW) Superfund Site (Site) located in Pensacola, Escambia County, Florida (FL) using the Technical Guidance Document: Construction Quality Assurance (CQA) for Hazardous Waste Land Disposal Facilities, U.S. Environmental Protection Agency (EPA)/530-(S) SW-86-031.

1.1.1 Purpose

Construction documentation as part of the CQAP documentation does not sanction the CQAP as a guarantee of facility construction and performance. Rather, the primary purpose of the CQAP documentation is to improve confidence in the constructed facility through written evidence that the CQAP was implemented as proposed and that the construction proceeds in general accordance with the drawings and specifications.

1.1.2 Responsibility and Authority

The final documentation will provide a record that areas of responsibility and lines of authority were clearly defined, understood, and accepted by all parties involved in the project. Signatures of appropriate site personnel, the Construction Quality Control Officer (CQAO), and the contractors will be included as confirmation that each party understood and accepted the areas of responsibility, lines of authority, and performed their function(s) in accordance with the CQAP.

1.2 SITE OVERVIEW

The ACW property is the location of a former wood treating facility that used creosote and pentachlorophenol (PCP) in the treatment processes. Details concerning the Site location, topography, surrounding land use, and other pertinent features are provided in the chart below:

Site Description Summary

Item	Summary
Address	The Site is located one block south of the intersection between Main Street and Barrancas Avenue, between L and F Street, about 500 yards north of Bayou Chico in Pensacola (**Figure 1-1**). Approximate address: 1800 Gimble Street, Pensacola, FL 32501 EPA ID: FLD008161994
Current and Future Land Use	The land use in the area includes high density residential to the south and west with commercial/industrial entities to the north and east. There is a public park and beach located to the south in the Sanders Beach community. No schools or churches were identified in the investigative area. Reasonably anticipated future land use of the Site is recreational. The City of Pensacola is planning to turn the property into a park.
Site Location Map	See **Figure 1-1**.
Size/Boundaries	The former ACW facility is approximately 18 acres in size and is located one block south of the intersection between Main Street and Barrancas Avenue.
Adjacent Properties	Several businesses are located north and west of the former ACW facility, including a lumber company, a former auto body shop, and an appliance sales and repair shop. Residential areas, which are included as part of the ACW Site, border the former ACW facility on the east and south, with the nearest residence within 50 feet (ft) of the former

Site Description Summary

Item	Summary
	facility. The Pensacola Yacht Club (PYC), which also is considered part of the ACW Site, is southwest of the former facility (U.S. Army Corps of Engineers [USACE], 2006).
Site Map with Utilities	See Drawings in Attachment 1 of the RD (Black & Veatch, 2019).
Former Use and Facilities	The ACW Site is an abandoned wood preserving facility that operated from 1902 through December 1981. The ACW facility treated wood products using only creosote until 1950, after which PCP was used with increasing frequency until the facility closed in 1981.
Current Site Features	The former ACW facility is currently abandoned, and all structures associated with the past operations have been demolished. The Site has been fenced to prevent unauthorized access. See **Figure 1-2**. An existing 35,000 cubic yard (cy) soil Stockpile, as well as a 10,000 cy PYC Dredging Spoil Pile, currently exist approximately in the center of the former ACW facility.
Access Limits	The ACW facility is fenced and the former creosote non-aqueous phase liquid (NAPL)/groundwater recovery system occupies the western portion of the facility, adjacent to the area of the former lagoons. Primary access to the former facility is from West Gimble Street.
Topography	The area surrounding the ACW facility is generally flat, with elevations ranging between 12 and 14 ft above mean sea level (amsl). The land slopes southward at about 25 ft per mile toward Pensacola Bay.
Climate	The Gulf of Mexico, situated about six miles south of Pensacola Bay, moderates the climate of Pensacola by tempering the cold northern winds of winter and causing cool sea breezes during the daytime in summer. The average temperature for the summer months is around 80 degrees Fahrenheit (°F) with an average daily range of 12.5°F. Temperatures of 90°F or higher occur on an average of 39 times yearly. A temperature of 100°F or higher occurs occasionally. The average winter temperature is in the low to mid 50s°F with an average daily range of 15.7°F. Severe cold waves are infrequent (EPA, 1994). Rainfall is usually well distributed through the year with the greatest frequency normally occurring in July and August. The greatest average monthly rainfall occurs in July, and the lowest occurs in October. Seriously destructive hurricanes are occasionally experienced in the vicinity. Hurricanes historically occur from early July to mid-October (EPA, 1994). Hurricane Ivan, a Category 5 hurricane, impacted this area in September 2004.
Drinking Water Supplies	There is a public water supply wells located approximately 1 mile north of the ACW facility. The Sand-and-Gravel aquifer in the vicinity of the Site has been classified as a Class G-II groundwater aquifer under Florida Administrative Code (F.A.C.) Chapter 62-520.410.
Surface Water	Most surface water drainage in the area is by overland sheet flow through the streets and storm drains south of the ACW facility into Bayou Chico/Pensacola Bay, and previously by way of a former drainage ditch on the PYC property. The City of Pensacola completed the construction in 2012 of a new storm water line to redirect storm water from entering the drainage ditch on the PYC property.
Utilities	The 2018 boundary survey indicates most of utilities are located on the northwest of the site. Utilities include a water-line, meters, pump controls, electric boxes, and a treatment system.

1.3 OPERATIONAL AND REGULATORY HISTORY

Wood-preserving operations were conducted at the ACW facility from 1902 until December 1981. Prior to 1950, creosote was used exclusively to treat wood poles. ACW began pressure-treating the lumber, using PCP and Number 2 fuel oil mixture in 1950. This process increased during the later years of the

ACW operations. The dioxin/furan contamination present at the Site resulted from the use of PCP as a wood treating chemical, because dioxins/furans are a common impurity in commercial grade PCP and are released when the PCP is heated.

Four surface impoundments were in the western portion of the ACW facility. The Main and Overflow ponds, located adjacent to L Street, were used for disposal of process wastes. During operations, ACW discharged liquid process wastes into the two unlined surface impoundments. Prior to 1970, waste water in these ponds was allowed to overflow through a spillway, then flow through the streets and storm drains into a ditch on the PYC property and then into Bayou Chico and Pensacola Bay. In later years, liquid wastes were drawn off the larger lagoons and collected in the smaller Railroad Impoundment and Holding Pond or were spread out on the ground in designated "Spillage Areas" on the facility. Additional discharges occurred during periods of heavy rainfall and flooding when the ponds overflowed the containment dikes.

1.4 OVERVIEW OF SITE CONTAMINATION

Prior investigations have determined that the Site is impacted by a large volume of creosote dense non-aqueous phase liquid (DNAPL). Two zones of NAPL have been identified under the former waste ponds, in the Upper Sand (US) Unit at approximately 30 ft below land surface (bls) and in the Lower Sand (LS) Unit at 75-100 ft bls, respectively. While prior Site investigations indicated that NAPL beneath the former facility waste ponds was limited to depths of 20-100 ft bls in October 2011, NAPL was confirmed at a depth of 136 ft bls as a thin stringer of creosote in an area immediately east of the former waste ponds. This is the deepest recorded observation of NAPL at the Site. The lateral extent of observed NAPL in the LS Unit is limited to within the facility boundaries. NAPL in the LS Unit extends south along pathway of the former PYC Ditch to a depth of 49 ft bls. Dissolved groundwater contamination contains elevated levels of semi-volatile organic compounds (SVOCs; including naphthalene and carbazole), benzene, and PCP have been detected across the ACW Site. The deepest documented extent of naphthalene and PCP above Cleanup Target Levels (CTLs) were detected in the 167-177 ft interval at monitoring well CW9. CW9 is located 900 ft south of the southern ACW facility boundary.

1.5 SITE SELECTED REMEDY

The ACW RD has been segmented into three main components. Part 1 of the RD contains the design for the on-facility slurry wall and cap, and excavation and containment of on-facility and off-facility surface soils. Part 2 of the RD addresses a design approach to remediate creosote NAPL present in shallow and deep saturated soils that lies outside the proposed onsite slurry wall. Part 3 of the RD addresses groundwater in situ chemical oxidation (ISCO) and bioremediation treatment components of the overall remedy.

The remedy was selected to address Site contamination in the surficial and subsurface soil. The objectives of the remedy will be to prevent exposure to contaminated surface and subsurface soil and prevent migration of soil and DNAPL source material. Per the Record of Decision (ROD; EPA, 2017), soil cleanup goals are focused on polycyclic aromatic hydrocarbons (PAHs) and dioxins (**Table 1-1**).

The DNAPL present in the subsurface was identified as a principal threat waste (PTW) in the ROD. In treatment of a PTW, National Contingency Plan (NCP) expectations include active treatment, “with priority placed on treating waste that is liquid, highly toxic or highly mobile”. Treatment of principal threats “will be combined with engineering controls (such as containment) and institutional controls (ICs), as appropriate, for treatment residuals and untreated waste” (EPA,1991). PTW materials at this Site will be addressed effectively through containment (Contaminated Media Zone [CMZ]-1) and

isolated in the on-site barrier wall and capped with a final cover that meets Resource Conservation and Recovery Act (RCRA) Subtitle C landfill requirements that are identified as Action-specific Applicable or Relevant and Appropriate Requirements (ARARs; CMZ-3, CMZ-4B). The remedy is based upon isolation and containment of the DNAPL and contaminated surficial and subsurface soil using a soil-cement bentonite (SCB) slurry barrier wall. Slurry walls are non-structural subsurface barriers. These walls are typically constructed using the slurry trench method of construction where a trench is excavated under a bentonite slurry and is "keyed" into the underlying bedrock. The slurry acts to keep the trench open during excavation operations until a mixture of blended soil, Portland cement, and bentonite clay is used to backfill the trench and create the final underground vertical barrier. The addition of cement to the backfill blend creates a more stable wall while still maintaining a sufficiently low permeability.

Due to the complexity of the Site, it was divided into five separate CMZs to aid in the screening, evaluation and selection of remedies. The selected remedies for CMZs, as pertaining to this Part 1 Remedial Design (RD), are presented below.

1.5.1 CMZ-1 Alternative #2 (Barrier Wall Containment with Cap)

Alternative #2 for CMZ-1 consists of a barrier wall constructed using a cutter soil mixer technology, or other in situ mixing method approved by the Engineer, surrounding the zone and a RCRA subtitle C cap and cover. This alternative would provide physical isolation and hydraulic containment of the top, base, and side boundaries of the zone. The barrier wall would be installed to a depth of approximately 115 ft below the nominal ground surface. The isolation cell created offers an additional advantage to this remedy, as it will provide isolation of additional deeper soil that may have lower but appreciable levels of contamination. The cutter soil mixer method would result in a wall thickness of approximately 3-ft. The entire area will be covered with a combination of geosynthetic clay liner (GCL) and low-density polyethylene (LDPE) or high-density polyethylene (HDPE) liner, to contain PTW as excavated and placed from CMZ-4B Off Facility Surface Soil and CMZ-1. The composite cap will also eliminate human exposure pathways, prevent infiltration of surface water, and subsequent leaching of the chemicals of concern (COCs).

1.5.2 CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility CMZ-2A/3 Areas)

CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility CMZ-2A/3 Areas) includes excavation of all unsaturated contaminated surficial soil on the former facility and surficial soil in CMZ-2A from 0 to 3-ft bls. All this soil will be placed inside the CMZ-2A/3 Areas and capped for long-term isolation. Those soils will be placed with the area of contamination onsite. The resulting engineered contaminant cell (ECC) will be completed with a RCRA subtitle C cap with hydro seeding. Excavation and placement will include all appropriate engineering controls for dust control and monitoring.

All CMZ-4A soil except for soil that currently overlays CMZ-3, and the soil currently overlying CMZ-3 will also be placed inside the ECC for long-term isolation. The 35,000 cy soil stockpile, as well as the 10,000 cy PYC Dredging Spoil Pile that currently exist on the former ACW facility will be spread over the CMZ-2A/3 areas in the ECC.

1.5.3 CMZ-4B Alternative #4 (Excavation/ Disposal On-facility in Barrier Wall [CMZ-1] and Encapsulate On-facility [CMZ-2A/3])

CMZ-4B Alternative #4 (Excavation/Disposal On-facility) was chosen as the recommended remedy for this zone. This Alternative includes excavation of all unsaturated contaminated surficial soil located off-facility at depths ranging from 6 inches to a maximum depth of 3-ft bls (top of the average water table). The soil would be spread over the CMZ-1 Barrier Wall Cap area and the CMZ-2A/CMZ-3 areas for long-

term isolation in the ECC. The resulting caps will be completed with a RCRA subtitle C cap with hydro seeded. Excavation and placement would include all appropriate engineering controls for dust control and monitoring.

The encapsulation of the CMZ-2A/3 areas in an ECC to provide further protection of the groundwater and will level out the heights of these two capped areas. At the end of remedial action (RA), there will be two RCRA subtitle C caps onsite, one covering the footprint of CMZ-1 and a second one covering the CMZ-2A/3 Areas.

The selected remedies for this Part 1 will only consist of the construction of barrier wall at CMZ-1 to a depth of approximately 115 ft using the cutter soil mixer technique, or other in situ mixing method approved by the Engineer, to isolate the highest percentage of mass; and excavation of CMZ-1, -2A, -3 (Stockpiles), -4A on-facility and CMZ-4B off-facility surficial soil to protect against the direct contact threat to the surrounding community. The removal of the upper 3 ft of onsite soil outside of CMZ-1 will be placed in the ECC located in the CMZ-3 area.

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2.0 Responsibility and Authority

2.1 TERMS OF REFERENCE

In the context of this CQAP, Quality Assurance (QA) and Quality Control (QC) are defined as follows:

- QA – A planned and systematic pattern of all means and actions designed to provide confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service.
- QC – Those actions that provide a means to measure and regulate the characteristics of an item of service regarding contractual and regulatory requirements.

In the context of any construction material brought onsite (liner, fill, etc.), QA and QC are defined as follows:

- QA – Refers to those actions employed by the individual material manufacturers to assure the CQAO of the conformity of the Site Development to provide adequate confidence that the installation of any construction item related to the remedy, was performed in accordance with the CQAP, project drawings, and project specifications.
- QC – Refers to those actions taken by the Manufacturer, Fabricator, Contractor, Installer and Construction Quality Control Inspector (CQCI) to ensure that the materials and workmanship of all site construction meet the requirements of the project plans and specifications.

The scope of the CQAP includes QA/QC activities applicable to manufacturing, shipping, handling, storing onsite, installing all components, and site construction activities of the selected remedies, including demolition, excavation, and associated grading and capping.

2.2 ROLES, AND RESPONSIBILITIES OF STAKEHOLDERS FOR QUALITY MANAGEMENT

The responsibilities of the parties involved in quality management for the construction of the remedy are described in this section. A Construction Quality Organization Chart is provided in **Figure 2-1**.

Depending on the final American Creosote Works Site RA contract, the roles and responsibilities may be adjusted.

2.2.1 Owner

EPA Region 4 shall perform as the Owner of all site activity. The Owner is responsible for providing decisions that guide the work progress, approve schedules and budgets, agree or disagree with change management proposals to the scope or design, and validate the final work products satisfy the stated needs of the ROD and Remedial Goals (**Table 1-1**). Final approval and decisions affecting the implementation of the remedies shall be documented through EPA Region 4.

The EPA has the authority to select and dismiss parties charged with design, CQA, and construction activities. The EPA also has the authority to accept or reject drawings and specifications, CQAPs, reports and recommendations of the CQAO, and the materials and workmanship of the Contractors.

2.2.1.1 Resident Engineer

The Resident Engineer (RE), should EPA choose to have one serve on the project, will serve as the official representative of the EPA. In many cases, the RE is the construction manager (CM). If an RE is not selected for the project, the Owner will serve as the RE. The RE is responsible for working with the Contractor to coordinate field activities of the construction quality control (CQC) personnel and to ensure that applicable testing and construction methods are being performed in accordance with the plans and specifications. The RE will be familiar with earth moving activities, subcontractor management, community relations, and health and safety.

The RE is responsible for:

- Reviewing shop drawings.
- Reporting any unresolved deviations from Drawings and Specifications.
- Ensuring that all site-specific documentation is developed, maintained, and transmitted to Owner.
- Attending job progress meetings.

2.2.1.2 Quality

The QA Officer shall represent the interests of the Owner to ensure there is adequate oversight and control for the overall management of the CQC program during construction. The quality program should ensure compliance with the Scope of Work (SOW), EPA-approved Construction Quality Control Plans (CQCPs), and approved design changes. The QA Officer responsibilities include ensuring there is adequate activity and evidence demonstrating:

- Independent assessment and testing of supplies, materials, and constructed features.
- Sampling and testing of QC samples.
- Acceptance of materials and lots.
- Site activity including procedures followed and approved deviations.
- Identification and segregation of non-conformities.
- Corrective Action and Preventive Action Plans approved and verification of their implementation.
- Effective change configuration management.
- Generation of punch-lists, their close-out, and final commissioning.

2.2.2 RA Contractor

The EPA or their agents will solicit contractors to provide the labor, materials, and equipment required to construct the remedy in accordance with the contract documents. Construction contractors are responsible for ensuring the quality of their constructed work product through inspections, testing, and measurements required to document that their work, and the work of their subcontractors, is in compliance with the contract documents. The construction contractor(s) exercise authority over their workforce, including QC personnel and their subcontractor QC support services.

Pursuant to Specification 01 45 00.00 10 QUALITY CONTROL (Appendix J, Specifications, of the Final RD Report), each contractor will submit a QC organization chart developed to show all QC personnel and

how these personnel integrate with other management, production and construction functions and personnel. All QC professionals are subject to acceptance by EPA and/or their agents. The requirements for the QC organization include a QC Manager and enough additional qualified personnel to comply with the contract documents. The contractor is to provide a QC organization that is represented on the Site at all times during the progress of the work and with the authority to take any action necessary to ensure compliance with the contract documents.

2.2.2.1 Construction Manager

The CM is the RA Contractor's on-site representative. The Contractor's Representative is a qualified individual assigned by the Contractor to represent him/her onsite at all times during all construction activities.

The Construction Manager is responsible for the following:

- Making sure that construction activities are conducted in accordance with the plans and specifications.
- Pointing out to the RE any discrepancies between the plans and specifications and the field conditions.
- Attending all meetings held on the project.
- Keeping a daily log of all construction activities onsite.
- Proposing alternative methods, where necessary, to the RE for approval and signature as required per the specifications.

2.2.2.2 Construction Quality Assurance Officer

The CQAO is responsible for the CQAP implementation. The CQAO is responsible for ensuring that the communication of all CQA-related material is conveyed to all affected parties. The CQAO will oversee the implementation of this CQAP during construction by reviewing the Contractor's CQCP, through field observation of construction activities, evaluation of construction QC tests performed by the geotechnical testing contractor and other subcontractors, and field measurement by CQC personnel. The CQAO may conduct additional field-testing, as necessary or requested by the EPA or RE during the RA, and submit samples to an independent laboratory for confirmation of CQC testing. The CQAO will direct the implementation of this CQAP and provide coordination with the Contractor and his subcontractors through the Contractor's CQC officer.

The CQAO shall have sufficient practical, technical, and managerial experience to successfully implement construction QA activities for hazardous waste disposal facilities. The CQAO should have good communication skills to facilitate a positive flow of information.

The CQAO and the necessary CQC personnel will perform activities specified in this CQAP. The specific responsibility and authority of each of these individuals is defined below and in the project's drawings and specifications.

Responsibilities of the CQAO will include:

- Reviewing of project drawings and specifications for clarity and completeness.
- Training CQC personnel on CQA requirements and procedures.

- Scheduling and coordinating CQA monitoring activities.
- Reviewing the Contractor's CQC Plan regarding project specifications.
- Reviewing of any construction material brought onsite (riprap, fill, etc.) manufacturers' QA/QC program regarding industry standard and project specifications.
- Reviewing of field tests, measurements, and laboratory analyses conducted by others pursuant to Contractor's CQC Plan and project specifications.
- Directing and supporting the CQC personnel in performing observations and confirmation of field and/or laboratory analyses by:
    - Submitting testing samples taken by the CQC personnel for evaluation and analysis as specified in this plan.
    - Confirming that regular calibration of testing equipment used by CQC personnel is properly conducted and recorded.
    - Confirming that the testing equipment and procedures used by CQC personnel are consistent.
    - Confirming that the CQC test data are accurately recorded and maintained.

Providing reports to the EPA on the monitoring results including:

- Summary of field-tests, measurements, and laboratory analysis conducted by others pursuant to Contractor's CQC Plan and project specifications.
- Review and evaluation of data sheets and reports prepared by CQC personnel.
- Recommendation to the EPA of work that should be accepted, rejected, or uncovered for observation, or that may require special testing, review, or approval.
- Confirmation to the EPA that corrective measures are implemented.

Responsibilities for supporting CQC personnel will include:

- Performing independent onsite monitoring of the work in progress to assess compliance with the project drawings and specifications.
- Confirming that the equipment used in testing meets the requirements and that the tests are conducted according to the standardized procedures defined by the specifications.
- Reporting results of observations and testing.

2.2.2.3 Construction Quality Control Inspector

The QC Inspector is the RA Contractor's on-site quality management representative and responsible for the implementation of the CQAP. The QC Inspector should possess adequate formal training and enough practical technical and administrative experience to execute and record construction activities successfully. This should include demonstrated knowledge of specific field practices relating to construction techniques used for hazardous waste sites and facilities, all codes and regulations concerning material and equipment installation, observation and testing procedures, equipment, documentation procedures, and site safety.

The QC Inspector shall assist the QA Officer by providing full-time, on-site observations, sampling, testing and documentation of the RA Contractors construction activities. In the event any discrepancies in the Contractor's work from that of the approved plans and specifications are noted, the QC Inspector shall immediately notify the QA Officer.

2.2.2.4 Construction Contractors

The Construction Contractors are responsible for excavation, barrier wall construction and construction of the multi-layer cap in accordance with the project drawings and specifications.

Offsite excavation includes:

- permitting,
- site setup (installation of temporary haul road, establishing lay down areas and site facilities [power, water, communications, etc.]), and
- site restoration (terminate temporary utilities, regrade the Site, and reestablish security fencing).

Barrier Wall construction includes:

- excavation
- hauling of excavation soils to CMZ-1 disposal area
- placement of barrier wall soil cap

Onsite facility area excavation/encapsulation includes:

- source area surficial soils excavation
- ECC placement
- stormwater pond installation

Each RA Construction Contractor will be responsible for construction management, construction administration, scheduling, and CQC including development of CQC Plan, field coordination, field-testing and surveying.

The Contractor’s Representative shall be a qualified individual assigned by the Contractor to represent them onsite at all times during the construction activities. The Contractor’s Representative is responsible for the following:

- Making sure that construction activities are conducted in accordance with the plans and specifications
- Notifying the RE of any discrepancies between the plans and specifications and field conditions
- Attending all meetings held on the project
- Keeping a daily log of all construction activities onsite
- Proposing alternative methods, where necessary, to the RE for approval and signature as required per the specifications.

2.2.2.5 Geotechnical testing contractor

The construction Contractor will engage a third-party Geotechnical Testing Contractor to be responsible for implementing the Contractor's CQC Plan for soils through field and laboratory testing. The Geotechnical Testing Contractor will be acceptable to the EPA and RE.

2.2.2.6 Surveying contractor

Each of the Construction Contractors is responsible for performing the surveying services required for construction of the remedy. These surveying services include but are not limited to, post construction (after Site Restoration). The Construction Contractor will perform the surveying or will engage a surveying contractor to be responsible for the surveying services including those services specified in the Contractor's CQC Plan. Surveying activities required by this CQAP will be performed by a licensed land surveyor in the State of Florida and will be acceptable to the EPA and the RE.

2.2.2.7 Barrier Wall contractor

It is anticipated that a specialty subcontractor experienced in the excavation and construction of an environmental slurry wall will construct the barrier wall. The barrier wall RA Construction Contractor will be responsible for excavation of the barrier wall, maintaining the slurry, mixing supplying the off-site clay material for mixing with the native soils, mixing the native soils with off-site clay, bentonite and slurry, backfilling the barrier wall trench in accordance with the drawings and specifications.

The barrier wall RA Construction Contractor will be responsible for maintaining and implementing a CQCP for barrier wall installation. The Construction Contractor may prepare the work platform for the slurry wall subcontractor. The Construction Contractor may install the barrier wall if he has the required qualifications and experience.

2.2.2.8 Other Subcontractors

Subcontractors, installers, or manufacturers (hereafter referred to as subcontractors) comprise the bulk of effort and personnel responsible for the implementation of the plans for the remedy on-site. Regardless of the contracting mechanism or entity, whether by the Owner, or RA Contractor, much of the overall QC responsibilities remains the same for the subcontractor.

The contracting entity is responsible for communicating through approved documentation and communication channels the requirements and expectations that meet the needs of the project stakeholders (such as Florida Department of Environmental Protection [FDEP]). The project stakeholder needs may be communicated by some of the following methods:

- General information to convey a clear understanding of project objectives and the scope of services to be conducted by the subcontractor such as: SOWs and modifications, quality plans, health and safety plans, ROD, and RD.
- A clear description of the scope of services that requires the subcontractor to perform.
- A complete list of subcontractor responsibilities.
- A specific list of subcontract documents (drawings, specifications, design criteria, quality requirements, etc.) that will govern the subcontractor's work. State that the documents are incorporated, by reference, into the subcontract.
- Documentation of their quality program and review process to ensure services, equipment, systems, and other deliverables will be adequately reviewed or inspected for quality.

The subcontractor shall be responsible for providing personnel, training, and material that meet or exceed remedial design criteria. Demonstration of meeting design criteria requirements may be in the form of the following documentation:

- Developing a quality plan (reviewed by the contracting entity) that includes:
  - Ensuring that the materials/systems/products are installed in accordance with Manufacturers guidelines and the project plans and specifications
  - Providing approved services for field handling, storing, deploying materials
  - Sampling and testing supplies and constructed materials to demonstrate conformance
  - Reporting to the CM and QC Inspector any materials or conditions that are non-conforming or may contribute to a non-conformance
  - Correcting immediately a non-conformance and if necessary implementing a preventive action
- Keeping a daily log of all site activities especially those related to:
  - Non-conformances or deviations from approved plans
  - Best practices
  - Approved deviations
  - Requests for information
  - Training needs
  - Completed products or services and those accepted by the Resident Engineer, Construction Manager, and CQCI
- Attending project meetings
- Communicating changes in site conditions or scope to the relevant subcontractor personnel or to the Construction Manager

Significant subcontractor types or functions that may be required for the Site activities may include:

- Earth moving for hazardous and non-hazardous soil
- Waste disposal
- Geotechnical testing
- Materials testing
- Surveying
- Waste disposal
- Seeding and re-vegetation

2.3 PROJECT MEETINGS

The RE will be responsible for conducting periodic meetings with the EPA, Contractor, Subcontractor(s) including QA personnel, and CQC personnel to enhance communication and resolve uncertainties.

2.3.1 Preconstruction CQA Meeting

A meeting will be held to resolve uncertainties following the issuance of this CQAP and prior to beginning construction of the elements addressed in the plan. EPA, RE, CQAO, other CQC personnel, the Contractor's subcontractors, and the Contractor's CQC officer should be present. The topics of these meetings include, but are not limited to:

- Providing each party with all relevant CQA documents and supporting information.
- Familiarizing each party with the CQAP and its role relative to the project drawings and specifications.
- Determining changes to the CQAP that are needed so that the facility will be constructed to meet or exceed the specified design.
- Reviewing the responsibilities of each party.
- Reviewing lines of authority and communication for each party.
- Reviewing procedures or protocol for observations and tests including sampling strategies.
- Reviewing the procedures or protocol for handling construction deficiencies, repairs, and retesting.
- Reviewing methods for documenting and reporting data.
- Reviewing methods for distributing and storing documents and reports.
- Reviewing procedures for locating and protecting construction materials from inclement weather or other adverse events.
- Conducting a site walk-around to review construction material, equipment, and material storage locations.

The meeting will be documented by the CQAO or other designated CQCI personnel and meeting minutes will be prepared.

2.3.2 Progress Meetings

Progress meetings will be held on-site at least weekly. At a minimum, the meetings will be attended by the RE, the Contractor and his CQAO, Subcontractors, and the CQCI. The purpose of the meetings will be to:

- Review previous period's activities and accomplishments.
- Review the planned activities for the forthcoming period.
- Identify the Contractor's personnel and equipment assignments for the period.
- Discuss best practices for increased performance or avoidance of potential construction problems that may cause an impact to the cost, schedule, quality or safety.

The meetings will be documented by the CQAO or other designated CQC personnel and meeting minutes will be prepared.

2.3.3 Problem or Work Deficiency Meetings

Special meetings will be held, as necessary, when problems or deficiencies occur. At a minimum, the meetings will be attended by the responsible contractor(s) and CQAO. The purpose of the meetings will be to:

- Define and discuss the problem or deficiency.
- Review alternative solutions.
- Implement a plan to resolve the problem or deficiency.

The meetings will be documented by the CQAO or other designated CQCI personnel and meeting minutes will be prepared.

2.4 RECORD KEEPING AND REPORTING

Specific record keeping and reporting requirements included in the CQAP are discussed in the following sections.

2.4.1 Submittals

The Contractor is responsible for submittals to the RE as required. It is the RE's responsibility to evaluate these submittals, in a timely manner, according to the Drawings and Specifications. If a submittal shows a variance from the drawings and specifications, the Owner should be consulted as to the appropriate response.

2.4.2 Contractor's Progress Reports

The Contractor's Progress Reports are the responsibility of the Contractor's Representative. These documents are produced monthly and summarize the over-all project progress to date. They shall contain, at a minimum, the following:

- Outline of monthly progress.
- Changes to Contract Drawings and/or Specifications.
- Problems and deficiencies in operations at the Site.
- Any remedial actions taken to resolve problems or deficiencies.
- Loss Management Monthly Summary.
- Work activities anticipated for the next reporting period.

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3.0 Personnel Qualifications

This section identifies the required qualifications of the consultants, CQAO, and the CQCI and describes their expected duties.

3.1 CONSTRUCTION QUALITY ASSURANCE OFFICER

The CQAO is responsible for the CQAP implementation. The CQAO will be a designated engineer. The CQAO will possess adequate training in civil or geotechnical engineering. The CQAO will work so that CQA-related matters are conveyed to and acted upon by the contractors, and the EPA.

3.2 CONSTRUCTION QUALITY CONTROL INSPECTOR

The CQCI will possess sufficient practical, technical, and administrative experience to execute and record monitoring activities. This will include knowledge of specific field practices relating to construction techniques used for demolition, excavation, slurry barrier wall installation, GCL and LDPE/ or HDPE liner installation, observation and testing procedures, equipment, and documentation procedures.

3.3 CONSULTANTS

Authorities in civil engineering and other technical disciplines may be called in from external organizations in the event of unusual site conditions or testing results. Documentation of consultant qualifications will be provided when outside testing or technical judgments are used as a basis for decision in some aspect of construction QA.

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4.0 Construction Monitoring Activities

This section of the CQAP describes the activities (observations) that will be performed by the CQAO and CQC personnel during construction. The scope of this discussion addresses the construction and implementation of the remedy components specified in Section 2.0 along with manufacture/fabrication of various components and subcomponents when applicable. Construction details can be found in the Remedial Design Specifications (Black & Veatch, 2019).

This section also addresses the monitoring activities that will be completed during construction for comparison to the project drawings and specifications. The first subsection addresses preconstruction activities generally applicable to facility components. The following subsections address each facility component separately and are further subdivided into sections on preconstruction, construction, and post construction-monitoring activities unique to each component. Specific test methods used to test the components are listed and referenced in Appendix A.

4.1 GENERAL PRECONSTRUCTION ACTIVITIES

The Contractors and their CQAOs and CQCI(s) will jointly review the project drawings and specifications and discuss the design concepts to provide an understanding of expected conditions, methods of construction, and the scope of the project drawings and specifications.

The following pre-approved RA Contractor provided site-specific plans will be maintained on site by the CQCI and updated as necessary.

- Site Management Plan (SMP).
- Construction Health and Safety Plan (HSP).
- Erosion and Sedimentation Control Plan (ESCP).
- Barrier Wall Work Plan.
- Air Quality Monitoring Plan.
- Soil Excavation, Grading, and Backfill Plan.
- Soil Screening Plan.
- Soil Disposal and Transportation Plan.

4.2 SUBGRADES AND MATERIALS

Monitoring activities during site excavation will be in accordance with the project drawings and specifications by testing for the following:

- Soil density and moisture content.
- Slope failure from loose sands and gravels, weak foundation soil, or slopes that are steeper than specified.
- Surface sloughing of fine sands.
- Improper undercut of the toe of a slope.
- Development of tension cracks at the top of slopes.

The following subsections describe the CQA activities that will be done to monitor site activities in regard to the project specifications. Specific tests mentioned in this section are listed and referenced in **Appendix A** and will be performed by the Contractor's CQCI as part of the CQC for the project. Additional confirmation tests may be performed by the CQCI at the direction of the CQAO.

4.2.1 Construction

CQA activities during construction of the foundation of the containment cell will include the following:

- Observations of stripping and excavation to determine that undesirable materials are removed.
- Observations of the subgrade and fill surfaces for adequate grading and filling of depressions and slough areas slopes.
- Observations of surface water runoff control and erosion protection.
- Measurements of the depths and slopes to evaluate construction regarding the project construction drawings.
- Observations of the compaction operation to provide the proper preparation of the subgrade, prior to placement of liner components. Verification that the density and moisture content of the compacted foundation/subgrade soil was tested according to American Society of Testing and Materials (ASTM) D1556 or D2922 at frequencies of at least one test per acre of prepared area. Tests will be repeated for failed areas after remedial actions are performed according to the project specifications.
- Confirmation that the Contractor's surveyor performed the necessary surveying during construction so the facility dimensions, are as specified in the project drawings and specifications.

CQA personnel will utilize visual-manual soil identification techniques (ASTM D2488) and index property tests performed by others to monitor foundation soil composition.

4.3 SOIL EXCAVATION, TRANSPORT, AND DISPOSITION

Excavation of soil will be conducted within the site area and at an adjacent off-site residential location. Off-site residential soils will be transported to the site for disposal within the containment area. Excavation of all unsaturated contaminated surficial soils from the site from 0 to 3 ft bls will be conducted (CMZ-4A Alternative #2 and CMZ-4B Alternative #4). Depths of excavation, quantities, and destination can be found in the RD and Specification Section 02 61 13 Excavation and Handling of Contaminated Material (Black & Veatch, 2019). Under the CMZ-4A remedy, all excavated soil would be placed inside the CMZ-1 barrier wall and encapsulated for long-term storage. Under the CMZ-4B remedy, excavated soils will be nearly equally spread over the CMZ-1 barrier cap area and the CMZ-2A/CMZ-3 areas for long term isolation in the ECC. Details of this soil placement can be found in the RD Drawings.

4.3.1 Construction

CQA activities during construction of containment cell cap will include the following:

- Observations of stripping and excavation to determine that undesirable materials are removed.
- Observations of the subgrade and fill surfaces for adequate grading.

- Observations of surface water runoff control and erosion protection.
- Measurements of the depths and slopes to evaluate construction in regard to the project construction drawings.
- Observations of the compaction operation to provide the proper preparation of the subgrade, prior to placement of liner components. Verification that the density and moisture content of the compacted foundation/subgrade soil was tested according to ASTM D1556 or D2922 at frequencies of at least one test per acre of prepared area. Tests will be repeated for failed areas after remedial actions are performed according to the project specifications.
- Confirmation that the Contractor's surveyor performed the necessary surveying during construction so the facility dimensions, side slopes, and bottom slopes are as specified in the project drawings and specifications.

The CQCI will utilize visual-manual soil identification techniques (ASTM D2488) and index property tests performed by others to monitor foundation soil composition.

4.3.2 Post-construction

Foundation completion monitoring activities include observation of proof-rolling, additional testing of foundation soil, observing foundation/subgrade surfaces, and additional surveys to measure elevations, slopes, and foundation/subgrade boundaries.

4.4 CONTAMINATED SOIL PLACEMENT

The following subsections describe the activities that will be done to monitor the placement of the contaminated soils regarding the project drawings and specifications. Specific tests mentioned in the following subsections are listed and referenced in **Appendix A** and will be performed by the CQCI as part of the CQC for the project. Additional confirmation tests may be performed by the CQCI at the direction of the CQAO.

4.4.1 Construction

CQA activities during fill construction will help identify problems resulting from inadequate construction practices or materials that could result in fill settlement, or erosion.

Contaminated on site materials and stockpiled materials will constitute fills. Monitoring activities conducted during fill placement, conditioning, and compaction will include:

- Review testing of fill material soil density and moisture relationships in accordance with the project specifications. Test areas represented by failed test results will be remediated and tested again until appropriate test results are obtained.
  - Maximum density in accordance with ASTM D698 D1557
  - In-place density in accordance with ASTM D1556 or D2922
  - In-place moisture content in accordance with ASTM D2216 or D3017
- Frequency shall be in accordance with the specification requirements.
- Measurement of lift thickness.

- Observation of type of compaction equipment, number of passes, and uniformity of compaction coverage.

4.4.2 Post-construction

Surveys and visual observations will be conducted to confirm that the soil is stable with no soft areas prior to placement of the cap.

4.5 GEOSYNTHETIC GAS COLLECTION SYSTEM

This section describes the activities that will be conducted to monitor the construction of the geosynthetic gas collection material and passive vents. A horizontal passive vent well system will be placed within the subgrade to provide a collection point for gasses under the GCL and synthetic turf liner. The perforated screen and piping shall be HDPE as shown on Drawing C-600 and shall be placed in a granular fill material. Specific tests mentioned in this section are listed and referenced in **Appendix A** and will be performed by the Liner Contractor's CQC personnel as part of the CQC for the project. Additional confirmation tests may be performed by the CQCI at the direction of the CQAO.

4.5.1 Preconstruction

Preconstruction activities for the geonet may include review of manufacturers QA/QC program including observations of the manufacturing operations, fabrication operations, and final product quality, and observation related to transportation, handling, and storage on-site.

4.5.1.1 Manufacturer

The manufacturer shall submit a sample of the geosynthetic gas collection material with a complete set of specifications to the CQCI for review. The manufacturer will also furnish a complete set of written instructions for storage, handling and jointing to the CQCI for documentation.

4.5.1.2 Transportation and Storage

The CQCI will confirm that the finished rolls of geosynthetic gas collection material have been protected with appropriate covering material. The rolls of finished material must be marked to show the following minimum information:

- Name of manufacturer
- Product identification
- Lot number
- Roll number
- Roll dimensions

The CQCI will review delivery tickets and QC documentation to confirm that the material rolls received on site meet the project specifications. Identifying labels from each roll will be taken and saved for future reference.

The CQCI will make observations for defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. When damage to a roll cover has occurred, examination of the underlying material will be conducted. If damage is found, the CQCI will examine the entire shipment for damage.

The CQCI will confirm that the geosynthetic gas collection material will be stored in a secure area with provisions against adverse weather to avoid damage caused by heavy winds, precipitation, temperature extremes, and vandals.

4.5.2 Construction and Post-construction

The CQCI shall ensure observations and tests used to detect defects during construction will be documented including:

- Verification that the subgrade is smooth and free of large rocks, debris, ruts, or sharp edges.
- Observations made so that the geocomposite placement plan was followed and that the material was properly deployed and not dragged into place.

As each geosynthetic gas collection material roll is placed, it will be visually observed for tears, punctures, and thin spots. To accomplish this, the rolls will be traversed by CQCI in such a way that the entire surface is observed. Activities that will be documented during field tying operations include:

- Tie spacing, and overlap lengths.
- Geotextile portion of the material is properly overlapped and sewn.
- Underlying soils are not disturbed by equipment or personnel during the connection process.

4.6 GEOSYNTHETIC CLAY LINER

This section describes the activities that will be conducted to monitor the construction of the GCL. Specific tests mentioned in this section are listed and referenced in **Appendix A** and will be performed by the Liner Contractor's CQC personnel as part of the CQC for the project. Additional confirmation tests may be performed by the CQCI at the direction of the CQAO.

4.6.1 Preconstruction

Preconstruction activities for the GCL will include review of manufacturers QA/QC program including observation of the manufacturing operations, fabrication operations, and final product quality; and observation related to transportation, handling and onsite storage of the material.

The CQCI shall check the delivery tickets and observe the unloading of the GCL shipment upon arrival at the site. The CQCI will conduct a visual inspection of all rolls of GCL for defects and damage. The CQCI will document and inform the contractor if any of the GCL rolls should be rejected and removed from the site due to damage or other nonconformity.

4.6.1.1 Manufacturer

A sample of the GCL will be submitted to the CQAO for review. The sample shall be labeled with manufacturer's name, product identification, lot number and roll number. Inventory tickets, roll numbers, or batch identifications, packing papers, and invoices for the GCL will also be submitted to the CQCI. The manufacturer shall supply certified test results to be reviewed for compliance with the test method and properties included in the project specifications.

4.6.1.2 Transportation and Storage

The CQCI will confirm that the finished rolls of GCL material have been protected with the appropriate covering material. The rolls of finished material must be marked to show the following minimum information:

- Name of manufacturer
- Product identification
- Lot number
- Roll number
- Roll dimensions

The CQCI will review delivery tickets and QC documentation to confirm that the material rolls received onsite meet the project specifications. Identifying labels from each roll will be taken and saved for future reference.

The CQCI will make observations for defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. When damage to a roll cover has occurred, examination of the underlying material will be conducted. If damage is found, the CQCI will examine the entire shipment for damage.

CQC personnel will confirm that the GCL is stored above the ground in a dry, secure area with provisions against adverse weather to avoid damage caused by heavy winds, precipitation, temperature extremes, and vandals.

The CQCI shall record deliveries of GCL on the geosynthetic material delivery log. This log will document that each roll of material has been marked with the following information:

- Condition of packaging
- Product type
- Roll numbers
- Damaged items
- Type of unloading equipment used
- Description of onsite material storage area

Based on general good practice principals, the Contractor shall not drag, lift by one end, or drop the GCL rolls. A pipe of solid bar of sufficient strength should be used for all handling activities. Chains should be used to link the ends of the pipe to the ends of a spreader bar. The spreader bar should be wide enough to prevent the chains from rubbing against the ends of the GCL rolls. Alternatively, a stinger bar protruding from the end of a forklift or other equipment may be used.

4.6.2 Construction and Post-construction

The observations and tests necessary to detect defects during construction will be documented. The monitoring activities include:

- Panels are placed with the non-woven side against the geocomposite and the woven side oriented upwards. All seams run perpendicular to the slope.
- Observations as to the material placement in the constructed project. The position of each material panel will be noted on an installation drawing to be prepared by the GCL installer. The document can be used as future reference.
- Observations to determine that the GCL placement plan was followed and that the material was properly deployed and not dragged into place.
- Observation that no damage was caused to the underlying geocomposite during placement of the GCL.

As each GCL panel is placed, it will be visually observed for tears, punctures, and thin spots. Observations will be conducted so there is no disassociation of the backing material from the bentonite core and that the granular bentonite is continuously encapsulated throughout the GCL. To accomplish this, the GCL panels will be traversed after placement by the CQCI in such a way that the entire panel surface is observed.

Activities that will be documented during field seaming operations include:

- Contacting surfaces along seam areas are clean and clear of dirt or native soils and that the edges are pulled tight to maximize contact and to smooth out any wrinkles or creases.
- Overlap widths on both panel edges and panel ends.
- Compliance with manufacturer's field-seaming recommendations, including quantity of bentonite per ft of field seam.
- Compliance with manufacturer's recommendations for patching damaged areas of the GCL.

GCL should not be deployed if precipitation is likely to hydrate bentonite prior to placement of the geomembrane. Ensure that the GCL does not wet before or during installation. The GCL shall not be installed during periods of rain, nor is it to be installed in standing water. The CQCI shall decide if any wetted material shall be used or removed from the premises.

4.7 BARRIER WALL

A subsurface barrier wall will be constructed to contain the contaminated source materials to prevent the migration of contaminants. The barrier wall will consist of slurry containing a mixture of water, soils, bentonite, and concrete. The slurry mixture ratios were determined in a Treatability Study (Kemron, 2019).

Detailed drawings and specifications show the areas available for material stockpile areas, details such as temporary construction crossings, permanent maintenance vehicle access crossing locations, miscellaneous details and cross sections showing required vertical and lateral limits of the work platform, and other elements of the design to be incorporated during construction (Black & Veatch, 2019). The RA Contractor shall prepare a location(s) for staging the reagent slurry batch plant system that is accessible for the delivery of bentonite and cement, and other reagents on tractor trailers while still being an efficient location for delivering the slurry mix to the mixing equipment where it is mixed in situ into the native soils. It is assumed that the slurry mix plant will be located within the confines of the barrier wall.

The proposed bottom-of-trench-elevations are indicated on subsurface profiles along wall alignments, as shown on Drawing C-500. The trench depth will follow the contour intervals for the depth to clay while maintaining a 4-ft insertion depth. Additional details are provided in Drawings C-600 and C-601 (Black & Veatch, 2019).

4.7.1 Preconstruction

The Contractor shall prepare and submit a Barrier Wall Work Plan to their RE for approval prior to implementation. The Work Plan shall at a minimum include a work schedule for all activities related to barrier wall construction; information pertaining, to the proposed slurry mixing, trench backfill mixing, off-site borrow soil used for preparing barrier wall backfill, QC procedures and excess soil and slurry disposal and site clean-up procedures. The Contractor shall submit a Treatability Study Report including similar testing results as documented in the Black &Veatch Treatability Study if an alternative backfill mix is proposed. Differences between laboratory and field conditions may require a greater amount of reagent to achieve an effective backfill mix.

4.7.2 Construction

CQA monitoring activities during barrier wall construction can be divided into the following five discrete functional steps and will be discussed in the following sections:

- Site preparation
- Slurry mixing and hydration
- Trench excavation
- Backfill preparation
- Backfill placement

4.7.2.1 Site Preparation

Site preparation activities to be enforced by the CQCI are discussed in the plans discussed in Section 4.1 above. Additional details and requirements of site preparation are presented in Section 6 of the Basis of Design Report (Black & Veatch, 2019).

4.7.2.2 Slurry Control

The slurry will be pumped from the slurry mix system to the trench via pipes/hoses. The slurries are introduced into the trench in one of two ways; either as the trenching slurry as well as the backfill, or by tremie method through bentonite slurry that is used to stabilize the trench sidewalls. SCB backfill is sluiced with bentonite slurry and/or cement grout to a typical slump of 4 to 6 inches (per ASTM D143) for workability. Sluicing with bentonite slurry is typically controlled only by workability requirements and may add as little as 0.3 percent bentonite to the SCB. Sluicing with cement grout is usually highly controlled to add a prescribed amount of cement, but still may require adding additional bentonite slurry to achieve the desired slump.

Slurry batching is critical to maintain proper hydrostatic pressure for trench stabilization. Slurry mixture ratios determined in the Treatability Study (Kemron, 2019) shall be continually verified during the installation. Criteria to be monitored during the installation are presented in Section 7 of the Basis of Design Report (Black & Veatch, 2019).

4.7.2.3 Trench Excavation

Excavation shall be conducted in accordance with Section 4.3 of the CQAP and Section 8 of the Basis of Design Report (Black & Veatch, 2019).

4.7.2.4 Backfill Preparation and Placement

The barrier wall construction will require a detailed program of field QA/QC testing to provide a uniform low permeability. The Contractor will be responsible for reviewing and updating the CQAP and will be required to perform the standard ASTM field tests for fines content, density, hydrogen ion concentration (pH), viscosity, filtrate loss and slump. Documentation of batch mix proportions and logging confirmatory test samples will also be required.

The Contractor shall also procure a qualified testing laboratory for providing permeability and strength testing analysis for confirmation of soil design criteria. The Contractor will be responsible for the sampling, preparation, storage, handling and shipping of test sample. The QC testing shall include the following features:

- Test soil samples shall be composited from the complete boring depth for analysis;
- Testing UCS shall be done in accordance with ASTM Method D4832 or D1633.
- Permeability testing shall be by a triaxial cell according to ASTM Method D5084.
- Field samples shall be taken of the material immediately after mixing and before placement in the trench.

Due to the addition of cement, bentonite, water and any other mixture additive, the quantity of excavated soil that can be returned to the slurry wall trench is expected to be lower, with a typical percentage of approximately 15 percent of the trench soil volume remaining as spoil that will require stabilization and disposal. The estimated spoils volume for the barrier wall construction is 2,000 cy. It is anticipated that the wall spoils will be stabilized with fly ash and cement on the ground or in a low spot within the interior of the wall following completion of the wall, and mixed with surface soils relocated from outside the wall.

4.7.3 Post-Construction

Post-construction activities include monitoring and testing of settlement platform riser pipe, site cleanup and installation of barrier wall protection cap. Each of the settlement platform risers shall be surveyed on a weekly basis for the initial two weeks, then monthly thereafter, until the RE indicates the survey measurements can be terminated. This will be followed by slurry trench backfilling. Once this is completed, the excess of excavated material and slurry wall will be removed from within 25 ft of the barrier wall. After the disposal and stabilization of trench backfill settlement, the barrier wall and work platform will be excavated to the top of wall elevations to install the site composite cap. The Contractor shall prepare barrier wall plan and profile record drawings and provide them to the RE as a part of the QC documentation.

4.8 SURVEYING

The following section describes the activities that will be conducted during survey activities at the Site.

4.8.1 Post-Construction

Following construction, the contractor will perform a topographic and well survey of the area to ensure that the final grades have been constructed in accordance with the construction drawings. The results of the survey will be submitted to the RE for review to assure that the area has been seeded to the grades specified on the project drawings. In addition, the CQCI will observe the areas for erosion. Any area identified by the CQCI will be repaired by the Contractor.

5.0 Sampling Strategy

It is necessary to estimate the quality of a material or construction process from the observed or measured quality of a representative sample that is a small fraction of the total material or process. Guidance on judgmental sampling and testing is included in this section.

5.1 SAMPLING BASIS

Sampling methods and testing frequency will be according to the RA Contractor's CQCP with minimum sampling frequencies. It is imperative that the judgmental sampling procedure be used in association with minimum sampling frequencies to sample the construction materials or operations being evaluated.

Judgmental sampling refers to a sampling strategy where decisions concerning sample size, selection scheme, and/or locations are based on other than probabilistic considerations. The CQAO may require additional samples beyond the minimum and the method used may be judgmental or biased. The objective is to select typical sample elements that represent a whole process or to identify zones of suspected poor quality. Selection of the sampling location(s) for the construction QC process will be the responsibility of the CQAO and CQCI.

Two considerations need to be addressed during the selection of sampling locations by judgment. First, the CQAO will select sample locations that they feel are representative of the quality of the work as a whole so that the test results will accurately reflect the constructed conditions. Second, the QC personnel will select sample locations in regions of questionable construction quality, as determined through visual inspection or failed tests, to identify work that does not meet project specifications. All sampling by the CQCI will be performed as set forth in the CQCP and in the project specifications.

The CQAO may request that the CQCI take additional samples at locations that represent a worst-case scenario. The CQAO may also conduct additional field-testing and submit samples to an independent laboratory for confirmation of the QC testing.

5.2 SELECTION OF SAMPLE SIZE

QA/QC samples will be collected during each sampling event. The sample proportions or sizes included in the project specifications have been established based upon judgment and experience from similar construction projects. Sampling schemes are used to specify minimum sampling frequencies. These frequencies will be increased to identify potential problem areas where additional tests should be made. Samples ideally will be located where the CQCI may have reason to doubt the quality of materials or workmanship.

5.3 CORRECTIVE MEASURES

When material or work is rejected because observations or tests indicate that it does not meet the tolerances set forth in the project specifications, corrective measures will be implemented. For material subject to 100 percent inspection, substandard material will simply be rejected. When workmanship subject to 100 percent inspection is rejected, it will be redone until it meets specifications. For material or workmanship in question because of CQCI observations or test results, additional testing of the component is necessary prior to rejecting the block of work and implementing the corrective measures set forth in the specifications. This additional testing will confirm that there is substandard construction

or an unrepresentative test. It also will define the extent of the problem so that appropriate corrective measures can be initiated.

The CQAO shall be made aware of all failed tests, the extent of any rejected material or workmanship, and all proposed corrective measures. CQCI will monitor the remediation so the appropriate test results are obtained.

6.0 Documentation

The CQAP depends to a large extent on recognizing the construction activities that should be monitored and assigning responsibility to the CQCI for the monitoring of each activity. This will be accomplished most effectively by documenting CQA activities. The CQCI will note through required documentation, data sheets, and checklists, photos, meeting minutes, test results, progress reports, daily summary reports, and all other contractor submittals that the monitoring activities have been accomplished. Examples of data and monitoring sheets are shown in **Appendix B**.

6.1 DAILY RECORDKEEPING

Standard daily reporting procedures include preparation of a summary report with supporting monitoring data sheets and including, when appropriate, descriptions of problem identification and corrective measures performed by the contractor.

6.1.1 Daily Summary Monitoring Reports

Daily Reports are required from the RE, CQAO or CQCI, and the EPA. The reports provide daily records of construction progress, summarize QA/QC activities, and highlight matters requiring action by the RE, CQAO, and the EPA. Daily reports shall be filed, and a copy maintained in a bound logbook that is kept at the Site.

Daily reports shall include, but not be limited to, the following items:

- Project name, location, and date
- Weather conditions, including:
  - temperature (daily high and low)
  - barometric pressure
  - wind direction and speed
  - last precipitation event and amount of precipitation
- Description of construction activities underway
- Identification of equipment, personnel, and work at each unit
- List of the kinds and types of materials delivered and used (what, where, when, and how often)
- Summary of implemented QA/QC procedures
- Lifts or other earthwork activity completed
- Measures taken to protect unfinished areas overnight
- Compaction tests completed
- Identification of failed QC tests requiring remedial action, as well as the nature and precise location of this action
- Note problems or concerns with site operations
- Issues requiring the RE/Owner's action or resolution
- Record of visitors

- List any conferences with EPA, Contractor, Construction Services, RE
- List of laboratory reports on testing material and equipment
- Identification of any in-field modifications
- Signature of CQCI and/or Construction Manager

Items above will be summarized into site-specific checklists and data sheets.

6.1.2 RA Contractor's Progress Reports

The RA Contractor's Progress Reports are the responsibility of the Contractor's Representative. These documents are produced monthly and summarize the over-all project progress to date. They shall contain, at a minimum, the following:

- Outline of biweekly progress
- Changes to Contract Drawings and/or Specifications
- Problems and deficiencies in operations at the site
- Any corrective measures taken
- Summary of weather conditions
- Work activities anticipated for the next reporting period

6.1.3 Monitoring Data Sheets

Observations, and field and/or laboratory tests, will be recorded by the CQCI on monitoring data sheets. Required data to be addressed for most of the standardized test methods are included in the pertinent American Association of State Highway and Transportation Officials and ASTM Standards.

Because of their highly specific nature, no standard format is given for data sheets to record observations. Recorded observations may take the form of notes, charts, sketches, photographs, or any combination of these. Where possible, a checklist will be developed and used so that no pertinent factors of a specific observation are overlooked.

At a minimum, the monitoring data sheets will include the following information:

- Unique identifying sheet number for cross-referencing and document control.
- Description or title of the monitoring activity.
- Location of the monitoring activity or location from which the sample increment was obtained.
- Type of monitoring activity procedure used (referenced to standard method when appropriate).
- Recorded observation or test data, with all necessary calculations.
- Results of the monitoring activity; comparison with project specification requirements.
- Personnel involved in the monitoring activity.
- Signature of the appropriate the CQCI and concurrence by the CQAO.

6.1.4 Problem Identification and Corrective Measures

Problem identification and descriptions of corrective measures, prepared by CQCI, will be cross-referenced to specific monitoring data sheets where the problem was identified. At a minimum, they will include the following information:

- Unique identifying sheet number for cross-referencing and document control.
- Description of the problem.
- Location of the problem.
- Probable cause of the problem.
- How and when the problem was located (reference to monitoring data sheets).
- Estimation of how long problem has existed.
- Suggested corrective measure.
- Documentation of corrective measure (reference to monitoring data sheets).
- Final results.
- Suggested methods to prevent similar problems.
- Signature of appropriate Corrective Action owner and the QCI for agreement on methods and final disposition with concurrence by the CQAO.

In some cases, not all the above information will be available or obtainable. However, when available, such efforts to document problems could help to avoid similar problems in the future.

Upon receiving the RE/Owner's written concurrence, copies of the report will be sent to the EPA for their comments and acceptance.

6.2 RECORD DRAWINGS

Record Drawings are the responsibility of the Contractor and shall be completed within four weeks after the completion of construction. The drawings shall, at a minimum, contain the following information:

- As built conditions of the work performed with the Contract.
- Changes to Construction Drawings.
- All deviations from the original approved Specifications.
- Any additions or deletions to the original Construction Drawings and Specifications.
- For soil components, the record drawings shall include survey data that show the bottom and top elevations of a component, the plan dimensions of the component, the location in accordance with the project coordinate grid system, and all test sample locations.
- For any construction material brought onsite (riprap, fill, etc.), the record drawings shall include their dimensions, their relative location, appropriate identification numbering or lettering, locations of all repairs, and locations of all test samples.

Record Drawings shall be reviewed by the RE for concurrence. Upon concurrence by the RE, the RA Contractor shall formally submit the Record Drawings to the DE.

6.3 PHOTOGRAPHIC REPORTING DATA SHEETS

Photographic reporting data sheets, prepared by the CQCI, will be cross-referenced or appended to monitoring data sheets. At a minimum, photographic reporting data sheets will include the following information:

- A unique identifying number on data sheets and photographs for cross-referencing and document control.
- The date, time, and location where the photograph was taken and weather conditions.
- The size, scale, and orientation of the subject matter photographed.
- Location and description of the work.
- The purpose of the photograph.
- Signature of the photographer and concurrence of the CQCI.

These photographs will serve as a pictorial record of work progress, problems, and corrective measures. They will be kept with the secure project files in the order in which they were taken.

6.4 CQC DAILY SUMMARY REPORTS AND DATA SHEETS

The RA Contractor shall submit CQC daily summary reports and the corresponding CQC data sheets to the CQAO on a daily basis. The daily summary report and data sheets shall contain the information listed in Section 6.1.1.

6.5 ACCEPTANCE OF COMPLETED COMPONENTS

All daily monitoring summary reports, monitoring data sheets, and problem identification and corrective measures reports, will be reviewed by the CQAO. The documentation will be evaluated for internal consistency and for consistency with similar work. Timely review of these documents will permit errors, inconsistencies, and other problems to be detected and corrected as they occur, when corrective measures are easiest to implement.

The above information will be assembled and summarized into the daily summary monitoring reports. These reports will indicate the materials used and construction processes. These reports will be included in project records, which will be kept on file by the EPA.

6.6 FINAL DOCUMENTATION

The RA contractor is responsible for preparing the Final Construction Report. The report should be completed within four weeks after the completion of construction. The report shall include a summary of all QA/QC activities of the project, document that all aspects of the plans and specifications were performed, and include relevant QA/QC documents such as:

- Introduction
- Chronology of events
- Performance standards and cleanup goals met
- Description of the QA and QC procedures followed that may include the following documentation

- CQA Certification Report
- Personnel or subcontractors involved
- Scope of work outline
- Schedule major phases of operations
- Significant features
- Schedule and milestones
- Copies of all daily quality control summary reports (DQCRs)
- Inspection data sheets
- Lab testing reports
- Problem identification
- Corrective measures
- Photographic records
- Deviations from design and material specifications (with justifying documentation)
- Record Drawings
- As-builts
- Punch list

- Description of construction activities
- Final inspection documentation
- Certification that the remedy is operational and functional
- Discussion of Operations and Maintenance (O&M) requirements
- Summary of project costs
- At the completion of the project, a final report should include a summary of the QA and QC activities during construction.

6.7 DOCUMENT CONTROL

Document control is the process and responsibilities for ensuring the project team have the most current approved version of all planning documents, records of project execution, and final submittals to the client. Control mechanisms include version control, updates, distribution, and disposition. Effective document control of the project enables the Owner and RA Contractor to account for all records upon project completion. All documents used in planning, decision, design, assessment, or direction from the client shall be uniquely identified both in the title and electronic file name. All contracts shall use a project file index to account for all client submittals.

Design work products, material usage, and constructed features shall traceable to their approved requirements and specifications through documented planning, change management, and client decisions. Final work products for project shall be signed/sealed as required by the SOW. A professional seal provides acknowledgment of the completeness and accuracy of the content under the signer's

supervision. Work products shall only be sealed and/or signed if contractually required. The sealing and signing of all documents shall be as required by the Scope of Work, federal and state laws.

A document control scheme should be developed for the quality documentation of the RA. The document control scheme will allow easy access to all CQAP documents and will enable a reviewer to identify and retrieve original data sheets for any completed design component. The control scheme includes unique identifying numbers for each CQAP record and an indexing scheme to relate summary reports to the original data sheets.

An example of a possible document control scheme for CQA reporting procedures may include:

- The QA Daily Summary Reports will be numbered sequentially according to date. For example, the QA Daily Summary Report for Day 1 of construction will be "Sheet Number 001". Sheets will also include the date and the sheet numbers for any data sheets which were used on that day.
- Problem Identification and Corrective Measures Reports will be numbered sequentially as the reports are necessary. The first report will be numbered as "Sheet Number PI-001". The second report will be numbered as "Sheet Number PI-002," etc. Reports will include sheet numbers for all data sheets which reference the problem and correction of the problem.
- Monthly and Weekly Quality Assurance Program Reports will be labeled sequentially according to the week or month, respectively. For example, the first weekly report will be labeled as "Sheet Number Week-001" and the first monthly report will be labeled as "Sheet Number Month-001". Weekly and monthly reports will reference the sheet numbers of corresponding QA Daily Summary Reports.

6.8 STORAGE OF RECORDS

During the construction of the remedy, the CQAO will be responsible for CQA documents. This includes the CQAO's copy of the design criteria, drawings, and specifications, the CQAP, and the originals of the data sheets and reports. Duplicate records shall be maintained at another location to avoid loss of this information if the originals are destroyed.

Once construction is complete, the document originals will be transmitted to the EPA and stored in a manner that will allow for easy access while still protecting them from any damage. All documentation will be maintained through the operating and post-closure monitoring periods of the facility.

7.0 References

Black & Veatch, 2019. Black & Veatch Special Projects Corp., Final (100%) Remedial Design Part 1 – Barrier Wall and Excavation Basis of Design Report for the American Creosote Works Site, Pensacola, Escambia County, Florida. August 2019.

Kemron, 2019. Black & Veatch Special Projects Corp., American Creosote Works Barrier Wall Bench Scale Treatability Study, SH0682, Final Report for the American Creosote Works Site, Pensacola, Escambia County, Florida. July 25, 2019.

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Table

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Table 1-1
Record of Decision Soil Remedial Goals
American Creosote Works Site
Pensacola, Escambia County, Florida

Chemical of Concern	Residential Cleanup Goal[1]	Commercial/Industrial Cleanup Goal[1]
BaP TEQ	0.1 mg/kg	0.7 mg/kg
Pentachlorophenol	7.2 mg/kg	28 mg/kg
2-Methylnaphthalene	210 mg/kg	2,100 mg/kg
2,3,7,8 TCDD TEQ (dioxin)	7 ng/kg	30 ng/kg

Notes:

BaP TEQ = Benzo(a)pyrene Toxicity Equivalent

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent

mg/kg - milligrams per kilogram

ng/kg - nanograms per kilogram

[1] FDEP Soil Cleanup Target Level (SCTL) based on 1E-06 cancer risk or hazard index of 1

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Figures

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Site Location Map
American Creosote Works Site
Pensacola, Escambia County, Florida

Figure 1-1

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N

0 125 250 500
Feet

NAD83 StatePlane FL North, Feet

Site Layout Map
American Creosote Works
Pensacola, Escambia County, Florida

Figure 1-2

fig47957 10/31/2017 6:17:09 PM C:\PROJECTS\EPA-Region 4\ACW Pensacola\GIS\Map Docs\ACW Site Layout Map.mxd

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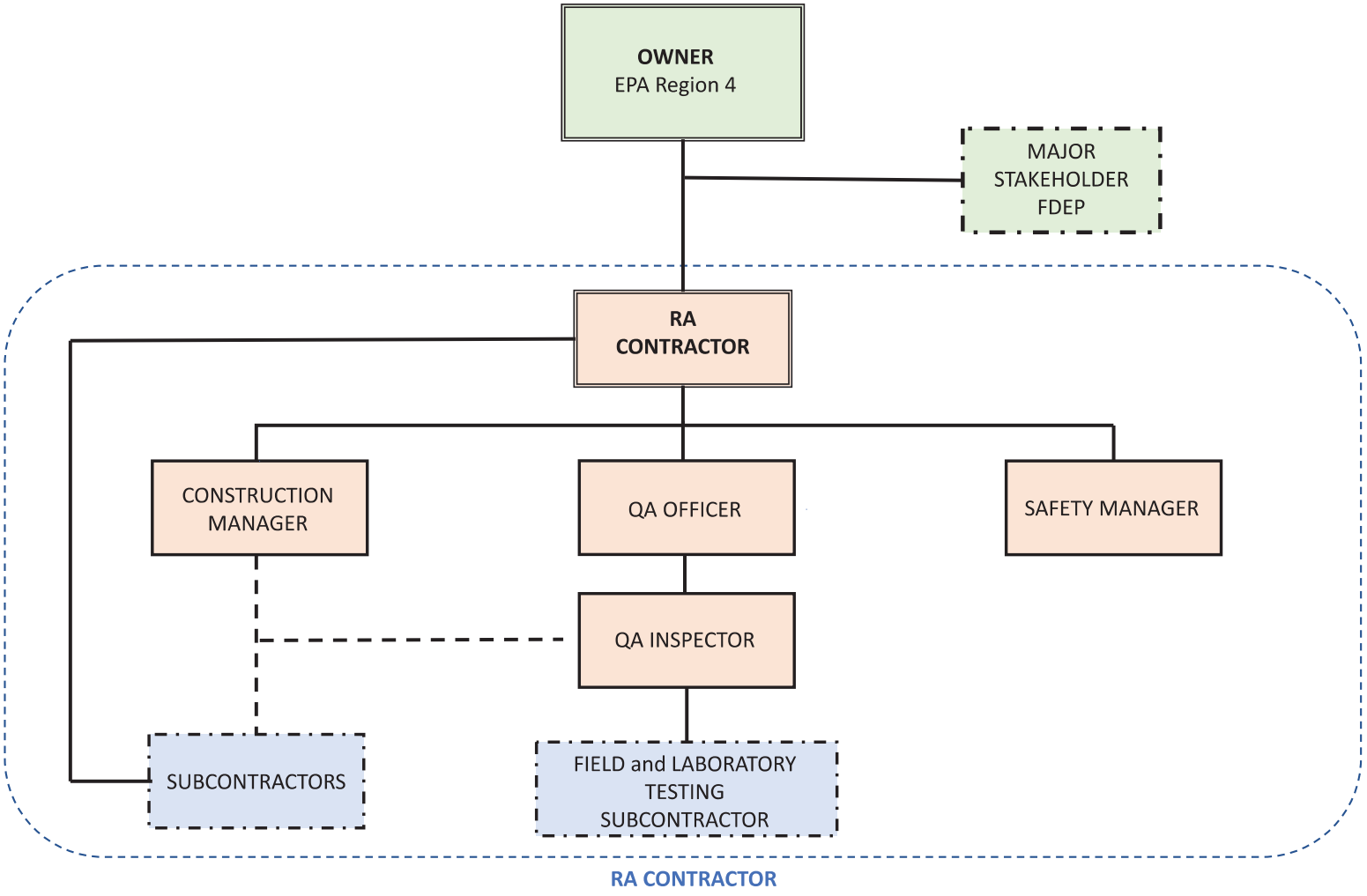
Figure 2-1 Construction Quality Organization Chart



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Appendix A. Quality Control/Quality Assurance and Monitoring/Testing Methods

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Quality Control/Quality Assurance
Monitoring/Testing Methods

Facility Component	Factors To Be Monitored	Monitoring/Testing Methods	Testing Method Reference
Subgrade	Removal of unsuitable materials	Observation	NA
	Proof-rolling of subgrade	Observation	NA
	Filling of surface sloughs	Observation	NA
	Soil compaction	Sand cone Rubber balloon Nuclear gauge	ASTM D1556 ASTM D2167 ASTM D2922
	Surface finishing	Observation	NA
	Sterilization	Supplier's certification and observation	NA
	Slope	Surveying	NA
	Depth of excavation	Surveying	NA
	Surface water runoff control	Observation	NA
	Soil type (index properties)	Visual-manual procedure	ASTM D2488
	In-place density	Sand cone Rubber balloon Nuclear gauge	ASTM D1556 ASTM D2167 ASTM D2922
Contaminated soil Placement	Soil Type	Visual-manual procedure Particle size analysis Soil Classification	ASTM D2488 ASTM D422 ASTM D2487
	Moisture Density	Laboratory	ASTM D698
	Thickness	Surveying; measurement	NA
	Coverage	Observation	NA
	In-place density	Sand cone Rubber balloon Nuclear gauge	ASTM D1556 ASTM D2167 ASTM D2922
Barrier Wall	Backfill Soil Type	Visual-manual procedure Particle size analysis Soil Classification	ASTM D2488 ASTM D422 ASTM D2487
	Wall Alignment	Surveying	NA
	Wall Depth	Surveying	NA
	Wall Width	Surveying	NA
	Slurry Viscosity	Sampling/Flow Cone	ASTM D143 ASTM D4832
	Backfill Density	Sampling/Mud Balance	ASTM D1556 ASTM D2216
	Permability	Sampling/Laboratory	ASTM D5084
Geosynthetic Clay Liner (GCL)	Material type	Manufacturer's Certification	NA
	Handling and storage	Observation	NA
	Coverage	Observation	NA

Facility Component	Factors To Be Monitored	Monitoring/Testing Methods	Testing Method Reference
	Overlap	Observation	NA
	Temporary anchoring	Observation	NA
	Folds and wrinkles	Observation	NA
LDPE/ or HDPE Liner	Handling and storage	Observation	NA
	Thickness	Thickness	ASTM D1593
	Tensile properties	Tensile properties	ASTM D638
	Tear strength	Tear strength of plastic sheeting	ASTM D1004
	Welding materials	Manufacturer's Certification	NA
	Welding equipment	Manufacturer's Certification	NA
	Seaming	Bonded seam strength in Shear Peel	ASTM D4545 6.1.2 ASTM D4545 6.1.1
	Anchoring	Observation	NA
	Coverage	Observation	NA
Leachate Collection Pipe	Material type	Manufacturer's Certification	NA
	Handling and storage	Observation	NA
	Location and layout	Surveying	NA
	Orientation of slots	Observation	NA
	Slotted pipe jointing	Observation	NA
Backfill Soil Placement	Soil Type	Visual-manual procedure Particle size analysis Soil Classification	ASTM D2488 ASTM D422 ASTM D2487
	Moisture Density	Laboratory	ASTM D698
	Thickness	Surveying; measurement	NA
	Coverage	Observation	NA

Appendix B. Data and Monitoring Sheets

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DAILY SUMMARY REPORT

REPORT NO. _____

DATE/SHIFT _____

DAY

S	M	T	W	TH	F	S

PROJECT American Creosote Works Site
JOB NO. _____
LOCATION _____
CLIENT _____
CONTRACTOR _____
CQAO _____

WEATHER	Bright Sun	Clear	Overcast	Rain
TEMP. (F)	40-60	60-80	80-100	100-120
WIND	Still	Moderate	High	
HUMIDITY	Dry	Moderate	Humid	

AVERAGE FIELD FORCE

Contractor	Employees	No.	Equipment	No.	Remarks

VISITORS

Time	Name	Representing	Remarks

Meetings at the site.

CONSTRUCTION ACTIVITIES. Descriptions should include:

- Unit processes of construction under way during the time frame of this report.
- Descriptions of areas or units of work that were monitored, including associated documentation.
- Description of off-site materials received, including supplier quality assurance certification (as an attachment).
- Calibrations, or recalibrations, of test equipment, including actions taken.
- Decisions made regarding units of material or blocks of work, and descriptions of corrective measures used to substantiate the decisions described in the preceding item.

DISTRIBUTION:

BY _____ TITLE _____

DAILY SUMMARY REPORT

Continuation Sheet

PROJECT American Creosote Works Site **REPORT NO.** _____

JOB NO. _____ **DATE/SHIFT** _____

Construction activities (continued)

DISTRIBUTION:

PAGE ____ OF ____ PAGES

DAILY SUMMARY REPORT

Continuation Sheet

PROJECT American Creosote Works Site **REPORT NO.** _____

JOB NO. _____ **DATE** _____

The space below should be utilized to describe unit process, and locations, of construction under way during the time frame of the daily summary report as well as descriptions of areas or units of work (blocks) being monitored.

EXCAVATION PLAN MAY BE REDUCED AND PLACED ON THIS SHEET FOR REFERENCE.

DISTRIBUTION:PAGE ____ OF ____ PAGES

BY _____ TITLE _____

DAILY SUMMARY REPORT

Continuation Sheet

ACTIVITY & LOCATION:
ITEMS RECEIVED AND/OR ISSUED:
CONDITION NEEDING ATTENTION:
GENERAL REMARKS:

DISTRIBUTION:PAGE _____ OF _____PAGES

DATE _____**SHIFT MONITOR**

TESTING PLAN

REPORT NO. _____

SHEET NO. _____

PROJECT American Creosote Works Site **JOB NO.** _____ **SPEC. SECTION** _____

SPEC SECTION AND PARAGRAPH	ITEM OF WORK	TESTS REQUIRED (ASTM, ACI, COMMERCIAL STDS.)	SAMPLED BY	TESTED BY	ON SITE	OFF SITE	FREQUENCY OF TESTING

CONTRACTOR'S EXPLANATORY NOTES

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Appendix G. VE Screening Memo

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MEMORANDUM

US Environmental Protection Agency (EPA) Region 4
American Creosote Works Superfund Site
Value Engineering Screening Memo, Rev 0

B&V Project Number 49089
B&V DCN: 49089-0128-01-I-02632R0
January 10, 2019

To: Peter Thorpe, Remedial Project Manager, EPA

From: Amy Callaway, Cost Account Manager, Black & Veatch Special Projects Corp. (Black & Veatch)

Cc: Geoffrey Kreiger, Contracting Officer, EPA
Luis Flores, Project Officer, EPA
Gina Montgomery, Program Manager, Black & Veatch
Ernie Mott-Smith, Project Engineer, Black & Veatch
Jacob Berger, Project Engineer, Black & Veatch
Darci Scherbak, Project Engineer, Black & Veatch
Ed Hicks, Project Manager, Black & Veatch

Purpose

This memo presents the results of a Value Engineering Screening (VES) conducted on the American Creosote Works Site. The design document has been broken into three submittals, corresponding to likely implementation phases and EPA priorities. The first document will be the incorporate designs for Contaminated Media Zone (CMZ)-1, CMZ-4A, and CMZ-4B (Part 1). The second submittal will be the incorporate designs for CMZ-2A and CMZ-2B (Part 2). The third and final document will be the incorporate designs CMZ-3 and CMZ-5 (Part 3). The VE Screening was conducted following submittal of the Part 1 Intermediate (50%) Remedial Design, dated September 2018; however, conceptual designs were discussed during the screening for Parts 2 and 3.

The purpose of the VES was to identify any potential high cost design elements or subsystems that may become candidates for a formal value engineering study, and to provide the remedial design team with ideas to improve the overall design for consideration as it moves from the 50% to 90% design stage. The design elements or subsystems that were identified during the VES were then presented to the RD teams, and all ideas that appeared to provide a cost reduction were evaluated further.

Below are descriptions of the VES team's ideas for improving the overall remedy design for the site. Ideas have been split into 5 groups, each correlating to a CMZ. The ideas are presented first by group. All ideas are intended to reduce costs, improve performance, or both.

The VES was performed by three senior engineers independent from the design team. The VES was facilitated by Amy Callaway and Ed Hicks. A listing of all the ideas and their respective ratings are presented following the text in Table 1.

VES IDEA DESCRIPTIONS

CMZ-1 VES Ideas

Item 1: Shorten Northern Boundary of barrier wall since it appears to extend farther to north than needed (Other data driving this?).

Conclusion: An evaluation of NAPL occurrence along the northern boundary was completed. It does appear that the barrier wall could be moved to the south, shortening the wall by approximately 193 linear feet. However, loosing this area within the barrier wall would increase the cap height. As a result, this idea is rejected.

Item 2: If concerned about height, how about offsite T&D? Cost versus public perception of height.

Conclusion: Idea scored less than a 7 and was not retained (Table 1).

Item 3: Excavated areas: Where is backfill coming from? Most is from offsite. Can any onsite soils be used? How about harvesting soils from onsite? Make sure there is enough area to stage contaminated surface layer.

Conclusion: Initial thoughts were that the area to be excavated to create the retention pond may be used as backfill. All historical data were evaluated, and it was found that at least one sample in this area, SS510 exceeds the dioxin FDEP SCTL of 30 ng/kg in samples collected from three intervals: 1) 0-6 inches; 2) 6-12 inches; and 3) 2-3 feet. Any areas that are scoped for excavation that can be proven to be clean will be used as backfill. This idea will be further evaluated during the Pre-Final/Final Remedial Design.

Item 4: Have we considered ex situ smoldering technology for creosote impacted soils? Soil could be re-used after treatment in capping system? Any issues with emissions/onsite treatment?

Conclusion: In situ smoldering technology was evaluated during the Feasibility Study and was not retained. The use of ex situ smoldering was discussed for the existing stockpiles onsite, however, the amount of NAPL in the previously excavated soils is not thought to be sufficient for successful use of this technology. As a result, this idea is rejected.

Item 5: Consider higher cap elevation along the north where industrial/commercial area. Improved visual effect of mound height.

Conclusion: The reuse of the site is projected as a City Park. Prior to the submittal of the 50% Remedial Design the City of Pensacola was contacted regarding the cap elevation, at that time the City expressed that one level surface was preferred for the site reuse. Unless the City expresses the need for a higher elevation in any area, the design team will move forward with one level surface to the extent possible (some slope will be required for surface water drainage).

Item 6: Consider placing more material in western end to reduce overall cap height or footprint.

Conclusion: Idea scored less than a 7 and was not retained.

Item 7: Why is area on east end not being utilized for Cap (to reduce height)?
Conclusion: The area to the east is being used for the retention pond. The area between the retention pond and W Gimble Street is not part of the Site proper. As a result, this idea is rejected.

Item 8: Consider placing all NAPL impacted soils in barrier wall/cap area, and dioxin soils in the engineered cell.
Conclusion: This idea was further examined; however, this would increase the cap height. As a result, this idea is rejected.

Item 9: Do we really need a base liner? Potential for migration? May not need in areas where only dioxin deposited, since it doesn't leach.
Conclusion: This idea was further examined; the results will be included in a separate memorandum.

Item 10: If we have a base liner, yes, we need a leachate collection system. Bottom liner should have a geonet instead of leachate collection system, or use impacted sandy soils as protection and leachate collection.
Item 10.5: Consider placing bottom liner directly on existing surface soils, without excavating the surface soils first.
Conclusion: This idea was further examined; the results will be included in a separate memorandum.

Item 11: Determine if there a GW separation regulation between bottom liner and GW.
Conclusion: This idea was further examined; the results will be included in a separate memorandum.

Item 12: 60 Mil HDPE liner recommended for bottom liner
Conclusion: A 60 mil HDPE liner is currently recommended in the design.

Item 13: Go with subtitle D design requirements for liner and cap, not subtitle C, if permissible
Conclusion: This idea was further examined; the results will be included in a separate memorandum.

Item 14: Consolidating and capping waste in place as opposed to engineered cell.
Conclusion: The soils to be excavated must be handled in a manner that ensures the protection of human health and the environment.

Item 15: Geonet may only be needed on cap side slopes, not necessarily across the top slope.
Conclusion: Idea scored less than a 7 and was not retained.

Item 16: Could focus placement of organic soils in limited area, include gas vent layer only there.
Conclusion: The organics are ubiquitous, and there are fairly few vents planned. An alternative gas vent relief flap could be used for the planned Site park reuse.

Item 17: Shrubs and bushes shouldn't go in cells. Take to a City vegetative waste disposal facility or other landfill.

Conclusion: Correct, all shrubs and bushes will be properly disposed of offsite.

Item 18: Consider closure turf instead of earthen and vegetative cover.
Conclusion: Samples of closure turf were sent to the EPA and the City of Pensacola. At this time, the grass cover is being used in the design due to the site reuse plans.

Item 19: Area north of proposed detention pond looks like a good parking area
Conclusion: Idea scored less than a 7 and was not retained.

CMZ-4B /Offsite Residential Excavation Work Ideas

Item 21: Will fences be removed and replaced, or new fences provided? Make sure clear in specs.

Conclusion: EPA confirmed that fences would be excavated around, if any damage occurs, the fence would need to be replaced. This will be confirmed in the specifications.

Item 22: Post excavation confirmation sampling/analysis, or to pre-established cut lines (preferred)? Get Regulatory buy-in (yards would have open excavation for 2 weeks).

Conclusion: EPA confirmed that the excavation would be performed to pre-established cut lines.

Item 23: TAT on sample analysis if necessary? Put it on the Contractor so if delays, not a change order

Conclusion: Not necessary if excavating to pre-established cut lines.

Item 24: Optimize work sequencing or determine optimal final placement in the design, to avoid potential double handling/staging of soils

Conclusion: The work sequencing will be further evaluated during the Pre-Final/Final Remedial design to determine optimal placement.

CMZ - 2A / 2B Ideas

Ideas for CMZ-2A/ -2B will be discussed in the Steam Enhanced Extraction Remedial Design (Part 2).

CMZ 3/ 5 including BW16 area/ L Street Area Ideas

Ideas for CMZ-3 and -5 will be discussed in the In Situ Chemical Oxidation Remedial Design (Part 3). Ideas for the B16 area/ L Street Area will be discussed once all the data collected in November and December 2018 have been evaluated.

Table 1
Brain Storming Ideas Summary and Scoring
ACW Pensacola Value Engineering Screening - November 2018

Value Engineering Idea #		VES member Scoring of Idea JD	Elizabeth	EMS	Overall Score (9 best)	Retained To Review (min 7)	Reviewed & Design Change
		Relative Score (1-3, 3 being best)					
CMZ-1							
1	Shorten Northern Boundary of BW since appears to extend farther to north than needed (Other data driving this?)	3	3	3	**9**	Y	
2	If worried about height, how about offsite T&D? Cost versus public perception of height.	2	1	1	**4**		
3	Excavated areas: Where is backfill coming from? Most is from offsite. Can any onsite soils be used? How about harvesting soils from onsite? Make sure enough area to stage contaminated surface layer	2	3	2	**7**	Y	
4	Have we considered ex situ smoldering technology for creosote impacted soils? Soil could be re-used after treatment in capping system? Any issues with emissions/onsite treatment? Cost to treat via Star in range of $ - $ /cy.	3	3	2	**8**	Y	
5	Consider higher cap elevation along the north where industrial/commercial area. Improved visual effect of mound height.	3	2	3	**8**	Y	5, 6, and 7 - look at together
6	Consider placing more material in western end to redcue overall cap height or footprint	2	2	2	**6**		
7	Why is area on east end not being utilized for Cap (to reduce height)	3	2	3	**8**	Y	
8	Maybe place all NAPL impacted soils in BW/Cap area, Dioxin soils in the engineered cell	3	3	3	**9**	Y	
9	Do we really need a base liner? Potential for migration? May not need in areas where only dioxin deposited, since it doesn't leach	3	3	3	**9**	Y	
10	If we have a base liner, yes we need a leachate collection system. Bottom liner should have a geonet instead of leachate collection system, or use impacted sandy soils as protection and leachate collection.	3	3	3	**9**	Y	Y
10.5	Consider placing btm liner directly on existing surface soils, without excavating the surface soils first	3	3	3	**9**	Y	
11	Determine if there a GW separation regulation between btm liner and GW.	3	3	3	**9**	Y	
12	60 Mil HDPE liner recommended for btm liner	3	3	3	**9**	Y	
13	Go with subtitle D design requirements for liner and cap, not subtitle C, if permissible	3	3	3	**9**	Y	Y
14	Consolidating and capping waste in place as opposed to engineered cell	3	3	3	**9**	Y	Part of btm liner issue
15	Geonet may only be needed on cap side slopes, not necessarily across the top slope.	2	2	2	**6**		
16	Could focus placement of organic soils in limited area, include gas vent layer only there	3	2	3	**8**	Y	
17	Shrubs and bushes shouldn't go in cells. Take to a City vegetative waste disposal facility or other landf	3	3	3	**9**	Y	
18	Consider closure turf instead of earthen and vegetative cover.	3	3	3	**9**	Y	
19	Area north of proposed detention pond looks like a good parking area	2	1	2	**5**		
Impacts West of L Street							
20	Consider in situ treatment (e.g. steam, star, S/S) for area west of L street	3	3	3	**9**	Y	
20.5	Consider extending BW and Cap around this area	3	3	3	**9**	Y	

Table 1
Brain Storming Ideas Summary and Scoring
ACW Pensacola Value Engineering Screening - November 2018

Value Engineering Idea #		VES member Scoring of Idea JD	Elizabeth	EMS Relative Score (1-3, 3 being best)	Overall Score (9 best)	Retained To Review (min 7)	Reviewed & Design Change
CMZ-4B Offsite Residential Excavation Work							
21	Fences. Remove and replace, or new fences? Make sure clear in specs	3	3	3	**9**	Y	
22	Post excavation confirmation sampling/analysis, or to pre-established cut lines (preferred)? Get Regulatory buy-in (yards will have open excavation for 2 weeks)	3	3	3	**9**	Y	
23	TAT on sample analysis if necessary? Put it on the Contractor so if delays, not a change order	3	3	3	**9**	Y	
24	Optimize work sequencing or determine optimal final placement in the design, to avoid potential double handling/staging of soils	3	3	3	**9**	Y	
CMZ-2A /-2B							
25	Define NAPL extent/ TarGOST investigation / has NAPL Migrated from 2011 investigation?	3	3	3	**9**	Y	
26	Residents will need to be located? What is length of time of implementation?	3	3	3	**9**	Y	
27	What is clean? How is that measured?	3	3	3	**9**	Y	
28	Perform Cost Benefint Analysis on NAPL in Apartment building	2	3	3	**8**	Y	TBD
29	Where would vapor cover be required? Only in Shallow treatment area	2	2	2	**6**		
30	How is the extracted water treated? Extracted water to POTW or UI	2	2	2	**6**		
CMZ-3/ -5 including BW16 Area/ L Street Area							
31	Remove ISCO barrier and implement Biobarrier?	3	3	3	**9**	Y	
32	Include treatment of L Street?	3	3	3	**9**	Y	
33	Limit Treatment only higher concentrations (SVOC) found in the shallow gw (upper 25 ft)/ Or MNA only?	3	3	3	**9**	Y	
34	Active Monitoring of MNA parameters during Source area treatments?	2	3	2	**7**	Y	
35	Better delineation and characterization of proposed treatment areas, immediately prior to implementation, including area downgradient of BW16 following SEE implementation	3	3	3	**9**	Y	
36	Pilot test after SEE implementation?	3	3	3	**9**	Y	TBD
37	Use existing ISCO Pilot wells to determine dispersion?	2	1	2	**5**		
38	Rather than dye test, would be better to use the actual chemical?	2	2	2	**6**		
39	Treatment wall - consider use of DPT to delivery amendments as opposed to permanent wells.	3	3	3	**9**	Y	
40	Defer RD until the source remedies are complete.	2	3	2	**7**	Y	TBD

Notes
cy - cubic yard
TBD - to be determined after 50% remedial design reports are complete.

BLACK & VEATCH
Building a world of difference.

TECHNICAL MEMORANDUM

US Environmental Protection Agency (EPA) Region 4 — B&V Project 049089
American Creosote Works Superfund Site — B&V DCN 49089-0128-01-B-02640R0

Date: May 15, 2019

To: Peter Thorpe, Remedial Project Manager, EPA

From: Darci Scherbak, Project Engineer, Black & Veatch Special Projects Corp. (Black & Veatch)
Jacob Berger, Project Engineer, Black & Veatch

Subject: ACW Remedial Design Update Memo, Rev 0

PURPOSE

A Value Engineering Screening (VES) was conducted for the American Creosote Works Site in September 2018. The purpose of the VES was to identify any potential high cost design elements or subsystems that may become candidates for a formal value engineering study, and to provide the remedial design team with ideas to improve the overall design for consideration as it moves from the 50% to 90% design stage. The results of the VES has been summarized in a separate Technical Memorandum.

This Memorandum will focus on changes to the ACW Remedial Design resulting from the VES. All ideas are intended to reduce costs, improve performance, or both.

Contaminated Media Zones-2A/-3/-4A

VE Screening Item 10: If there is an ECC base liner, a leachate collection system is needed. The bottom liner should either have a geonet instead of leachate collection system, or use impacted sandy soils as protection and leachate collection.

VE Screening Item 13: Use Subtitle D (non-hazardous industrial solid waste) design requirements for Engineered Containment Cell (ECC) liner and cap instead of Subtitle C, if permissible.

CLOSURE PERFORMANCE CRITERIA – SUBTITLE C

CFR 40 §264.310

a) Final cover system must:

1) Provide long-term minimization of migration of liquids through the closed landfill;
2) Function with minimum maintenance;
3) Promote drainage and minimize erosion or abrasion of the cover;
4) Accommodate settling and subsidence so that the cover's integrity is maintained; and
5) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present. EPA (DRAFT) Technical Guidance For RCRA/CERCLA Final Covers

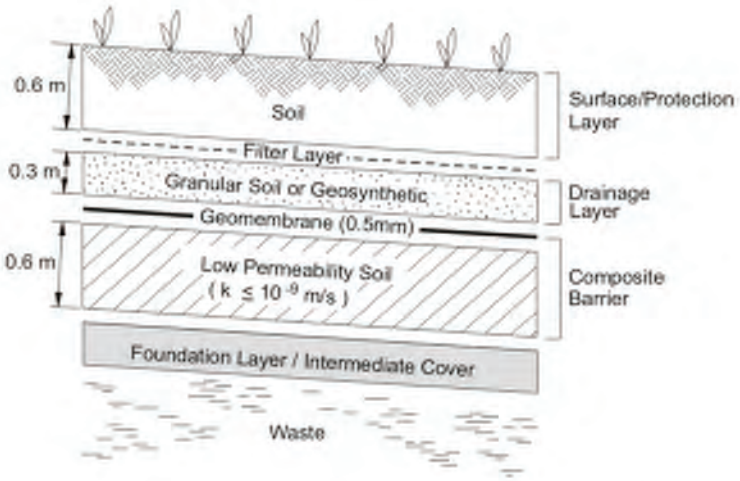


Figure 1-7. EPA (1989) Recommended Minimum Cover System for HW Landfills.

EPA accpets GCL as alternative to Low Permeability Soil (compacted clay layer)

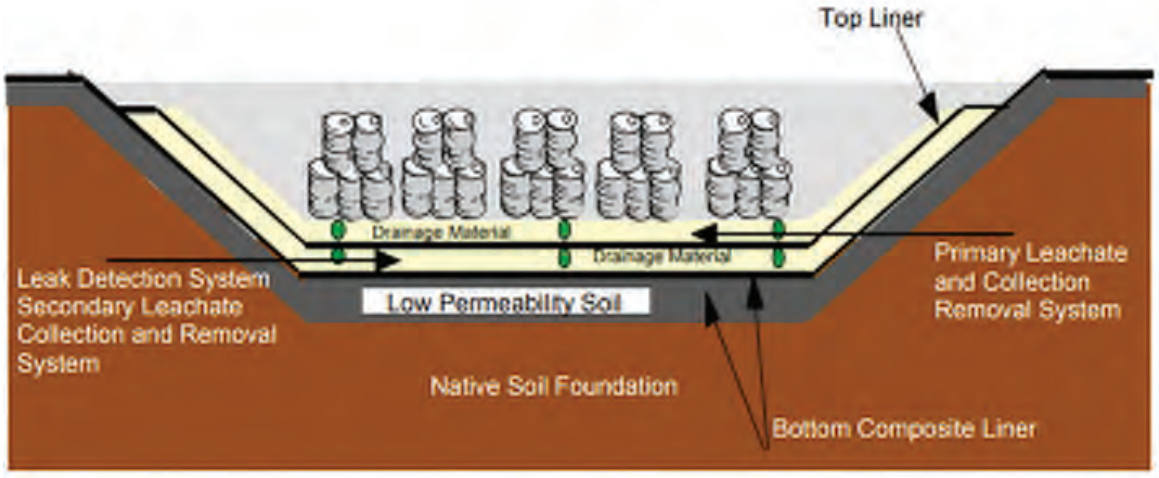
Geosynthetic Clay Liners Used in Municipal Solid Waste Landfills

LANDFILL DESIGN MINIMUM TECHNOLOGICAL REQUIREMENTS (MTRS)

RCRA Training Module – Land Disposal Units

Landfills are subject to virtually the same MTRs as surface impoundments and waste piles. They must have a double-liner, leachate collection and removal systems (LCRS), and leak detection (§264/265.301), and an action leakage rate (ALR) (§264/265.302). Like waste piles, landfills require a second LCRS that is above the top liner. Figure 3 illustrates the MTRs of landfills. In addition, landfills must have stormwater run-on and runoff controls to prevent migration of hazardous constituents for at least a 25-year storm and a cover to prevent wind dispersal.

Figure 3
CROSS-SECTION OF A LANDFILL AND ITS MINIMUM TECHNOLOGICAL REQUIREMENTS



Design Elements

- Double liner
- Double leachate collection and removal systems
- Leak detection system
- Run on, runoff, and wind dispersal controls
- Construction quality assurance program

Closure Elements

- Installing and maintaining a final cover
- Continuing operation of the leachate collection and removal system until leachate is no longer detected
- Maintaining and monitoring the leak detection system
- Maintaining ground water monitoring
- Preventing storm water run on and runoff
- Installing and protecting surveyed benchmarks

CLOSURE CRITERIA – SUBTITLE D

CFR 40 §258.60

a) Final cover system must:

1) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils or a permeability no greater than 1 × 10−5 cm/sec, whichever is less

2) Minimize infiltration using an infiltration layer that contains a minimum 18-inches of earthen material

3) Minimize erosion using an erosion layer that contains a minimum 6-inches of earthen material that can sustain native plant growth

b) State (FDEP) can approve alternative materials for infiltration (for example, GCL) and erosion protection (for example, riprap, synthetic turf, etc.)

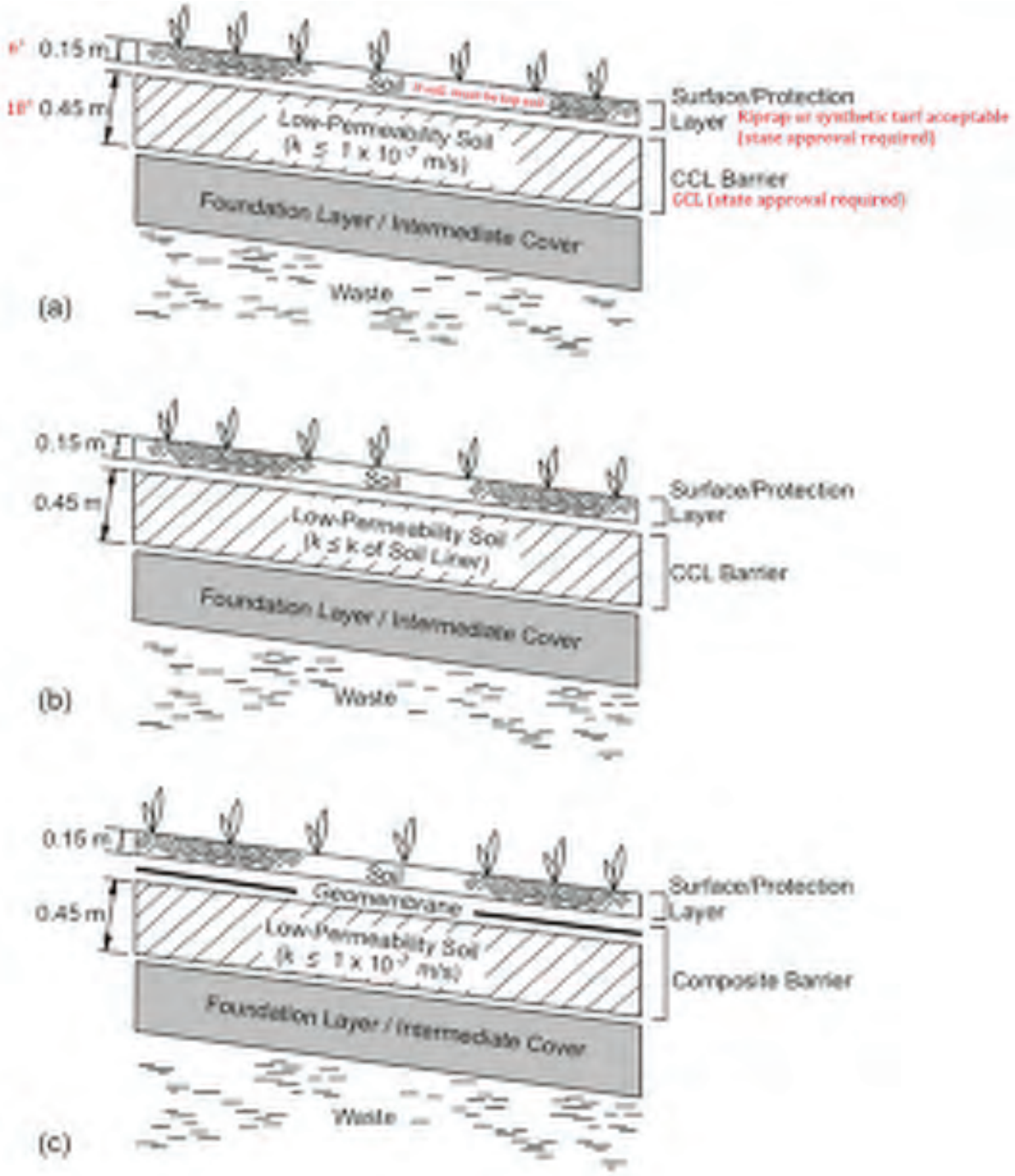


Figure 1-6. EPA Prescriptive Minimum Criteria Cover Systems for: (a) Unlined MSW Landfills; (b) MSW Landfills Underlain by a CCL; and (c) MSW Landfills Underlain by a GM/CCL Composite Liner.

ENGINEERED CONTAINMENT CELL CONCLUSIONS

The current ACW Engineered Containment Cell (ECC) design is not a RCRA C or D landfill, but rather is considered a miscellaneous unit subject to environmental performance standards, not prescribed technology-based standards. The standards require that these miscellaneous units must be located, designed, constructed, operated, maintained, and closed in a manner that ensures the protection of human health and the environment. So, our risk analysis informs the robustness of the containment systems' protective elements.

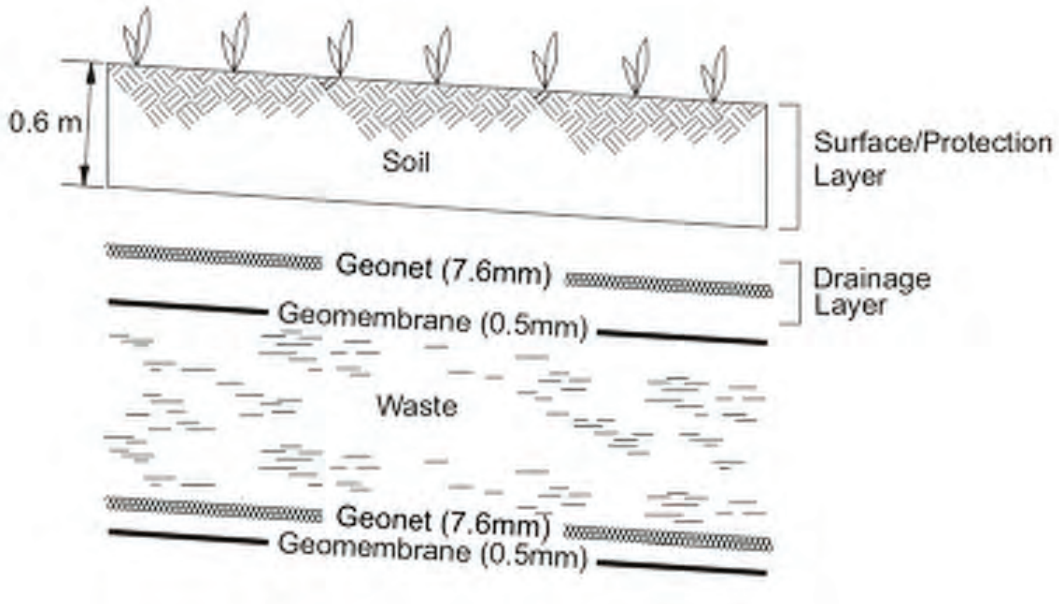
Page 27 of the August 2017 ROD commits the design to including a cap with a GCL, LDPE, or HDPE geomembrane, or a combination of these with a 2-ft protection layer.

Based on 40 CFR Part 264 Subpart X and the presence of a shallow water table, the use of a low permeability bottom liner in the ECC system is required in the portions containing NAPL (leachable) impacted soil.

Option 1

An ECC with a bottom liner system consisting of a geomembrane liner overlain with geonet for leachate collection and a top cap system consisting of a geomembrane liner overlain with geonet drainage layer and 2 ft of protective cover would provide adequate protection. This configuration (illustrated in the figure below) would produce approximately 22.5 gallons of leachate per acre per year. Resulting leachate head on bottom liner after 30 years of cumulative leakage through the cap would be about 0.0249".

Option 1 Cost Estimate: $110,513/acre

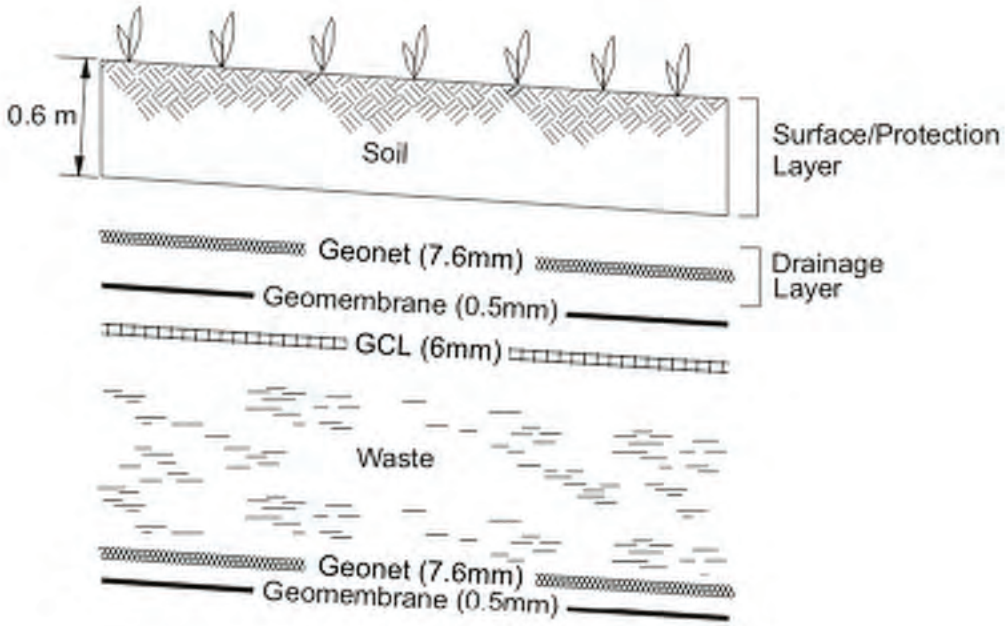


Option 2

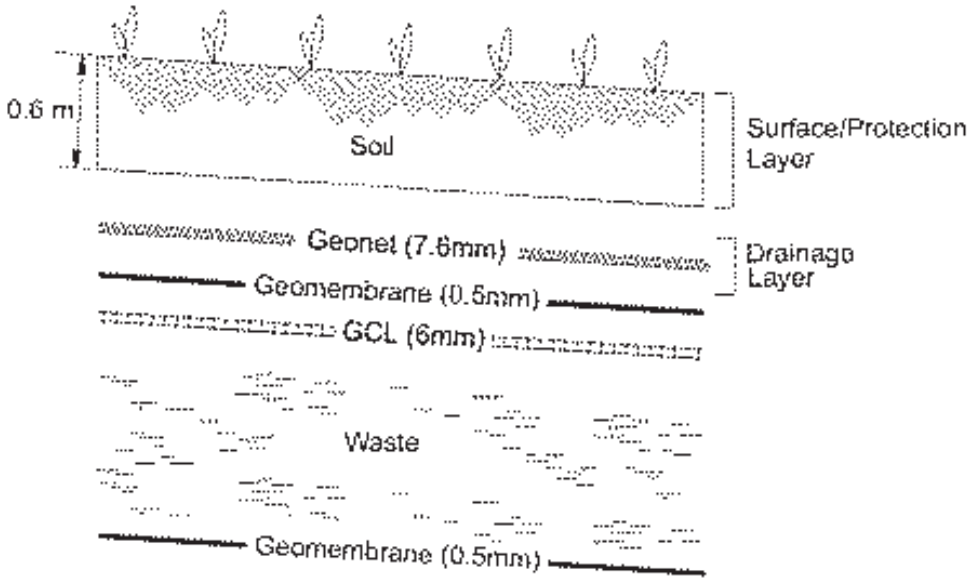
Alternatively, including a GCL in the cap system just below the top geomembrane would reduce leachate generation. This configuration (illustrated in the figure below) would produce approximately 0.13 gallons of leachate per acre per year. Resulting leachate head on bottom liner after 30 years of cumulative leakage through the cap would be about 0.00014". The minimal

leachate generation and low head on the bottom liner make a good case for elimination of the leachate collection geonet.

Option 2 Cost Estimate: $114,095 / acre. 3.24% capital cost increase to eliminate leachate management.



The superior performance of the GCL/geomembrane composite cap limit infiltration to the extent that a bottom geonet is unnecessary. Additionally, Option 2 provides a more protective with nominal change in cost. Below is an updated cross section for the ECC design, that will be incorporated into the (90%) Pre-Final Design.



Appendix H. RA Construction Schedule

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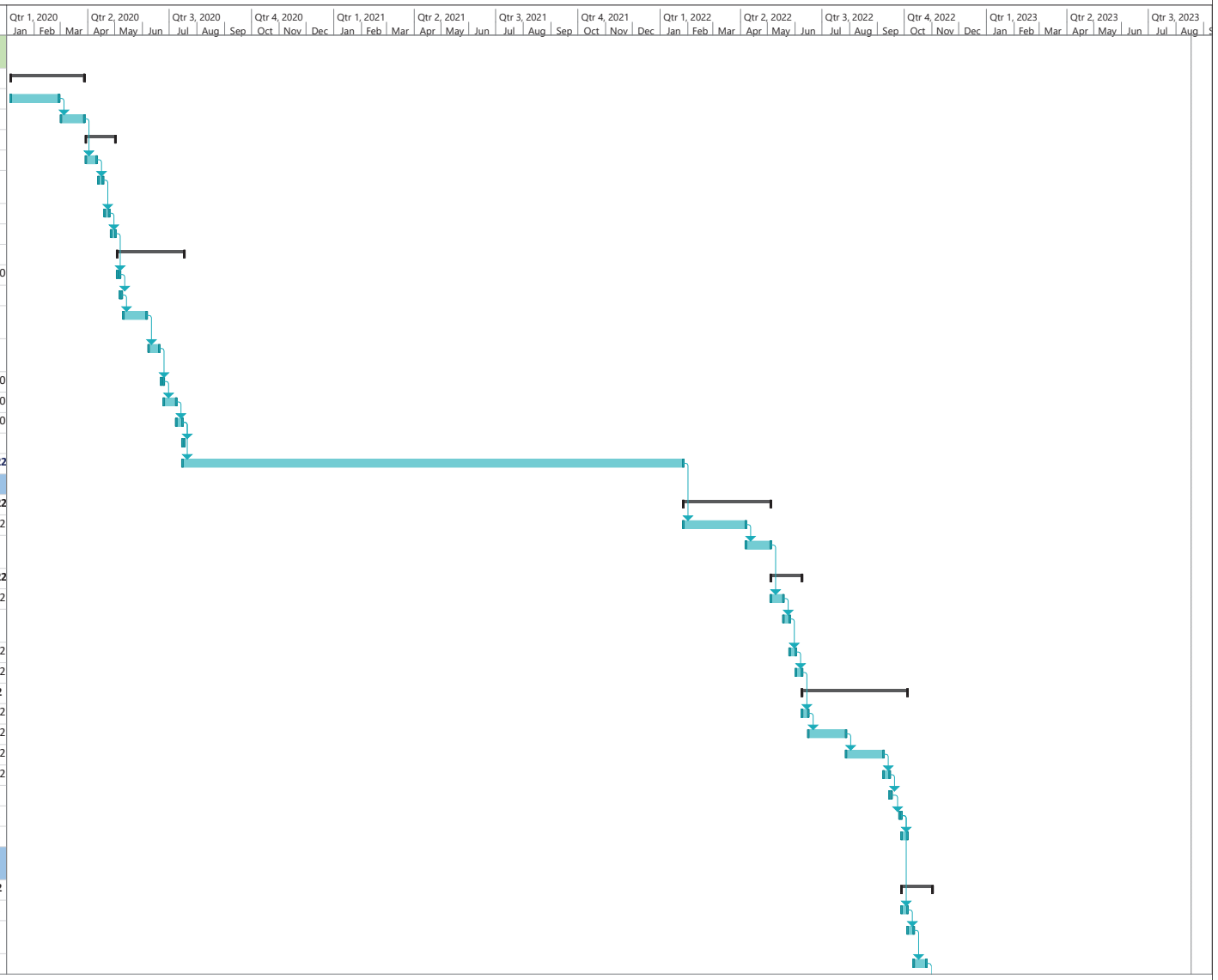
Appendix Table H
PreFinal Construction Schedule, Part 1
American Creosote Works Site
Pensacola, Escambia County, Florida

ID	Task Name	Duration	Start	Finish
1	PHASE 1 - OFF-FACILITY SOILS EXCAVATION (CMZ-4B) & ONSITE CONSOLIDATION			
2	**1.0 Procurement**	**60 days**	**Mon 01/06/20**	**Fri 03/27/20**
3	1.1 Procurement of [Phase 1] Subcontractor	2 mons	Mon 01/06/20	Fri 02/28/20
4	1.2 Submittals Review and Approval, Pre-Construction Meeting	1 mon	Mon 03/02/20	Fri 03/27/20
5	**2.0 Mobilization and Offsite Prep**	**25 days**	**Mon 03/30/20**	**Fri 05/01/20**
6	2.1 Mob and Off-Facility Equipment Set up	10 days	Mon 03/30/20	Fri 04/10/20
7	2.2 Temp Facilities, Erosion Controls, SW Ditches/Berms, and Temp Roads	5 days	Mon 04/13/20	Fri 04/17/20
8	2.3 Clearing and demolition	5 days	Mon 04/20/20	Fri 04/24/20
9	2.4 Baseline Surveys and Controls	5 days	Mon 04/27/20	Fri 05/01/20
10	**3.0 Off-Facility CMZ-4B Excavation and Onsite Consolidation**	**55 days**	**Mon 05/04/20**	**Fri 07/17/20**
11	3.1 Baseline Surveys and Controls	3 days	Mon 05/04/20	Wed 05/06/20
12	3.2 Utility Clearing and Protection	2 days	Thu 05/07/20	Fri 05/08/20
13	3.3 Off-Facility Soil Excavation, Segregation, Relocation to Main Site Areas	4 wks	Mon 05/11/20	Fri 06/05/20
14	3.3b Install Temporary offsite soil Stockpile Liner, anchor trench	2 wks	Mon 06/08/20	Fri 06/19/20
15	3.4 As-Excavated Survey	3 days	Mon 06/22/20	Wed 06/24/20
16	3.5 Excavation Backfill and Compaction	10 days	Thu 06/25/20	Wed 07/08/20
17	3.6 Site Restoration	5 days	Thu 07/09/20	Wed 07/15/20
18	3.7 Seeding and Mulching	2 days	Thu 07/16/20	Fri 07/17/20
19	**Part 2 RA - SEE Thermal Remediation [break in Part 1 RA]**	**20 mons**	**Thu 07/16/20**	**Wed 01/26/22**
20	PHASE 2A - BARRIER WALL CONSTRUCTION			
21	**4.0 Procurement**	**70 days**	**Thu 01/27/22**	**Wed 05/04/22**
22	4.1 Procurement of [Phase 2] Subcontractor	2.5 mons	Thu 01/27/22	Wed 04/06/22
23	4.2 Submittals Review and Approval, Pre-Construction Meeting	1 mon	Thu 04/07/22	Wed 05/04/22
24	**5.0 Mobilization and Site Preparation**	**25 days**	**Thu 05/05/22**	**Wed 06/08/22**
25	5.1 Mob and Equipment Setup	10 days	Thu 05/05/22	Wed 05/18/22
26	5.2 Temp Facilities, Erosion Controls, SW Ditches/Berms, Temp Roads	5 days	Thu 05/19/22	Wed 05/25/22
27	5.3 Clearing and Demolition	5 days	Thu 05/26/22	Wed 06/01/22
28	5.4 Baseline Surveys and Controls	5 days	Thu 06/02/22	Wed 06/08/22
29	**6.0 Barrier Wall Construction**	**84 days**	**Thu 06/09/22**	**Tue 10/04/22**
30	6.1 Working Platform Construction	5 days	Thu 06/09/22	Wed 06/15/22
31	6.2 Wall Construction	6 wks	Thu 06/16/22	Wed 07/27/22
32	6.3 QC Testing	30 days	Thu 07/28/22	Wed 09/07/22
33	6.4 Spoils Stabilization	5 days	Thu 09/08/22	Wed 09/14/22
34	6.5 Pre-Final Inspections, Punch List Items	2 days	Thu 09/15/22	Fri 09/16/22
35	6.6 Final Inspections, Punch List Items	2 days	Mon 09/26/22	Tue 09/27/22
36	6.7 Demobilization	5 days	Wed 09/28/22	Tue 10/04/22
37	PHASE 2B - ONSITE SOIL EXCAVATION, ECC CONSTRUCTION			
38	**7.0 Mobilization and Site Preparation**	**25 days**	**Wed 09/28/22**	**Tue 11/01/22**
39	7.1 Mobilization	5 days	Wed 09/28/22	Tue 10/04/22
40	7.2 Temporary Facilities, Erosion Controls, SW Ditches/Berms, and Temporary Roads	5 days	Wed 10/05/22	Tue 10/11/22
41	7.3 Fencing, Clearing	10 days	Wed 10/12/22	Tue 10/25/22

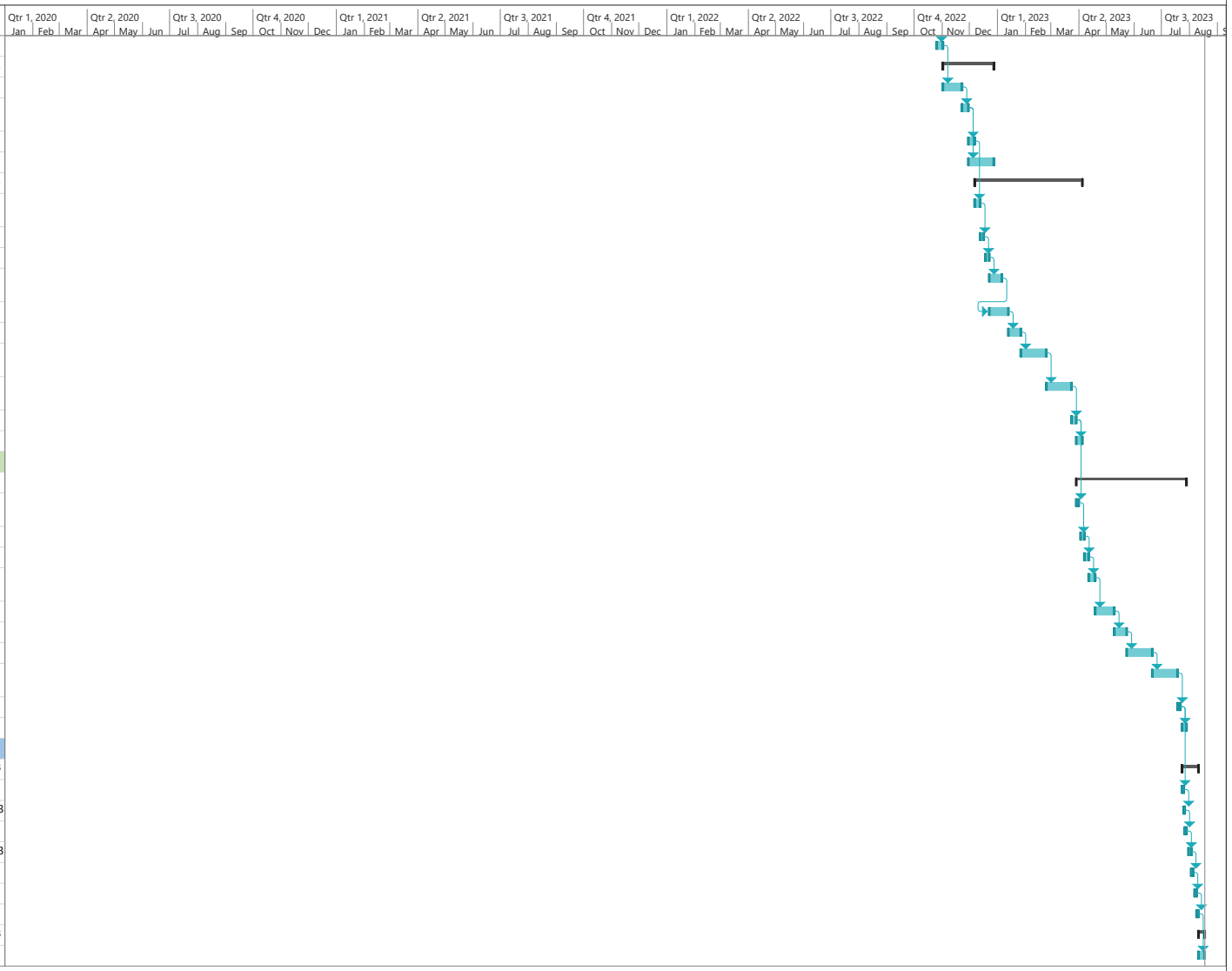


Project: ACW PreFinal Const Sche
Date: Thu 08/15/19

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

Appendix Table H
PreFinal Construction Schedule, Part 1
American Creosote Works Site
Pensacola, Escambia County, Florida

ID	Task Name	Duration	Start	Finish
42	7.4 Baseline Surveys and Controls	5 days	Wed 10/26/22	Tue 11/01/22
43	**8.0 Soil Loading & Transport**	**40 days**	**Wed 11/02/22**	**Tue 12/27/22**
44	8.1 Soil Loading and Transport to different area Onsite	3 wks	Wed 11/02/22	Tue 11/22/22
45	8.2 Non-Haz Debris (if any trees/shrubs/concrete/rebar/ etc.) loading and offsite Disposal	5 days	Wed 11/23/22	Tue 11/29/22
46	8.3 Post Removal Surveys	5 days	Wed 11/30/22	Tue 12/06/22
47	8.4 Manifest Tracking and Confirmation (if used)	1 mon	Wed 11/30/22	Tue 12/27/22
48	**9.0 Engineered Containment Cell (ECC) Construction**	**85 days**	**Wed 12/07/22**	**Tue 04/04/23**
49	9.1 Clearing / Timber / Debris Removal - minimal (completed during soil excavation)	4 days	Wed 12/07/22	Mon 12/12/22
50	9.2 Baseline Surveys and Control	4 days	Tue 12/13/22	Fri 12/16/22
51	9.3 Install Erosion & Sediment Controls	4 days	Mon 12/19/22	Thu 12/22/22
52	9.4 Spreading and Compacting Stockpiled Soils and Rough Grading	2 wks	Fri 12/23/22	Thu 01/05/23
53	9.5 Progress Surveys and QC Testing	3 wks	Fri 12/23/22	Thu 01/12/23
54	9.6 Install Augmented Clay Cap	2 wks	Fri 01/13/23	Thu 01/26/23
55	9.7 Install Liner and Drainage System and Anchor Trench	1 mon	Fri 01/27/23	Thu 02/23/23
56	9.8 Placement of 18 in. Soil Cover, 6 in. Top Soil Layer, Final Grading	1 mon	Fri 02/24/23	Thu 03/23/23
57	9.9 Seeding and Mulching	3 days	Fri 03/24/23	Tue 03/28/23
58	9.11 As-Built Surveys	1 wk	Wed 03/29/23	Tue 04/04/23
59	PHASE 2C - BARRIER WALL CAP CONSTRUCTION			
60	**10.0 Barrier Wall-Cap Construction**	**88 days**	**Wed 03/29/23**	**Fri 07/28/23**
61	10.1 Clearing/ Debris Removal - minimal (already completed during soil excavation)	3 days	Wed 03/29/23	Fri 03/31/23
62	10.2 Baseline Surveys and Control	4 days	Mon 04/03/23	Thu 04/06/23
63	10.3 Install additional Erosion & Sediment Controls (if needed)	3 days	Fri 04/07/23	Tue 04/11/23
64	10.4 Spreading and Compacting Stockpiled Soils inside Barrier-Wall-Area and Rough Grading	5 days	Wed 04/12/23	Tue 04/18/23
65	10.5 Progress Surveys and QC Testing	3 wks	Wed 04/19/23	Tue 05/09/23
66	10.6 Install Augmented Clay Cap on top of Barrier Wall	10 days	Wed 05/10/23	Tue 05/23/23
67	10.7 Install Liner, Drainage System, and Anchor Trench	1 mon	Wed 05/24/23	Tue 06/20/23
68	10.8 Placement of 18 in. Soil Cover, 6 in. Top Soil Layer, Final Grading	1 mon	Wed 06/21/23	Tue 07/18/23
69	10.10 Seeding and Mulching	3 days	Wed 07/19/23	Fri 07/21/23
70	10.11 As-Built Survey	5 days	Mon 07/24/23	Fri 07/28/23
71	PHASE 2D - DETENTION POND CONSTRUCTION			
72	**11.0 Detention Pond Construction**	**14 days**	**Mon 07/24/23**	**Thu 08/10/23**
73	11.1 Clearing / Timber / Debris Removal	2 days	Mon 07/24/23	Tue 07/25/23
74	11.2 Baseline Surveys and Control	1 day	Wed 07/26/23	Wed 07/26/23
75	11.3 Install Erosion & Sediment Controls	2 days	Thu 07/27/23	Fri 07/28/23
76	11.4 Pond Excavation and Grading	3 days	Mon 07/31/23	Wed 08/02/23
77	11.5 Outlet Structure Installation	2 days	Thu 08/03/23	Fri 08/04/23
78	11.6 As-Excavated Surveys	2 days	Mon 08/07/23	Tue 08/08/23
79	11.7 Seeding and Mulching	2 days	Wed 08/09/23	Thu 08/10/23
80	**12.0 Demobilization**	**5 days**	**Fri 08/11/23**	**Thu 08/17/23**
81	12.1 Demobilization	5 days	Fri 08/11/23	Thu 08/17/23



Project: ACW PreFinal Const Sche
Date: Thu 08/15/19

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

Appendix I. RA Construction Cost Estimate

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Table I-1
Part 1 - Barrier Wall and Excavation Cost Estimate
American Creosote Works Site
Pensacola, Escambia County, Florida

No.	Description	Estimated Quantity	Units	EXTENDED PRICE
PHASE 1 - EXCAVATION OF CMZ-4B OFFSITE SOILS AND ON SITE STOCKPILING				
1.0 Procurement				
1.1	General Conditions (Bonds, Insurance, Licenses, etc.)	1	lump	$ 74,400.00
1.2	Submittals Preparation, Pre-Construction Meetings	1	lump	$ 14,400.00
2.0 Mobilization and Site Preparation				
2.1	Mobilization	1	lump	$ 120,000.00
2.2	Temporary Facilities (2 - 12 ft x 56 ft office trailers)	3	month	$ 25,200.00
2.3	Baseline Surveys and Controls	1	lump	$ 11,700.00
2.4	Health and Safety (Plan, Execute, Monitor & Control). Onsite H&S Person.	1	lump	$ 12,000.00
2.5	Work Plan/Submittals (Draft, Rev 1, Final)	1	lump	$ 12,000.00
2.6	Project Meetings (4 1-day meetings with contractor and client)	4	day	$ 48,000.00
2.7	Stabilized Site Construction Entrance	2	each	$ 28,800.00
2.8	Utility Clearing and Protecting	1	lump	$ 152,222.40
2.9	Clearing and Grubbing (Yard and Site Preparation)	19.1	residential/ commercial yard sf (acre)	$ 59,658.18
2.10	On-Site Demolition (Above-Ground Features Within Barrier Wall Footprint)	1	lump	$ 12,000.00
2.11	Erosion Control (Silt Fence) for Offsite - Includes maintenance/replacement as needed	16,800	LF	$ 22,377.60
2.12	Residential Fence Removal (see 4.4 for replacement)	4,800	LF	$ 13,305.60
3.0 Soil Loading, Transport, and Stockpiling Onsite				
3.1	Excavate and Load Soils (Includes Hand Excavation and Vacuum-Assisted Excavation)	34,900	BCY	$ 247,929.60
3.2	Transport Soils to Site, Stockpile, Shape, and Compact	34,900	BCY	$ 260,074.80
3.3	Installation 40-mil HDPE Temporary Liner Over Stockpile (Includes 2 ft Deep Temporary	3.44	acre	$ 185,210.15
3.4	Post Removal Surveys	1	lump	$ 6,000.00
3.5	Perimeter Air Monitoring and Reporting (3 locations of monitoring)	3.0	month	$ 7,581.60
4.0 Phase 1 Restoration and Demobilization				
4.1	Import, Place, Compact, and Grade Clean Backfill (Residential Yards)	19,430	BCY	$ 598,754.88
4.2	Import, Place, Compact, and Grade Topsoil (Residential Yards - 6 in)	15,470	BCY	$ 476,723.52
4.3	Replacement of Trees and Shrubs	960	each	$ 424,419.84
4.4	Residential Fencing Reconstruction/Replacement	4,800	residential/ commercial yard LF	$ 170,496.00
4.5	Sodding	19.1	acre	$ 364,965.28
4.6	Watering of Sod (8 weeks)	1	lump	$ 13,320.00
4.7	Seeding and Establishment of vegetation (on Site)	6.00	acre	$ 6,911.64
4.8	Watering and Reseeding Vegetation On-Site Vegetation While Getting Established (8 Weeks)	1	lump	$ 14,471.94
4.9	Post Restoration Surveys	1	lump	$ 6,000.00
4.10	Removal of Debris	60	BCY	$ 12,000.00
4.11	Demobilization	1	lump	$ 60,000.00
4.12	Phase 1 Remedial Action Report (Draft, Rev 1, Final)	1	lump	$ 12,000.00
PHASE 2A - BARRIER WALL CONSTRUCTION				
5.0 Procurement				
5.1	General Conditions (Bonds, Insurance, Licenses, etc.)	1	lump	$ 402,000.00
5.2	Submittals Preparation, Pre-Construction Meetings	1	lump	$ 18,000.00
6.0 Mobilization and Site Preparation				
6.1	Mobilization	1	lump	$ 570,000.00
6.2	Temporary Facilities (2 @ 12 ft x 56 ft office trailers)	4	month	$ 33,600.00
6.3	Baseline Surveys and Controls (12.4 acres)	1	lump	$ 8,894.67
6.4	Health and Safety (Plan, Execute, Monitor & Control)	1	lump	$ 12,000.00
6.5	Work Plan/Submittals (Draft, Rev 1, Final)	1	lump	$ 12,000.00
6.6	Project Meetings	1	lump	$ 12,000.00
6.7	Utility Clearing and Protecting	1	lump	$ 28,919.04
6.8	Clearing and Grubbing	12.4	acres	$ 38,754.07
6.9	Removal and Disposal of 40-mil HDPE Liner	3,100	SF	$ 3,831.60
6.10	Electrical Conduit/ Wire Demolition and Removal	3,600	LF	$ 19,872.00
6.11	Removal and Disposal of Existing Site Trailer and Utillty Service Lines	1	lump	$ 12,000.00
6.12	Removal and Disposal of Three (3) Steel Product Storage Tanks, Associated steel Structures (RECYCLE), and Utility Service Lines	1	lump	$ 24,000.00
6.13	Monitoring Well Abandonment (MW-1, MW-2, MW-3, MW-4, MW-5 (5 wells): Stainless Steel (RECYCLE), Avg 116.1 ft bls, 2" ID)	1	lump	$ 64,830.00
6.14	Extraction Well Abandonment (11 Stainless Steel Wells (RECYCLE), Avg 43.8 ft bls, 4" ID)	1	lump	$ 5,148.00
6.15	Erosion Control Logs (9" terra tubes)	3,275	LF	$ 15,877.20
7.0 Barrier Wall Construction				
7.1	Rough Grading (1.77 acres) to Establish Working Platform - Top of BW Grade	1	lump	$ 4,931.08
7.2	Placement of Cut soil from platform to cap area	3,000	BCY	$ 19,260.00
7.3	Wall Construction (1,770 LF; 115 ft average depth)	203,550	VSF	$ 4,201,440.00
7.4	Placement of excess spoils from wall installation	4,327	BCY	$ 21,858.32
7.5	QC Testing every 150 LF (20, 3-pt composite samples to be tested for unconfined compressive strength & hydraulic conductivity)	1	lump	$ 7,920.00
7.6	Perimeter Air Monitoring and Reporting	4.0	month	$ 1,440.00
7.7	As-Built Survey	1	lump	$ 2,460.00
7.8	Pre-Final Inspections	1	lump	$ 6,480.00
7.9	Final Inspections	1	lump	$ 6,480.00
7.10	Rip Rap at Toe of Slope	973	CY	$ 80,889.70

Table I-1
Part 1 - Barrier Wall and Excavation Cost Estimate
American Creosote Works Site
Pensacola, Escambia County, Florida

No.	Description	Estimated Quantity	Units	EXTENDED PRICE
PHASE 2B - SURFACE SOIL EXCAVATION, GRADING ECC SURFACE, & INSTALLATION OF ECC BOTTOM LINER				
8.0 Excavate CMZ-1 Beyond Barrier Wall, CMZ-2A, and CMZ-4A				
8.1	Removal and Disposal of Debris Pile E. of CMZ-1 (concrete, etc)	1,832	BCY	$ 9,167.33
8.2	Excavate and Load Soils	51,047	BCY	$ 224,198.42
8.3	Perimeter Air Monitoring and Reporting	2.0	month	$ 720.00
8.4	Dewatering and Stormwater Controls During Excavation	1	lump	$ 59,819.76
8.5	Transport and Temporary Stockpiling of (ECC, Stockpile) Soils	51,047	BCY	$ 73,507.68
8.6	As-Excavated Survey (12.4 Acres)	12.4	acre	$ 8,170.16
9.0 ECC Grading and Liner Placement				
9.1	Grading of Excavation Surface to Prepare for Liner Installation (5.33 acre)	1	lump	$ 6,500.89
9.2	Excavation of Anchor Trench	3,070	LF	$ 11,973.00
9.3	Perimeter Air Monitoring and Reporting	2.0	month	$ 720.00
9.4	Installation of Monitoring Wells	7	each	$ 366,324.00
9.5	Installation of Piezometers	8	each	$ 14,400.00
9.6	Installation of 60-mil HDPE/LLDPE Bottom Liner	5.33	acre	$ 306,559.44
9.7	As-Built Survey of Bottom Liner Surface (5.33 acre)	1	lump	$ 16,988.61
PHASE 2C - CONTAMINATED SOIL PLACEMENT, CAP CONSTRUCTION				
10.0 Place and Grade Contaminated Soil, Cap Construction				
10.1	Grading and Compaction of Excavated Soil	111,295	BCY	$ 562,262.34
10.2	Install 40-mil HDPE/LLDPE Top Liner - Barrier Wall and ECC	10.44	acre	$ 562,351.57
10.3	Install Geosynthetic Gas Collection Layer and Vents (8)	0.97	acre	$ 12,631.20
10.4	Install Augmented Clay Cap on top of Barrier Wall	2,500	BCY	$ 85,500.00
10.5	Install Geosynthetic Clay Liner - Barrier Wall and ECC	10.44	acre	$ 578,730.74
10.6	Install HDPE Drainage Net - Barrier Wall and ECC	10.44	acre	$ 191,090.34
10.7	Perimeter Air Monitoring and Reporting	3.0	month	$ 1,080.00
10.8	Construct Anchor Trench (3,650 LF)	1	lump	$ 22,411.00
10.9	As-Built Surveys	1	lump	$ 6,000.00
PHASE 2D - FINISH GRADING, STORM DRAINAGE, POND CONSTRUCTION				
11.0 Finish Grading				
11.1	Import, Grading, and Compaction of 18" Clean Common Fill Layer (Cap) - Barrier Wall and	10.44	acre	$ 657,593.42
11.2	Import, Grading, and Compaction of 6" Topsoil Layer (Cap) - Barrier Wall and ECC	10.44	acre	$ 219,197.81
11.3	Seeding and Mulching of Disturbed Areas	6.50	acres	$ 7,487.61
11.4	Watering to Establish Vegetation (8 weeks)	1	lump	$ 12,720.00
11.5	Rough Grading - Roads, Swales, Stormwater Detention Pond, Installation of graded outlet	13,000	SY	$ 10,296.00
11.6	Perimeter Air Monitoring and Reporting	1.0	month	$ 360.00
11.7	As-Built Surveys (2.6 acres)	1	lump	$ 16,364.43
11.8	Demobilization	1	lump	$ 282,000.00
11.9	Phase 2 Remedial Action Report (Draft, Rev 1, Final)	1	lump	$ 12,000.00
	Phase 1 Total Price			**$ 3,472,923.02**
	Phase 2A Total Price			**$ 5,634,885.67**
	Phase 2B Total Price			**$ 1,099,049.30**
	Phase 2C Total Price			**$ 2,022,057.20**
	Phase 2D Total Price			**$ 1,218,019.27**
	TOTAL PRICE (PHASES 1 and 2)			**$ 13,446,934**

Company Name:
Authorized Representative:
Date: _____

Appendix J. RA Specifications

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-- End of Project Table of Contents --

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Utility Outage Requests

Utility Connection Requests

Borrow Permits

Excavation Permits

Welding Permits

Salvage Plan; G

1.2 WORK COVERED BY CONTRACT DOCUMENTS

1.2.1 Project Description

The work includes the Phased Construction and incidental related work outlined below.

CONSTRUCTION ACTIVITIES PHASING

PHASE 1 - EXCAVATION OF OFFSITE AND ONSITE STOCKPILING

Mobilization and Site Preparation:
Mobilization; Temporary Facilities; Baseline Surveys; Construct Stabilized Site Construction Entrances; Clearing and Grubbing of Offsite Locations (Yard and Site Preparation); On-Site Demolition Activities (Above Ground Within Barrier Wall); Erosion Control (Silt Fence) for Offsite; Residential Fence Removal and Replacement.

Soil Loading, Transportation, and Stockpiling Onsite:
Excavate and Load Soils; Transport Soils from Offsite to Onsite; Stockpile Soil Onsite (Shape and Compact); Installation of Temporary Liner Cover; Post-Remedial Surveys.

Restoration and Demobilization:
Import, Place, Compact, and Grade Offsite Backfill; Import, Place, Compact, and Grade Offsite Top Soil; Replace Offsite Trees and Shrubs; Replace/Re-Construct Residential Fencing; Sodding of Offsite Residential Locations; Seeding and Establishment of Onsite Vegetation; Post Restoration Surveys; Removal of Debris; Demobilization.

PHASE 2A - BARRIER WALL (SW) CONSTRUCTION

Mobilization, Temporary Facilities, Baseline Surveys, Clearing and Grubbing, Removal and Disposal of Liner Cover; Demolition/Removal of Electrical Conduit/Wiring; Removal and Disposal of Existing Site Trailer and Utility Service Lines; Removal and Disposal of Onsite Storage Tanks, Associated Facilities, and Utility Service Lines; Monitoring and Extraction Well Abandonment; Erosion Control.

Barrier Wall (BW) Construction:
Rough Grading to Establish Working Platform (Top of BW Grade), Placement of Cut Soil from Platform to Cap Area; BW Construction, Placement of Excess Soils Inside BW; QC Testing; As-Built Survey.

PHASE 2B - SURFACE SOIL EXCAVATION, GRADING ENGINEERED CONTAINMENT CELL (ECC) SURFACE AND INSTALLATION OF BOTTOM LINER

Excavate Onsite Soils Beyond Barrier Wall:
Removal and Disposal of Debris Pile; Onsite Soil Excavation and Load, Transport and Temporary Stocking of Soils; As-Excavated Survey.

Engineered Containment Cell (ECC) Grading and Bottom Liner Placement:
Grading of Excavation Surface for Bottom Liner Installation; Excavation of Anchor Trench; Installation on Monitoring Wells and Piezometers; Installation of Bottom Liner.

PHASE 2C - CONTAMINATED SOIL PLACEMENT, CAP CONSTRUCTION

Grading and Compaction of Excavated Soil; Cap Construction (ECC and BW):
Installation of Augmented Clay (Top of BW Only); Install of Geosynthetic Clay Liner; Installation of Top Liners; Install Geosynthetic Drainage Layer and Vents.

PHASE 2D - FINISH GRADING, STORM DRAINAGE, POND CONSTRUCTION, AND DEMOBILIZATION

Finish Grading (Engineered Containment Cell and Barrier Wall Caps):
Import, Place, Compact, and Grade Backfill; Import, Place, Compact, and Grade Top Soil; Seeding and Mulching.

Rough Grading:
Roads; Swales; Stormwater Detention Pond; Graded Outlet Structures.

Demobilization:
As-Built Survey, Demobilization.

1.2.2 Location

The work is located as indicated on the drawings.

1.3 ON-SITE PERMITS

1.3.1 Utility Outage Requests and Utility Connection Requests

Schedule work to minimize outages. For utility outages and connections required during the execution of work that affect existing systems, schedule outside the regular working hours or on weekends, as approved by the Contracting Officer. Schedule utility outages and connections to minimize disruptions to the Government. No additional payment will be provided for utility outages and connections required to be performed

outside the regular work hours.

Submit requests for utility outages and connections in writing to the Contracting Officer for approval at least 15 calendar days in advance of the time required. In each request, state the system involved, area involved, approximate duration of outage, and the nature of work involved.

1.3.2 Borrow, Excavation, Welding, and Burning Permits

ACTIVITY	SUBMISSION DATE
Borrow Permits	15 calendar days prior to work
Excavation Permits	15 calendar days prior to work
Welding Permits	15 calendar days prior to work

Post permits at a conspicuous location in the construction area.

Burning of trash or rubbish is not permitted on project site. Comply with requirements for burning of trash or rubbish, as established by the Authority having Jurisdiction.

1.4 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities. Contact local utility locating service a minimum of 48 hours prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday. Verify existing utility locations indicated on contract drawings, within area of work.

Identify and mark all other utilities not managed and located by the local utility companies. Scan the construction site with Ground Penetrating Radar (GPR), electromagnetic, or sonic equipment, and mark the surface of the ground or paved surface where existing underground utilities are discovered. Verify the elevations of existing piping, utilities,and any type of underground or encased obstruction not indicated, or specified to be removed, that is indicated or discovered during scanning, in locations to be traversed by piping, ducts, and other work to be conducted or installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.4.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work.

1.5 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the Contracting Officer to be salvaged remain the property of the Government. Segregate, itemize, deliver and off-load the salvaged property in the Contracting Officer's designated storage area. Items to be demolished or removed from the site are shown on drawings and addressed by Section 02 41 00 DEMOLTION.

Provide a salvage plan, listing material and equipment to be salvaged, and

their storage location. The Salvage Plan shall be submitted as part of the Site Managment Plan defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Maintain property control records for material or equipment designated as salvage. Use a system of property control that is approved by the Contracting Officer. Store and protect salvaged materials and equipment until disposition by the Government.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel; G

1.2 CONTRACTOR ACCESS AND USE OF PREMISES

1.2.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Wear appropriate personal protective equipment in designated areas. Mark Contractor equipment for identification.

1.2.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.2.1.2 No Smoking Policy

Smoking is prohibited within the site exclusion zone. Discarding tobacco materials other than into designated tobacco receptacles is considered littering.

1.2.2 Utility Cutovers and Interruptions

a. Coordinate all utility cutover and interruptions with the Contracting Officer in writing at least seven (7) days prior to cutover or interruption.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 DESCRIPTION

This MEASUREMENT AND PAYMENT section refers to the completed and accepted CONTRACT PRICING SCHEDULE which will form the basis for Contractor's compensation and progress payments for successfully completed work. The Contractor's approved Schedule of Values, which further breaks down lump sum payment items into sub items, shall also be used to support progress payment requests.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

As-Built Surveys to Document Payment Requests

Contractor's Schedule of Values

1.3 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payaments will be made are listed in the CONTRACT PRICING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, are to be included in the listed job item most closely associated with the work involved. The job price and payment made for each item listed constitutes full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.4 PHASE 1 - EXCAVATION OF CMZ-4B OFFSITE SOILS AND ON SITE STOCKPILING

1.4.1 Procurement

1.4.1.1 (Bid Item 1.1) General Conditions (Bonds, Insurance, Licenses, etc.)

a. Payment

This work consists of furnishing 100 percent performance and payment bonds, securing and maintaining the required insurance coverage, obtaining and securing and maintaining all licenses and permits needed to perform all work.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete

1.4.1.2 (Bid Item 1.2) Submittals Preparation, Pre-Construction Meetings

a. Payment

This work consists of preparing and submitting all required work plans and submittals, including drafts, revisions 1 (incorporating EPA's and/or Appointed Representative's comments), and Final revisions (incorporating additional EPA's and/or Appointed Representative's comments); and attending all required pre-construction meetings.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete.

1.4.2 Mobilization and Site Preparation

1.4.2.1 (Bid Item 2.1) Mobilization

a. Payment

Payment will be made for costs associated with mobilization of personnel, equipment, materials, and supplies to the project work site.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.2.2 (Bid Item 2.2) Temporary Facilities

a. Payment

Payment will be made for costs associated with furnishing, set-up and use throughout the project duration of office and construction trailers (two 12 ft x 56 ft office trailers), vehicles for onsite management use, off road personnel vehicles, fuel for same vehicles, personnel hygiene facilities, phone, power, water, internet services, etc. as required by the specifications. There should be no labor or personnel travel costs in this item.

b. Unit of Measure

Unit of measure: Per month, or proportioned partial month.

1.4.2.3 (Bid Item 2.3) Baseline Surveys and Controls

a. Payment

Payment will be made for costs associated with obtaining and maintaining Baseline Surveys and controls for the area that will be disturbed/excavated for the duration of the project.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.2.4 (Bid Item 2.4) Health and Safety (Plan, Execute, Monitor, and Control)

a. Payment

Payment will be made for costs associated with preparation and submittal of Health and Safety Plans; and the Execution, Monitoring, and Controls of that program including perimeter air monitoring for Contaminants of Concern (COC's) prior to and during soil loading operations.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete.

1.4.2.5 (Bid Item 2.5) Work Plans and Submittals (Draft, Rev 1, Final)

a. Payment

Payment will be made for costs associated with preparation and submittal of all required work plans, submittals, plus the RA Report at project completion. Basis assumes each work plan or submittal will require a draft submittal, a revised draft submittal, and the final submittal.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.2.6 (Bid Item 2.6) Project Meetings

a. Payment

Payment shall be made for the costs associated with RA Contractor personnel preparing for and participating in Project meetings, and submitting the meeting summaries.

b. Unit of Measure

Unit of measure: Per Day.

1.4.2.7 (Bid Item 2.7) Stabilized Construction Entrance

a. Payment

Payment will be made for costs associated with preparation, construction, and stabilization of two construction entrances to the project site per the specifications and plans.

b. Unit of Measure

Unit of measure: Each.

1.4.2.8 (Bid Item 2.8) Utility Clearing and Protecting

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to provide locate utilities including

maintaining current utility locate tickets (811 calls), private utility location service, GPR surveys, and any required permits.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.2.9 (Bid Item 2.9) Clearing and Grubbing

a. Payment

Payment shall be made for the costs associated with the removal of trees, shrubs, bushes, and their root systems within the limits of construction, chipping and stockpiling, and offsite transporting and disposal of clearing material of approximately 19 acres.

b. Unit of Measure

Unit of measure: Per acre as measured by field survey.

1.4.2.10 (Bid Item 2.10) On-Site Demolition of Above Ground Features

a. Payment

Payment will be made for costs associated with demolition and disposal of all above ground features within the limits of the barrier wall including electrical panels, posts, etc.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.2.11 (Bid Item 2.11) Erosion Control (Silt Fence)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, and supplies needed to install approximately 16,800 linear feet of silt fencing around off-site properties.

b. Unit of Measure

Unit of measure: Per Liner Foot.

1.4.2.12 (Bid Item 2.12) Residential Fence Removal

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, and supplies needed to remove and dispose of approximately 4,800 linear feet of fencing from off-site properties. Materials shall be sent for recycling to the greatest extent possible.

b. Unit of Measure

Unit of measure: Per Liner Foot.

1.4.3 Soil Loading, Transport, and Stockpiling Onsite

1.4.3.1 (Bid Item 3.1) Excavate and Load

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, and supplies needed to excavate approximately 34,900 Bank Cubic Yards (BCY) of soils into fully licensed hazardous waste transport trucks.

b. Unit of Measure

Unit of measure: Per BCY, as surveyed prior to and after excavation/loading.

1.4.3.2 (Bid Item 3.2) Transport Soils to Site, Stockpile, Shape, and Compact

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and testing needed to successfully transport, dump, shape, and compact contaminated soils from Item 3.1 consisting of approximately 34,900 BCY to the site.

b. Unit of Measure

Unit of measure: Per BCY.

1.4.3.3 (Bid Item 3.3 Installation of 40-mil HDPE Temporary Liner Over Stockpile (Includes 2-ft Deep Anchor Trench)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install a 40-mil geosynthetic liner over the contaminated soil stockpile consisting of approximately 3.44 acres and 1630 linear feet of anchor trench.

b. Unit of Measure

Unit of measure: Per Acre.

1.4.3.4 (Bid Item 3.4) Post-Removal Surveys

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplied needed to successfully survey the residential yards after relocation (approximately 19 acres) to quantify the exact quantity for payment under Item 3.1.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.3.5 (Bid Item 3.5) Perimeter Air Monitoring and Reporting

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed for daily air quality monitoring and reporting through the estimated duration (3 months) of the project.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.4.4 Phase 1 Restoration and Demobilization

1.4.4.1 (Bid Item 4.1) Import, Place, Compact, and Grade Clean Backfill (Residential Yards)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, supplies, and testing needed to successfully transport and place approximately 19,430 bank cubic yards (BCY) of clean backfill.

b. Unit of Measure

Unit of measure: Per Bank Cubic Yard.

1.4.4.2 (Bid Item 4.2) Import, Place, Compact, and Grade Clean Topsoil (Residential Yards - 6 inches)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, supplies, and testing needed to successfully transport and place approximately 15,470 bank cubic yards (BCY) of clean topsoil.

b. Unit of Measure

Unit of measure: Per Bank Cubic Yard.

1.4.4.3 (Bid Item 4.3) Replacement of Shrubs

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully replace approximately 960 shrubs in yards after installation of clean backfill and topsoil.

b. Unit of Measure

Unit of measure: Per Shrub.

1.4.4.4 (Bid Item 4.4) Residential Fencing Reconstruction/Replacement

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install fencing on residential yards, consisting of approximately 4,800 linear feet.

b. Unit of Measure

Unit of measure: Per Linear Foot.

1.4.4.5 (Bid Item 4.5) Sodding

a. Payment

This cost shall include all sod material, delivery to site, storage, surface preparation, fertilizing, mulch, and watering required for establishing vegetation in disturbed areas of yards, consisting of approximately 19.1 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.4.4.6 (Bid Item 4.6) Watering of Sod

a. Payment

This cost shall include all labor, equipment, fuel, and supplies required for watering sod at a frequency of 5 times per week for a period of 8 weeks.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.4.7 (Bid Item 4.7) Seeding and Establishment of On-Site Vegetation

a. Payment

This cost shall include all seed material, delivery to site, storage, surface preparation, fertilizing, mulch, and watering required for establishing vegetation in disturbed areas, consisting of approximately 6.0 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.4.4.8 (Bid Item 4.8) Watering and Spot Repairs (Reseeding) While Getting Established

a. Payment

This cost shall include all seed material, delivery to site, storage, surface preparation, fertilizing, mulch, and watering required for establishing vegetation in disturbed areas in which the original seeding is failing.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.4.9 (Bid Item 4.9) Post Restoration Surveys

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully survey yards after restoration.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.4.10 (Bid Item 4.10) Removal of Debris

a. Payment

Payment will be made for costs associated with Contractor's labor and supplies needed to load and dispose of approximately 60 cubic yards of non-hazardous debris at an off-site facility.

b. Unit of Measure

Unit of measure: Per Cubic Yard.

1.4.4.11 (Bid Item 4.11) Demobilization

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to demobilize from the site.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.4.4.12 (Bid Item 4.12) RA Report (Draft, Rev. 1, Final)

a. Payment

Payment will be made for costs associated with preparing and submitting an RA Report documenting all work performed and completed by the Contractor. The report should include narrative describing work sequencing and summaries of major work elements, along with appendices containing surveys, daily reports, air monitoring data, disposal manifests, etc. Assume draft, revision 1, and final versions will be required.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5 PHASE 2 - BARRIER WALL CONSTRUCTION

1.5.1 Procurement

1.5.1.1 (Bid Item 5.1) General Conditions (Bonds, Insurance, Licenses, etc.)

a. Payment

This work consists of furnishing the RA Contract required 100% performance and payment bonds, securing and maintaining the required insurance coverage, obtaining and maintaining all required licenses, and securing all required local permits prior to work initiation.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete.

1.5.1.2 (Bid Item 5.2) Submittals Preparation, Pre-Construction Meetings

a. Payment

This work consists of preparing and submitting all required work plans and submittals, including drafts, revisions 1 (incorporating EPA's and/or Appointed Representative's comments), and Final revisions (incorporating additional EPA's and/or Appointed Representative's comments); and attending all required pre-construction meetings.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete.

1.5.2 Mobilization and Site Preparation

1.5.2.1 (Bid Item 6.1) Mobilization

a. Payment

Payment will be made for costs associated with mobilization of personnel, equipment, materials, and supplies to the project work site.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.2 (Bid Item 6.2) Temporary Facilities

a. Payment

Payment will be made for costs associated with furnishing, set up and use throughout the project duration of office and construction trailers (three 12 ft x 56 ft office trailers), vehicles for onsite management use, off road personnel vehicles, fuel for same vehicles, personnel hygiene facilities, phone, power, water, internet services, etc. There should be no labor or personnel travel costs in this item.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.5.2.3 (Bid Item 6.3) Baseline Surveys and Controls

a. Payment

Payment will be made for costs associated with obtaining and maintaining Baseline Surveys and controls for the barrier wall alignment, working platform construction, and other work items as needed within an approximately 12.4 acre area for the duration of the project.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.4 (Bid Item 6.4) Health and Safety (Plan, Execute, Monitor, and Control)

a. Payment

Payment will be made for costs associated with preparation and submittal of Health and Safety Plans; and the Execution, Monitoring, and Controls of that program.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete.

1.5.2.5 (Bid Item 6.5) Work Plans and Submittals (Draft, Rev 1, Final)

a. Payment

Payment will be made for costs associated with preparation and submittal of all required work plans, submittals, plus the RA Report at project completion. Basis assumes each work plan or submittal will require a draft submittal, a revised draft submittal, and the final submittal.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.6 (Bid Item 6.6) Project Meetings

a. Payment

Payment shall be made for the costs associated with RA Contractor personnel preparing for and participating in Project meetings, and submitting the meeting summaries.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.7 (Bid Item 6.7) Utility Clearing and Protecting

a. Payment

Payment will be made for costs associated with Contractor's labor,

equipment, and supplies needed to provide locate utilities including maintaining current utility locate tickets (811 calls), private utility location service, GPR surveys, and any required permits.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.8 (Bid Item 6.8) Clearing and Grubbing

a. Payment

Payment shall be made for the costs associated with the removal of trees, shrubs, bushes, and their root systems within the limits of construction, chipping and stockpiling, and transporting and offsite disposal of clearing material, consisting of approximately 12.4 acres.

b. Unit of Measure

Unit of Measure: Per Acre.

1.5.2.9 (Bid Item 6.9) Removal and Disposal of 40-mil HDPE Liner

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, and supplies needed to load and dispose of approximately 3,100 square feet of 40-mil HDPE liner at an off-site facility.

b. Unit of Measure

Unit of measure: Per Square Foot.

1.5.2.10 (Bid Item 6.10) Electrical Conduit/Wire Demolition and Removal

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment and supplies needed to demolish, load, and dispose of approximately 3,600 linear feet of wire and conduit at an off-site facility.

b. Unit of Measure

Unit of measure: Per Linear Foot of Wire and Conduit.

1.5.2.11 (Bid Item 6.11) Removal and Disposal of Existing Site Trailer and Utility Service Lines

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, and supplies needed to remove, load, and dispose of the approximate 12' x 30' existing site trailer, foundation, stairs, and attached utility service lines at an off-site facility.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.12 (Bid Item 6.12) Removal and Disposal of Product Storage Tanks, Associated Structures, and Utility Service Lines

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, and supplies needed to load, transport, and dispose of 3 stainless steel existing product storage tanks, stainless steel supports, and attached utility service lines at an off-site facility. Stainless steel shall be recycled.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.13 (Bid Item 6.13) Monitoring Well Abandonment

a. Payment

This cost shall include all costs associated with removing and abandoning 5 monitoring wells (stainless steel 2-inch id; avg depth of 116.1 ft. bls) within the footprint of the barrier wall. Piping will be decontaminated and sent to an off-site facility for recycling.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.14 (Bid Item 6.14) Extraction Well Abandonment

a. Payment

This cost shall include all costs associated with removing and abandoning 11 stainless steel extraction wells (4-inch id; average depth of 43.8 ft. bls) including piping and meter boxes within the footprint of the barrier wall. Piping will be decontaminated and sent to an off-site facility for recycling.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.2.15 (Bid Item 6.15) Erosion Control Logs (9" Terra Tubes)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install and maintain approximately 3,275 linear feet (LF) of 9" Terra Tubes for erosion control.

b. Unit of Measure

Unit of measure: Per Linear Foot.

1.5.3 Barrier Wall Construction

1.5.3.1 (Bid Item 7.1) Rough Grading to Establish Working Platform - Top of BW Grade

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully establish a level working platform at the top of the barrier wall grade. The approximate area of the platform is 1.77 acres.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.3.2 (Bid Item 7.2) Placement of Cut Soil from Platform to Cap Area

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully transport and place the cut soils from the platform area to an approved location inside the platform, consisting of approximately 3,000 Bank Cubic Yards (BCY) of soils.

b. Unit of Measure

Unit of measure: Per Bank Cubic Yard as determined by survey.

1.5.3.3 (Bid Item 7.3) Wall Construction (Approximately 1,770 LF, 115' Average Depth)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully construct a barrier wall meeting specifications of approximately 1,770 linear feet and an average depth of approximately 45 feet (approximately 203,550 vertical square feet).

b. Unit of Measure

Unit of measure: Per Vertical Square Foot.

1.5.3.4 (Bid Item 7.4) Placement of Excess Spoils From Wall Installation

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully spread barrier wall construction spoils at a suitable approved location inside the barrier wall alignment, consisting of approximately 4,327 Loose Cubic Yards (LCY).

b. Unit of Measure

Unit of Measure: Per Loose Cubic Yard estimated in the field.

1.5.3.5 (Bid Item 7.5) QC Testing Every 150 Linear Feet (12, 3-Point Composite Samples to be Tested for Unconfined Compressive Strength and Hydraulic Conductivity)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully perform Quality Control testing every 150 linear feet of the barrier wall.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.3.6 (Bid Item 7.6) Perimeter Air Monitoring and Reporting

a. Payment

Air monitoring systems for the remedial action implemented generally includes: setup and operation of 1 sample per week - PUF grab samples for SVOCs during construction and reporting activities to document that there are no contaminant emissions from the site during soil handling operations. Payment shall be made for the costs associated with collection, shipment, analysis, and reporting of results.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.5.3.7 (Bid Item 7.7) As Built Survey

a. Payment

This cost shall include all costs associated with preparation of an as built survey to document post-demolition site conditions and the construction of the barrier wall. RA Contractor shall submit a draft version for review. Submit final survey after all draft comments have been addressed. Assume one round of comments.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.3.8 (Bid Item 7.8) Pre-Final Inspections, Punch List Items

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to comply with the pre-final inspection process and correct any punch list items that may arise.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.3.9 (Bid Item 7.9) Final Inspections, Punch List Items

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to comply with the final inspection process and correct any punch list items that may arise.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.5.3.10 (Bid Item 7.10) Riprap at Toe of Slope

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully place approximately 973 cubic yards of riprap along the toe of slope.

b. Unit of Measure

Unit of measure: Per Cubic Yard.

1.6 PHASE 2B SURFACE SOIL EXCAVATION, GRADING ECC SURFACE, AND INSTALLATION OF BOTTOM LINER

1.6.1 Excavate CMZ-1 Beyond Barrier Wall, CMZ-2A, and CMZ-4A

1.6.1.1 (Bid Item 8.1) Removal and Disposal of Debris Pile East of CMZ-1

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed for off site removal and disposal of approximately 1,832 Cubic Yards (CY) of concrete and miscellaneous debris. Metal with salvage value must be recycled off site.

b. Unit of Measure

Unit of Measure: Per cubic yard.

1.6.1.2 (Bid Item 8.2) Excavate and Load Soils

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully excavate and load contaminated subsurface soils consisting of approximately 51,047 bank cubic yards (BCY) of contaminated soils.

b. Unit of Measure

Unit of Measure: Per bank cubic yard of contaminated soils as measured in the field or surveyed.

1.6.1.3 (Bid Item 8.3) Perimeter Air Monitoring and Reporting

a. Payment

Air monitoring systems for the remedial action implemented generally includes: setup and operation of 1 sample per week - PUF grab samples

for SVOCs and dioxin during construction and reporting activities to document that there are no contaminant emissions from the site during soil handling operations. Payment shall be made for the costs associated with collection, shipment, analysis, and reporting of results.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.6.1.4 (Bid Item 8.4) Dewatering and Stormwater Controls During Excavation

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to successfully control and manage groundwater and stormwater during site excavation including the use of pumps, diversion berms, temporary swales, etc.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.6.1.5 (Bid Item 8.5) Transport and Temporary Stockpiling of ECC and Stockpile Soils

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to successfully transport, stockpile, and manage soils excavated from the ECC area consisting of approximately 51,047 BCY. Management of stockpile can include measures such as the use of silt fence to control runoff, fugitive dust suppression, temporary soil pile covers, etc.

b. Unit of Measure

Unit of measure: Per BCY.

1.6.1.6 (Bid Item 8.6) As-Excavated Survey

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully survey the volume of excavated soil and surrounding area, consisting of approximately 12.4 acres.

b. Unit of Measure

Unit of Measure: Lump Sum Percent Complete.

1.6.2 ECC Grading and Liner Placement

1.6.2.1 (Bid Item 9.1) Grading and Excavation Surface to Prepare for Liner Installation

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to successfully complete the final surface for installation of HDPE liner, consisting of approximately 5.33 acres.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.6.2.2 (Bid Item 9.2) Excavation of Anchor Trench

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to excavate approximately 3,070 linear feet of anchor trench for the ECC liner.

b. Unit of Measure

Unit of measure: Per Linear Foot.

1.6.2.3 (Bid Item 9.3) Perimeter Air Monitoring and Reporting

a. Payment

Air monitoring systems for the remedial action implemented generally includes: setup and operation of 1 sample per week - PUF grab samples for SVOCs and dioxin during construction and reporting activities to document that there are no contaminant emissions from the site during soil handling operations. Payment shall be made for the costs associated with collection, shipment, analysis, and reporting of results.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.6.2.4 (Bid Item 9.4) Installation of Monitoring Wells

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to install seven 2" ID monitoring wells to a depth of approximately_12 feet bls.

b. Unit of Measure

Unit of measure: Per Each Monitoring Well.

1.6.2.5 (Bid Item 9.5) Installation of Piezometers

a. Payment

Payment will be made for costs associated with contractor's labor, equipment, and supplies needed to install eight 1" ID piezometers to a depth of approximately 12 feet bls.

b. Unit of Measure

Unit of measure: Per Each Piezometer.

1.6.2.6 (Bid Item 9.6) Installation of 60-mil HDPE/LLDPE Bottom Liner

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install a 60-mil geosynthetic bottom liner for the ECC, consisting of approximately 5.33 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.6.2.7 (Bid Item 9.7) As Built Survey of Bottom Liner Surface

a. Payment

This cost shall include all costs associated with preparation of an as built survey to document construction of the bottom liner surface including surface elevations, seam location, and patch locations. Submit a draft version for review. Submit final survey after all draft comments have been addressed. Assume one round of comments.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.7 PHASE 2C CONTAMINATED SOIL PLACEMENT, CAP CONSTRUCTION

1.7.1 Place and Grade Contaminated Soil

1.7.1.1 (Bid Item 10.1) Grading and Compaction of Excavated Soil

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, testing, and supplies needed to successfully grade and compact approximately 111,295 Bank Cubic Yards (BCY) of contaminated soils.

b. Unit of Measure

Unit of measure: Per BCY.

1.7.1.2 (Bid Item 10.2) Installation of 40-mil HDPE/LLDPE Top Liner - Barrier Wall and ECC

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install a 40-mil geosynthetic top liner for the barrier wall and CC, consisting of approximately 10.44 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.7.1.3 (Bid Item 10.3) Install Geosynthetic Gas Collection Layer and Vents Complete

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to install the cap geosynthetic gas collection layer consisting of approximately 0.97 acres and 8 vents per contract drawings and specifications complete.

b. Unit of Measure

Unit of measure: Per Acre.

1.7.1.4 (Bid Item 10.4) Install Augmented Clay Cap on Top of Barrier Wall

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to install an augmented clay cap on top of the barrier wall per the contract drawings and specifications, consisting of approximately 2,500 BCY.

b. Unit of Measure

Unit of measure: Per BCY as surveyed in the field.

1.7.1.5 (Bid Item 10.5) Install Geosynthetic Clay Layer (GCL)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install a geo synthetic clay liner per contract drawings and specifications, consisting of approximately 10.44 acres.

b. Unit of Measure

Unit of measure: Per plan view area in acres (nearest 1/100 acre) to outer edge of anchor trench as surveyed.

1.7.1.6 (Bid Item 10.6) Installation of HDPE Drainage Net - Barrier Wall and ECC

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install an HDPE drainage net for the barrier wall and CC, consisting of approximately 10.44 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.7.1.7 (Bid Item 10.7) Perimeter Air Monitoring and Reporting

a. Payment

Air monitoring systems for the remedial action implemented generally includes: setup and operation of 1 sample per week - PUF grab samples for SVOCs during construction and reporting activities to document that there are no contaminant emissions from the site during soil handling operations. Payment shall be made for the costs associated with collection, shipment, analysis, and reporting of results.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.7.1.8 (Bid Item 10.8) Anchor Trench

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully install a drainage system and anchor trench per the contract drawings and specifications, consisting of approximately 3,650 linear feet (although pay item is lump sum).

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.7.1.9 (Bid Item 10.9) As-Built Survey (10.44 Acres)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully survey the areas and elements of construction at necessary times and at completion for conformance with contract drawings, quality control, and pay quantity determination, consisting of approximately 10.44 acres (although a lump sum pay item).

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.8 PHASE 2D FINISH GRADING, STORM DRAINAGE, POND CONSTRUCTION, AND MONITORING WELL INSTALLATION

1.8.1 Finish Grading

1.8.1.1 (Bid Item 11.1) Import, Grading, and Compaction of 18" Clean Common Fill Layer (Cap)- Barrier Wall and ECC

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, testing, and supplies needed to successfully import, grade and compact clean common fill consisting of approximately 10.44 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.8.1.2 (Bid Item 11.2) Import, Grading, and Compaction of 6" Topsoil Layer (Cap)- Barrier Wall and ECC

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, testing, and supplies needed to successfully import, grade and compact clean topsoil consisting of approximately 10.44 acres.

b. Unit of Measure

Unit of measure: Per Acre.

1.8.1.3 (Bid Item 11.3) Seeding/Mulching/Watering of Disturbed Areas

a. Payment

This cost shall include all seed material, delivery to site, storage, surface preparation, fertilizing, mulch, and watering required for establishing vegetation in disturbed areas (approximately 6.5 acres).

b. Unit of Measure

Per Acre as measured in the field or surveyed.

1.8.1.4 (Bid Item 11.4) Watering to Establish Vegetation

a. Payment

This cost shall include all labor, equipment, fuel, and supplies required for watering to establish vegetation on the cap at a frequency of 5 times per week for a period of 8 weeks.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.8.1.5 (Bid Item 11.5) Rough Grading - Roads, Swales, Storm Water Detention Ponds

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully rough grade required areas such as roads, swales and detention ponds, consisting of approximately 13,000 square yards.

b. Unit of Measure

Unit of measure: Per SY as surveyed.

1.8.1.6 (Bid Item 11.6) Perimeter Air Monitoring and Reporting

a. Payment

Air monitoring systems for the remedial action implemented generally includes: setup and operation of 1 sample per week - PUF grab samples

for SVOCs during construction and reporting activities to document that there are no contaminant emissions from the site during soil handling operations. Payment shall be made for the costs associated with collection, shipment, analysis, and reporting of results.

b. Unit of Measure

Unit of measure: Per Month, or Proportioned Partial Month.

1.8.1.7 (Bid Item 11.7) As-Built Survey (2.6 Acres)

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to successfully survey all areas of Phase 4 construction not previously surveyed, consisting of approximately 2.6 acres.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.8.1.8 (Bid Item 11.8) Demobilization

a. Payment

Payment will be made for costs associated with Contractor's labor, equipment, materials, and supplies needed to demobilize from the site.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

1.8.1.9 (Bid Item 11.9) RA Report (Draft, Rev 1, Final)

a. Payment

Payment will be made for costs associated with preparing and submitting an RA report documenting all work performed and completed by the Contractor. The report should include narrative describing work sequencing and summaries of major work elements, along with appendices containing surveys, daily reports, air monitoring data, disposal manifests, etc. Assume draft, revision 1, and final versions will be required.

b. Unit of Measure

Unit of measure: Lump Sum Percent Complete.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map

Progress and Completion Pictures

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Include aerial photographs. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer. Submit with the monthly invoice two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch on the CD or DVD as a digital file. Include a date designator in file names. Cross reference submittals in the appropriate daily report. Photographs provided are for unrestricted use by the Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 LIABILITY, during the entire period of performance under this contract.

Provide other insurance coverage as required by State law.

1.6 SUPERVISION

1.6.1 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of contract work. In addition, if a Quality Control (QC) representative is required on the contract, then that individual must also have fluent English communication skills.

1.6.2 Superintendent Qualifications

The project superintendent must have a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

For routine projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 00.00 10 QUALITY CONTROL, the superintendent must have qualifications in accordance with that section.

1.6.2.1 Duties

The project superintendent is primarily responsible for managing and coordinating day-to-day production and schedule adherence on the project. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.6.3 Project Manager

Assign a Project Manager with the responsibility for the overall management of the project. The Contracting Officer may request proof of the Project Manager's qualifications at any point in the project if the performance of the Project Manager is in question.

1.6.3.1 Project Manager Qualifications

The Project Manager must have a minimum 10 years experience as a Project Manager or Superintendent on projects of similar size and complexity.

1.6.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject

of claim for extension of time for excess costs or damages by the Contractor.

1.7 PRECONSTRUCTION MEETING CONFERENCE

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major subcontractors who will engage in the work must also attend.

1.8 PARTNERING

To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership within the Project Team whose members are from the Government, the Contractor and their Subcontractors. Key personnel from the Government Design and Construction team and Subject Matter Experts, the Contractor and Subcontractors, and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, and stays within budget and on schedule.

The Contracting Officer will provide Information on the Partnering Process and a list of key and optional personnel who should attend the Partnering meeting.

1.8.1 Informal Partnering

The Contracting Officer will organize the Partnering Sessions with key personnel of the project team, including Contractor personnel and Government personnel.

The Initial Partnering session should be a part of the Pre-Construction Meeting. Partnering sessions will be held at a location agreed to by the Contracting Officer and the Contractor. The Partners will determine the frequency of the follow-on sessions.

1.9 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments as text files, pdf files, and other similar formats. Within 10 days after contract award, provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes or terrorist threats. Multiple email addresses are not allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). Promptly notify the Contracting Officer, in writing, of any changes to this email address.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 32 01.00 10

PROJECT SCHEDULE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AACE INTERNATIONAL (AACE)

AACE 52R-06	(2006) Time Impact Analysis - As Applied in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11	(1995) Administration -- Progress, Schedules, and Network Analysis Systems

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Scheduler Qualifications; G

Preliminary Project Schedule; G

Initial Project Schedule; G

Periodic Schedule Update; G

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2 years' experience scheduling construction projects similar in size and nature to this project with scheduling software that meets the requirements of this specification. Representative must have a comprehensive knowledge of Critical Path Method (CPM) scheduling principles and application.

PART 2 PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this specification.

2.1.1 Government Default Software

The Government intends to use Primavera P6.

2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required sdef file must be created and supported by the software manufacturer.

2.1.2.1 Primavera

If Primavera P6 is selected for use, provide the "xer" export file in a version of P6 importable by the Government system.

2.1.2.2 Other Than Primavera

If the contractor chooses software other than Primavera P6, that is compliant with this specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to FAR Clause 52.236-15, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of design and construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Designers, Subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Provide additional documentation to demonstrate reasonableness if requested by the Contracting Officer.

3.2.2 Withholdings / Payment Rejection

Failure to meet the requirements of this specification may result in the

disapproval of the preliminary, initial, or periodic schedule updates and subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities may have Original Durations (OD) greater than 20 work days or 30 calendar days.

3.3.3 Design and Permit Activities

Include design and permit activities with the necessary conferences and follow-up actions and design package submission dates. Include the design schedule in the project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. Provide at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. Also include review and correction periods associated with each item.

3.3.4 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.3.5 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).

b. Submission, review and acceptance of features require design completion Submission, review and acceptance of design packages.

c. Submission of mechanical/electrical/information systems layout drawings.

d. Long procurement activities

e. Submission and approval of O&M manual.

f. Submission and approval of as-built drawings.

g. Performance Verification testing.

h. Other testing, if required.

i. Pre-final inspection.

j. Correction of punch list from pre-final inspection.

k. Final inspection.

3.3.6 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: approvals, acceptance, design reviews, environmental permit approvals by State regulators, inspections, utility tie-in, and Notice to Proceed (NTP) for phasing requirements.

3.3.7 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11. This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein. A template SDEF compatible schedule backup file is available on the QCS web site: http://rms.usace.army.mil.

The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per day
2	RESP	4	Responsible party
3	AREA	4	Area of work
4	MODF	6	Modification Number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of work
7	CATW	1	Category of work
8	FOW	20	Feature of work*

Field	Activity Code	Length	Description
*Some systems require that FEATURE OF WORK values be placed in several activity code fields. The notation shown is for Primavera P6. Refer to the specific software guidelines with respect to the FEATURE OF WORK field requirements.			

3.3.7.1 Workers Per Day (WRKP)

Assign Workers per Day for all field construction or direct work activities, if directed by the Contracting Officer. Workers per day is based on the average number of workers expected each day to perform a task for the duration of that activity.

3.3.7.2 Responsible Party Coding (RESP)

Assign responsibility code for all activities to the Prime Contractor, Subcontractor(s) or Government agency(ies) responsible for performing the activity.

a. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Property/Equipment (GFP) and Notice to Proceed (NTP) for phasing requirements.

b. Activities cannot have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for EPA).

3.3.7.3 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities cannot have more than one Work Area Code.

Not all activities are required to be Work Area coded. A lack of Work Area coding indicates the activity is not resource or space constrained.

3.3.7.4 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the Government's modification numbering system. An activity can have only one Modification Number Code.

3.3.7.5 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Schedule (CLIN) to which the activity belongs, even when an activity is

not cost loaded. An activity can have only one BIDI Code.

3.3.7.6 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities. Examples of phase of work are design phase, procurement phase and construction phase. Each activity can have only one Phase of Work code.

a. Code proposed fast track design and construction phases proposed to allow filtering and organizing the schedule by fast track design and construction packages.

b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

3.3.7.7 Category of Work Coding (CATW)

Assign a Category of Work Code to all activities. Category of Work Codes include, but are not limited to design, design submittal, design reviews, review conferences, permits, construction submittal, procurement, fabrication, weather sensitive installation, non-weather sensitive installation, start-up, and testing activities. Each activity can have no more than one Category of Work Code.

3.3.7.8 Feature of Work Coding (FOW)

Assign a Feature of Work Code to appropriate activities based on the Definable Feature of Work to which the activity belongs based on the approved QC plan.

Definable Feature of Work is defined in Section 01 45 00.00 10 QUALITY CONTROL. An activity can have only one Feature of Work Code.

3.3.8 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

3.3.8.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.8.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a

way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

3.3.8.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.8.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.8.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.9 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop seasonal Calendar(s) and assign to seasonally affected activities as applicable.

If an activity is weather sensitive it should be assigned to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar, using the anticipated days provided in the contract clause TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Assign non-work days over a seven-day week as weather records are compiled on seven-day weeks, which may cause some of the weather related non-work days to fall on weekends.

3.3.10 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Acknowledged" may have no predecessor logic, and the last activity -"End Project" may have no successor logic.

Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

3.3.11 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document

the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

3.3.12 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

3.3.13 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.3.14 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

3.3.15 Leads, Lags, Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb float, or to replace proper schedule logic.

a. Leads (negative lags) are prohibited.

3.3.16 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

3.3.17 Percent Complete

Update the percent complete for each activity started based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management.

3.3.18 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete.

3.3.19 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete upon the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s).

3.3.19.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $35,000 or 1 percent of the present contract value, whichever is greater, up to $200,000. Activity will be declared 100 percent complete upon the Government's approval.

3.3.19.2 O & M Manual

Cost load the "Submission and approval of O & M manual" activity. Activity will be declared 100 percent complete upon the Government's approval of O & M manual.

3.3.20 Anticipated Adverse Weather

Paragraph applicable to contracts with clause entitled TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Reflect the number of anticipated adverse weather delays allocated to a weather sensitive activity in the activity's calendar.

3.3.21 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.

b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD/DVD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged submit the

Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, planned submissions of all early design packages, permitting activities, design review conference activities, and other non-construction activities intended to occur within the first 90 calendar days. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI), Responsibility Code (RESP) and Feature of Work code (FOW).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 30 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. Include in the design-build schedule detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences; permit submissions and any required Government actions; and long lead item acquisition prior to design completion. Also cover in the initial design-build schedule the entire construction effort with as much detail as is known at the time but, as a minimum, include all construction start and completion milestones, and detailed construction activities through the dry-in milestone, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by Government acceptance of associated designs. When the design is complete, incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur after the dry-in milestone. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.2.1 Design Package Schedule Submission

With each design package submitted to the Government, submit a fragnet schedule extracted from the then current Preliminary, Initial or Updated schedule which covers the activities associated with that Design Package including construction, procurement and permitting activities.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum.

Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE

MEETINGS. These updates will enable the Government to assess Contractor's progress. Update the schedule to include detailed construction activities as the design progresses, but not later than the submission of the final un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission if such activity is authorized.

a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete is subject to the approval of the Government at the meeting.

b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Data CD/DVDs

Provide two sets of data CD/DVDs containing the current project schedule and all previously submitted schedules in the format of the scheduling software (for example, .xer). Also include on the data CD/DVDs the Narrative Report and all required Schedule Reports. Label each CD/DVD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule must have a unique file name and use project specific settings.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. Include the following information as minimum in the Narrative Report:

a. Identify and discuss the work scheduled to start in the next update period.

b. A description of activities along the two most critical paths where the total float is less than or equal to 20 work days.

c. A description of current and anticipated problem areas or delaying factors and their impact and an explanation of corrective actions taken or required to be taken.

d. Identify and explain why activities based on their calculated late dates should have either started or finished during the update period but did not.

e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.

f. Identify and discuss out-of-sequence work.

3.5.3 Schedule Reports

The format, filtering, organizing and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. Provide the reports electronically in .pdf format. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.

3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Schedule Log

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

3.5.4 Network Diagram

The Network Diagram is required for the Preliminary, Initial, and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.4.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.4.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

3.5.4.4 Banding

Organize activities using the WBS or as otherwise directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by major elements of work, category of work, work area and/or responsibility.

3.5.4.5 Cash Flow / Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a presentation which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 2 hours. Provide a draft of the proposed narrative report and schedule data file to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the periodic schedule update meeting, make corrections to the draft submission. Include only those changes approved by the Government in the submission and invoice for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 work days after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Contracting Officer between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the

purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs and Submittals.

3.8 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

3.8.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Contracting Officer based on industry standard AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time impact.

3.8.3 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

3.8.4 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.8.5 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and may result in corrective action directed by the Contracting Officer pursuant to FAR 52.236-15 Schedules for Construction Contracts, FAR 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to FAR 52.236-15 Schedules for Construction Contracts.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, may not be considered for the exclusive use of either the Government or the Contractor including activity and/or project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the contract completion date milestone.

3.11 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

Import the schedule data into the Quality Control System (QCS) and export the QCS data to the Government. This data is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and matching electronic export from QCS of the application for progress payment.

3.12 PRIMAVERA P6 MANDATORY REQUIREMENTS

If Primavera P6 is being used, request a backup file template (.xer) from the Government, if one is available, prior to building the schedule. The following settings are mandatory and required in all schedule submissions to the Government:

a. Activity Codes must be Project Level, not Global or EPS level.

b. Calendars must be Project Level, not Global or Resource level.

c. Activity Duration Types must be set to "Fixed Duration & Units".

d. Percent Complete Types must be set to "Physical".

e. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days.

f. Set Schedule Option for defining Critical Activities to "Longest Path".

g. Set Schedule Option for defining progressed activities to "Retained Logic".

h. Set up cost loading using a single lump sum labor resource. The Price/Unit must be $1/hr, Default Units/Time must be "8h/d", and settings "Auto Compute Actuals" and "Calculate costs from units" selected.

i. Activity ID's must not exceed 10 characters.

j. Activity Names must have the most defining and detailed description within the first 30 characters.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Submittal Information

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

1.1.2 Project Type

The Contractor's Quality Control (CQC) Manager are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

The Contractor and the Designer of Record (DOR), if applicable, are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

1.1.3 Submission of Submittals

Schedule and provide submittals requiring Government approval before acquiring the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Safety Data Sheets (SDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

SD-01 Preconstruction Submittals

Submittals that are required prior to or commencing with the start of work on site. Submittals that are required prior to or at the start of construction (work) or the next major phase of the construction on a multiphase contract.

Include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates Of Insurance

Surety Bonds

Construction Progress Schedule

List Of Proposed Subcontractors

List Of Proposed Products

Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Accident Prevention Plan/Health And Safety Plan

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

Design submittals, design substantiation submittals and extensions of design submittals.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (SDS)concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to maintain and install equipment, for operating and maintenance use by facility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2.2 Approving Authority

Office or designated person authorized to approve the submittal.

1.2.3 Work

As used in this section, on-site and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction. In exception, excludes work to produce SD-01 submittals.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal Register; G

1.4 SUBMITTAL CLASSIFICATION

1.4.1 Government Approved (G)

Government approval is required for extensions of design, critical materials, variations, equipment whose compatibility with the entire

system must be checked, and other items as designated by the Government.

Government approval is required for any variations from the Solicitation or the Accepted Proposal and for other items as designated by the Government.

Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, submittals are considered to be "shop drawings."

1.5 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

As soon as practicable after award of contract, and before procurement or fabrication, forward to the Government submittals required in the technical sections of this specification, including shop drawings, product data and samples. In addition, forward a copy of the submittals to the Resident Engineer.

1.5.1 O&M Data

Government will review and approve for Engineer O&M data to verify the time limits specified, the submittals comply with the contract requirements; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

In the event the Contractor fails to deliver O&M data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the items to which such O&M data apply.

1.6 PREPARATION

1.6.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to the office of the approving authority using the transmittal form prescribed by the Contracting Officer. On the transmittal form identify contractor, indicate date of submittal, and include all information prescribed by the transmittal form and required in paragraph IDENTIFYING SUBMITTALS. Use the submittal transmittal forms to record actions regarding samples.

1.6.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp submittals, including those provided by a subcontractor, before submitting for approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location

b. Construction contract number

c. Dates of the drawings and revisions

d. Name, address, and telephone number of Subcontractor, supplier, manufacturer, and any other Subcontractor associated with the

submittal.

e. Section number of the specification by which submittal is required

f. Submittal description (SD) number of each component of submittal

g. For a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission

h. Product identification and location in project.

1.6.3 Submittal Format

1.6.3.1 Format of SD-01 Preconstruction Submittals

When the submittal includes a document that is to be used in the project, or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.6.3.2 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full-size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.

b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Present shop drawings sized 8 1/2 by 11 inches as part of the bound volume for submittals. Present larger drawings in sets. Submit an electronic copy of drawings in PDF format.

1.6.3.2.1 Drawing Identifaction

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location next to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

Reserve a blank space, no smaller than 2 inches on the right-hand side of each sheet for the Government disposition stamp.

1.6.3.3 Format of SD-03 Product Data

Present product data submittals for each section as a complete, bound volume. Include a table of contents, listing the page and catalog item numbers for product data.

Indicate, by prominent notation, each product that is being submitted; indicate the specification section number and paragraph number to which it pertains.

1.6.3.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

Provide product data in units used in the Contract documents. Where product data are included in preprinted catalogs with another unit, submit the dimensions in contract document units, on a separate sheet.

1.6.3.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.6.3.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of the construction effort.

Submit the manufacturer's instructions before installation.

1.6.3.4 Format of SD-04 Samples

1.6.3.4.1 Sample Characteristics

Furnish samples in the following sizes, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified:

a. Sample of Equipment or Device: Full size.

b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.

c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

1.6.3.4.2 Sample Incorporation

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at the time of use.

Recording of Sample Installation: Note and preserve the notation of any area constituting a sample installation, but remove the notation at the final clean-up of the project.

1.6.3.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.6.3.5 Format of SD-05 Design Data

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.6.3.6 Format of SD-06 Test Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.6.3.7 Format of SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.6.3.8 Format of SD-08 Manufacturer's Instructions

Present manufacturer's instructions submittals for each section as a

complete, bound volume. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry, and technical-society publication references. If supplemental information is needed to clarify the manufacturer's data, submit it as specified for SD-07 Certificates.

Submit the manufacturer's instructions before installation.

1.6.3.8.1 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.6.3.9 Format of SD-09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.6.3.10 Format of SD-11 Closeout Submittals

When the submittal includes a document that is to be used in the project or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.6.4 Source Drawings for Shop Drawings

1.6.4.1 Source Drawings

The entire set of source drawing files (DWG) will not be provided to the Contractor. Request the specific Drawing Number for the preparation of shop drawings. Only those drawings requested to prepare shop drawings will be provided. These drawings are provided only after award.

1.6.4.2 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim, and waives to the fullest extent permitted by law any claim or cause of action of any nature against the Government, its agents, or its subconsultants that may arise out of or in connection

with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities, or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern. Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates).

1.6.5 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

Email electronic submittal documents as directed by the Contracting Officer. Provide hard copies of submittals when requested by the Contracting Officer. Up to 4 additional hard copies of any submittal may be requested at the discretion of the Engineer, at no additional cost to the Government.

1.7 QUANTITY OF SUBMITTALS

1.7.1 Number of SD-01 Preconstruction Submittal Copies

Unless otherwise specified, submit two hard copy sets and one pdf electronic set of administrative submittals.

1.7.2 Number of SD-02 Shop Drawing Copies

Submit one pdf electronic set of submittals of shop drawings requiring review and approval by a QC organization and one pdf electronic set of shop drawings requiring review and approval by the Contracting Officer.

1.7.3 Number of SD-03 Product Data Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.4 Number of SD-04 Samples

a. Submit two samples, or two sets of samples showing the range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.

b. Submit one sample panel or provide one sample installation where directed. Include components listed in the technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of nonsolid materials.

1.7.5 Number of SD-05 Design Data Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.6 Number of SD-06 Test Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings, other than field test results that will be submitted with QC reports.

1.7.7 Number of SD-07 Certificate Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.8 Number of SD-08 Manufacturer's Instructions Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.9 Number of SD-09 Manufacturer's Field Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

1.7.10 Number of SD-11 Closeout Submittals Copies

Unless otherwise specified, submit three sets of administrative submittals.

1.8 INFORMATION ONLY SUBMITTALS

Approval of the Contracting Officer is not required on information only submittals. However, the Government reserves the right to return unsatisfactory submittals and require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans

and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.9 PROJECT SUBMITTAL REGISTER AND DATABASE

A sample Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register."

1.9.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Use an electronic submittal register program furnished by the Government. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and (i) as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with Section 01 45 00.00 10 QUALITY CONTROL. The Government will provide the initial submittal register in electronic format with the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD Number. and type, e.g., SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in each specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting the project requirements.

Column (f): Lists the approving authority for each submittal.

1.9.2 Use of Submittal Register

Submit the submittal register as an electronic database, using the submittal management program furnished to Contractor. Include the QC plan and the project schedule. Verify that all submittals required for the project are listed and add missing submittals. Coordinate and complete the following fields on the register database submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for the approving authority to receive submittals.

Column (h) Contractor Approval Date: Date that Contractor needs

approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.9.3 Contractor Use of Submittal Register

Update the following fields in the submittal register program or equivalent fields in the program used by the Contractor with each submittal throughout the contract.

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) Date submittal transmitted.

Column (q) Date approval was received.

1.9.4 Approving Authority Use of Submittal Register

Update the following fields:

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (l) Date submittal was recieved.

Column (m) through (p) Dates of review actions.

Column (q) Date of return to Contractor.

1.9.5 Action Codes

Entries for columns (j) and (o) are to be used as follows (others may be prescribed by the Transmittal Form):

1.9.5.1 Government Review Action Codes

"A" - "Approved as submitted"; "Completed"

"B" - "Approved, except as noted on drawings"; "Completed"

"C" - "Approved, except as noted on drawings; resubmission required"; "Resubmit"

"D" - "Returned by separate correspondence"; "Completed"

"E" - "Disapproved (See attached)"; "Resubmit"

"F" - "Receipt acknowledged"; "Completed"

"G" - "Other (Specify)"; "Resubmit"

"X" - "Receipt acknowledged, does not comply with contract requirements"; "Resubmit"

1.9.5.2 Contractor Review Action Codes

"A" - "Approved as submitted"

"AN" - "Approved as noted"

"RR" - "Disapproved as submitted"; "Completed"

"NR" - "Not Reviewed"

1.9.6 Delivery of Copies

Submit an updatd electronic copy of the submittal register to the Contracting Officer with each invoice request , unless a paper copy is requested by the Contracting Officer. Provide an updated Submittal Register monthly regardless of whether an invoice is submitted.

1.10 VARIATIONS

Variations from contract requirements require Contracting Officer approval pursuant to contract Clause FAR 52.236-21 Specifications and Drawings for Construction, and will be considered where advantageous to the Government.

1.10.1 Considering Variations

Discussion of variations with the Contracting Officer before submission will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation that results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

1.10.2 Proposing Variations

When proposing variation, deliver a written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. Include the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals that include variations proposed by the Contractor. Set forth in writing the reason for any variations and note such variations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted variations.

1.10.3 Warranting that Variations are Compatible

When delivering a variation for approval, the Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.10.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 10 working days will be allowed for the Government to consider submittals with variations.

1.11 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated. Submit pertinent certifications at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.

b. Submittals required by the contract documents are listed on the submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."

c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required.

d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor-scheduled submittal date shown on the approved "Submittal Register."

1.12 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Contracting Officer, the Government will:

a. Note the date on which the submittal was received from the QC manager.

b. Review submittals for approval within the scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with comments and markings appropriate for the action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. Two copies of the submittal will be retained by the Contracting Officer and three copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be identified and returned, as described above.

1.13 DISAPPROVED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Offficer as required under the FAR clause titled CHANGES. The Contractor is responsible for the dimensions and design of connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.14 APPROVED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory. the design, general method of construction, materials, detailing, and other information appear to meet the Solicitation and Accepted Proposal.

Approval or acceptance by the Government for a submittal does not relieve the Contractor of the responsibility for meeting the contract requirements or for any error that may exist, because under the Contractor's Quality Control (CQC) requirements of this contract, the Contractor is responsible for ensuring information contained with in each submittal accurately conforms with the requirements of the contract documents.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.15 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, provide assurance that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those that may be damaged in testing, will be returned to the Contractor, at its expense, upon completion of the contract. Unapproved samples will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make as that material. The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in

place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements.

1.16 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. No payment for materials incorporated in the work will be made unless all required DOR approvals or required Government approvals have been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information-only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.17 PROGRESS SCHEDULE

1.17.1 Bar Chart

a. Submit the progress chart, for approval by the Engineer, at the Preconstruction Conference in one reproducible and 4 copies.

b. Prepare the progress chart in the form of a bar chart utilizing form "Construction Progress Chart" or comparable format acceptable to the Contracting Officer.

c. Include no less than the following information on the progress chart:

(1) Break out by major headings for primary work activity.

(2) A line item break out under each major heading sufficient to track the progress of the work.

(3) A line item showing contract finalization task which includes punch list, clean-up and demolition, and final construction drawings.

(4) A materials bar and a separate labor bar for each line item. Both bars will show the scheduled percentage complete for any given date within the contract performance period. Labor bar will also show the number of men (man-load) expected to be working on any given date within the contract performance period.

(5) The estimated cost and percentage weight of total contract cost for each materials and labor bar on the chart.

(6) Separate line items for mobilization and drawing submittal and approval. (These items are to show no associated costs.)

d. Update the progress schedule in one reproduction and 4 copies every 30 calendar days throughout the contract performance period.

1.18 STATUS REPORT ON MATERIALS ORDERS

Within 90 calendar days after notice to proceed, submit, for approval by the Engineer, an initial material status report on all materials orders. This report will be updated and re-submitted every 30 calendar days as the status on material orders changes.

Report to include list, in chronological order by need date, materials orders necessary for completion of the contract. The following information will be required for each material order listed:

a. Material name, supplier, and invoice number.

b. Bar chart line item or CPM activity number affected by the order.

c. Delivery date needed to allow directly and indirectly related work to be completed within the contract performance period.

d. Current delivery date agreed on by supplier.

e. When item d exceeds item c, the effect that delayed delivery date will have on contract completion date.

f. When item d exceeds item c, a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

1.19 STAMPS

Stamps on the submittal data to certify that the submittal meets contract requirements are to be similar to the following:

CONTRACTOR
(Firm Name)
_____ Approved
_____ Approved with corrections as noted on submittal data and/or attached sheet (s)
SIGNATURE: _____
TITLE: _____
DATE: _____

For Design-Build construction, both the Contractor QC manager and the DOR are to stamp and sign to certify that the submittal meets contract requirements.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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		01 11 00	SD-01 Preconstruction Submittals															
			Utility Outage Requests	1.3.1														
			Utility Connection Requests	1.3.1														
			Borrow Permits	1.3.2														
			Excavation Permits	1.3.2														
			Welding Permits	1.3.2														
			Salvage Plan	1.5	G													
		01 14 00	SD-01 Preconstruction Submittals															
			List of Contact Personnel	1.2.1.1	G													
		01 22 00	SD-03 Product Data															
			As-Built Surveys to Document															
			Payment Requests															
			Contractor's Schedule of Values															
		01 30 00	SD-01 Preconstruction Submittals															
			View Location Map	1.3														
			Progress and Completion	1.4														
			Pictures															
		01 32 01.00 10	SD-01 Preconstruction Submittals															
			Project Scheduler Qualifications	1.3	G													
			Preliminary Project Schedule	3.4.1	G													
			Initial Project Schedule	3.4.2	G													
			Periodic Schedule Update	3.6.2	G													
		01 33 00	SD-01 Preconstruction Submittals															
			Submittal Register	1.9	G													
		01 35 13.43 10	SD-06 Test Reports															
			Report	3.1														

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		01 35 26	SD-01 Preconstruction Submittals																
			Accident Prevention Plan (APP)	1.7	G														
			SD-06 Test Reports																
			Monthly Exposure Reports	1.4															
			Notifications and Reports	1.12															
			Accident Reports	1.12.2	G														
			LHE Inspection Reports	1.12.3															
			SD-07 Certificates																
			Activity Hazard Analysis (AHA)	1.8															
		01 35 29.13	SD-02 Shop Drawings																
			Work Zones	3.8.1	G														
			Decontamination Facilities	3.9.1	G														
			SD-03 Product Data																
			Amendments to the APP/SSHP	1.4															
			Exposure Monitoring/Air	3.5															
			Sampling Program																
			Site Control Log	3.8.2															
			SSHO's Daily Inspection Logs	1.8															
			SD-07 Certificates																
			Certificate of Worker/Visitor	1.7															
			Acknowledgement																
			SD-11 Closeout Submittals																
			Safety And Health Phase-Out	1.9															
			Report																
		01 45 00.00 10	SD-01 Preconstruction Submittals																

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		01 45 00.00 10	Contractor Quality Control (CQC) Plan	3.2	G														
			SD-05 Design Data																
			Design Quality Control	3.9.1															
			SD-06 Test Reports																
			Daily Reports	3.9.2															
		01 50 00	SD-01 Preconstruction Submittals																
			Construction Site Plan	1.3	G														
			Traffic Control Plan	3.4.1	G														
			SD-03 Product Data																
			Backflow Preventers	1.4	G														
			SD-06 Test Reports																
			Backflow Preventer Tests	2.4															
			SD-07 Certificates																
			Backflow Tester	1.4.1															
			Backflow Preventers	1.4															
		01 57 19	SD-01 Preconstruction Submittals																
			Preconstruction Survey	1.5.1															
			Pesticide Treatment Plan	1.2.14	G														
			Solid Waste Management Permit	1.10	G														
			Regulatory Notifications	1.5.2	G														
			Site Management Plan	1.6	G														
			Environmental Protection Plan	1.7	G														
			Dirt and Dust Control Plan	1.7.9.1	G														
			Air Quality Monitoring Plan	1.7.9.5	G														

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		01 57 19	Stormwater Pollution Prevention	3.2.1.1	G														
			Plan																
			Erosion and Sediment Control	3.2.2.1	G														
			Plan																
			Spill Prevention, Control, and	3.10.2.1	G														
			Countermeasures Plan																
			Employee Training Records	1.5.5	G														
			Environmental Manager	1.5.4	G														
			Qualifications																
			SD-06 Test Reports																
			Inspection Reports	3.2.1.3															
			Solid Waste Management Report	3.7.2.1	G														
			SD-07 Certificates																
			Employee Training Records	1.5.5	G														
			Erosion and Sediment Control	1.5.5															
			Inspector																
			SD-11 Closeout Submittals																
			Stormwater Pollution Prevention	3.2.1.4	G														
			Plan Compliance Notebook																
			Stormwater Notice of Termination	3.2.1.5	G														
			Waste Determination	3.7.1	G														
			Documentation																
			Disposal Documentation for	3.7.3.3	G														
			Hazardous and Regulated Waste																
			Assembled Employee Training	1.5.5	G														
			Records																

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		01 57 19	Solid Waste Management Permit	1.10	G														
			Solid Waste Management Report	3.7.2.1	G														
			Contractor Hazardous Material	3.8.1	G														
			Inventory Log																
			Hazardous Waste/Debris	3.7.3.1	G														
			Management																
			Regulatory Notifications	1.5.2	G														
			Sales Documentation	3.7.2.1	G														
			As-Built Topographic Survey	3.2.1.5															
		01 58 00	SD-02 Shop Drawings																
			Sign Legend Orders	1.3.1	G														
		01 74 19	SD-01 Preconstruction Submittals																
			Waste Management Plan	1.5	G														
			SD-11 Closeout Submittals																
			Records	1.6															
		01 78 00	SD-11 Closeout Submittals																
			As-Built Drawings	3.1	G														
			Record Drawings	3.3	G														
			Final Approved Shop Drawings	3.4															
			Construction Contract	3.5															
			Specifications																
			Certification of EPA Designated	2.3	G														
			Items																
		02 35 27	SD-01 Preconstruction Submittals																
			Preconstruction Testing Plan	1.5	G														
			Qualifications	1.6.1	G														

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		02 35 27	Soil-Cement-Bentonite Design	2.3.1	G														
			Mix																
			Barrier Wall Construction Plan	3.1	G														
			SD-02 Shop Drawings																
			As-Built Profile	3.8															
			SD-04 Samples																
			Bentonite	2.1.1	G														
			SD-06 Test Reports																
			Quality Control Testing	3.10															
			Measurement of Wall Depth	3.7															
			Water	2.1.2															
			Slurry Mixes	2.3															
			S-C-B Slurry and Placement	3.10.3															
			SD-07 Certificates																
			Bentonite	2.1.1															
			Cement	1.2.4															
		02 41 00	SD-01 Preconstruction Submittals																
			Demolition Plan	1.4.1	G														
			Existing Conditions	1.11															
			SD-07 Certificates																
			Notification	1.8	G														
			SD-11 Closeout Submittals																
			Well	3.1.10															
			Decommissioning/Abandonment																
			Record																
		02 56 13	SD-02 Shop Drawings																

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		02 56 13	As-Built Drawings	3.9															
			SD-03 Product Data																
			Tests, Inspections, and	2.2	G														
			Verifications																
			Field Seaming	3.3	G														
			Qualifications	1.3	G														
			SD-04 Samples																
			Samples	3.4															
			SD-06 Test Reports																
			Materials	2.1	G														
			Surface Preparation	3.1.1	G														
			Non-Destructive Field Seam	3.5.1	G														
			Continuity Testing																
			Destructive Field Seam Testing	3.5.2	G														
			Destructive Seam Test Repairs	3.6.1	G														
			Tests	3.5	G														
		02 56 15	SD-02 Shop Drawings																
			Layout and Detail Drawings	1.4	G														
			SD-03 Product Data																
			Manufacturer's Quality Control	1.6.1															
			(QC) Manual																
			GCL Properties	2.1															
			Warranty	1.8															
			Tests, Inspections, and	2.2															
			Verifications																
			Qualifications	1.6.2	G														

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		02 56 15	SD-04 Samples																
			Samples	3.1.1															
			SD-06 Test Reports																
			Tests, Inspections, and	2.2															
			Verifications																
			Conformance Tests	3.1.2															
			Subgrade Preparation	3.2.1	G														
		02 61 13	SD-02 Shop Drawings																
			Surveys	3.1															
			SD-03 Product Data																
			Soil Excavation, Grading, and	1.3	G														
			Backfill Plan																
			Soil Excavation, Grading, and	1.3.2	G														
			Backfill Plan																
			Closure Report	3.10	G														
			SD-04 Samples																
			Topsoil	2.3															
			SD-06 Test Reports																
			Backfill	2.2															
			Surveys	3.1															
			Compaction	3.8.2															
		02 66 00	SD-03 Product Data																
			Materials Handling Plan	2.3	G														
			SD-04 Samples																
			Cover Soil	2.1															
			Topsoil	2.2															

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		02 66 00	SD-06 Test Reports																
			Borrow Source Assessment	3.1	G														
			Report																
			Cover Soil and Topsoil Material	3.4.1															
			Tests																
			Moisture Content and Density	3.4.2															
			Tests of In-Place Cover Soil																
		31 00 00	SD-01 Preconstruction Submittals																
			Shoring and Sheeting Plan	3.3.1	G														
			SD-03 Product Data																
			Utilization of Excavated Materials	3.6	G														
			Augmented Clay	2.3	G														
			SD-06 Test Reports																
			Testing	3.11															
			Borrow Site Testing	2.1															
			SD-07 Certificates																
			Testing	3.11															
		31 05 20	SD-03 Product Data																
			Sampling and Testing	2.2															
			Penetrations	3.1.5	G														
			Construction Quality Control (QC)	1.4	G														
			Laboratory																
			SD-04 Samples																
			Geosynthetic Drainage Layer	2.1															
			SD-06 Test Reports																
			Sampling and Testing	2.2															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)		(q)	(r)
		31 05 20	Geosynthetic Drainage Layer	2.1	G														
		31 11 00	SD-01 Preconstruction Submittals																
			Herbicide Application Plan	3.1.1															
			SD-03 Product Data																
			Nonsaleable Materials	3.4.2	G														
			Herbicides	1.4.2	G														
			SD-04 Samples																
			Tree Wound Paint	2.1.1															
			SD-07 Certificates																
			Qualifications	1.4.2	G														
		31 32 11	SD-01 Preconstruction Submittals																
			Work Sequence Schedule	1.7	G														
			Erosion and Sediment Control Plan	1.7	G														
			SD-02 Shop Drawings																
			Layout	3.2.2	G														
			Obstructions Below Ground	3.2.4	G														
			Maintenance Record	3.6															
			SD-03 Product Data																
			Geosynthetic Binders	2.2.2	G														
			Recycled Plastic	2.1															
			Wood Cellulose Fiber	2.3.3															
			Paper Fiber	2.3.4															
			Mulch Control Netting and Filter Fabric	2.3.9															
			Wood Hydraulic Mulch	2.3.10	G														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
American Creosote Works Site, Part 1 BW

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
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		31 32 11	Erosion Control Blankets Type XI	2.5.11														
			Geotextile Fabrics	2.4	G													
			Equipment	1.2														
			Erosion Control Blankets	2.5														
			SD-04 Samples															
			Geosynthetic Binders	2.2.2														
			Mulch	2.3														
			Wood Hydraulic Mulch	2.3.10														
			Geotextile Fabrics	2.4														
			Erosion Control Blankets	2.5														
			SD-06 Test Reports															
			Geosynthetic Binders	2.2.2														
			Wood Hydraulic Mulch	2.3.10														
			Geotextile Fabrics	2.4														
			Erosion Control Blankets	2.5														
			SD-07 Certificates															
			Fill Material	3.3.14.1														
			Mulch	2.3														
			Wood Hydraulic Mulch	2.3.10														
			Geotextile Fabrics	2.4														
			Geosynthetic Binders	2.2.2														
			Synthetic Soil Binders	2.2.1														
			Installer's Qualification	1.5.1														
			Seed	2.5.13														
			Asphalt Adhesive	2.3.8														
			Tackifier	2.3.11														

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		31 32 11	Wood By-Products	2.3.6															
			Wood Cellulose Fiber	2.3.3															
			SD-10 Operation and Maintenance																
			Data																
			Maintenance Instructions	3.6.2	G														
			SD-11 Closeout Submittals																
			Warranty	1.8															
		32 05 33	SD-01 Preconstruction Submittals																
			Integrated Pest Management	2.4	G														
			Plan																
			SD-03 Product Data																
			Fertilizer	2.1	G														
			Mulches Topdressing	2.3															
			Organic Mulch Materials	2.3.2															
			SD-07 Certificates																
			Maintenance Inspection Report	3.4.1															
			Plant Quantities	3.4.2	G														
			SD-10 Operation and Maintenance																
			Data																
			Maintenance	1.8															
			SD-11 Closeout Submittals																
			Tree Staking and Guying	3.4.3															
			Removal																
		32 31 13	SD-02 Shop Drawings																
			Fence Assembly	2.1	G														

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		32 31 13	Location of Gate, Corner, End,	3.2.1.1	G														
			and Pull Posts																
			Gate Assembly	2.1	G														
			Gate Hardware and Accessories	2.2.11	G														
			Erection/Installation Drawings	Part 3	G														
			SD-03 Product Data																
			Fence Assembly	2.1	G														
			Gate Assembly	2.1	G														
			Gate Hardware and Accessories	2.2.11	G														
			Zinc Coating	2.3.1	G														
			Fabric	2.2.1	G														
			Stretcher Bars	2.2.6	G														
			Concrete	2.3.3	G														
			SD-04 Samples																
			Fabric	2.2.1	G														
			Posts	2.2.2	G														
			Braces	2.2.2	G														
			Sleeves	2.2.3	G														
			Top Rail and Braces	2.2.4	G														
			Tension Wire	2.3.2	G														
			Stretcher Bars	2.2.6	G														
			Gate Posts	2.2.9	G														
			Gate Hardware and Accessories	2.2.11	G														
			Padlocks	2.2.14	G														
			Wire Ties	2.2.13	G														
			SD-07 Certificates																

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		32 31 13	Certificates of Compliance	1.4.1															
			SD-08 Manufacturer's Instructions																
			Fence Assembly	2.1															
			Gate Assembly	2.1															
			Hardware Assembly	2.1															
			Accessories	2.1															
		32 92 19	SD-03 Product Data																
			Wood Cellulose Fiber Mulch	2.3.3															
			Fertilizer	2.2															
			SD-07 Certificates																
			Seed	2.1															
			SD-08 Manufacturer's Instructions																
			Erosion Control Materials	2.5															
		32 92 23	SD-03 Product Data																
			Fertilizer	2.4															
			SD-06 Test Reports																
			Topsoil composition tests	2.2.3															
			SD-07 Certificates																
			sods	2.1															
		33 26 00.00 10	SD-01 Preconstruction Submittals																
			Permits	1.9	G														
			Proposed Work Schedule	1.10	G														
			Drilling Rigs and Personnel	1.10	G														
			SD-03 Product Data																
			Pipe Casing	2.1	G														
			Slotted Pipe (Screen)	2.2	G														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

American Creosote Works Site, Part 1 BW

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		33 26 00.00 10	Fittings	2.3	G														
			Gravel Filter Pack	2.4	G														
			Grout	2.5	G														
			Drilling Fluids	2.6	G														
			Caps	2.7	G														
			Sealing Materials	3.4	G														
			Vent Pipe Coating	3.5	G														
			SD-06 Test Reports																
			Daily Drillers Report	3.8	G														
			Gas Vent Completion Report	3.8	G														

SECTION 01 35 13.43 10

SPECIAL PROJECT PROCEDURES FOR CONTAMINATED SITES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE (FRTR)

USAEC SFIM-AEC-ET-CR-97053	(2007) Federal Remediation Technologies Screening Matrix and Reference Guide, Fourth Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 1110-1-19	(2001) A Guide to Preparing and Reviewing Remedial Action Reports of Cost and Performance
ER 1110-3-1301	(1999) Engineering and Design -- Cost Engineering Policy Requirements for Hazardous, Toxic Radioactive Waste (HTRW) Cost Engineering

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 542-B-98-007	(1998) Guide to Documenting and Managing Cost and Performance Information for Remediation Projects

1.2 DESCRIPTION OF WORK

Work consists of the preparation of a report containing cost and performance data from the American Creosote Works (ACW) environmental remediation project.

1.2.1 Report Format

Prepare the report in accordance with EPA 542-B-98-007. Present the report as follows: 1) Word processing format: MS Word, 11 point font size, Calibri typeface. 2) Page layout: 8-1/2 x 11 inch size paper; 1 inch margins; portrait or landscape orientation; bold headings, footnotes, page numbering. 3) Tables and charts software: spreadsheets, groundwater modeling. 4) Computer file: also present the document in Hypertext Mark-up Language (HTML 2.0) saved as an electronic file; link postscript drawings to document text.

1.2.2 Drawing Format

Use the same format for drawings, including software, as that used in the investigative and design phases of the project. Provide drawing files in .pdf

and .dwg format.

1.2.3 Quality Control

Develop a project-specific quality control program to detail the procedures for preparation of the report and for correction of deficiencies. Arrange for conferences to coordinate the work or to sequence related work for sensitive and complex items as needed and as requested by the Contracting Officer.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Report

One copy of the report upon completion of each of the following stages: Draft Report and Final Report. Provide the report to the Contracting Officer. Provide electronic file of the report to the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 REPORT

Prepare the report in accordance with EP 1110-1-19.

3.1.1 Executive Summary

The Executive Summary is a brief overview of the Cost and Performance Report. It includes a brief description of the historical activities that generated the need for environmental restoration, a brief summary of the appropriate regulatory framework under which the cleanup is to occur, the remedial technology specified, the date, number and title of decision document, any special sequencing and scheduling milestones, definitions for standard terminology used in the preparation of the report, and average characteristics of the contaminated media pre- and post-treatment.

3.1.2 Site Information

Information developed prior to remediation is included.

3.1.2.1 Type of Action

State that the cleanup to be performed is an entire site remediation project.

3.1.2.2 Period of Operation

Indicate the dates of start-up, shut-down, partial operation, inactivity, and operation of the remediation in the report.

3.1.2.3 Quantity of Material Treated During Application

Indicate the estimated quantity of material treated during the remedial or removal action. For ex-situ or in-situ treatment, determine the estimated volume of material treated as specified in the respective technical specification section and note in the report.

3.1.2.4 Performance Objectives

Bulletize the clean-up goals associated with this project.

3.1.2.5 Site Logistics/Contacts

List the addresses and telephone numbers for the Project Manager, Regulatory Agency Contacts, and Vendors involved in the cleanup activities.

3.1.3 Matrix and Contaminant Description

3.1.3.1 Matrix Identification

Report the type of matrix treated using the standard terminology contained in EP 1110-1-19.

3.1.3.2 Site Geology/Stratigraphy

Describe the site soils and geology in the site geology/stratigraphy narrative. Include the areal and vertical (stratigraphy) variability in the soils, soil classifications and particle-size distributions. Include depth to groundwater, depth to bedrock, and thickness of overburden soil.

3.1.3.3 Contaminant Characterization

Identify the primary contaminant and the extent of vertical and areal contamination in this section. Note other contaminants which may affect treatment.

3.1.3.4 Contaminant Properties

Report the properties of contaminants present at the remediation site as a summary of the results from the Basis of Design Report. The Contractor will be provided a copy of the Basis of Design Report for reference by the Contracting Officer.

3.1.3.5 Nature and Extent of the Contaminants

Describe the location, nature, and extent of contamination by text and/or appropriate contract drawings.

3.1.3.6 Matrix Characteristics Affecting Treatment Cost or Performance

Identify the measurement procedure used for each parameter. Provide the measurement, the procedure to obtain the measurement, and the effect on cost and performance for each parameter as shown in Tables 1 and 3 of EP 1110-1-19.

3.1.4 Remediation Description

Describe treatment technologies for the site remedy using terminology from

the Remedial Design, USAEC SFIM-AEC-ET-CR-97053, and EPA 542-B-98-007 or other approved similar terminology in areas where those documents are incomplete.

3.1.4.1 Primary Treatment Technology Types

List primary treatment technology types for each contaminant matrix using standard terminology and the listing of primary treatment technologies in EP 1110-1-19.

3.1.4.2 Supplemental Treatment Technology Types

If used, list Pre-treatment and Post-treatment technology types for each matrix using standard terminology and the listing of supplemental treatment technologies in EP 1110-1-19.

3.1.4.3 Time Line

Provide a tabular or Gannt chart form specifying the major tasks associated with the remediation. Include key milestones such as treatability testing; design completion; site preparation; site mobilization; excavation; treatment start date; adjustment dates; submittal dates, and demobilization. Initiate the time line at the onset of remedial investigations and terminate at completion of demobilization from the site. Designate the projects critical path on the time line.

3.1.4.4 Remediation

Provide a completion Process Flow Diagram in the report and include an overall schematic of the Selected Remedy and each treatment unit process. Also include personnel requirements for completing the remedy, and the health and safety requirements including level of personal protective equipment required in the description of the remedy.

3.1.4.5 Operating Parameters Affecting Treatment Cost or Performance

Provide a table presenting the major operating parameters affecting cost and performance for the primary treatment technologies and the values measured for each parameter. Include site-specific items such as number of samples, number of wells, and other specific parameters that may affect the cost of operation in the report in accordance with Table 4 of EP 1110-1-19.

3.1.5 Remediation Performance

3.1.5.1 Treatment Performance Data

Report the pre-treatment and post-treatment contaminant concentrations in the soil or groundwater. Present the number and type of samples collected, management or reduction of sampling results, and the method number of the laboratory analysis in a table. For in-situ technologies, provide information for separate locations using cross-referenced site plans and tables. Present analytical results in tabular format using the following conventions for reporting data: mass/volume for contaminant levels in off-gas; mass/mass for solids; mass/volume for contaminant levels in water, and ND (DL) with footnote saying: not detected at levels above the detection limit (reported laboratory detection limit shown in parentheses).

3.1.5.2 Data Assessment and Deviations from Standard Performance

Describe the available performance data and discuss in terms of whether cleanup goals were met and whether treatment performance varied during the course of the remediation. Include an evaluation of the performance of the remediation in the report. Include the information contained in the following paragraphs.

3.1.5.3 Material Balances

Perform material balances around the treatment unit; link the data to specific operating conditions. State whether balances are required for a specific process unit, the complete train of processes or both.

3.1.5.4 Target Contaminant and Operating Conditions

Match target contamination concentrations prior to treatment with concentrations in treated material. Link these data to specific operating conditions.

3.1.5.5 Target Contaminant and Removal Efficiencies

Compare target contaminant concentrations prior to treatment with concentrations in treated material, to determine removal efficiencies and average concentrations.

3.1.5.6 Characteristics of Treated Material

Assess the physical and chemical state of the treated material using methods appropriate for the material.

3.1.6 Performance Data Quality

Provide an overall assessment of the quality control of the available performance data in the narrative.

3.1.7 Remediation Cost

Use the work breakdown structure specified in ER 1110-3-1301 to the third (subsystem) level, in conjunction with the standard descriptions, to document costs for activities directly attributed to the remediation; however, utilizing lower levels for each work breakdown structure is optional. Use the third (subsystem) level of detail for capturing the primary treatment technology costs. Identify documentation of costs for before treatment activities separately in the appropriate third-level remedial action work breakdown structure categories, such as Monitoring, Sampling, Testing, and Analysis. Separately identify post construction operation and maintenance using the O&M work breakdown structure. Identify unit costs and number of units for each cost element in the documentation, as specified in ER 1110-3-1301. Show cost for activities directly attributed to the treatment as a total cost and as a calculated cost on a per-unit of media treated basis, and on a per unit of contaminant removed basis, as indicated. The second (system) and the third (subsystem) level cost elements for activities directly associated with the project are shown in the same referenced documents.

3.1.7.1 HTRW - Remedial Action Work Breakdown Structure

Appropriately allocate invoices for materials, labor, supplies, services,

and other costs. Allocate these costs to pretreatment, treatment, and post-treatment activities. These cost allocations must include the sub-breakdown of cost elements. Further allocate costs between capital and operating costs.

3.1.7.2 Pre-Treatment Costs

Include preparation costs in the reported pre-treatment costs (for example, Treatability Plans) management and other distributive costs, mobilization, site work, excavation, site clearing, demolition, and well abandonment.

3.1.7.3 Costs Directly Associated with Treatment

Include solids, liquid, vapor preparation and handling; mobilization, spill control, testing, permits, training, and O&M costs in the costs directly associated with the treatment.

3.1.7.4 Post-Treatment Costs

The post-treatment costs include decontamination and decommissioning, disposal, site restoration, and demobilization.

3.1.8 Regulatory/Institutional Issues

List approvals, licenses and permits required for remediation along with the direct cost and time lines associated with obtaining them.

3.1.9 Observations and Lessons Learned

3.1.9.1 Cost Observations and Lessons Learned

Summarize observations or lessons learned concerning cost for each remediation activity conducted for this contract. Consider key factors that affected project costs, and major items that caused final costs to differ from initial bid. Issues to be discussed include change orders, reclarifications, liquidated damages, variations in quantities, and unforeseen conditions. Include recommendations for cost savings in future procurements of each treatment technology in the narrative.

3.1.9.2 Performance Observations and Lessons Learned

Summarize observations or lessons learned concerning performance of each remediation activity conducted for this contract. Consider key factors that caused performance variations from contract requirements/cleanup standards. Describe lessons learned from scaling-up treatability studies to full-scale activities. Discuss the accuracy of such treatability studies in predicting the full-scale application cost and performance. Also discuss recommendations for improved performance in future applications, including information from each remediation vendor.

3.1.9.3 Other Observations and Lessons Learned

Summarize observations or lessons learned from each treatment unit not directly related to cost or performance.

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.22	(2007; R 2012) Safety Requirements for Rope-Guided and Non-Guided Workers' Hoists
ASSE/SAFE A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSE/SAFE Z359.1	(2016) The Fall Protection Code
ASSE/SAFE Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSE/SAFE Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSE/SAFE Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSE/SAFE Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSE/SAFE Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSE/SAFE Z359.2	(2007) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ASSE/SAFE Z359.3	(2007) Safety Requirements for Positioning and Travel Restraint Systems
ASSE/SAFE Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSE/SAFE Z359.6	(2009) Specifications and Design Requirements for Active Fall Protection Systems

ASSE/SAFE Z359.7	(2011) Qualification and Verification Testing of Fall Protection Products

ASME INTERNATIONAL (ASME)

ASME B30.20	(2013; INT Oct 2010 - May 2012) Below-the-Hook Lifting Devices
ASME B30.22	(2016) Articulating Boom Cranes
ASME B30.23	(2011) Personnel Lifting Systems Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
ASME B30.26	(2015; INT Jun 2010 - Jun 2014) Rigging Hardware
ASME B30.3	(2016) Tower Cranes
ASME B30.5	(2014) Mobile and Locomotive Cranes
ASME B30.7	(2011) Winches
ASME B30.8	(2015) Floating Cranes and Floating Derricks
ASME B30.9	(2014; INT Feb 2011 - Nov 2013) Slings

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2015) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2003) Guide for Protective Grounding of Power Lines
IEEE C2	(2017; Errata 1 2017) National Electrical Safety Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2013) Standard for Portable Fire Extinguishers
NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations
NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2) National Electrical Code
NFPA 70E	(2015; ERTA 1 2015) Standard for

	Electrical Safety in the Workplace

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-1019	(2012; R 2016) Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas
TIA-222	(2005G; Add 1 2007; Add 2 2009; Add 3 2014; Add 4 2014; R 2014; R 2016) Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.147	Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.1400	Cranes and Derricks in Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
29 CFR 1926.552	Material Hoists, Personal Hoists, and Elevators
29 CFR 1926.553	Base-Mounted Drum Hoists
CPL 02-01-056	(2014) Inspection Procedures for Accessing Communication Towers by Hoist

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSE/SAFE Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.6 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.7 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.8 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.9 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

1.2.10 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.11 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.12 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.2.13 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ASSE/SAFE Z359.0, with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.14 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped

load, or roll over). Document an LHE mishap using the Crane High Hazard working group mishap reporting form.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

SD-06 Test Reports

Monthly Exposure Reports

Notifications and Reports

Accident Reports; G

LHE Inspection Reports

SD-07 Certificates

Activity Hazard Analysis (AHA)

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and

qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.6.1.1.1 Additional Site Safety and Health Officer (SSHO) Requirements and Duties

The SSHO may also serve as the Quality Control Manager. The SSHO may also serve as the Superintendent.

1.6.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for information in consultation with the Safety Office.

1.6.1.2.1 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04 and herein.

1.6.1.3 Qualified Trainer Requirements

Individuals qualified to instruct the 40 hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards,Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.450, Subpart L.

Instructors are required to:

a. Prepare class presentations that cover construction-related safety requirements.

b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class

session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.6.1.4 Crane Operators/Riggers

Provide Operators, Signal Persons, and Riggers meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators and Signal Persons. Provide proof of current qualification.

1.6.2 Personnel Duties

1.6.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.

b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.

c. Use and maintain OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors, and make available to the Contracting Officer upon request. Post and maintain the Form 300A on the site Safety Bulletin Board.

d. Maintain applicable safety reference material on the job site.

e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.

f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.

g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.

h. Ensure subcontractor compliance with safety and health requirements.

i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).

j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.

k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.6.3 Meetings

1.6.3.1 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction conference. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin work until an APP is established that is acceptable to the Contracting Officer.

1.6.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.7 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the

Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

1.7.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.

b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection,

use and maintenance.

1.7.2 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.7.2.1 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

1.7.2.2 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. In addition, Critical Lift Plans are required for the following:

a. When working around energized power lines where the work will get closer than the minimum clearance distance in EM 385-1-1 Table 16-1.

b. For lifts with anticipated binding conditions.

c. When erecting cranes.

1.7.2.2.1 Critical Lift Plan Planning and Schedule

Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

1.7.2.2.2 Lifts of Personnel

In addition to the requirements of EM 385-1-1, Section 16.H.02, for lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

1.7.2.3 Multi-Purpose Machines, Material Handling Equipment, and Construction Equipment Lift Plan

Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Written approval from a qualified registered professional engineer, after a safety analysis is performed, is allowed in lieu of the OEM's approval. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.7.2.4 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and

ASSE/SAFE Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.7.2.5 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSE/SAFE Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.7.2.6 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A and Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS.

1.7.2.7 Site Safety and Health Plan

Identify the safety and health aspects, and prepare in accordance with Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES.

1.7.2.8 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION and referenced sources.

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards,

site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including crane and rigging, excavations, trenching, and fall protection.

1.8.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.8.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.9 DISPLAY OF SAFETY INFORMATION

1.9.1 Safety Bulletin Board

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.07.

1.9.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

a. Date deficiency identified;

b. Description of deficiency;

c. Name of person responsible for correcting deficiency;

d. Projected resolution date;

e. Date actually resolved.

1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including

those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.11 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.12 NOTIFICATIONS and REPORTS

1.12.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, or any property damage. For LHE or rigging mishaps, notify the Contracting Officer as soon as practical but not more than 4 hours after mishap. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

1.12.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable Accident Report Form 3394, and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: Report all "Near Misses" to the SSHO using local mishap reporting procedures, within 24 hrs. The Contracting Officer will provide the Contractor the required forms. Near miss reports are considered positive and proactive Contractor safety management actions.

1.12.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.13 HOT WORK

1.13.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to place in memory the emergency Fire Department phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DEPARTMENT IMMEDIATELY.

1.13.2 Work Around Flammable Materials

Obtain permit for "HOT WORK" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) that have the potential for flammable or explosive atmospheres.

Whenever these materials are encountered, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in EM 385-1-1, Section 06.H.

1.14 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated

noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Hard Hat

b. Long Pants

c. Appropriate Safety Shoes

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval.

3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within 10 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4, "Changes" and FAR 52.236-2, "Differing Site Conditions."

3.2 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

3.3 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSE/SAFE Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.3.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSE/SAFE Z359.2 in the AHA.

3.3.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M,ASSE/SAFE Z359.0, ASSE/SAFE Z359.1, ASSE/SAFE Z359.2, ASSE/SAFE Z359.3, ASSE/SAFE Z359.4, ASSE/SAFE Z359.6, ASSE/SAFE Z359.7, ASSE/SAFE Z359.11, ASSE/SAFE Z359.12, ASSE/SAFE Z359.13, ASSE/SAFE Z359.14, and ASSE/SAFE Z359.15.

3.3.2.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.O through 21.O.06. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.3.2.2 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabiners must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper

energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.3.3 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.3.4 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.3.5 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of EM 385-1-1, ASSE/SAFE Z359.2, and ASSE/SAFE Z359.4.

3.4 WORK PLATFORMS

3.4.1 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.5 EQUIPMENT

3.5.1 Material Handling Equipment (MHE)

a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.5.2 Load Handling Equipment (LHE)

The following requirements apply. In exception, these requirements do not apply to commercial truck mounted and articulating boom cranes used solely to deliver material and supplies (not prefabricated components, structural steel, or components of a systems-engineered metal building) where the lift consists of moving materials and supplies from a truck or trailer to the ground; to cranes installed on mechanics trucks that are used solely in the repair of shore-based equipment; to crane that enter the activity but are not used for lifting; nor to other machines not used to lift loads suspended by rigging equipment. However, LHE accidents occurring during such operations must be reported.

a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards safety standards.

c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.

e. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.

f. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

g. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

h. All employees must keep clear of loads about to be lifted and of suspended loads, except for employees required to handle the load.

i. Use cribbing when performing lifts on outriggers.

j. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

k. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.

l. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.

m. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.

n. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

o. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

3.5.3 Machinery and Mechanized Equipment

a. Proof of qualifications for operator must be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.5.4 Base Mounted Drum Hoists

a. Operation of base mounted drum hoists must comply with EM 385-1-1 and ASSE/SAFE A10.22.

b. Rigging gear must comply with applicable ASME/OSHA standards

c. When used on telecommunication towers, base mounted drum hoists must comply with TIA-1019, TIA-222, ASME B30.7, 29 CFR 1926.552, and 29 CFR 1926.553.

d. When used to hoist personnel, the AHA must include a written standard operating procedure. Operators must have a physical examination in accordance with EM 385-1-1 Section 16.B.05 and trained, at a minimum, in accordance with EM 385-1-1 Section 16.U and 16.T. The base mounted drum hoist must also comply with OSHA Instruction CPL 02-01-056 and ASME B30.23.

e. Material and personnel must not be hoisted simultaneously.

f. Personnel cage must be marked with the capacity (in number of persons) and load limit in pounds.

g. Construction equipment must not be used for hoisting material or personnel or with trolley/tag lines. Construction equipment may be used for towing and assisting with anchoring guy lines.

3.6 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.6.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

3.6.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within 3 feet of the underground system.

3.6.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility

systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

3.7 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

3.7.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.7.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State and Local requirements applicable to where work is being performed.

3.7.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.7.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.7.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

SECTION 01 35 29.13

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z358.1	(2014) American National Standard for Emergency Eyewash and Shower Equipment

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 85-115	(1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1904	Recording and Reporting Occupational Injuries and Illnesses
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

1.2 PRECONSTRUCTION SAFETY CONFERENCE

Conduct a preconstruction safety conference prior to the start of site activities and after submission of the Accident Prevention Plan/Site Safety And Health Plan (APP/SSHP). The objective of the meeting is to discuss health and safety concerns related to the impending work, discuss project health and safety organization and expectations, review and answer

comments and concerns regarding the APP/SSHP or other health and safety concerns . Ensure that those individuals responsible for health and safety at the project level are available and attend this meeting.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Work Zones; G

SZ/trailer shown in C-233, remainder Work Zones to be shown in Contractor plan submittals.

Decontamination Facilities; G

To be shown in Contractor plan submittals.

SD-03 Product Data

Amendments to the APP/SSHP

Exposure Monitoring/Air Sampling Program

Site Control Log

SSHO's Daily Inspection Logs

SD-07 Certificates

Certificate of Worker/Visitor Acknowledgement

SD-11 Closeout Submittals

Safety And Health Phase-Out Report

1.4 ACCIDENT PREVENTION PLAN/SITE SAFETY AND HEALTH PLAN (APP/SSHP)

Develop and implement a Site Safety and Health Plan in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS, and attach to the Accident Prevention Plan (APP) as an appendix (APP/SSHP). Address all occupational safety and health hazards (traditional construction as well as contaminant-related hazards) associated with cleanup operations within the APP/SSHP. Cover each SSHP element in sections 28.A.01 and 33.B of EM 385-1-1 and each APP element in Appendix A of EM 385-1-1. There are overlapping elements in Section 28.A.01 and Appendix A of EM 385-1-1. SSHP appendix elements that overlap with APP elements need not be duplicated in the APP/SSHP provided each safety and occupational health (SOH) issue receives adequate attention and is documented in the APP/SSHP. The APP/SSHP is a dynamic document, subject to change as project operations/execution change. Modify the APP/SSHP to address changing and previously unidentified health and safety conditions. Ensure that the APP/SSHP is updated accordingly. Submit amendments to the APP/SSHP to the Contracting Officer as the APP/SSHP is updated. For long duration projects resubmit the APP/SSHP to the Contracting Officer

annually for review. The APP/SSHP must contain all updates.

1.4.1 Acceptance and Modifications

Prior to submittal, the APP/SSHP must be signed and dated by the Safety and Health Manager and the Site Superintendent. Submit for review 14 days prior to the Preconstruction Safety Conference. Deficiencies in the APP/SSHP will be discussed at the preconstruction safety conference, and must be revised to correct the deficiencies and resubmitted for acceptance. Onsite work must not begin until the plan has been accepted. Maintain a copy of the written APP/SSHP onsite. Changes and modifications to the APP/SSHP must be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Bring to the attention of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer any unforeseen hazard that becomes evident during the performance of the work, through the Site Safety and Health Officer (SSHO) for resolution as soon as possible. In the interim, take necessary action to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted APP/SSHP is cause for stopping work until the matter has been rectified.

1.4.2 Availability

Make available the APP/SSHP in accordance with 29 CFR 1910.120, (b)(1)(v) and 29 CFR 1926.65, (b)(1)(v).

1.5 STAFF ORGANIZATION, QUALIFICATION AND RESPONSIBILITIES

Provide hazardous waste operations and emergency response organization in accordance with EM 385-1-1, Section 33.

1.5.1 Safety and Health Manager

Safety and Health Manager must be a safety professional certified by the Board of Certified Safety Professionals or equivalent approved alternate.

Apply the following in conjunction with the required qualifications and responsibilities stated in EM 385-1-1, Section 33.C.01.

1.5.1.1 Additional Qualifications

The Safety and Health Manager must have the following qualifications:

a. A minimum of 3 years' experience in developing and implementing safety and occupational health programs at HTRW sites.

b. Documented experience in supervising professional and technician level personnel.

c. Documented experience in developing worker exposure assessment programs and air monitoring programs and techniques.

d. Documented experience in managing personal protective equipment (PPE) programs and conducting PPE hazard evaluations for the types of activities and hazards likely to be encountered on the project.

e. Working knowledge of state and Federal occupational safety and health

regulations.

1.5.1.2 Responsibilities and Duties

a. Development, implementation, oversight, and enforcement of the APP/SSHP.

b. Provide onsite consultation as needed to ensure the APP/SSHP is fully implemented.

c. Conduct initial site-specific training.

d. Be present onsite during the first 3 days of remedial activities and at the startup of each new major phase of work.

e. Visit the site as needed and at least once per month for the duration of activities, to audit the effectiveness of the APP/SSHP.

f. Be available for emergencies.

g. Coordinate any modifications to the APP/SSHP with the Site Superintendent, the SSHO, and the Contracting Officer.

h. Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE.

i. Provide continued support for upgrading/downgrading of the level of personal protection.

j. Serve as a member of the quality control staff.

k. Review accident reports and results of daily inspections.

l. Sign and date the APP/SSHP prior to submittal.

1.5.2 Site Safety and Health Officer

Designate an individual and one alternate as the Site Safety and Health Officer (SSHO). Include the name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer and alternate in the APP/SSHP.

The Apply the following in conjunction with the required qualifications and responsibilities stated in EM 385-1-1, Section 33.C.02.

1.5.2.1 Qualifications

The following requirements are in addition to those in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

a. A minimum of 1 year experience in implementing SOH programs at HTRW sites where Level C personal protective equipment was required.

b. Meet 29 CFR 1910.120/29 CFR 1926.65 requirements for 40-hour initial and 8-hour supervisor training and, maintain 8-hour refresher training requirements.

c. Specific training in personal and respiratory protective equipment, and in the proper use of air monitoring instruments and air sampling

methods.

d. Documented experience in construction techniques and construction safety procedures.

e. Working knowledge of Federal and state occupational SOH regulations.

1.5.2.2 Responsibilities and Duties

The following requirements are in addition to those in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

a. Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted APP/SSHP.

b. Be assigned to the site on a full time basis for the duration of field activities. The SSHO can have collateral duties in addition to SOH related duties. If operations are performed during more than 1 work shift per day, a site Safety and Health Officer must be present for each shift.

c. Have authority to stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.

d. Have authority to ensure site compliance with specified SOH requirements, Federal, state and OSHA regulations and all aspects of the APP/SSHP including, but not limited to, activity hazard analyses, air monitoring, monitoring for ionizing radiation, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment program, and preparation of records by performing a daily SOH inspection and documenting results on the Daily Safety Inspection Log in accordance with 29 CFR 1904.

e. In coordination with site management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.

f. Consult with and coordinate any modifications to the APP/SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.

g. Conduct daily safety inspection and document SOH findings into the Daily Safety Inspection Log. Track noted SOH deficiencies to ensure that they are corrected.

h. Conduct accident investigations and prepare accident reports.

i. Serve as a member of the quality control staff on matters relating to SOH.

1.5.3 Additional Certified Health and Safety Support Personnel

Retain safety support from a safety professional certified by the Board of Certified Safety professionals to develop written occupational safety procedures for the APP/SSHP and, when necessary, visit the site to help

implement APP/SSHP requirements.

1.5.4 Occupational Physician

Utilize the services of a licensed physician, who is certified in occupational medicine by the American Board of Preventative Medicine, or who, by necessary training and experience is Board eligible. The physician must be familiar with the site's hazards and the scope of this project. Include the medical consultant's name, qualifications, and knowledge of the site's conditions and proposed activities in the APP/SSHP. The physician is responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120, (f) and 29 CFR 1926.65, (f) and paragraph MEDICAL SURVEILLANCE PROGRAM.

1.5.5 Persons Certified in First Aid and CPR

At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency must be onsite at all times during site operations. They must be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030. These persons may perform other duties but must be immediately available to render first aid when needed.

1.5.6 Safety and Health Technicians

For each work crew in the exclusion zone, one person, designated as a Safety and Health technician, must perform activities such as air monitoring, decontamination, and safety oversight on behalf of the SSHO. They must have appropriate training equivalent to the SSHO in each specific area for which they have responsibility and report to and be under the supervision of the SSHO.

1.6 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Develop and implement an Emergency Response Plan, that meets the requirements of EM 385-1-1 Section 33.G, 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l), as a section of the APP/SSHP. In the event of any emergency associated with remedial action, without delay, alert all onsite employees and as necessary offsite emergency responders that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Train employees that are required to respond to hazardous emergency situations to their level of responsibility according to 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) requirements. Rehearse the plan regularly as part of the overall training program for site operations. Review the plan periodically and revised as necessary to reflect new or changing site conditions or information. Provide copies of the Emergency Response Portion of the accepted APP/SSHP to the affected local emergency response agencies. Address, as a minimum, the following elements in the plan:

a. Pre-emergency planning. Coordinate with local emergency response providers during preparation of the Emergency Response Plan. At a minimum, coordinate with local fire, rescue, hazardous materials response teams, police and emergency medical providers to assure all organizations are capable and willing to respond to and provide services for on-site emergencies. Ensure the Emergency Response Plan

for the site is compatible and integrated with the local fire, rescue, medical and police security services available from local emergency response planning agencies.

b. Personnel roles, lines of authority, communications for emergencies.

c. Emergency recognition and prevention.

d. Site topography, layout, and prevailing weather conditions.

e. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

f. Route maps to nearest prenotified medical facility. Site-support vehicles must be equipped with maps. At the beginning of project operations, drivers of the support vehicles must become familiar with the emergency route and the travel time required.

g. Specific procedures for decontamination and medical treatment of injured personnel.

h. Emergency alerting and response procedures including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, Federal, state, and local environmental agencies; as well as Safety and Health Manager, the Site Superintendent, the Contracting Officer and their alternates).

i. Criteria for initiating community alert program, contacts, and responsibilities.

j. Procedures for reporting incidents to appropriate government agencies. In the event that an incident such as an explosion or fire, or a spill or release of toxic materials occurs during the course of the project, the appropriate government agencies must be immediately notified. In addition, verbally notify the Contracting Officer and the local district safety office immediately and submit a written notification within 24 hours. Include within the report the following items:

(1) Name, organization, telephone number, and location of the Contractor.

(2) Name and title of the person(s) reporting.

(3) Date and time of the incident.

(4) Location of the incident, i.e., site location, facility name.

(5) Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.

(6) Cause of the incident, if known.

(7) Casualties (fatalities, disabling injuries).

(8) Details of any existing chemical hazard or contamination.

(9) Estimated property damage, if applicable.

(10) Nature of damage, effect on contract schedule.

(11) Action taken to ensure safety and security.

(12) Other damage or injuries sustained, public or private.

k. Procedures for critique of emergency responses and follow-up.

1.7 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

A copy of a certificate of worker/visitor acknowledgement must be completed and submitted for each visitor allowed to enter contamination reduction or exclusion zones, and for each employee, following the Example Certificate Of Worker/Visitor Acknowledgement at the end of this section.

1.8 INSPECTIONS

Attach to and submit with the Daily Quality Control reports the SSHO's Daily Inspection Logs. Include with each entry the following: date, work area checked, employees present in work area, PPE and work equipment being used in each area, special SOH issues and notes, and signature of preparer.

1.9 SAFETY AND HEALTH PHASE-OUT REPORT

Submit a Safety and Health Phase-Out Report in conjunction with the project close out report, prior to final acceptance of the work. Include the following minimum information :

a. Summary of the overall performance of SOH (e.g., accidents or incidents including near misses, unusual events, lessons learned).

b. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and on site facilities.

c. Summary of exposure monitoring and air sampling accomplished during the project.

d. Signatures of Safety and Health Manager and SSHO.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

Comply with EM 385-1-1, 29 CFR 1926.65, 29 CFR 1910.120, OSHA requirements in 29 CFR 1910 and 29 CFR 1926 with work performed under this contract, and state specific OSHA requirements where applicable. Submit to the Contracting Officer for resolution matters of interpretation of standards before starting work. The most stringent requirements apply where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary.

2.2 PERSONAL PROTECTIVE EQUIPMENT

2.2.1 Site Specific PPE Program

Provide onsite personnel exposed to contaminants with appropriate personal protective equipment. Components of levels of protection (B, C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Use only respirators approved by NIOSH.

Keep protective equipment and clothing clean and well maintained. Include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, cartridge change out, and storage of PPE within the PPE section of the APP/SSHP.

2.2.2 Levels of Protection

The Safety and Health Manager must establish and evaluate as the work progresses the levels of protection for each work activity. Also establish action levels for upgrade or downgrade in levels of PPE. Describe in the SSHP the protocols and the communication network for changing the level of protection. Address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, and individual medical considerations within the PPE evaluation protocol.

2.2.2.1 Initial PPE Components

The following items constitute initial minimum protective clothing and equipment ensembles. Modified Level D PPE is the expected PPE to be required for most operations given the current scope and site conditions.

Level D	- Tyvek for soil sampling, Saranex for groundwater sampling. - Boots, safety toe. - Outer boot covers, chemical-resistant, disposable. - Chemical-resistant (4 mil nitrile). - Safety glasses with side shields. - Hardhat.
Modified Level D	- Long sleeved work uniform or equivalent. - Safety glasses with side shields. - Safety or steel toe boots that are puncture resistant. - Chemical-resistant (4 mil nitrile) when handling contaminated materials. - Hardhat.

Level C	- Air Purifying respirator (MSHA/NIOSH approved) with an organic vapor/acid gas/P100 filter cartridge. - Chemical-resistant one or two piece suit (Saranex/Tyvek) with double bonded seams. - Long cotton underwear (optional). - Outer gloves, chemical-resistant (11 mil nitrile). - Inner gloves, chemical-resistant (4 mil nitrile). - Boots, chemical-resistant, safety or steel toe. - Outer boot covers, chemical-resistant, disposable. - Face shield (optional). - Hardhat.
Level B	- Supplied-air respirator (Mine Safety and Health Administration (MSHA)/approved). Respirators may be positive pressure-demand self-contained breathing apparatus (SCBA) or positive pressure-demand airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere). - Hooded chemical-resistant one piece suit (Saranex/Tyvek) with double bonded seams. - Long cotton underwear (optional). - Outer gloves, chemical-resistant (11 mil nitrile). - Inner gloves, chemical-resistant (4 mil nitrile). - Boots, chemical-resistant, steel toe. - Outer boot covers, chemical-resistant, disposable. - Face shield (optional). - Hardhat.

2.2.3 PPE for Government Personnel

Two clean sets of personal protective equipment, as required for entry into the Exclusion Zone and Contamination Reduction Zone, must be available for use by the Contracting Officer or official visitors. The items must be cleaned, maintained and stored in the clean room of the decontamination facility or construction trailer and clearly marked: "FOR USE BY GOVERNMENT ONLY." Provide basic training in the use and limitations of the PPE provided.

2.3 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

Maintain, as a minimum, the following items onsite and available for immediate use:

a. First aid equipment and supplies approved by the consulting physician.

b. Emergency eyewashes and showers that comply with ANSI/ISEA Z358.1.

c. Emergency-use respirators. Not used.

d. Provide fire extinguishers of sufficient size and type at site facilities and in all vehicles and at any other site locations where flammable or combustible materials present a fire risk.

PART 3 EXECUTION

3.1 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

3.1.1 Project/Site Conditions

Refer to the following reports and information for the site description and contamination characterization. The documents are available for viewing through the Contracting Officer.

3.1.1.1 CERCLA Documents

Remedial Design, APP/HASP.

3.2 TASK SPECIFIC HAZARDS, INITIAL PPE, HAZWOPER MEDICAL SURVEILLANCE AND TRAINING APPLICABILITY

Task specific occupational hazards, task specific HAZWOPER medical surveillance and training applicability and task specific initial PPE requirements for the project are listed on the Task Hazard and Control Sheets at the end of this section. Reevaluate occupational safety and health hazards as the work progresses and to adjust the PPE and onsite operations, if necessary, so that the work is performed safely and in compliance with occupational safety and health regulations.

3.3 TRAINING

In conjunction with EM 385-1-1, Section 33D, meet the training program requirements for workers performing cleanup operations and who will be exposed to contaminants.

3.3.1 General HTRW Operations Training

All Personnel performing duties with potential for exposure to onsite contaminants must meet and maintain the following 29 CFR 1910.120/ 29 CFR 1926.65 (e) training requirements:

a. 40 hours of off site HTRW instruction.

b. 3 days actual on-the-job field experience under the direct supervision of a trained, experienced supervisor.

c. 8 hours refresher training annually.

Onsite supervisors must have an additional 8 hours management and supervisor training specified in 29 CFR 1910.120/29 CFR 1926.65 (e) (4).

3.3.2 Pre-Entry Briefing

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, must attend a site-specific SOH training session. This session will be conducted by the Safety and Health Manager and the Site Safety and Health Officer to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Thoroughly discuss procedures and contents of the accepted APP/SSHP and Sections 01.B.02 and 28.D.03 of EM 385-1-1 . Each employee must sign a training log to acknowledge attendance and understanding of the training. Notify the Engineer at least 5 days prior to the initial site-specific training

session so government personnel involved in the project may attend.

3.3.3 Periodic Sessions

Conduct periodic onsite training by the SSHO at least weekly for personnel assigned to work at the site during the following week. Address SOH procedures, work practices, any changes in the APP/SSHP, activity hazard analyses, work tasks, or schedule; results of previous week's air monitoring, review of safety discrepancies and accidents. Convene a meeting prior to implementation of the change should an operational change affecting onsite field work be made, to explain SOH procedures. Conduct a site-specific training sessions for new personnel, visitors, and suppliers by the SSHO using the training curriculum outlines developed by the Safety and Health Manager. Each employee must sign a training log to acknowledge attendance and understanding of the training.

3.3.4 Other Training

Special site specific training requirements:

a. Train in accordance with 49 CFR 172, persons involved in any aspect of the transportation of hazardous materials.

3.4 MEDICAL SURVEILLANCE PROGRAM

Meet all requirements of 29 CFR 1910.120/29 CFR 1926.65 medical surveillance program and EM 385-1-1, Section 33.G for workers performing cleanup operations and who will be exposed to contaminants. Ensure the Occupational Physician or the physician's designee performs the physical examinations and reviews examination results. Participation in the medical surveillance program is without cost to the employee, without loss of pay and at a reasonable time and place.

3.5 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Prepare and implement by the Safety and Health Manager an exposure monitoring/air sampling program to identify and quantify SOH hazards and airborne levels of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment for affected site personnel. Include action levels for upgrading/downgrading PPE in the program. Submit personnel exposure monitoring/sampling results. Monitor for the following gasses and vapors: air borne site contaminants. The detailed approach to be used for air monitoring will be proposed by the RA Contractor in the Air Quality Monitoring Plan defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.6 HEAT STRESS MONITORING AND MANAGEMENT

Document in the APP/SSHP and implement the procedures and practices in section 06.J. in EM 385-1-1 to monitor and manage heat stress.

3.7 SPILL AND DISCHARGE CONTROL

Develop and implement written spill and discharge containment/control procedures. Address laboratory waste packs, material handling equipment, as well as drum and container handling, opening, sampling, shipping and transport. Describe prevention measures, such as building berms or dikes; spill control measures and material to be used (e.g. booms, vermiculite);

location of the spill control material; personal protective equipment required to cleanup spills; disposal of contaminated material; and who is responsible to report the spill. Storage of contaminated material or hazardous materials must be appropriately bermed, diked and contained to prevent any spillage of material on uncontaminated soil. If the spill or discharge is reportable, or human health or the environment are threatened, notify the National Response Center, the state, and the Contracting Officer as soon as possible. Provide control as required by Section 01 57 19 TEMPORARY ENVIRONMENT CONTROLS. Reporting requirements must be in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.8 SITE CONTROL MEASURES

Coordinate site control measures with Section 01 57 19 TEMPORARY ENVIRONMENT CONTROLS.

3.8.1 Work Zones

Initial anticipated work zone boundaries (exclusion zone, contamination reduction zone, support zone, all access points and decontamination areas) are to be clearly delineated on the site drawings. Base delineation of work zone boundaries on the contamination characterization data and the hazard/risk analysis to be performed as described in EM 385-1-1 06.A.02. As work progresses and field conditions are monitored, work zone boundaries may be modified (and site drawings modified) with approval of the Contracting Officer. Clearly identify work zones and mark in the field (using fences, tape, or signs). Submit and post a site map, showing work zone boundaries and locations of decontamination facilities in the onsite office. Work zones must consist of the following:

3.8.1.1 Exclusion Zone (EZ)

The exclusion zone is the area where hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Control entry into this area and exit may only be made through the Contamination Reduction Zone (CRZ).

3.8.1.2 Contamination Reduction Zone (CRZ)

The CRZ is the transition area between the Exclusion Zone and the Support Zone. The personnel and equipment decontamination areas must be separate and unique areas located in the CRZ.

3.8.1.3 Support Zone (SZ)

The Support Zone is defined as areas of the site, other than exclusion zones and contamination reduction zones, where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from HTRW operations. Secure the Support Zone against active or passive contamination. Site offices, parking areas, and other support facilities must be located in the Support Zone.

3.8.2 Site Control Log

A log of personnel visiting, entering, or working on the site must be maintained. Include the following: date, name, agency or company, time entering and exiting site, time entering and exiting the exclusion zone (if applicable). Before visitors are allowed to enter the Contamination

Reduction Zone or Exclusion Zone, they must show proof of current training, medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and fill out a Certificate of Worker or Visitor Acknowledgment. Record this visitor information, including date, in the log.

3.8.3 Communication

Site emergency communication shall follow the procedures set forth in the APP/SSHP.

3.8.4 Site Security

The work areas on the facility shall be controlled at all times to discourage unwarranted trespass, theft, improper disposal, illegal dumping practices, and other practices which could damage the remedy or create a hazard for people. The on-facility and off-facility perimeter that falls within areas of soil excavation or barrier wall construction will be secured with fencing in accordance with requirements defined in Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

3.9 PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the Exclusion or Contamination Reduction Zones or otherwise exposed to hazardous chemical vapors, gases, liquids, or contaminated solids must decontaminate themselves and their equipment prior to exiting the contamination reduction zone (CRZ) and entering the support zone. Consult Chapter 10.0 of NIOSH 85-115 when preparing decontamination procedures. Submit a detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers as part of the APP/SSHP. Train employees in the procedures and enforce the procedures throughout site operations.

3.9.1 Decontamination Facilities

Submit drawings showing the layout of the personnel and equipment decontamination areas.

3.9.2 Personnel Decontamination

Initially set up a decontamination line in the CRZ. Employees must exit the exclusion zone through the CRZ and implement the following decontamination procedures and techniques: Scrub and rinse water proof outer garments. Showers, if needed, must comply with 29 CFR 1910, Section.141 and EM 385-1-1, 02 F, Washing Facilities. It is the Site Safety and Health Officer's responsibility to recommend techniques to improve personnel decontamination procedures, if necessary.

3.9.3 Equipment Decontamination

Decontaminate the vehicles and equipment used in the EZ in the CRZ prior to leaving the EZ.

3.9.3.1 Facilities for Equipment and Personnel

Provide a vehicle/equipment decontamination station within the CRZ for decontaminating vehicles and equipment leaving the EZ. Construct a decontamination station pad, which meets the site decontamination needs for all vehicles and larger equipment decontamination. Contaminated

equipment will be decontaminated by washing with steam or high-pressure water until visible traces of soil are removed. Construct the pad to capture decontamination water, including overspray, and allow for collection and removal of the decontamination water using sumps, dikes and ditches as required.

3.9.3.2 Procedures

Procedures for equipment decontamination must be developed and utilized to prevent the spread of contamination into the SZ and offsite areas. These procedures must address disposal of contaminated products and spent materials used on the site, including, as a minimum, containers, fluids, and oils. Assume any item taken into the EZ to be contaminated and perform an inspection and decontaminate. Vehicles, equipment, and materials must be cleaned and decontaminated prior to leaving the site. Handle construction material in such a way as to minimize the potential for contaminants being spread or carried offsite. Prior to exiting the site, vehicles and equipment must be monitored to ensure the adequacy of decontamination.

Task Hazard and Control Requirements Sheet	
Task	Remedial Action Construction
Initial Anticipated Hazards	COCs: - BaP TEQ - Pentachlorophenol - 2 - Methylnapthalene - 2,3,7,8-TCDD TEQ (Dioxin)
Initial PPE	Modified Level D: - Long sleeved work uniform or equivalent. - Safety glasses with side shields. - Safety or steel toe boots that are puncture resistant. - Chemical-resistant (4 mil thick nitrile) when handling contaminated materials. - Hardhat.
Initial Controls	The Contractor will use appropriate engineering measures for control of dust, storm water, erosion and equipment decontamination as necessary during all excavation, hauling, placement and loading/unloading operations. Environmental controls shall be in place prior to any intrusive work in contaminated areas.
Initial Exposure Monitoring	Dust controls will be designed to suppress visible dust above limits specified in the Contractor's HSP and Air Quality Monitoring Plan.
Yes	HAZWOPER Medical Surveillance Required
Yes	HAZWOPER Training Required

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g. ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AACE INTERNATIONAL (AACE)
1265 Suncrest Towne Centre Drive
Morgantown, WV 26505-1876 USA
Ph: 304-296-8444
Fax: 304-291-5728
E-mail: info@aacei.org
Internet: http://www.aacei.org

AMERICAN PETROLEUM INSTITUTE (API)
Internet: http://www.api.org

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
1800 East Oakton Street
Des Plaines, IL 60018
Ph: 847-699-2929
Internet: http://www.asse.org

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 West Quincy Avenue
Denver, CO 80235-3098
Ph: 303-794-7711
E-mail: distribution@awwa.org
Internet: http://www.awwa.org

ASME INTERNATIONAL (ASME)
Two Park Avenue, M/S 10E
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: http://www.asme.org

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 877-909-2786
Internet: http://www.astm.org

FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE (FRTR)
Ph: 703-487-4650
Internet: http://www.frtr.gov/

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)
University of South California
Research Annex 219
3716 South Hope Street
Los Angeles, CA 90089-7700
Ph: 213-740-2032 or 866-545-6340
Fax: 213-740-8399
E-mail: fccchr@usc.edu
Internet: http://www.usc.edu/dept/fccchr

GEOSYNTHETIC INSTITUTE (GSI)
475 Kedron Avenue
Folsom, PA 19033-1208
Ph: 610-522-8440
Fax: 610-522-8441
Internet: http://www.geosynthetic-institute.org

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-562-9667
E-mail: onlinesupport@ieee.org
Internet: http://www.ieee.org

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)
1901 North Moore Street
Arlington, VA 22209-1762
Ph: 703-525-1695
Fax: 703-528-2148
Internet: http://www.safetyequipment.org/

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
Internet: http://www.nfpa.org

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
395 E Street, S.W.
Suite 9200
Patriots Plaza Building
Washington, DC 20201
Ph: 800-232-4636
Fax: 513-533-8347
E-mail: nioshdocket@cdc.gov

Internet: http://www.cdc.gov/niosh/

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)
1320 N. Courthouse Rd., Suite 200
Arlington, VA 22201
Ph: 703-907-7700
Fax: 703-907-7727
Internet: http://www.tiaonline.org

TURFGRASS PRODUCERS INTERNATIONAL (TPI)
2 East Main Street
East Dundee, IL 60118
Ph: 847-649-5555
Fax: 847-649-5678
E-mail: info@turfgrasssod.org
Internet: http://www.turfgrasssod.org

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet:
http://www.wbdg.org/ccb/browse_cat.php?c=68
Order Other Documents from:
USACE Publications Depot
Attn: CEHEC-IM-PD
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: pubs-army@usace.army.mil
Internet: http://www.publications.usace.army.mil/
or
http://www.hnc.usace.army.mil/Missions/Engineering/TECHINFO.aspx

U.S. DEPARTMENT OF AGRICULTURE (USDA)
Order AMS Publications from:
AGRICULTURAL MARKETING SERVICE (AMS)
Seed Regulatory and Testing Branch
801 Summit Crossing Place, Suite C
Gastonia, NC 28054-2193
Ph: 704-810-8871
Fax: 704-852-4189
E-mail: seed.ams@usda.gov
Internet: http://www.ams.usda.gov/lsg/seed.htm
Order Other Publications from:
U.S. Department of Agriculture, Rural Utilities Program
USDA Rural Development, Room 4051-S
Mail Stop 1510
1400 Independence Avenue SW
Washington, DC 20250-1510
Phone: (202) 720-9540
TTY: (800) 877-8339 (Federal Relay Service)
Fax: (202) 720-1725
Internet: http://www.rurdev.usda.gov/utilities_lp.html

U.S. DEPARTMENT OF DEFENSE (DOD)
Order DOD Documents from:
Room 3A750-The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400

Ph: 703-571-3343
FAX: 215-697-1462
E-mail: customerservice@ntis.gov
Internet: http://www.ntis.gov
Obtain Military Specifications, Standards and Related Publications from:
Acquisition Streamlining and Standardization Information System (ASSIST)
Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues
Internet: http://assist.daps.dla.mil/online/start/; account registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, CD 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet: http://www.wbdg.org/references/docs_refs.php

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004
Ph: 202-272-0167
Internet: http://www2.epa.gov/libraries
--- Some EPA documents are available only from:
National Technical Information Service (NTIS)
5301 Shawnee Road
Alexandria, VA 22312
Ph: 703-605-6050 or 1-688-584-8332
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: http://www.ntis.gov

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
FHWA, Office of Safety
1200 New Jersey Ave., SE
Washington, DC 20590
Ph: 202-366-4000
Internet: http://www.fhwa.dot.gov
Order from:
Superintendent of Documents
U. S. Government Printing Office (GPO)
710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: http://www.gpoaccess.gov

U.S. GENERAL SERVICES ADMINISTRATION (GSA)
General Services Administration
1275 First St. NE

Washington, DC 20417
Ph: 202-501-1231
Internet: http://www.gsaelibrary.gsa.gov/ElibMain/home.do
Obtain documents from:
Acquisition Streamlining and Standardization Information System (ASSIST)
Internet: https://assist.dla.mil/online/start/; account registration required

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Fax: 301-837-0483
Internet: http://www.archives.gov
Order documents from:
Superintendent of Documents
U.S.Government Printing Office (GPO)
710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: http://www.gpoaccess.gov

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 45 00.00 10

QUALITY CONTROL

PART 1 GENERAL

1.1 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program. Include all associated costs in the applicable Bid Schedule item.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

SD-05 Design Data

Design Quality Control

SD-06 Test Reports

Daily Reports

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with the Contract Clause titled "Inspection of Construction." QC consist of plans, procedures, and organization necessary to produce an end product which complies with the Contract requirements. The QC system covers all design and construction operations, both onsite and offsite, and be keyed to the proposed design and construction sequence. The project superintendent will be held responsible for the quality of work and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. In this context the highest level manager responsible for the overall construction activities at the site, including quality and production is the project superintendent. The project superintendent maintains a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to the Contracting Officer.

3.2 CONTRACTOR QUALITY CONTROL (CQC) PLAN

Submit no later than 15 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work.

3.2.1 Content of the CQC Plan

Include, as a minimum, the following to cover all design and construction-operations, both onsite and offsite, including work by subcontractors designers of record, consultants, architect/engineers (AE), fabricators, suppliers and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified. Include a CQC Manager that reports to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC Manager, including authority to stop work which is not in compliance with the Contract. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC Manager. Furnish copies of these letters to the Contracting Officer.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer are required to be used.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and is identified by different trades or disciplines, or it is work by the same trade in a different environment. Although each section of the specifications can generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in the Contractor Quality Control(CQC) Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference,Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. Submit the CQC Plan a minimum of 14 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work. Minutes of the meeting will be prepared by the Government and will become a part of the contract file. There can be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a Safety and Health Manager, CQC Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure safety and Contract compliance. The Safety and Health Manager reports directly to a senior project (or corporate) official independent from the CQC Manager. The Safety and Health Manager will also serve as a member of the CQC Staff Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff maintains a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional

CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization is responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC Manager

Identify as CQC Manager an individual within the onsite work organization that is responsible for overall management of CQC and has the authority to act in all CQC matters for the Contractor. The CQC Manager is required to be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this Contract, or a construction person with a minimum of 10 years in related work. This CQC Manager is on the site at all times during construction and is employed by the prime Contractor. The CQC Manager is assigned as CQC Manager but has duties as project superintendent in addition to quality control. Identify in the plan an alternate to serve in the event of the CQC Manager's absence. The requirements for the alternate are the same as the CQC Manager.

3.4.3 CQC Inspector

The CQC Inspector is responsible for monitoring and documenting activities related to QC testing during the project. The CQC inspector shall have provided QC and/or QA services for at least 3 projects of similar scope.

3.4.4 Organizational Changes

Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, have to comply with the requirements in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

CQC is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control are required to be conducted by the CQC Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:

a. A review of each paragraph of applicable specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government

personnel until final acceptance of the work.

b. Review of the Contract drawings.

c. Check to assure that all materials and equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the Contract.

f. Examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. Review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Contracting Officer needs to be notified at least 48 hours in advance of beginning the preparatory control phase. Include a meeting conducted by the CQC Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:

a. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing are in compliance with the contract.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with

each worker.

f. The Government needs to be notified at least 48 hours in advance of beginning the initial phase for definable feature of work. Prepare separate minutes of this phase by the CQC Manager and attach to the daily CQC report. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases.

g. The initial phase for each definable feature of work is repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing. Testing includes operation and acceptance tests when specified. Procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual

test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Conduct an inspection of the work by the CQC Manager near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved drawings and specifications, as required by paragraph DOCUMENTATION. Include within the list of deficiencies the estimated date by which the deficiencies will be corrected. Make a second inspection the CQC Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Pre-Final Punch List may be developed as a result of this inspection. Ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph need to be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative is required to be in attendance at the final acceptance inspection. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notify the Contracting Officer at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the Contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

3.9.1 Quality Control Activities

Maintain current records providing factual evidence that required quality

control activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

a. The name and area of responsibility of the Contractor/Subcontractor.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and specifications.

j. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Independent Technical Review (ITR) team, the ITR review comments, responses and the record of resolution of the comments.

3.9.2 Daily Reports

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract. Furnish one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the Contractor Quality Control(CQC) System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC Manager Report.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the

Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer can issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2007) Standard for Reduced-Pressure Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies
FCCCHR Manual	(10th Edition) Manual of Cross-Connection Control

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2) National Electrical Code

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2009) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Traffic Control Plan; G

SD-03 Product Data

Backflow Preventers; G

SD-06 Test Reports

Backflow Preventer Tests

SD-07 Certificates

Backflow Tester Certification

Backflow Preventers Certificate of Full Approval

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas. The Construction Site Plan shall be submitted as part of the Site Management Plan defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

1.4 BACKFLOW PREVENTERS CERTIFICATE

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval will not be acceptable.

1.4.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with any company participating in any other phase of this Contract.

1.4.2 Backflow Prevention Training Certificate

Submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Immediately upon beginning of work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this contract. Construct with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic are be avoided. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic barricades will be required. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.2.3 Fencing

Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people.

a. The safety fencing must be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 48 inches high and maximum mesh size of 2 inches, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. Install fencing to be able to restrain a force of at least 250 pounds against it.

b. Enclose the project work area and Contractor lay-down area with a 8 ft high chain link fence and gates with brown, UV light resistant, plastic fabric mesh netting (similar to tennis court or other screening). Remove the fence upon completion and acceptance of the work. Intent is to block (screen) public view of the construction.

c. In addition, prior to the start of work, enclose those areas at the construction site which are not within the construction fence with a temporary safety fence, including gates and warning signs, to protect the public from construction activities. The safety fence shall match the base standard color (or bright orange where it protects excavated areas), shall be made of high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on minimum 10 foot centers. Remove the fence from the work site upon completion of the contract.

2.3 TEMPORARY WIRING

Provide temporary wiring in accordance with NFPA 241 and NFPA 70. Include frequent inspection of all equipment and apparatus.

2.4 BACKFLOW PREVENTERS

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged cast iron mounted gate valve and strainer, 304 stainless steel or bronze, internal parts. The particular make, model/design, and size of backflow preventers to be installed must be included in the latest edition of the List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and be accompanied by a Certificate of Full Approval from FCCCHR List. After installation conduct Backflow Preventer Tests and provide test reports verifying that the installation meets the FCCCHR Manual Standards.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Contractor employees will park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site.

3.2 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

3.3 AVAILABILITY AND USE OF UTILITY SERVICES

3.3.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.4 TRAFFIC PROVISIONS

3.4.1 Maintenance of Traffic

a. Traffic Control Plan. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. The Traffic Control Plan shall be submitted as part of the Site Management Plan defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Make all notifications and obtain any permits required for modification to traffic movements outside Station's jurisdiction. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at contractors expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority

having jurisdiction.

3.4.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to roads caused by construction operations.

3.4.3 Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations without notification to and approval by the Contracting Officer.

3.4.4 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Treat dust abatement on access roads with applications of calcium chloride, water sprinklers, or similar methods or treatment.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

3.5.1 Safety

Protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor must obtain prior approval from the Contracting Officer. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.5.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site.

3.5.3 Storage Area

Construct a temporary fence around trailers and materials. Include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit.

3.5.4 Appearance of Trailers

a. Trailers utilized by the Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and be in a state of good repair.

3.5.5 Maintenance of Storage Area

a. Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, will be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles; gravel gradation will be at the Contractor's discretion. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers will be edged or trimmed neatly.

3.6 ENGINEER'S FIELD OFFICE

3.6.1 Resident Engineer's Office

Provide the Government Resident Engineer with an office furnished with a door and window security package, located where directed and providing air conditioning, heat, electric light and power, and toilet facilities consisting of one lavatory and one water closet complete with connections to water and sewer mains if available or a portable toilet with hand washing station. Utilities will be connected and disconnected in accordance with local codes and to the satisfaction of the Contracting Officer.

3.6.2 Trailer-Type Mobile Office

The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer and providing as a minimum the facilities specified above. Securely anchor the trailer to the ground at all four corners to guard against movement during high winds.

3.7 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the contract and, upon completion and acceptance of the work, will become the property of the Contractor and be removed from the work site.

3.8 DUMPSTERS

Equip dumpsters with a secure cover and paint the standard installation color. Keep dumpster closed, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker installation color to collect debris in the construction site area. For large demolitions, large dumpsters without lids are acceptable, but must not have debris higher than the sides before emptying.

3.9 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store any salvageable materials resulting from demolition activities within the fenced area

described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.10 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and any other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence that will become the property of the Contractor. Restore areas used by the Contractor for the storage of equipment or material, or other use to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 261.7	Residues of Hazardous Waste in Empty Containers
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 262.31	Standards Applicable to Generators of Hazardous Waste-Labeling
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of

	Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64	Compliance Assurance Monitoring
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 172.101	Hazardous Material Regulation-Purpose and Use of Hazardous Material Table
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. http://www.epa.gov/ozone/science/ods/classone.html.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. http://www.epa.gov/ozone/science/ods/classtwo.html.

1.2.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or

disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.2.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

1.2.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; or during end use, treatment, handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibit a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D.

1.2.9 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.10 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.11 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

1.2.12 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.13 Pesticide

Pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.14 Pesticide Treatment Plan

A plan for the prevention, monitoring, and control to eliminate pest infestation. The Pesticide Treatment Plan shall be submitted as part of the Site Management Plan defined in Paragraph SITE MANAGEMENT PLAN.

1.2.15 Pests

Pests are arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.16 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.17 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.18 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.2.18.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.2.18.2 Green Waste

Green waste is the vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

1.2.18.3 Material not regulated as solid waste

Material not regulated as solid waste is nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.18.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

1.2.18.5 Recyclables

Recyclables are materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable, wiring, and structural components. It also includes commercial-grade refrigeration equipment with Freon removed, household appliances where the basic material content is metal, clean polyethylene terephthalate bottles, cooking oil, used fuel oil, textiles, high-grade paper products and corrugated cardboard, stackable pallets in good condition, clean crating material, and clean rubber/vehicle tires. Metal meeting the definition of lead contaminated or lead based paint contaminated may not be included as recyclable if sold to a scrap metal company. Paint cans that meet the definition of empty containers in accordance with 40 CFR 261.7 may be included as recyclable if sold to a scrap metal company.

1.2.18.6 Surplus Soil

Surplus soil is existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars, and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.

1.2.18.7 Scrap Metal

This includes scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe, and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

1.2.18.8 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

1.2.19 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.20 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.2.20.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not

evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.2.21 Waters of the United States

Waters of the United States means Federally jurisdictional waters, including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

1.2.22 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1.2.23 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey

Pesticide Treatment Plan; G

Solid Waste Management Permit; G

Regulatory Notifications; G

Site Management Plan; G

Environmental Protection Plan; G

Dirt and Dust Control Plan; G

Air Quality Monitoring Plan; G

Stormwater Pollution Prevention Plan; G

Erosion and Sediment Control Plan; G

Spill Prevention, Control, and Countermeasures Plan; G

Employee Training Records; G

Environmental Manager Qualifications; G

SD-06 Test Reports

Inspection Reports

Solid Waste Management Report; G

SD-07 Certificates

Employee Training Records; G

Erosion and Sediment Control Inspector Qualifications

SD-11 Closeout Submittals

Stormwater Pollution Prevention Plan Compliance Notebook; G

Stormwater Notice of Termination (for NPDES coverage under the general permit for construction activities); G

Waste Determination Documentation; G

Disposal Documentation for Hazardous and Regulated Waste; G

Assembled Employee Training Records; G

Solid Waste Management Permit; G

Solid Waste Management Report; G

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management; G

Regulatory Notifications; G

Sales Documentation; G

As-Built Topographic Survey

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the

laboratories must be certified.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey and Protection of Features

Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.5.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to the Contracting Officer at least 5 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and installation requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are

obtained, maintained, and closed out; ensure compliance with Stormwater Program requirements; and ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements. This can be a collateral position; however, the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out. Submit Environmental Manager Qualifications to the Contracting Officer.

1.5.5 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet EPA requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area. Provide copy of the Erosion and Sediment Control Inspector Qualifications as defined by EPA.

1.5.6 Non-Compliance Notifications

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

1.6 SITE MANAGEMENT PLAN (SMP)

A site management plan shall be prepared and submitted for review by the Contracting Officer. This plan will provide information on the Contractor's overall work approach and staging, construction sequencing, dust control, decontamination methods, equipment requirements. This submittal will also include the Contractor's preliminary construction schedule. The SMP will integrate by reference the plans described below.

Specific plans to be provided in the SMP defined in this Section include information defined in the following paragraphs:

a. Paragraph "Pesticide Treatment Plan."

b. Paragraph "ENVIRONMENTAL PROTECTION PLAN."

c. Paragraph "Air Quality Monitoring Plan."

d. Paragraph "Stormwater Pollution Prevention Plan."

e. Paragraph "Spill Prevention, Control, and Countermeasures."

In addition, there are several plans that shall be included within the SMP which have been defined in other specification sections for this project. For requirements to be covered by these plans refer to the following list of plans and associated referenced Sections:

a. Salvage Plan defined in Section 01 11 00 SUMMARY OF WORK. This plan shall be addressed as part of the Waste Plan to be included in the Site Management Plan.

b. Construction Site Plan defined in Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

c. Traffic Control Plan defined in Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

d. Waste Management Plan defined in Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

e. Demolition Plan defined in Section 02 41 00 DEMOLITION.

1.7 ENVIRONMENTAL PROTECTION PLAN (EPP)

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within 15 days after Contract award and not less than 10 days before the preconstruction meeting. The EPP shall be submitted as part of the Site Management Plan defined in Paragraph SITE MANAGEMENT PLAN. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.7.1 General Overview and Purpose

1.7.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as solid waste management plan and air pollution control plan.

1.7.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.7.1.3 Procedures

A copy of any standard or project-specific operating procedures that will be used to effectively manage and protect the environment on the project site.

1.7.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.7.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.7.2 General Site Information

1.7.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.7.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.

1.7.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the

removal and replacement of non-conforming work.

1.7.3 Management of Natural Resources

a. Land resources

b. Tree protection

c. Replacement of damaged landscape features

d. Temporary construction

e. Stream crossings

f. Fish and wildlife resources

g. Wetland areas

1.7.4 Protection of Historical and Archaeological Resources

a. Objectives

b. Methods

1.7.5 Stormwater Management and Control

a. Ground cover

b. Erodible soils

c. Temporary measures

(1) Structural Practices

(2) Temporary and permanent stabilization

d. Effective selection, implementation and maintenance of Best Management Practices (BMPs).

1.7.6 Contractor Waste Management Procedures

Procedures for control and disposal of solid and sanitary waste and hazardous waste generated derived by Contractor's operation shall be addressed.

Solid waste procedures shall be addressed in accordance with provision for the Waste Management Plan defined in Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

For hazardous waste to be generated, procedures, as a minimum, shall include the following:

a. List of the types of hazardous wastes expected to be generated

b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated

c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory

certifications

d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)

e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)

f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268)

g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar

h. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization procedures

i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.

1.7.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.7.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.7.9 Clean Air Act Compliance

1.7.9.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

1.7.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Contracting Officer.

1.7.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60

Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between emergency and non-emergency operation.

1.7.9.4 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, demolition, material handling, fugitive dust, and fugitive emissions). Log hours of operations and track quantities of materials used.

1.7.9.5 Air Quality Monitoring Plan

For the protection of public health, monitor and control contaminant emissions to the air from Hazardous and Toxic remedial action area sources to minimize short-term risks that might be posed to the community during the implementation of the remedial alternative in accordance with the items listed below. The Air quality Monitoring Plan shall be submitted as a separate discussion as part of the Site Management Plan defined in Paragraph SITE MANAGEMENT PLAN.

a. Perimeter Air Contaminant of Concern includes BaP TEQ and Dioxin TEQ.

b. Time Averaged Perimeter Action Levels are to be presented in the Air Quality Monitoring Plan.

c. Perimeter Sampling/Monitoring Locations are to be presented in the Air Quality Monitoring Plan.

d. Monitoring Instruments/Sampling and Analysis Methods are to be presented in the Air Quality Monitoring Plan.

e. Staffing are to be presented in the Air Quality Monitoring Plan.

1.7.9.6 Compliant Materials

Provide a list of and SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet permit requirements for emissions.

1.8 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7. Notify the Contracting Officer of all general use permitted equipment the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7.

1.9 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT

SUBMITTALS in this section.

1.10 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off site.

1.10.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Contracting Officer, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting

Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with any required permits including, but not limited to, Clean Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Contracting Officer and appropriate Government Agencies for any release of contaminated water.

3.2.1 Construction General Permit

Provide a Construction General Permit as required by 40 CFR 122.26 or EPA General Permit. Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports. Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

3.2.1.1 Stormwater Pollution Prevention Plan

Submit a project-specific Stormwater Pollution Prevention Plan (SWPPP) to the Contracting Officer for approval, prior to the commencement of work. The SWPPP shall be submitted as a separate discussion as part of the Site Management Plan defined in Paragraph SITE MANAGEMENT PLAN. The SWPPP must meet the requirements of 40 CFR 122.26 and the EPA General Permit for stormwater discharges from construction sites.

Include the following:

a. Comply with terms of the EPA general permit for stormwater discharges from construction activities. Prepare SWPPP in accordance with EPA requirements. Use EPA guide Developing your Stormwater Pollution Prevention Plan located at http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Pollution-Prevention-Plans-for-Construction-Activities.cfm to prepare the SWPPP.

b. Select applicable BMPs from EPA Fact Sheets located at http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-StormWater-

Run-Off-Control.cfm or in accordance with applicable state or local requirements.

c. Include a completed copy of the Notice of Intent, BMP Inspection Report Template, and Stormwater Notice of Termination, except for the effective date.

3.2.1.2 Stormwater Notice of Intent for Construction Activities

Submit the approved NOI and appropriate permit fees onto the appropriate federal or state agency for approval. No land disturbing activities may commence without permit coverage. Maintain an approved copy of the SWPPP at the onsite construction office, and continually update as regulations require, reflecting current site conditions.

3.2.1.3 Inspection Reports

Submit "Inspection Reports" to the Contracting Officer in accordance with EPA Construction General Permit.

3.2.1.4 Stormwater Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence with the EPA and the Florida State Permitting Agency, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

3.2.1.5 Stormwater Notice of Termination for Construction Activities

Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the appropriate state or federal agency. Prepare as-built topographic survey information required by the permitting agency for certification of the stormwater management system, and provide to the Contracting Officer.

3.2.2 Erosion and Sediment Control Measures

3.2.2.1 Erosion and Sediment Control Plan

Provide erosion and sediment control measures in accordance with Erosion and Sedimentation Control Plan (ESCP). This plan will describe equipment and procedures used by the Contractor to control and manage erosion and sedimentation caused by wind, surface water and storm water in accordance with Florida Large Construction Storm Water General Permit (Florida Statutes Section 403.0885).

3.2.2.2 Erosion Control

Provide temporary and permanent erosion control in accordance with Section 31 32 11 SOIL SURFACE EROSION CONTROL.

3.2.3 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure must be constantly controlled to maintain compliance with existing state water quality standards and designated uses of the surface water body. Comply with the State of Florida water quality standards and anti-degradation provisions. Do not discharge excavation ground water to the sanitary sewer, storm drains, or to surface waters without prior specific authorization in writing from the Contracting Officer and appropriate Government Agencies. Discharge of hazardous substances will not be permitted under any circumstances. Use sediment control BMPs to prevent construction site runoff from directly entering any storm drain or surface waters.

If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization for any contaminated groundwater release in advance from the Contracting Officer and the federal or state authority, as applicable. Discharge of hazardous substances will not be permitted under any circumstances.

3.3.2 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States.

3.4 PROTECTION OF CULTURAL RESOURCES

3.4.1 Archaeological Resources

If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery

or find, immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Burning

Burning is not allowed.

3.5.2 Dust Control

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations.

3.5.2.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with state and local visibility regulations.

3.5.3 Odors

Control odors from construction activities. The odors must be in compliance with state regulations and local ordinances and may not constitute a health hazard.

3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP.

3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for

reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	cubic yards or tons, as appropriate
C&D Debris Recycled	cubic yards or tons, as appropriate
Total C&D Debris Generated	cubic yards or tons, as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	cubic yards or tons, as appropriate

3.7 WASTE MANAGEMENT AND DISPOSAL

3.7.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g. scrap metal, domestic sewage) or subject to special rules, (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 261 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not inclusive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.7.2 Solid Waste Management

3.7.2.1 Solid Waste Management Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind

the firm may be submitted. The sales documentation must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported unless required by other provisions or specifications of this Contract or public law.

3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Comply with site procedures. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government or private property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government or private property.

3.7.3.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from the site, hazardous waste manifests must be signed by the Contractor and/or the Engineer. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

3.7.3.2 Hazardous Waste Disposal

3.7.3.2.1 Responsibilities for Contractor's Disposal

Provide hazardous waste manifest to the Contracting Officer for review, approval, and signature prior to shipping waste off site.

3.7.3.2.1.1 Services

Provide service necessary for the final treatment or disposal of the hazardous material or waste in accordance with 40 CFR 260, local, and state, laws and regulations, and the terms and conditions of the Contract within 60 days after the materials have been generated. These services include necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal or transportation, include manifesting or complete waste profile sheets, equipment, and compile documentation).

3.7.3.2.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

3.7.3.2.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

3.7.3.2.1.4 Labeling

Determine the Department of Transportation's (DOT's) proper shipping names for waste (each container requiring disposal) and demonstrate to the Contracting Officer how this determination is developed and supported by the sampling and analysis requirements contained herein. Label all containers of hazardous waste with the words "Hazardous Waste" or other words to describe the contents of the container in accordance with 40 CFR 262.31 and applicable state or local regulations.

3.7.3.2.2 Contractor Disposal Turn-In Requirements

Hazardous waste generated must be disposed of in accordance with the following conditions to meet installation requirements:

a. Drums must be compatible with waste contents and drums must meet DOT requirements for 49 CFR 173 for transportation of materials.

b. Band drums to wooden pallets.

c. No more than three 55 gallon drums or two 85 gallon over packs are to be banded to a pallet.

d. Band using 1-1/4 inch minimum band on upper third of drum.

e. Provide label in accordance with 49 CFR 172.101.

f. Leave 3 to 5 inches of empty space above volume of material.

3.7.3.3 Disposal Documentation for Hazardous and Regulated Waste

Submit a copy of the applicable EPA and or state permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifests must be reviewed, signed, and approved by the Contracting Officer before the Contractor may ship waste.

3.7.4 Releases/Spills of Oil and Hazardous Substances

3.7.4.1 Response and Notifications

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the the Contracting Officer and the state or local authority.

Submit verbal and written notifications as required by the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills without cost to the Government.

3.7.4.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto the site that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the site. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261.

3.8.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log"(found at: www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf), which provides information required by (EPCRA Sections 312 and 313) along with corresponding SDS, to the Contracting Officer at the start and at the end of construction (30

days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Keep copies of the SDSs for hazardous materials onsite. At the end of the project, provide the Contracting Officer with copies of the SDSs, and the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used.

The Contracting Officer may request documentation for any spills or releases, environmental reports, or off-site transfers.

3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.10 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of fuel on the project site must be in accordance with EPA, state, and local laws and regulations and paragraph OIL STORAGE INCLUDING FUEL TANKS.

3.10.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.10.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater

prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

3.10.2.1 Spill Prevention, Control, and Countermeasures Plan

If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a Spill Prevention, Control, and Countermeasures (SPCC) plan meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the installation for Contractor use during a project. Submit the SPCC plan to the Contracting Officer for approval. The Spill Prevention, Control, and Countermeasures Plan shall be submitted as part of the Site Management Plan defined in paragraph SITE MANAGEMENT PLAN.

3.11 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents, immediately notify the Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

3.12 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of Florida rules.

3.13 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

-- End of Section --

SECTION 01 58 00

PROJECT IDENTIFICATION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 310-1-6a	(2006) Sign Standards Manual, VOL 1
EP 310-1-6b	(2006) Sign Standards Manual, VOL 2, Appendices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Sign Legend Orders; G

1.3 PROJECT SIGN

Prior to initiating any work on site, provide one project identification sign at the site entrance. Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site.

1.3.1 Construction Project Signs

Furnish the construction project sign package, maintain the signs during construction, and remove the signs from the job site upon completion of the project. The construction project sign package consists of two signs: one for project identification and the other to show the on-the-job safety performance of the contractor. The package shall conform to the requirements of EP 310-1-6a and EP 310-1-6b, specifically Section 16. Submit the sign legend orders as described in Section 16 of EP 310-1-6a prior to erecting the signs.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

PART 1 GENERAL

1.1 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. Divert a minimum of 10 percent by weight of total project solid waste from the landfill.

1.2 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. The Environmental Manager, as specified in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, is responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste, consider the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. Implement any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G

SD-11 Closeout Submittals

Records

1.4 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Engineer to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 00.00 2001 45 00.00 10 QUALITY CONTROL. At a minimum, discuss environmental and waste management goals and issues at the following additional meetings:

a. Pre-bid meeting.

b. Preconstruction meeting.

c. Regular site meetings.

d. Work safety meetings.

1.5 WASTE MANAGEMENT PLAN

Submit a waste management plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. The Waste Management Plan shall be submitted as part of the Site Management Plan defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. The plan demonstrates how to meet the the project waste diversion goal. Also, include the following in the plan:

a. Name of individuals on the Contractor's staff responsible for waste prevention and management.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.

e. Characterization, including estimated types and quantities, of the waste to be generated.

f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

h. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for

reuse on a future project, or recycled. Identify the recycling facilities by name, location, and phone number, including a copy of the permit or license for each facility.

i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.

j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.

k. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

1.6 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. Make the records available to the Contracting Officer during construction.

1.7 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and handle recyclable materials to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable

regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Separate materials by one of the following methods:

1.7.1 Source Separated Method.

Separate waste products and materials that are recyclable from trash and sorted as described below into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

a. Land clearing debris.

b. Asphalt.

c. Concrete and masonry.

d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).

(1) Ferrous.

(2) Non-ferrous.

e. Wood (nails and staples allowed).

f. Debris.

g. Glass (colored glass allowed).

h. Paper.

(1) Bond.

(2) Newsprint.

(3) Cardboard and paper packaging materials.

i. Plastic.

Type	
1	Polyethylene Terephthalate (PET, PETE)
2	High Density Polyethylene (HDPE)
3	Vinyl (Polyvinyl Chloride or PVC)
4	Low Density Polyethylene (LDPE)

Type	
5	Polypropylene (PP)
6	Polystyrene (PS)
7	Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

j. Gypsum.

k. Non-hazardous paint and paint cans.

l. Carpet.

m. Ceiling tiles.

n. Insulation.

o. Beverage containers.

1.7.2 Other Methods

Other proposed methods may be used when approved by the Contracting Officer.

1.8 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.8.1 Reuse

Give first consideration to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Coordinate reuse with the Contracting Officer. Consider sale or donation of waste suitable for reuse.

1.8.2 Recycle

Recycle waste materials not suitable for reuse, but having value as being recyclable. Recycle all fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.8.3 Compost

Consider composting on site if a reasonable amount of compostable material will be available. Compostable materials include plant material, sawdust, and certain food scraps.

1.8.4 Waste

Dispose of materials with no practical use or economic benefit to waste-to-energy plants where available. As the last choice, dispose of materials at a landfill or incinerator.

1.8.5 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 As-Built Drawings

As-built drawings are developed and maintained by the Contractor and depict actual conditions, including deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to Contractor submitted Requests for Information; direction from the Contracting Officer; designs which are the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site and/or red-lined PDF files. These files serve as the basis for the creation of the record drawings.

1.1.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.2 SOURCE DRAWING FILES

Request the full set of electronic drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.2.1 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any

conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction drawings and data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

As-Built Drawings; G
Record Drawings; G
Final Approved Shop Drawings
Construction Contract Specifications
Certification of EPA Designated Items; G

1.4 QUALITY CONTROL

Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must be the same as the original line colors, line weights, lettering, layering conventions, and symbols.

1.5 WARRANTY MANAGEMENT

1.5.1 Performance Bond

The Performance Bond must remain effective throughout the construction period.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

PART 2 PRODUCTS

2.1 GOVERNMENT FURNISHED MATERIALS

The Government will provide an optical disc (CD or DVD) at the preconstruction conference that contains the following:

a. One set of "as-designed" electronic CAD files in the specified software and format revised to reflect all amendments and the final contract PDF drawings. The CAD files are provided to enable preparation of as-built or as-constructed drawings. If discrepancies exist between the CAD files and the contract PDF drawings, correct the CAD files to show the contract PDF drawings.

2.2 SYSTEM DESCRIPTION

Prepare the CAD drawing files in AutoCAD Release 2017 format compatible with a Windows 7 operating system.

2.2.1 Additional Drawings

If additional drawings are required, prepare them using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings.

2.3 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9, "Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items". Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification form will be completed and signed by the Contractor.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings.

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate.

3.1.2 As-Built Drawings Content

Provide 2 sets of paper copies from PDF drawings to show the as-built conditions by red-line process during the execution of the project. Keep these working as-built markup drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract drawings which are made during construction or additional information which might be uncovered in the course of construction must be

accurately and neatly recorded as they occur by means of details and notes.

3.2 RECORD DRAWING FILES

If additional drawings are required, prepare them using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings. Accomplish additions and corrections to the contract drawings using CAD files. Provide all program files and hardware necessary to prepare final PDF record drawings. The Contracting Officer will review final PDF record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

3.3 RECORD DRAWINGS

Prepare final record drawings after the completion of each definable phase of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). Transfer the changes from the approved working as-built markup drawings to the original electronic CAD drawing files. Modify the as-built CAD drawing files to correctly show the features of the project as-built by bringing the working CAD drawing set into agreement with approved working as-built markup drawings, and adding such additional drawings as may be necessary.

3.4 FINAL APPROVED SHOP DRAWINGS

Submit final approved project shop drawings 30 days after transfer of the completed facility.

3.5 CONSTRUCTION CONTRACT SPECIFICATIONS

Submit final PDF file record construction contract specifications, including revisions thereto, 30 days after transfer of the completed facility.

3.6 CLEANUP

Clean debris from drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, and 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

-- End of Section --

SECTION 02 35 27

VERTICAL BARRIER WALL

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for vertical barrier wall shall be based on the area in square feet of completed low permeability wall measured in a vertical plane through the centerline of the constructed wall, from the top of the working surface to the bottom of the constructed wall, and vertical lines at each corner of the full depth of the wall. Measurement shall be based on data from the insitu mixing equipment, surveys, and soundings taken at the site as directed and approved.

1.1.2 Payment

Payment for vertical barrier wall will be made at the contract unit price per square foot of wall face that meets the required specifications. Such price will include costs incurred for the construction and completion of the barrier wall. No separate payment will be made for material, equipment, handling, preparing and installing the slurry, quality control testing, record keeping, site preparation including construction of the working surface, excavation of the shallow cut in guide trench, and management of excess spoils. Quantities of cement and other reagents installed during remixing to achieve the specification requirements will not be measured for payment.

1.2 DEFINITIONS

The terms used in this Section are defined as follows:

1.2.1 Vertical Barrier Wall

The vertical barrier wall is a 3 feet minimum width (thickness) vertical barrier wall installed through the existing ground or prepared working surface using the cutter soil mixer (CSM), or other insitu mixing method approved by the Engineer, such as a soil saw of mixing reagents insitu with the native soils to form a low permeability vertical cutoff wall.

1.2.2 Method of Construction

The CSM method of construction utilizes two sets of counter rotating, vertically mounted cutter wheels. The wheels cut the surrounding soil while at the same time blending the injected cement slurry with the insitu soil to form soil cement panels.

1.2.3 Bentonite

Bentonite is an ultrafine natural clay whose principal mineral constituent is sodium cation montmorillonite.

1.2.4 Cement

ASTM C150/C150M Portland Type I or Type I-III.

1.2.5 Soil-Cement-Bentonite (S-C-B)

S-C-B is a homogeneous mixture of material produced by mixing native in place soil with cement, bentonite, and other reagents such as quick lime or lime kiln dust in slurry form, to produce a low permeability vertical barrier wall.

1.2.6 Ground Water Level

The ground water level is the piezometric level of the ground water as determined from piezometers and wells.

1.2.7 Working Surface

The working surface is the top of the prepared natural ground or the surface of previously compacted fill from which the wall shall be constructed.

1.2.8 Confining Stratum

The confining stratum is identified as the Secondary Lower Permeability Unit (clay), as indicated on drawings, into which the bottom of the wall is constructed to a minimum penetration of 4 feet.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

API Spec 13A	(2010; Errata 1 2014; Errata 2-3 2015) Specification for Drilling-Fluid Materials

ASTM INTERNATIONAL (ASTM)

ASTM C150/C150M	(2018) Standard Specification for Portland Cement
ASTM D1633	(2000; R 2007) Compressive Strength of Molded Soil-Cement Cylinders
ASTM D5084	(2016a) Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Testing Plan; G
Qualifications; G
Soil-Cement-Bentonite Design Mix; G
Barrier Wall Construction Plan; G

SD-02 Shop Drawings

As-Built Profile

SD-04 Samples

Bentonite; G

SD-06 Test Reports

Quality Control Testing
Measurement of Wall Depth
Water
Slurry Mixes
S-C-B Slurry and Placement

SD-07 Certificates

Bentonite
Cement

1.5 PRECONSTRUCTION TESTING PLAN

Submit the following:

a. Plan describing the general work sequence and layout of operations. The layout of operations shall include scale drawings, which depict slurry preparation and storage areas. The plan shall describe Contractor qualifications, equipment, method of insitu mixing, use or disposal of any excavated material and spoils, reagent preparation and maintenance, and site clean-up.

b. Plan describing quality control equipment and test procedures, sample collection procedures, and test forms for reporting test results, and the offsite laboratory proposed for use.

c. Data on the equipment to be used in the construction of the soil cement elements; equipment and procedures to be used to determine that penetration into the impervious stratum was achieved; equipment to be used to obtain samples of the freshly completed slurry wall material from depths designated by the Engineer; and equipment to be used in the Contractor's quality control testing.

d. A copy of the test results from the bentonite manufacturer for each lot shipped to the site and a certificate of compliance stating that the bentonite complies with applicable standards.

1.6 QUALITY ASSURANCE

The Government may perform quality assurance testing on representative samples obtained by the Contractor of the bentonite slurry the S-C-B mix, and the completed S-C-B native soil slurry trench mixed material using the laboratory and equipment furnished by the Contractor. The Government testing will in no way relieve the Contractor of the responsibility of performing tests necessary to meet the Construction Quality Control (CQC) requirements. Provide the equipment and laboratory space to government personnel on demand and these services will be considered a subsidiary obligation of the slurry trench construction. Make all routine testing procedures available for inspection by the Contracting Officer at any time.

1.6.1 Qualifications

1.6.1.1 Contractor

Successfully installed 3 similar sized CSM or similar insitu constructed vertical barrier wall projects within the last 5 years. The qualifications and experience of personnel who shall be responsible for conducting the operations shall include references (name and telephone number) of the owners of the Contractor's previous CSM construction projects.

1.6.1.2 Insitu Specialist

The CSM, or other insitu mixing specialist shall be an individual who has had experience with at least 3 projects in all aspects of similar construction which includes, but is not limited to:

a. The use, testing, and control of soil-cement-bentonite slurries,

b. The mixing methods required to properly mix the slurry and native in place materials as required,

c. A thorough knowledge of construction equipment and material testing required for such construction.

1.6.1.3 CSM or Other Insitu Equipment Operator

The equipment operator shall have experience using similar insitu mixing equipment to be used for this contract in a minimum of 2 projects of similar or greater magnitude (depth).

1.7 DELIVERY, STORAGE, AND HANDLING

Protect materials delivered and placed in storage from the weather, dirt, dust or other contaminants.

1.8 GEOTECHNICAL SITE CONDITIONS

1.8.1 Exploratory Borings

Subsurface exploratory borings have been obtained by the Government to determine the character of materials to be excavated. Locations of the borings are shown on the drawings and the logs of those borings, which fall within the area of this contract, are included. The Government assumes no responsibility for interpretation or deductions made from the

logs and borings. Local minor variations may exist in the subsurface materials between boring locations and, if encountered, will not be considered as being materially different. Soils classifications shown on the logs are the result of field visual classifications in accordance with the Unified Soil Classifications System. The results of all laboratory testing, including rock and soil, are available for review by the Contractor.

1.8.2 Subsurface Conditions

The vertical barrier wall will be installed within a geologic setting consisting of the following lithology:

Second Lower Permeability Unit: a fat clay unit that has been identified directly beneath the former ACW holding ponds; however, this unit pinches out to the east of the former waste ponds and to the south of the Site. This second lower permeability unit is encountered at depths ranging from 77 to 117 feet below ground surface (ft bls). Four clay samples collected from the barrier wall location at approximately 111 ft bls were tested for hydraulic conductivity and ranged from 1.1E-09 to 2.0E-09 cm/sec, indicative of a low-permeability clay. The grain size distribution of the two fat clay samples collected near the barrier wall location (one location at depths from 104 to 112 ft bls and other location from 113.5 to 117 ft bls) contained 81.9 to 86.2 percent clay-sized particles. These clay samples contained 12.0 to 12.7 percent silt and less than 10 percent sand-sized particles.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Bentonite

The bentonite shall be sodium cation base montmorillonite powder that conforms to API Spec 13A, Section 9, and Table 1, located at the end of this section. Other chemically treated bentonites may be considered provided the required permeability values can not be obtained with bentonites conforming with Section 9 of API Spec 13A. No bentonite from the bentonite manufacturer shall be used prior to acceptance by the Contracting Officer. Bentonite not meeting specifications shall be promptly removed from the site at the Contractor's expense. Bentonite shall be protected from moisture during transit and storage. Submit a minimum of 10 pounds of the proposed bentonite at least 1 month prior to use.

2.1.2 Water

The Contractor shall supply and condition water required for mixing with bentonite to produce slurry. The water shall be clean, fresh, and free of excessive amounts of deleterious substances that adversely affect the properties of the slurry. Submit water quality test results for water used for mixing the bentonite slurry to assure conformance to these standards. Submit a record of the water source and associated chemical analysis.

2.1.3 Reagent Binder

Furnish Type I/II or Type II cement conforming to DMS-4600, "Hydraulic

Cement." Store cement to prevent moisture damage. Do not use material which has become caked due to moisture absorption. Do not use cement containing lumps or foreign matter of a nature and in amounts that may be deleterious to the CSM operations.

2.2 EQUIPMENT

Furnish all necessary plant and equipment for use on this project.

2.2.1 Soil Cement Mixing Equipment

Furnish machines of sufficient size, capacity, torque, and capable of performing deep mixing to the required depths shown on the plans. Furnish machines capable of advancing and withdrawing the mixing tools while simultaneously injecting cement-grout and mixing in-situ soils.

2.2.2 Slurry Mixing and Cleaning Equipment

The slurry mixing plant shall be equipped with a high-speed/high-shear, colloidal mixer or a high-velocity/high pressure venturi jet mixer used in conjunction with a high-speed/high-shear centrifugal pump. The plant shall be equipped with a mechanically or hydraulically agitated sump and shall include pumps, valves, hoses, supply lines, tools, and other equipment and materials required to prepare the slurry and deliver it in a continuous supply from the hydration pond or tanks to the slurry trench. Mixers shall be capable of achieving complete dispersion of bentonite and additives, and shall be capable of continually mixing the slurry to provide and maintain a uniform blended slurry. Provide sufficient ponds or tanks for storage of hydrated bentonite slurry and bentonite-cement-reagent mixed slurry.

2.2.3 Field Laboratory Equipment

The field laboratory shall contain as a minimum the following equipment:

All equipment necessary to prepare and cure 3 inch by 6 inch right cylinder molds for testing to verify permeability and unconfined compressive strength tests using methods ASTM D5084 and ASTM D1633, including, but not limited to, molds and caps, rods to eliminate air pockets, and picnic coolers, or other means to cure samples in a 100 percent humidity environment. Other equipment may be included if desired by the contractor as part of the contractors Quality Control program.

2.3 SLURRY MIXES

2.3.1 Soil-Cement-Bentonite Design Mix

At least 14 days before construction the Contractor shall submit proportions and properties of the Contractor's proposed soil-cement-bentonite-reagent mix including cement, bentonite, additives, water proportions, along with any laboratory test results for unconfined compressive strength, and permeability. The mix design shall be submitted to the Contracting Officer for review.

2.3.2 Additives

Only cement, bentonite, and other additives approved by the Contracting Officer (Engineer) may be mixed with the native soils.

2.3.3 Soil-Cement Bentonite Mixture

The cement, bentonite, and any other additives may be blended together into a single slurry for insitu mixing with the soil, or, if the Contractor prefers, the bentonite may be used alone, first and mixed as a slurry with the native soils and the cement and other reagents added as a second mixing step.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The vertical barrier wall shall be constructed insitu to the elevations, lines, grades, and cross-sections shown and in accordance with these specifications, unless otherwise directed. The Government may modify the dimensions and quantities of the work as determined necessary. Submit a Barrier Wall Construction Plan for approval, a minimum of 14 days prior to the start of construction.

3.2 WORKING SURFACE

Barrier wall construction shall be accomplished from the working surface, as shown on the drawings. If the Contractor's operations require a wider working surface, the reason for the change shall be submitted. If approved, a wider working surface may be constructed at no additional cost to the Government. The working surface thus constructed shall be utilized as a basis for measurement for payment.

3.3 CSM TRENCH EXCAVATION

Construct a series of overlapping soil-cement panels to the depths and alignment as shown on the drawings. Use the installation sequence and schedules described in the Contractor's Work Plan and with soil-cement elements conforming to the alignment tolerances. Install the barrier wall with the same make and model of mixing machinery, cement grout mixing and pumping equipment, and the same materials and procedures described in the Work Plan and so as to meet the specifications for unconfined compressive strength and permeability. Submit changes in the mix design to the Contracting Officer for review and acceptance prior to implementing the changes. Insure that the reagent slurry is uniformly mixed with the native soils and is keyed into the confining stratum to the minimum required 4 feet. Upon reaching the bottom of the wall, operate the mixing equipment at sufficient speed and duration to mix all loose, soft and otherwise unmixed soil prior to withdrawal of the mixing tools.

Construct all parts of the wall to within the following tolerances:

a. Vertical plumbness - no more than 2 percent.

b. Vertical length - no more than 2 percent of plan element length.

c. Horizontal alignment - no more than 3 inches from plan element center coordinate.

In event that tolerances are not met, remix or supplement with one or more adjacent and overlapping wall sections which comply with the allowable tolerance shown above unless approved by the Contracting Officer. Provide repair at no additional cost.

3.4 SOIL CEMENT MIXING AND PLACING

3.4.1 Slurry Placement

The vertical barrier wall shall be accurately staked prior to construction. A shallow pretrench shall be excavated on the centerline of the wall to define the location of the installation.

Vertical alignment of the barrier wall will be controlled by the insitu mixing equipment operator. Two measurements of verticality will be monitored. These are the fore-aft and left-right vertical positions.

The mixing shaft speed (RPMs) shall be adjusted to accommodate a constant rate of mixing shaft penetration based on the degree of drilling difficulty. The mixing speed can be adjusted according to drilling difficulty. The mixing speed can be adjusted to aid mixing of the soil column when needed. Mixing speed may be adjusted to assist penetration in hard drilling.

In order to ensure adequate mixing, the penetration rate of the cutter heads shall be maintained such that the proper amount of slurry is added and the proper amount of mixing time is allowed.

3.4.2 Vertical Barrier Wall Sampling and Testing

Samples from the wall will be retrieved a minimum of 2 times each 8-10 hour shift at two depthsas directed by the Engineer. These samples shall be taken by a special sampling tool capable of retrieving sample material from the designated depth. Samples shall be taken immediately following the addition and mixing of all reagents with the native soil. The fresh soil mix shall be placed in suitable 3 inch by 6 inch right cylinder molds, rodded to remove trapped air pockets and then capped and cured in a 100 percent humid atmosphere until they have taken an initial hard set Alternative mold sizes may be proposed, but must be approved by the Engineer.

Each sample shall be of sufficient size to produce at least 4 molds each for permeability and unconfined compressive strength testing. Additional molds may be prepared by the Contractor if the Contractor desires. Test one cylinder for permeability at 14 days, one at 28 days, with a third held for testing at 56 days if the 28-day result does not meet specifications. The fourth is for duplicate testing, if desired, at 28 or 56 days. Determine unit weight on each cylinder at the start of the test.

The samples will be transported to an independent geotechnical laboratory for testing once they have taken a hard set so that the transporting will not adversely affect the properties. Additional samples shall be obtained at the request of the Contracting Officer.

3.5 EXCAVATED MATERIAL AND SPOIL

Material excavated from the lead-in trench and excess spoil from insitu construction of the vertical barrier wall shall be disposed as fill under the cap, unless approved by the Engineer for placement elsewhere. See Section 31 00 00 EARTHWORK regarding requirements for placing backfill material. Note that some additional treatment of the excess spoil may be necessary to meet requirements. Excavated material placed as backfill must meet the following requirements:

a. Backfill shall be free of roots, debris, brush, sod, organic or frozen material.

b. Backfill shall be free of any mobile creosote non-aqueous phase liquid (NAPL).

c. Backfill with visible mobile creosote and any creosote stained soil shall only be placed under the cap.

Excavated material to be used as backfill shall be stockpiled for subsequent processing in approved areas. Excavated trench material not used as backfill shall be placed in the planned barrier wall area as directed by the Engineer.

3.6 ADDITIONAL REQUIREMENTS

3.6.1 Mixing and Placing During Cold Weather

No reagent mixing or construction of the vertical barrier wall shall be performed when the air temperature is below 32 degrees F.

3.6.2 Testing

When required, additional samples of the freshly mixed vertical barrier wall shall be collected and prepared for permeability testing at one per 50 linear feet of the completed CSM wall. If test results do not meet the requirements, corrective action, as determined by the Contracting Officer, shall be taken.

3.7 MEASUREMENT OF WALL DEPTH

The insitu mixing equipment will shall be used to make continuous measurements of the vertical wall depth and when requested by the Engineer, additional soil cement wall soundings shall be taken every 20 feet along the centerline of the freshly mixed vertical barrier wall using a weighted tape, cable, or other approved device. Submit a record of soundings and measurements taken during construction of the barrier wall. Soundings shall be measured to the nearest 0.1 ft. The soundings shall measure the following:

3.7.1 Elevation of Top of Confining Stratum

The top of the confining stratum shall be determined based on examination of samples taken as described under paragraph SAMPLES OF CONFINING STRATUM as well as from cutting resistance and other operating data from the insitu mixing equipment. This elevation shall be subject to approval.

3.7.2 Elevation of Wall Bottom

Determine the elevation of the wall bottom using data from the insitu mixing equipment. This shall be verified by the use of soundings, when requested by the Engineer. This elevation is subject to approval by the Contracting Officer.

3.7.3 Profile Wall Bottom

The wall bottom shall be sounded at the beginning and end of each shift, and at additional times as directed, by the Contracting Officer.

3.8 AS-BUILT PROFILE

An as-built profile of the constructed wall, including descriptions of materials encountered at the wall bottom, shall be continuously maintained. This profile shall indicate extent of construction at the end of each work day.

3.9 TREATMENT OF TOP OF VERTICAL BARRIER WALL

Prior to placement of the compacted wall cover, a temporary non-compacted soil or plastic sheeting cover shall be placed over the wall to prevent desiccation. The temporary cover material shall be placed within 2 days after completion of each 100 foot reach. If any depression develops within the completed slurry wall area, it shall be repaired by placing and compacting additional wall cover soil. After a minimum two weeks, the temporary wall cover shall be removed and replaced by a final compacted wall cover. A final compacted wall cover 3 feet wide shall be placed to a dry density of 95 percent of maximum density at optimum moisture to plus 3 percent in accordance with ASTM D698. Heavy construction equipment and machinery shall only be driven over the wall at approved heavy equipment crossing points.

3.10 QUALITY CONTROL TESTING

Provide Quality Control Inspectors as necessary for bentonite and reagent slurry preparation and maintenance, wall alignment, and S-C-B preparation and placement. Submit all test results.

3.10.1 Bentonite Tests

A minimum of 1 test for each specified requirement shall be performed for each truck or rail car shipment delivered to the site.

3.10.2 Water Tests

A minimum of 1 test for each specified requirement shall be performed for each water source used. Testing shall be performed as specified in Table 1.

3.10.3 S-C-B Slurry and Placement

The Contractor shall provide records for each batch of reagent mixed to document the quantities of reagents, including water and continuous records to document that the proper proportions of reagents were uniformly distributed and mixed into the native soil column.

3.10.4 Samples of Confining Stratum

Samples of the confining stratum shall be taken at 100 foot horizontal intervals along the vertical barrier wall and at additional intervals or depths as directed by the Engineer to document that the bottom of the wall has been constructed into the confining stratum. Samples shall be obtained from insitu soil mixer cuttings. After examining these samples, the Contracting Officer will either approve the termination of wall at the sample points or require that the wall be constructed deeper. If additional depth is required, then additional samples shall be furnished as specified above. All samples shall be properly identified and labeled, placed in sealed plastic containers and stored in a location designated by the Contracting Officer.

3.11 CLEAN-UP

Wall construction spoil and unused S-C-B slurry shall be removed following completion of S-C-B wall construction. These materials shall be disposed of within the barrier wall area.

VERTICAL BARRIER WALL QUALITY CONTROL TESTING		
Property	Requirement	Test Method
S-C-B Backfill		
Permeability	$\leq$ 1 x 10-7 cm/sec	ASTM D5084
Unconfined Compressive Strength	$\geq$ 25 psi	ASTM D1633
1) Flexible wall permeability tests shall be performed at a maximum effective confining pressure of 5 psi unless otherwise directed by the Engineer.		

-- End of Section --

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 MEASUREMENT PROCEDURES

1.1.1 Demolition

The unit of measurement for demolition items shall be unit price as indicated on the Bid Table and stated in Section 01 22 00 MEASUREMENT AND PAYMENT.

1.1.2 Bollard Removal and Well Abandonment

The unit of measure for bollard removal and well abandonment shall be lump sum as indicated on the Bid Table and as stated in Section 01 22 00 MEASUREMENT AND PAYMENT.

1.2 PAYMENT PROCEDURES

Payment will constitute full compensation for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6	(2006) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61	National Emission Standards for Hazardous Air Pollutants

1.4 PROJECT DESCRIPTION

1.4.1 Demolition Plan

Prepare a Demolition Plan and submit proposed demolition and removal procedures for approval before work is started. The Demolition Plan shall be submitted as part of the Site Management Plan defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of

utility services, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Plan shall be approved by Contracting Officer prior to work beginning.

1.4.2 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes the value derived from the salvage and recycling of materials. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from the project site daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.5 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements and pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.5.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.5.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.5.3 Trees

Protect trees within the project site which might be damaged during demolition or deconstruction, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

1.5.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations.

1.5.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.7 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G
Existing Conditions

SD-07 Certificates

Notification; G

SD-11 Closeout Submittals

Well Decommissioning/Abandonment Record

1.8 QUALITY ASSURANCE

Submit timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the Regional Office of the United States Environmental Protection Agency (USEPA), State's environmental protection agency, local air pollution control district/agency, and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.8.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.9 PROTECTION

1.9.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.9.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.10 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.11 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures. Fill material shall be waste products from demolition or deconstruction until all waste appropriate for this purpose is consumed.

b. Fill material shall conform to the definition of satisfactory soil material as defined in Section 31 00 00 EARTHWORK. In addition, fill material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.1.1 Structures

a. Remove existing structures indicated to one foot below grade. Interior walls, other than retaining walls and partitions, shall be removed to one foot below grade or to top of concrete slab on ground. Break up basement slabs to permit drainage. Remove sidewalks, curbs, gutters and street light bases as indicated.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

3.1.3 Paving and Slabs

Remove ground concrete and asphaltic concrete paving and slabs including aggregate base as indicated to a full depth.

3.1.4 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch.

3.1.5 Structural Steel

Dismantle structural steel at field connections and in a manner that will

prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Flame-cutting torches are permitted when other methods of dismantling are not practical. Transport steel joists and girders as whole units and not dismantled. Transport structural steel shapes to a designated area as directed by the Contracting Officer, stacked according to size, type of member and length, and stored off the ground, protected from the weather.

3.1.6 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.7 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated storage area as directed by the Contracting Officer. Do not remove equipment until approved. Do not offer low-efficiency equipment for reuse.

3.1.7.1 Preparation for Storage

Remove water, dirt, dust, and foreign matter from units; tanks, piping and fixtures shall be drained; interiors, if previously used to store flammable, explosive, or other dangerous liquids, shall be steam cleaned. Seal openings with caps, plates, or plugs. Secure motors attached by flexible connections to the unit. Change lubricating systems with the proper oil or grease.

3.1.7.2 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage.

3.1.8 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.8.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured

prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.8.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.8.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.8.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.1.9 Items With Unique/Regulated Disposal Requirements

Remove and dispose of items with unique or regulated disposal requirements in the manner dictated by law or in the most environmentally responsible manner.

3.1.10 Well Decommissioning/Abandonment Records

Submit a well decommissioning/abandonment record, for each well, or test hole abandoned, within 30 working days of the completion of the abandonment procedure. Include in decommissioning/abandonment records, as a minimum, the following:

a. Project name.

b. Well or test hole number.

c. Well/boring location, depth and diameter.

d. Date of decommissioning/abandonment.

e. Method of decommissioning/abandonment.

f. All materials used in the decommissioning/abandonment procedure and the interval in which test materials were placed.

g. Casing, and or other items left in hole by depth, description, and composition.

h. Description and total quantity of grout used initially.

i. Description and daily quantities of grout used to compensate for settlement.

j. Water or mud level (specify) prior to grouting and date measured.

k. The reason for decommissioning/abandonment of the monitoring well/test hole.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.4 CLEANUP

Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified. Storage of removed materials on the project site is prohibited.

3.5.2 Burning on Project Site

Burning of materials removed from demolished and deconstructed structures will not be permitted.

3.5.3 Removal to Spoil Areas on Project Site

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on site.

3.5.4 Removal from Project Site

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from the site for legal disposal. Dispose of waste soil as directed.

-- End of Section --

SECTION 02 56 13

WASTE CONTAINMENT GEOMEMBRANE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D1004	(2013) Initial Tear Resistance of Plastic Film and Sheeting
ASTM D1505	(2018) Standard Test Method for Density of Plastics by the Density-Gradient Technique
ASTM D1603	(2014) Carbon Black Content in Olefin Plastics
ASTM D3895	(2014) Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D4213	(2008) Standard Test Method for Scrub Resistance of Paints by Abrasion Weight Loss
ASTM D4218	(2015) Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D4833	(2000e1) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D5323 REV A	(2019) Standard Practice for Determination of 2% Secant Modulus for Polyethylene Geomembranes
ASTM D5397	(2007; R 2012) Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
ASTM D5596	(2003; R 2016) Standard Test Method For Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
ASTM D5617	(2004) Standard Test Method for Multi-Axial Tension Test for Geosynthetics
ASTM D5721	(2008; R 2013) Air-Oven Aging of Polyolefin Geomembranes

ASTM D5885	(1997) Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry
ASTM D5994	(1998; R 2003) Measuring Core Thickness of Textured Geomembrane
ASTM D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D6392	(2012; R 2018) Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D6693/D6693M	(2004; R 2015; E 2015) Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
ASTM D7238	(2006; R 2012) Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus
ASTM D7466	(2010) Standard Test Method for Measuring Asperity Height of Textured Geomembranes

GEOSYNTHETIC INSTITUTE (GSI)

GSI GRI GM11	(1997) Accelerated Weathering of Geomembranes Using a Fluorescent UVA Device
GSI GRI GM12	(1998) Asperity Measurement of Textured Geomembranes Using a Depth Gauge
GSI GRI GM7	(1995) Accelerated Curing of Geomembrane Test Strip Seams Made by Chemical Fusion Methods
GSI GRI GM9	(1995; R 2013) Cold Weather Seaming of Geomembranes

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

As-Built Drawings

Final as-built drawings of geomembrane installation

SD-03 Product Data

Tests, Inspections, and Verifications; G

Manufacturer's and fabricator's QC manuals, a minimum of 14 days prior to geomembrane shipment.

Field Seaming; G

Installer's QC manual, a minimum of 14 days prior to geomembrane placement.

Qualifications; G

Manufacturer's, and fabricator's qualification statements, including resumes of key personnel involved in the project, a minimum of 14 days prior to geomembrane shipment.

Installer's, QC inspector's, and QC laboratory's qualification statements including resumes of key personnel involved in the project a minimum of 14 days prior to geomembrane placement. The submittal from the QC laboratory shall include verification that the laboratory is accredited via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP) for the tests the QC laboratory will be required to perform.

SD-04 Samples

Samples

Geomembrane QA and QC samples.

SD-06 Test Reports

Materials; G

Manufacturer's certified raw and sheet material test reports and a copy of the QC certificates, a minimum of 14 days prior to shipment of geomembrane to the site.

Surface Preparation; G

Certification from the QC inspector and installer of the acceptability of the surface on which the geomembrane is to be placed, immediately prior to geomembrane placement.

Non-Destructive Field Seam Continuity Testing; G

QC inspector certified test results on all field seams.

Destructive Field Seam Testing; G

Installer and certified QC laboratory test results on all destructively tested field seams.

Destructive Seam Test Repairs; G

QC inspector certified test results on all repaired seams.

Tests; G

Certified QC test results.

1.3 QUALIFICATIONS

1.3.1 Manufacturer

Manufacturer shall have produced the proposed geomembrane sheets for at least 5 completed projects having a total minimum area of 10 million square feet.

1.3.2 Installer

The installer is responsible for field handling, deploying, seaming, anchoring, and field Quality Control (QC) testing of the geomembrane. The installer shall have installed the proposed geomembrane material for at least 5 completed projects having a total minimum area of 2 million square feet. At least one seamer shall have experience seaming a minimum of 500,000 square feet of the proposed geomembrane using the same type of seaming equipment and geomembrane thickness specified for this project.

1.3.3 QC Laboratory

The QC laboratory shall have provided QC and/or Quality Assurance (QA) testing of the proposed geomembrane and geomembrane seams for at least five completed projects having a total minimum area of 2 million square feet. The QC laboratory shall be accredited via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP) for the tests the QC laboratory will be required to perform.

1.4 DELIVERY, STORAGE AND HANDLING

1.4.1 Delivery

The QC inspector shall be present during delivery and unloading of the geomembrane. Each geomembrane roll/panel shall be labeled with the manufacturer's name, product identification number, roll/panel number, and roll dimensions.

1.4.2 Storage

Temporary storage at the project site shall be on a level surface, free of sharp objects where water cannot accumulate. The geomembrane shall be protected from puncture, abrasion, excessive heat or cold, material degradation, or other damaging circumstances. Storage shall not result in crushing the core of roll goods or flattening of the rolls. Rolls shall not be stored more than two high. Palleted materials shall be stored on level surfaces and shall not be stacked on top of one another. Damaged geomembrane shall be removed from the site and replaced with geomembrane that meets the specified requirements.

1.4.3 Handling

Rolls/panels shall not be dragged, lifted by one end, or dropped. A pipe or solid bar, of sufficient strength to support the full weight of a roll without significant bending, shall be used for all handling activities. The diameter of the pipe or solid bar shall be small enough to be easily inserted through the core of the roll. Chains shall be used to link the ends of the pipe or bar to the ends of a spreader bar. The spreader bar

shall be wide enough to prevent the chains from rubbing against the ends of the roll. Alternatively, a stinger bar protruding from the end of a forklift or other equipment may be used. The stinger bar shall be at least three-fourths the length of the core and also must be capable of supporting the full weight of the roll without significant bending. If recommended by the manufacturer, a sling handling method utilizing appropriate loading straps may be used.

1.5 WEATHER LIMITATIONS

Geomembrane shall not be deployed or field-seamed in the presence of excess moisture (i.e., rain, fog, dew), in areas of ponded water, or in the presence of excess wind. Unless authorized by the Contracting Officer, no placement or seaming shall be attempted at ambient temperatures below 32 degrees F or above 104 degrees F. Ambient temperature shall be measured at a height no greater than 6 inches above the ground or geomembrane surface. If seaming is allowed below 32 degrees F, the procedures outlined in GSI GRI GM9 shall be followed. In marginal conditions, seaming shall cease unless destructive field seam tests, conducted by the QC laboratory, confirm that seam properties meet the requirements listed in Table 3. Tests shall be conducted in accordance with paragraph Destructive Field Seam Testing.

1.6 EQUIPMENT

Equipment used in performance of the work shall be in accordance with the geomembrane manufacturer's recommendations and shall be maintained in satisfactory working condition.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Raw Materials

Resin used in manufacturing geomembrane sheets shall be made of virgin uncontaminated ingredients. No more than 10 percent regrind, reworked, or trim material in the form of chips or edge strips shall be used to manufacture the geomembrane sheets. All regrind, reworked, or trim materials shall be from the same manufacturer and exactly the same formulation as the geomembrane sheet being produced. No post consumer materials or water-soluble ingredients shall be used to produce the geomembrane. For geomembranes with plasticizers, only primary plasticizers that are resistant to migration shall be used. The Contractor shall submit a copy of the test reports and QC certificates for materials used in the manufacturing of the geomembrane shipped to the site.

2.1.2 Sheet Materials

Geomembrane sheets shall be unreinforced and manufactured as wide as possible to minimize factory and field seams. Geomembrane sheets shall be uniform in color, thickness, and surface texture. Textured surface features on both sides of the sheet shall consist of raw materials identical to that of the parent sheet material and shall be uniform over the entire face of the geomembrane. The sheets shall be free of and resistant to fungal or bacterial attack and free of cuts, abrasions, holes, blisters, contaminants and other imperfections.

2.1.2.1 HDPE Geomembrane Liner of Engineered Containment Cell

Geomembrane sheets and factory seams shall conform to the requirements listed in Table 1 and 2 for Manufacturing Quality Control (MQC) for the textured high density polyethylene (HDPE) geomembrane to be used for the liner of the engineered containment cell as indicated on drawings.

TABLE 1. TEXTURED HDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY (MIN.)	TEST METHOD
Nominal Thickness	60 mils		
Thickness (min ave)	-5 percent of nominal	per roll	ASTM D5994
Lowest individual for 8 out of 10 values	-10 percent of nominal	per roll	ASTM D5994
Lowest individual of 10 values	-15 percent of nominal	per roll	ASTM D5994
Asperity Height (min ave)(10)	16 mils	every second roll	GSI GRI GM12 (11)
Density (min)	0.940 g/cc	per 200,000 lb	ASTM D1505
Tensile Properties (1) (min ave)		per 20,000 lb	ASTM D638 Type IV
-yield stress	126 lb/in		
-break stress	90 lb/in		
-yield elong	12 percent		
-break elong	90 percent		
Tear Resistance (min ave)	42 lb	per 45,000 lb	ASTM D1004
Puncture Resistance (min ave)	90 lb	per 45,000 lb	ASTM D4833
Stress Crack Resistance (2)	500 hr	per 200,000 lb	ASTM D5397 (Appendix)
Carbon Black Content	2.0-3.0 percent	per 20,000 lb	ASTM D1603 (3)
Carbon Black Dispersion	Note (4)	per 45,000 lb	ASTM D5596

TABLE 1. TEXTURED HDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY (MIN.)	TEST METHOD
Oxidative Induction Time (OIT) (min ave) (5)		per 200,000 lb	
-Std OIT	100 min		ASTM D3895
or			
-High Pres OIT	400 min		ASTM D5885
Oven Aging at 85 deg C (min ave) (5), (6)		per year and change in formulation	ASTM D5721
-Std OIT	55 percent at 90 days		ASTM D3895
or			
-High Pres OIT	80 percent at 90 days		ASTM D5885
UV Resistance (min ave) (7)		per year and change in formulation	GSI GRI GM11
-High Pres OIT(8)(9)	50 percent at 1600 hours		ASTM D5885

MQC = Manufacturing Quality Control

Note (1): Minimum average machine direction and minimum average cross machine direction values shall be based on 5 test specimens in each direction. For HDPE geomembrane, yield elongation is calculated using a gauge length of 1.3 inches. For HDPE geomembrane, break elongation is calculated using a gauge length of 2.0 inches.

Note (2): For HDPE geomembrane, the yield stress used to calculate the applied load for test method ASTM D5397 (Appendix), shall be the manufacturer's mean value.

Note (3): Other methods such as ASTM D4218 or microwave methods are acceptable if an appropriate correlation to ASTM D1603 can be established.

Note (4): Carbon black dispersion for 10 different views:
- 9 in Categories 1 or 2 and 1 in Category 3

Note (5): The manufacturer has the option to select either one of the OIT methods to evaluate the antioxidant content.

Note (6): Evaluate samples at 30 and 60 days and compare with the 90 day response.

Note (7): The condition of the test shall be a 20 hour UV cycle at 167

TABLE 1. TEXTURED HDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY (MIN.)	TEST METHOD

degrees F followed by a 4 hour condensation cycle at 140 degrees F.

Note (8): The standard OIT test (ASTM D3895) shall not be used in determining UV resistance.

Note (9): UV resistance is based on percent retained value regardless of the original HP-OIT value.

Note (10): Textured Geomembrane Only: Of 10 readings; 8 out of 10 must be 7 mil, and lowest individual reading must be 5 mil.

Note (11): Textured Geomembrane Only: Alternate the measurement side for double sided textured sheet.

TABLE 2. HDPE SEAM PROPERTIES

PROPERTY	TEST VALUE	TEST METHOD
Seam Shear Strength (1)percent min. sheet tensile strength	90 percent	ASTM D6392
Seam Peel Strength fusion welded (1)(2)percent min. sheet tensile strength	70 percent	ASTM D6392
Seam Peel Strength extrusion welded (1)(2)	50 percent	ASTM D6392

Note (1): Seam tests for peel and shear must fail in the Film Tear Bond mode. This is a failure in the ductile mode of one of the bonded sheets by tearing or breaking prior to complete separation of the bonded area.

Note (2): Where applicable, both tracks of a double hot wedge seam shall be tested for peel adhesion.

2.1.2.2 LLDPE Geomembrane - Cap Cover

Geomembrane sheets and factory seams shall conform to the requirements listed in Table 3 and 4 for the textured linear low density polyethylene (LLDPE) geomembrane to be used for the cap cover(s) as indicated on the drawings.

TABLE 3. TEXTURED LLDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY (MIN.)	TEST METHOD
Nominal Thickness	40 mils		
Thickness (min ave)	-5 percent of nominal	per roll	ASTM D5994
Lowest individual for 8 out of 10 values	-10 percent of nominal	per roll	ASTM D5994
Lowest individual of 10 values	-15 percent of nominal	per roll	ASTM D5994
Asperity Height (min ave)(10)	16 mils	every second roll	ASTM D7466
Density (min)	0.940 g/cc	per 200,000 lb	ASTM D1505
Tensile Properties (1) (min ave)		per 20,000 lb	ASTM D6693/D6693M Type IV
-break stress	60 lb/in		
-break elong	250 percent		
2% Modulus (max)	2400 lb/in	per formulation	ASTM D5323 REV A
Tear Resistance (min ave)	22 lb	per 45,000 lb	ASTM D1004
Puncture Resistance (min ave)	44 lb	per 45,000 lb	ASTM D4833
Axi-Symmetric Break Resistance Strain (min)	500 hr	30 percent	ASTM D5617 (Appendix)
Carbon Black Content	2.0-3.0 percent	per 20,000 lb	ASTM D4213 (3)
Carbon Black Dispersion	Note (2)	per 45,000 lb	ASTM D5596
Oxidative Induction Time (OIT) (min ave) (3)		per 200,000 lb	
-Std OIT	100 min		ASTM D3895
or			
-High Pres OIT	400 min		ASTM D5885

TABLE 3. TEXTURED LLDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY (MIN.)	TEST METHOD
Oven Aging at 85 deg C (min ave) (4)		per year and change in formulation	ASTM D5721
-Std OIT	55 percent at 90 days		ASTM D3895
or			
-High Pres OIT	80 percent at 90 days		ASTM D5885
UV Resistance (min ave) (5)		per year and change in formulation	ASTM D7238
-High Pres OIT(6)	35 percent at 1600 hours		ASTM D5885

MQC = Manufacturing Quality Control

Note (1): Minimum average machine direction and minimum average cross machine direction values shall be based on 5 test specimens in each direction. For HDPE geomembrane, break elongation is calculated using a gauge length of 2.0 inches.

Note (2): Carbon black dispersion for 10 different views:
- 9 in Categories 1 or 2 and 1 in Category 3

Note (3): The manufacturer has the option to select either one of the OIT methods to evaluate the antioxidant content.

Note (4): Evaluate samples at 30 and 60 days and compare with the 90 day response.

Note (5): The condition of the test shall be a 20 hour UV cycle at 167 degrees F followed by a 4 hour condensation cycle at 140 degrees F.

Note (6): UV resistance is based on percent retained value regardless of the original HP-OIT value.

TABLE 4. LLDPE SEAM PROPERTIES

PROPERTY	TEST VALUE	TEST METHOD
Seam Shear Strength (1)percent min. sheet tensile strength	90 percent	ASTM D6392
Seam Peel Strength fusion	70 percent	ASTM D6392

TABLE 4. LLDPE SEAM PROPERTIES

PROPERTY	TEST VALUE	TEST METHOD
welded (1)(2)	percent min. sheet tensile strength	
Seam Peel Strength extrusion welded (1)(2)	50 percent	ASTM D6392

Note (1): Seam tests for peel and shear must fail in the Film Tear Bond mode. This is a failure in the ductile mode of one of the bonded sheets by tearing or breaking prior to complete separation of the bonded area.

Note (2): Where applicable, both tracks of a double hot wedge seam shall be tested for peel adhesion.

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

2.2.1 Manufacturing, Sampling, and Testing

2.2.1.1 Raw Materials

Raw materials shall be tested in accordance with the approved MQC manual. Any raw material which fails to meet the geomembrane manufacturer's specified physical properties shall not be used in manufacturing the sheet. Seaming rods and pellets shall be manufactured of materials which are essentially identical to that used in the geomembrane sheet. Seaming rods and pellets shall be tested for density, melt index and carbon black content in accordance with the approved MQC manual. Seaming rods and pellets which fail to meet the corresponding property values required for the sheet material, shall not be used for seaming.

2.2.1.2 Sheet Material

Geomembrane sheets shall be tested in accordance with the approved MQC manual. As a minimum, MQC testing shall be conducted at the frequencies shown in Table 1. Sheets not meeting the minimum requirements specified in Table 1 shall not be sent to the site.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Surface Preparation

Soil subgrade surface preparation shall be performed in accordance with Section 31 00 00 EARTHWORK. Rocks larger than 1/2 inch in diameter and any other material which could damage the geomembrane shall be removed from the surface to be covered with the geomembrane. Construction equipment tire or track deformations beneath the geomembrane shall not be greater than 1.0 inch in depth. Each day during placement of geomembrane, the QC Inspector and installer shall inspect the surface on which geomembrane is to be placed and certify in writing that the surface is acceptable. Repairs to the subgrade shall be performed at no additional cost to the Government.

3.1.2 Anchor Trenches

The anchor trench shall be 24 inches deep and 18 inches wide at the bottom of the trench. Ponded water shall be removed from the anchor trench while the trench is open. Trench corners shall be slightly rounded to avoid sharp bends in the geomembrane. Loose soil, rocks larger than 1/2 inch in diameter, and any other material which could damage the geomembrane shall be removed from the surfaces of the trench. The geomembrane shall extend down the front wall and across the bottom of the anchor trench. Backfilling and compaction of the anchor trench shall be in accordance with Section 31 00 00 EARTHWORK.

3.2 GEOMEMBRANE DEPLOYMENT

The procedures and equipment used shall not elongate, wrinkle, scratch, or otherwise damage the geomembrane, other geosynthetic layers, or the underlying subgrade. Geomembrane damaged during installation shall be replaced or repaired, at the QC inspector's discretion. Only geomembrane panels that can be anchored and seamed together the same day shall be deployed. Adequate ballast (i.e., sand bags) shall be placed on the geomembrane, without damaging the geomembrane, to prevent uplift by wind. No equipment shall be operated on the top surface of the geomembrane without permission from the Contracting Officer. Seams shall be oriented parallel to the line of maximum slope. Where seams can only be oriented across the slope, the upper panel shall be lapped over the lower panel. The methods used to deploy and backfill over the geomembrane shall minimize wrinkles and tensile stresses in the geomembrane. The geomembrane shall have adequate slack to prevent the creation of tensile stress. The wrinkle height to width ratio for installed geomembrane shall not exceed 0.5. In addition, geomembrane wrinkles shall not exceed 6 inches in height. Wrinkles that do not meet the above criteria shall be cut out and repaired in accordance with the installer's approved QC manual.

3.3 FIELD SEAMING

3.3.1 Trial Seams

Trial seams shall be made under field conditions on strips of excess geomembrane. Trial seams shall be made each day prior to production seaming, whenever there is a change in seaming personnel or seaming equipment and at least once every four hours, by each seamer and each piece of seaming equipment used that day. Trial seam samples shall be collected and tested in accordance with ASTM D6392. One sample shall be obtained from each trial seam. This sample shall be at least 36 inches long by 12 inches wide with the seam centered lengthwise. Ten random specimens 1 inch wide shall be cut from the sample. Five seam specimens shall be field tested for shear strength and 5 seam specimens shall be field tested for peel adhesion using an approved quantitative tensiometer. Where necessary, accelerated curing of trial seams made by chemical methods shall be conducted in accordance with GSI GRI GM7. To be acceptable, 4 out of 5 replicate test specimens shall meet seam strength requirements specified in Table 3. If the field tests fail to meet these requirements, the entire operation shall be repeated. If the additional trial seam fails, the seaming apparatus or seamer shall not be used until the deficiencies are corrected by the installer and 2 consecutive successful trial seams are achieved.

3.3.2 Field Seams

Panels shall be seamed in accordance with the geomembrane manufacturer's recommendations. In sumps, corners and odd-shaped geometric locations, the number of field seams shall be minimized. Seaming shall extend to the outside edge of panels. Soft subgrades shall be compacted and approved prior to seaming. The seam area shall be free of moisture, dust, dirt, and foreign material at the time of seaming. Fish mouths in seams shall be repaired.

3.3.2.1 Polyethylene Seams

Polyethylene geomembranes shall be seamed by double wedge weld thermal fusion methods. Extrusion welding shall only be used for patching and seaming in locations where thermal fusion methods are not feasible. Seam overlaps that are to be attached using extrusion welds shall be ground prior to welding. Grinding marks shall be oriented perpendicular to the seam direction and no marks shall extend beyond the extrudate after placement. Extrusion welding shall begin within 10 minutes after grinding. Where extrusion welds are temporarily terminated long enough to cool, they shall be ground prior to applying new extrudate over the existing seam. The total depth of the grinding marks shall be no greater than 10 percent of the sheet thickness.

3.4 SAMPLES

One QC sample, 18 inches in length, for the entire width of a roll, shall be obtained for every 100,000 square feet of material delivered to the site. Samples shall not be obtained from the first three feet of the roll. For accordion folded geomembranes, samples of equivalent size shall be collected from approved locations. The samples shall be identified by manufacturer's name, product identification, lot and roll/panel number. The date, a unique sample number, and the machine direction shall also be noted. In addition, a 12 inch by 12 inch QA sample shall be collected, labeled, and submitted to the Contracting Officer each time QC samples are collected.

3.5 TESTS

The Contractor shall provide all QC samples to the QC laboratory to determine density, thickness, tensile strength at break, and elongation at break in accordance with the methods specified in Table 1 and 2. Samples not meeting the specified requirements shall result in the rejection of applicable rolls/panels. As a minimum, rolls/panels produced immediately prior to and immediately after the failed roll/panel shall be tested for the same failed parameter. Testing shall continue until a minimum of three successive rolls/panels on both sides of the original failing roll/panel pass the failed parameter.

3.5.1 Non-Destructive Field Seam Continuity Testing

Field seams shall be non-destructively tested for continuity over their full length in accordance with the installer's approved QC manual. Seam testing shall be performed as the seaming work progresses, not at the completion of field seaming. Any seams which fail shall be documented and repaired in accordance with the installer's approved QC manual.

3.5.2 Destructive Field Seam Testing

A minimum of one destructive test sample per 750 feet of field seam shall be obtained at locations specified by the QC inspector. Sample locations shall not be identified prior to seaming. Samples shall be a minimum of 12 inches wide by 42 inches long with the seam centered lengthwise. Each sample shall be cut into 3 equal pieces, with one piece retained by the installer, one piece given to the QC laboratory, and the remaining piece given to the Contracting Officer for QA testing and/or permanent record. Each sample shall be numbered and cross referenced to a field log which identifies: (1) panel number; (2) seam number; (3) date and time cut; (4) ambient temperature within 6 inches above the geomembrane; (5) seaming unit designation; (6) name of seamer; and (7) seaming apparatus temperature and pressures (where applicable). Ten 1 inch wide replicate specimens shall be cut from the installer's sample. Five specimens shall be tested for shear strength and 5 for peel adhesion using an approved field quantitative tensiometer. Jaw separation speed shall be in accordance with the approved QC manual. To be acceptable, 4 out of 5 replicate test specimens shall meet the seam strength requirements specified in Table 3. If the field tests pass, 5 specimens shall be tested at the QC laboratory for shear strength and 5 for peel adhesion in accordance with the QC laboratory's approved procedures. To be acceptable, 4 out of 5 replicate test specimens shall meet the seam strength requirements specified in Table 2. If the field or laboratory tests fail, the seam shall be repaired in accordance with paragraph Destructive Seam Test Repairs. Holes for destructive seam samples shall be repaired the same day they are cut.

3.6 DEFECTS AND REPAIRS

3.6.1 Destructive Seam Test Repairs

Seams that fail destructive seam testing may be overlaid with a strip of new material and seamed (cap stripped). Alternatively, the seaming path shall be retraced to an intermediate location a minimum of 10 feet on each side of the failed seam location. At each location a 12 by 18 inch minimum size seam sample shall be taken for 2 additional shear strength and 2 additional peel adhesion tests using an approved quantitative field tensiometer. If these tests pass, then the remaining seam sample portion shall be sent to the QC laboratory for 5 shear strength and 5 peel adhesion tests in accordance with the QC laboratory's approved procedures. To be acceptable, 4 out of 5 replicate test specimens must meet specified seam strength requirements. If these laboratory tests pass, then the seam shall be cap stripped or repaired using other approved methods between that location and the original failed location. If field or laboratory tests fail, the process shall be repeated. After repairs are completed, the repaired seam shall be non-destructively tested in accordance with paragraph Non-Destructive Field Seam Continuity Testing.

3.6.2 Patches

Tears, holes, blisters and other defects shall be repaired with patches. Patches shall have rounded corners, be made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects. Minor localized flaws shall be repaired by spot welding or seaming as determined by the QC inspector. Repairs shall be non-destructively tested. The Contracting Officer or the QC inspector may also elect to perform destructive seam tests on suspect areas.

3.7 VISUAL INSPECTION AND EVALUATION

Immediately prior to covering, the geomembrane, seams, and non-seam areas shall be visually inspected by the QC inspector and Contracting Officer for defects, holes, or damage due to weather conditions or construction activities. At the Contracting Officer's or the QC inspector's discretion, the surface of the geomembrane shall be brushed, blown, or washed by the installer if the amount of dust, mud, or foreign material inhibits inspection or functioning of the overlying material. Each suspect location shall be non-destructively tested in accordance with paragraph Non-Destructive Field Seam Continuity Testing. Each location that fails non-destructive testing shall be repaired in accordance with paragraph Patches and non-destructively retested.

3.8 PROTECTION AND BACKFILLING

Wrinkles in the geomembrane shall be prevented from folding over during placement of cover materials. Cover soil shall not be dropped onto the geomembrane or overlying geosynthetics from a height greater than 3 feet. The soil shall be pushed out over the geomembrane or overlying geosynthetics in an upward tumbling motion. Soil shall be placed from the bottom of the slope upward. The initial loose soil lift thickness shall be 12 inches. Equipment with ground pressures less than 7 psi shall be used to place the first lift over the geomembrane. A minimum of 24 inches of soil shall be maintained between construction equipment with ground pressures greater than 7 psi and the geomembrane. Cover soil compaction and testing requirements are described in Section 31 00 00 EARTHWORK. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 mph.

3.9 AS-BUILT DRAWINGS

Final as-built drawings of the geomembrane installation shall be prepared. These drawings shall include panel numbers, seam numbers, location of repairs, destructive seam samples, and penetrations.

-- End of Section --

SECTION 02 56 15

GEOSYNTHETIC CLAY LINER (GCL)

PART 1 GENERAL

1.1 UNIT PRICES

Measurement will be made of the total surface area covered by GCL in acres as shown on the contract drawings. Final quantities will be based on as-built conditions. Allowance will be made for GCL in anchor and drainage trenches; however, no allowance will be made for waste, overlap, repairs, or materials used for the convenience of the Contractor.

1.2 PAYMENT

GCL installed and accepted will be paid for at the respective contract unit price in the bidding schedule. This unit price will include the cost of all labor, materials, equipment, installation, testing, and costs associated with placement of the GCL.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D5261	(2010) Measuring Mass Per Unit Area of Geotextiles
ASTM D5887/D5887M	(2016) Standard Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
ASTM D5888	(2006; R 2016) Standard Guide for Storage and Handling of Geosynthetic Clay Liners
ASTM D5889/D5889M	(2016) Standard Practice for Quality Control of Geosynthetic Clay Liners
ASTM D5890	(2011) Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
ASTM D5891/D5891M	(2002; R 2016; E 2016) Fluid Loss of Clay Component of Geosynthetic Clay Liners
ASTM D5993	(2014) Measuring Mass Per Unit of Geosynthetic Clay Liners
ASTM D6072/D6072M	(2009; R 2015) Obtaining Samples of Geosynthetic Clay Liners
ASTM D6496/D6496M	(2004a; R 2015; E 2015) Standard Test

	Method for Determining Average Bonding Peel Strength Between Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners
ASTM D6768/D6768M	(2004; R 2015; E 2015; E 2015) Standard Test Method for Tensile Strength of Geosynthetic Clay Liners

1.4 ADMINISTRATIVE REQUIREMENTS

Submit GCL panel layout and detail drawings, for approval, a minimum of 14 days prior to deployment. Include GCL panel layout and penetration detail drawings.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Layout and Detail Drawings; G

SD-03 Product Data

Manufacturer's Quality Control (QC) Manual
GCL Properties

Submit certified test results at least 14 working days prior to delivery of the GCL.

Warranty
Tests, Inspections, and Verifications
Qualifications; G

Manufacturer's, installer's, QC inspector's, and QC laboratory's qualification statements including resumes of key personnel involved in this project.

SD-04 Samples

Samples

Deliver QC samples at the specified frequencies.

SD-06 Test Reports

Tests, Inspections, and Verifications
Conformance Tests
Subgrade Preparation; G

1.6 QUALITY CONTROL

1.6.1 Manufacturer's Quality Control (QC) Manual

Submit the manufacturer's quality control (QC) manual which describes testing procedures, frequency of testing and acceptance/rejection criteria

for QC testing at least 14 days prior to delivery of the GCL.

1.6.2 Qualifications

1.6.2.1 Manufacturer

Geosynthetic clay liner shall be the product of a GCL Manufacturer who has produced the proposed GCL using the same bentonite, polyethylene geomembrane, geotextiles, sewing thread, and adhesive for at least 5 completed projects and shall have produced a minimum of 2,000,000 square feet of the proposed GCL.

1.6.2.2 Installer

The installer shall have installed GCL at a minimum of 5 projects of comparable scope and complexity and shall have installed a minimum of 200,000 square feet of the proposed GCL.

1.6.2.3 QC Inspector

The independent QC inspector is responsible for monitoring and documenting activities related to the QC of the GCL from manufacturing through installation. The QC inspector shall have provided QC and/or QA inspection during installation of GCL material for at least 5 projects and shall have performed QC and/or QA inspection on a minimum of 200,000 square feet of GCL.

1.6.2.4 QC Laboratory

An independent QC laboratory is responsible for QC GCL testing. The QC laboratory shall have provided QC and/or QA testing of GCL for at least 5 completed projects and shall have performed QC and or QA testing for a minimum of 200,000 square feet of GCL. The QC laboratory shall be accredited via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP).

1.7 DELIVERY, STORAGE, AND HANDLING

Delivery, storage, and handling of GCL shall be in accordance with ASTM D5888.

1.7.1 Delivery

The Contracting Officer shall be present during unloading of the GCL. Rolls shall be packaged in an opaque, waterproof, protective covering and wrapped around a central core. Tears in the packaging shall be repaired to restore a waterproof protective barrier around the GCL. Unloading of rolls from the delivery vehicles shall be done in a manner that prevents damage to the GCL and its packaging.

1.7.2 Storage

Field storage shall be in flat dry areas where water cannot accumulate and the GCL rolls can be protected from damage. Storage of the rolls on blocks or pallets will not be allowed unless the GCL rolls are fully supported as approved by the Contracting Officer. Stacks of GCL rolls shall be no greater than three high. Rolls shall be covered with a water proof tarpaulin or plastic sheet if stored outdoors.

1.7.3 Handling

During handling, rolls shall not be dragged, lifted by one end, dropped to the ground, or otherwise damaged. A pipe or solid bar of sufficient strength to support the full weight of the roll without significant bending shall be used for all unloading and handling activities. If recommended by the manufacturer, a sling handling method utilizing appropriate loading straps may be used.

1.8 WARRANTY

The manufacturer's warranty shall state that the GCL materials meet all requirements of the contract documents and that for the intended use, the GCL has a pro-rated warranty for 20 years against deterioration. The installer's warranty shall state that the GCL shall not fail due to improper installation within 2 years.

PART 2 PRODUCTS

2.1 GCL PROPERTIES

GCL shall be a manufactured product consisting of a sodium montmorillonite clay (bentonite) layer evenly distributed between two geotextiles. GCL shall conform to the property requirements listed in Table 1 and shall be free of tears, holes, or other defects that may affect its serviceability. Encapsulating geotextiles shall be mechanically bonded together using a needle punch or stitch bonding process. Needle punched and stitch bonded GCLs shall be continuously inspected for broken needles using an in-line metal detector and broken needles shall be removed. The minimum manufactured GCL sheet width shall be 13.5 feet and the minimum manufactured GCL sheet length shall be 98 feet.

Submit manufacturer's certified raw and roll material data sheets. The certification shall indicate that the GCL has been continuously inspected for broken needles using an in-line metal detector and all broken needles have been removed. The certified data sheets shall be attested to by a person having legal authority to bind the GCL manufacturing company.

TABLE 1 - GCL PROPERTIES

	TEST METHOD	TEST VALUE
BENTONITE		
Swell Index Test, minimum	ASTM D5890	24 mL
Fluid Loss, maximum	ASTM D5891/D5891M	18 mL
UPPER GEOTEXTILE PROPERTIES		
Material Type		Nonwoven

TABLE 1 - GCL PROPERTIES		
	TEST METHOD	TEST VALUE
Mass per Unit Area, min.	ASTM D5261	6 ounces/square yard
LOWER GEOTEXTILE PROPERTIES		
Material Type		Woven
Mass per Unit Area, min.	ASTM D5261	3 ounces/square yard
COMPOSITE		
Bentonite Mass/Unit Area, minimum, Note 1	ASTM D5993	0.81 lbs/sq foot
Moisture Content, maximum	ASTM D5993	35 percent
Tensile Strength, minimum, (MD and CD)	ASTM D6768/D6768M	23 lbs/in
Index Flux, maximum	ASTM D5887/D5887M	1×10^{-6} $cm^3/sec\text{-}cm^2$
Peel Strength, MARV MD Note 2	ASTM D6496/D6496M	2.3 lbs/inch
Note 1: Bentonite mass/unit area shall be computed at 0 percent moisture content. Bentonite mass/unit area is exclusive of glues added to the bentonite. Note 2: The peel test applies to geotextile backed GCL products only.		

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

2.2.1 Manufacturing Sampling and Testing

GCL and its components shall be sampled and tested in accordance with the manufacturer's approved QC manual. The manufacturer's QC procedures shall be in accordance with ASTM D5889/D5889M. Test results not meeting the requirements specified in Table 1 shall result in the rejection of applicable rolls. The manufacturer's QC manual shall describe procedures used to determine rejection of applicable rolls. As a minimum, rolls produced immediately prior to and immediately after the failed roll shall

be tested for the same failed parameter. Testing shall continue until a minimum of three successive rolls on both sides of the original failing roll pass the failed parameter.

PART 3 EXECUTION

3.1 SAMPLES AND TESTS

3.1.1 Samples

Collect QC samples at approved locations upon delivery to the site at the request of the Contracting Officer a frequency of one test sample per 225,000 square feet. Samples shall be collected, packaged, and transported in accordance with ASTM D6072/D6072M. Samples shall be identified with a waterproof marker by manufacturer's name, product identification, lot and roll number. The date, a unique sample number, the machine direction, and the top surface of the GCL shall also be noted on the sample. The outer layer of the GCL roll shall be discarded prior to sampling a roll. Samples shall then be collected by cutting the full-width of the GCL sheet a minimum of 3 feet wide in the machine direction. An additional 24 by 24 inch QA sample shall be collected, labeled, and submitted to the Contracting Officer each time QC samples are collected.

3.1.2 Conformance Tests

Provide QC samples to the QC laboratory to determine bentonite mass per unit area (ASTM D5993) peel strength (ASTM D6496/D6496M), flux (ASTM D5887/D5887M) and tensile strength (ASTM D6768/D6768M) at a frequency of once per 225,000 square feet of GCL placed. Tests not meeting the requirements specified in Table 1 shall result in the rejection of applicable rolls. Determination of applicable rolls shall be as described in paragraph TESTS, INSPECTIONS, AND VERIFICATIONS.

3.2 INSTALLATION

3.2.1 Subgrade Preparation

Each day during placement, the Contracting Officer and installer shall inspect the surface on which GCL is to be placed. The installer shall certify in writing that the surface is acceptable.

3.2.2 Placement

GCL shall be installed as soon as practical after completion and approval of the geocomposite gas collection layer. Rolls shall be delivered to the work area in their original packaging. Immediately prior to deployment, the packaging shall be carefully removed without damaging the GCL. GCL which has been hydrated prior to being covered by an overlying geomembrane or a minimum of 12 inches of cover soil shall be removed and replaced. Hydrated GCL is defined as having become soft as determined by squeezing the material with finger pressure or material which has exhibited swelling. Construction equipment may be used to deploy GCL. On side slopes, GCL shall be anchored at the top and deployed down the slope to minimize wrinkles. Dragging of GCL panels over the ground surface shall be minimized. The Contracting Officer has the option of requiring the use of a slip sheet. Deployed GCL panels shall lie flat on the subgrade surface, with no wrinkles or folds.

3.2.3 Anchor Trench

Where anchor trenches are required, they shall be placed as shown on the drawings. The front edge of the trench shall be rounded so as to eliminate sharp corners that could damage the GCL. The GCL shall extend down the front wall and across the bottom of the anchor trench. Soils used for backfill shall have a maximum particle size of 1.0 inch and shall be placed in two lifts. Compaction and testing requirements are described in Section 31 00 00 EARTHWORK.

3.2.4 Seams

On side slopes, GCL shall be placed with seams oriented parallel to the line of maximum slope and shall be free of tension or stress upon completion of installation. Panels shall be positioned with the overlap recommended by the manufacturer, but not less than 6 inches for panel sides or 18 inches for panel ends. Soil or other foreign matter shall be removed from the overlap area immediately prior to seaming. If recommended by the manufacturer, granular bentonite of the same type as the bentonite used for the GCL shall be placed along the entire overlap width at a minimum rate of 0.25 lbs/linear foot or as recommended by the manufacturer. Construction adhesive or other approved seaming methods recommended by the manufacturer shall be used for horizontal seams on slopes. Overlaps which occur on slopes shall be constructed with the up slope GCL shingled over the down slope GCL. Alternate seaming methods may be approved if recommended by the manufacturer.

3.2.5 Protection

Only those GCL panels which can be anchored and covered in the same day shall be unpackaged and installed. If exposed GCL cannot be permanently covered before the end of a working day, it shall be temporarily covered with plastic or other waterproof material to prevent hydration.

3.3 REPAIRS

Holes or tears in GCL shall be repaired by placing a patch of GCL extending a minimum of 12 inches beyond the edges of the hole or tear on all sides. If recommended by the manufacturer, granular bentonite or bentonite mastic shall be applied in the overlap area. Patches shall be secured with a construction adhesive or other approved methods as recommended by the manufacturer.

3.4 PENETRATIONS

Penetration details shall be as recommended by the GCL manufacturer. As a minimum, pipe penetrations shall incorporate a collar of GCL wrapped around the pipe and securely fastened. Dry bentonite or bentonite paste shall be placed around the penetration as recommended by the GCL manufacturer.

3.5 COVERING

GCL shall not be covered with the geomembrane prior to inspection and approval by the Contracting Officer.

-- End of Section --

SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for excavation and onsite transportation shall be based on the actual number of bank cubic yards of contaminated material in-place prior to excavation. Determination of the volume of contaminated material excavated shall be pre- and post-removal surveys. Measurement for backfilling of excavated areas shall be based on in-place cubic yards of compacted backfill soil and topsoil as indicated on drawings. Measurement for construction of stockpile areas shall be based on the number of square yards of stockpile liner constructed.

1.1.2 Payment

1.1.2.1 Excavation and Transportation

Compensation for excavation and onsite and offsite to onsite transportation of contaminated material will be paid as a unit cost. This unit cost shall include any other items incidental to excavation and handling not defined as having a specific unit cost.

1.1.2.2 Backfilling

Compensation for backfill soil and topsoil, transportation of backfill soil and topsoil, backfill soil and topsoil conditioning, backfilling, compaction, and geotechnical testing will be paid as a unit cost.

1.1.2.3 Stockpiling

Compensation for construction of stockpile areas will be paid for as a unit cost. This unit cost shall include all aspects of grading, preparation, handling, placement, maintenance, removal, treatment, and disposal of stockpile cover materials and liner materials and all other items incidental to construction of stockpiles.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2974	(2014) Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

ASTM D422	(1963; R 2007; E 2014; E 2014) Particle-Size Analysis of Soils
ASTM D4972	(2018) Standard Test Methods for pH of Soils
ASTM D5434	(2012) Field Logging of Subsurface Explorations of Soil and Rock
ASTM D6938	(2017) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 302	Designation, Reportable Quantities, and Notification

1.3 DESCRIPTION OF WORK

The work consists of excavation, temporary storage, and transport of contaminated material. Approximate locations of contaminated material are shown on the drawings. Characterization data on the nature and extent of the contaminated material is shown on the Drawings. Subsurface conditions are shown on the drawings. Submit a Soil, Excavation, Grading, and Backfill Plan as specified below. Notify the Contracting Officer within 24 hours, and before excavation, if contaminated material is discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered. Backfill soil and topsoil material is not available onsite.

Surficial soil to be excavated includes onsite soil with dioxin TEQ levels above 30 ng/kg and off-site soil from the adjacent neighborhoods off-facility with dioxin TEQ levels of 7 ng/kg. All off-facility contaminated excavated soil shall be transported to the area within the barrier wall and shall underline the planned surface soil cap/cover. Excavated soil onsite will either be placed within the barrier wall confines or within the engineered containment cell. Contaminated materials to be excavated and handled are indicated on drawings.

1.3.1 Scheduling

Notify the Contracting Officer 7 calendar days prior to the start of excavation of contaminated material. The Contractor shall be responsible for contacting regulatory agencies in accordance with the applicable

reporting requirements.

1.3.2 Soil Excavation, Grading, and Backfill Plan

Submit a Soil Excavation, Grading, and Backfill Plan within 30 calendar days after notice to proceed. No work at the site, with the exception of site inspections and surveys, shall be performed until the Plan is approved. Allow 30 calendar days in the schedule for the Government's review. No adjustment for time or money will be made if resubmittals of the Plan are required due to deficiencies in the plan. At a minimum, the Plan shall include:

a. Schedule of activities.

b. Method of excavation and equipment to be used.

c. Shoring or side-wall slopes proposed, if required.

d. Dewatering plan.

e. Temporary Storage methods and locations for liquid and solid contaminated material.

f. Borrow sources and haul routes, including dust suppression.

g. Decontamination procedures.

h. Spill contingency plan.

i. Traffic control plan for offsite excavation activities.

j. Sources and methods proposed for backfilling.

1.3.3 Other Submittal Requirements

Submit separate cross-sections of each area before and after excavation and after backfilling, test results, and 3 copies of the Closure Report within 14 calendar days of work completion at the site.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Surveys

SD-03 Product Data

Soil Excavation, Grading, and Backfill Plan; G
Closure Report; G

SD-04 Samples

Topsoil

SD-06 Test Reports

Backfill
Surveys
Compaction

1.5 REGULATORY REQUIREMENTS

1.5.1 Permits and Licenses

Obtain required federal, state, and local permits for excavation and storage of contaminated material. Permits shall be obtained at no additional cost to the Government.

1.5.2 Air Emissions

Air emissions shall be monitored and controlled in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

PART 2 PRODUCTS

2.1 SPILL RESPONSE MATERIALS

Provide appropriate spill response materials including, but not limited to the following: containers, adsorbents, shovels, and personal protective equipment. Spill response materials shall be available at all times when contaminated materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of materials and contaminants being handled.

2.2 BACKFILL

Backfill material shall be obtained from offsite sources approved by the Contracting Officer. Backfill shall be classified in accordance with ASTM D2487 as SW, SP, SM, SC, ML, MH, CL, or CH and shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials. Backfill material shall be tested for the parameters listed below at a frequency of once per 7,500 cubic yards. A minimum of one set of classification tests shall be performed per borrow source. One backfill sample per borrow source shall also be collected and tested for the chemical parameters listed in Requirements for Offsite Borrow in Section 31 00 00 EARTHWORK. Backfill shall also comply with criteria listed in Table 1.

TABLE 1
REQUIRED PHYSICAL PROPERTIES OF BACKFILL

Physical Parameter	Criteria	Test Method
Maximum Grain Size	1.0 inch	ASTM D422
Compaction	90 percent of maximum dry	ASTM D698

Do not use material for backfill until borrow source chemical and physical test results have been submitted and approved.

2.3 TOPSOIL

Topsoil shall consist of natural, friable soil that is representative of soils in the vicinity which produce heavy growths of crops, grass, or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances, or any material that might be harmful to plant growth or be a hindrance to grading, planting, or maintenance operations. Submit a minimum of 5 pounds of topsoil from each proposed borrow source to the Contractor's designated laboratory at least 15 days prior to placement. Topsoil shall also comply with the criteria listed in Table 2.

TABLE 2
REQUIRED PHYSICAL PROPERTIES OF TOPSOIL

Property	Test Value	Test Method
pH	5-7	ASTM D4972
Organic content (percent)	5-20	ASTM D2974

PART 3 EXECUTION

3.1 SURVEYS

Perform surveys immediately prior to and after excavation of contaminated material to determine the volume of contaminated material removed. Also, perform surveys immediately after backfill of each excavation. Provide cross-sections on 10 foot intervals and at break points for all excavated areas.

3.2 EXISTING STRUCTURES AND UTILITIES

No excavation shall be performed until site utilities have been field located. Take the necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the Contractor's operations shall be repaired at no additional cost to the Government. Utilities encountered that were not previously shown or otherwise located shall not be disturbed without approval from the Contracting Officer.

3.3 CLEARING AND DEMOLITION

Clearing shall be performed to the limits shown on the drawings in accordance with Section 31 11 00 CLEARING AND GRUBBING. Demolition shall be performed in accordance with Section 02 41 00 DEMOLITION.

3.4 CONTAMINATED MATERIAL REMOVAL

Excavations should be marked and secured in accordance with the requirements specified in Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES.

3.4.1 Excavation

Areas of contamination shall be excavated to the depth and extent shown on the drawings and not more than 0.2 feet beyond the depth and extent shown

on the drawings unless directed by the Contracting Officer. Excavation shall be performed in a manner that will limit spills and the potential for contaminated material to be mixed with uncontaminated material. An excavation log describing visible signs of contamination encountered shall be maintained for each area of excavation. Excavation logs shall be prepared in accordance with ASTM D5434.

3.4.2 Shoring

If workers must enter the excavation, it shall be evaluated, shored, sloped or braced as required by EM 385-1-1 and 29 CFR 1926 section 650.

3.4.3 Dewatering

Surface water shall be diverted to prevent entry into the excavation. Dewatering shall be limited to that necessary to assure adequate access, a safe excavation, prevent the spread of contamination, and to ensure that compaction requirements can be met.

3.5 TRANSPORTATION

Contaminated materials shall be transported within the construction limits shown on the drawing. Dedicated haul routes shall be used for contaminated material transport. At the completion of excavation, the transport onsite routes shall be scraped of all contaminated material and placed within the barrier wall confines or within the engineered containment cell.

3.6 CONTAMINATED MATERIAL STORAGE

Material shall be placed within the barrier wall limits immediately after excavation as indicated on the drawings.

3.6.1 Stockpiles

Stockpiles shall be constructed to isolate stored contaminated material from the environment. The Contractor may use temporary stockpiles as part of the Soil Excavation, Grading, and Backfill Plan. The Contractor shall submit a design for the stockpile that will prevent contamination of the subgrade materials. The stockpile design shall be approved by the Contracting Officer.

3.7 SPILLS

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), pollutant, contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), notify the Contracting Officer immediately. If the spill exceeds the reporting threshold, follow the pre-established procedures as described in Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES for immediate reporting and containment. Immediate containment actions shall be taken to minimize the effect of any spill or leak. Cleanup shall be in accordance with applicable federal, state, and local regulations. As directed by the Contracting Officer, additional sampling and testing shall be performed to verify spills have been cleaned up. Spill cleanup and testing shall be done at no additional cost to the Government.

3.8 BACKFILLING

3.8.1 General Backfilling Requirements

Excavations shall be backfilled immediately after all contaminated materials have been removed. Backfill and topsoil shall be placed and compacted to the lines and grades shown on the drawings.

3.8.2 Compaction

Place approved backfill in lifts with a maximum loose thickness of 18 inches. Compact soil to 90 percent of ASTM D698 maximum dry density. Perform density tests at a frequency of once per 20,000 square feet per lift. Conduct a minimum of one density test on each lift of backfill placed in each excavation. Determine field in-place dry density in accordance with ASTM D6938.

3.9 DISPOSAL REQUIREMENTS

All excavated onsite and offsite contaminated soils will be disposed of in onsite area as shown on drawings. No offsite disposal of contaminated soils will be required for this project.

3.10 CLOSURE REPORT

Submit 3 copies of a Closure Report within 14 calendar days of completing work at the site. The report shall be labeled with the contract number, project name, location, date, name of general Contractor, and the Government Agency contracting for the work. The Closure Report shall include the following information as a minimum:

a. A cover letter signed by a responsible company official certifying that all services involved have been performed in accordance with the terms and conditions of the contract documents and regulatory requirements.

b. A narrative report including, but not limited to, the following:

(1) site conditions, ground water elevation, and cleanup criteria;

(2) excavation logs;

(3) field screening readings;

(4) quantity of materials removed from each area of contamination;

(5) quantity of water/product removed during dewatering;

(6) sampling locations and sampling methods;

(7) sample collection data such as time of collection and method of preservation;

(8) sample chain-of-custody forms; and

(9) source of backfill.

c. Copies of all chemical and physical test results.

d. Copies of all manifests and land disposal restriction notifications.

e. Copies of all certifications of final disposal signed by the responsible disposal facility official.

f. Waste profile sheets.

g. Scale drawings showing limits of each excavation, limits of contamination, known underground utilities within 50 feet of excavation, sample locations, and sample identification numbers. On-site stockpile, storage, treatment, loading, and disposal areas shall also be shown on the drawings.

h. Progress Photographs. Color photographs shall be used to document progress of the work. A minimum of four views of the site showing the location of the area of contamination, entrance/exit road, and any other notable site conditions shall be taken before work begins. After work has been started, activities at each work location shall be photographically recorded weekly. Photographs shall be digital and shall include:

(1) Soil removal and sampling.

(2) Dewatering operations.

(3) Unanticipated events such as spills and the discovery of additional contaminated material.

(4) Contaminated material/water storage, handling, treatment, and transport.

(5) Site or task-specific employee respiratory and personal protection.

(6) Fill placement and grading.

(7) Post-construction photographs. After completion of work at each site, take a minimum of four views of each excavation site.

A digital version of all photos shown in the report shall be included with the Closure Report. Photographs shall include the following information:

Project Name:	Direction of View:
Location:	Date/Time:
Photograph No.:	Description of View:

-- End of Section --

SECTION 02 66 00

COVER SOIL AND TOPSOIL FOR LANDFILL COVER

PART 1 GENERAL

1.1 UNIT PRICES

Measurement and payment for "cover soil" and "topsoil" shall be based on the respective unit prices for each cubic yard of "cover soil" and "topsoil" in place. This unit price shall include the cost for development of borrow sources, cost of materials, excavation, hauling, equipment, placement, testing, and other work required to construct the "cover soil" or "topsoil" layers.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D2216	(2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2974	(2014) Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
ASTM D422	(1963; R 2007; E 2014; E 2014) Particle-Size Analysis of Soils
ASTM D4318	(2017) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4972	(2013) pH of Soils
ASTM D6938	(2017) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL

PROCEDURES:

SD-03 Product Data

Materials Handling Plan; G

SD-04 Samples

Cover Soil
Topsoil

SD-06 Test Reports

Borrow Source Assessment Report; G
Cover Soil and Topsoil Material Tests
Moisture Content and Density Tests of In-Place Cover Soil

PART 2 PRODUCTS

2.1 COVER SOIL

Cover soil shall comply with the criteria listed in Table 1 and shall be free of debris, frozen materials, angular rocks, roots, and organics.

2.2 TOPSOIL

Topsoil shall consist of natural, friable soil that is representative of soils in the vicinity which produce heavy growths of crops, grass, or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances, or any material that might be harmful to plant growth or be a hindrance to grading, planting, or maintenance operations. Topsoil shall also comply with the criteria listed in Table 1.

TABLE 1
REQUIRED PHYSICAL PROPERTIES OF SELECT FILL AND TOPSOIL

Property	Test Value	Test Method
Cover Soil		
Soil classification	Lean clay (CL) or Clayey sand (SC)	ASTM D2487
Max. particle size (inches)	0.75	ASTM D422
Topsoil		
pH	5-7	ASTM D4972
Organic content (percent)	5-20	ASTM D2974

2.3 EQUIPMENT

Equipment used to place the cover soil and topsoil layers shall be as described in the approved Materials Handling Plan, including ground

pressures. Equipment shall not accelerate or brake suddenly, turn sharply, or be operated at speeds exceeding 5.0 miles per hour.

PART 3 EXECUTION

3.1 BORROW SOURCE ASSESSMENT REPORT

Submit a Borrow Source Assessment Report at least 15 days prior to cover soil and topsoil placement. No cover soil or topsoil may be placed until the Borrow Source Assessment Report is approved. Include the following in the report: location of each borrow source; estimated quantity of borrow available; logs of subsurface explorations; and laboratory test results.

3.1.1 Cover Soil

3.1.1.1 Classification Testing

Borrow source assessment tests shall be performed on each principal type or combination of materials proposed for use in the cover soil layer to ensure compliance with specified requirements. At least one set of borrow assessment tests shall be performed on each borrow source proposed for use. A set of borrow source assessment tests shall consist of Atterberg limits (ASTM D4318), particle size analysis (ASTM D422), and moisture content (ASTM D2216). Based on borrow source assessment testing, soils shall be classified in accordance with ASTM D2487.

3.1.1.2 Moisture-Density (Compaction) Testing

A representative sample from each principal type or combination of borrow materials shall be tested to establish compaction curves using ASTM D698. At least one compaction test shall be performed on each borrow source proposed. A minimum of 5 points shall be used to develop each compaction curve. During construction, placement of cover soil shall conform to the following requirements:

a. The minimum allowable dry density shall be no less than 90 percent of maximum dry density.

3.1.2 Topsoil

Testing shall be performed on representative samples of each principal type or combination of topsoil materials. At least one set of tests shall be performed on each borrow source proposed. Testing shall consist of the determination of pH in accordance with ASTM D4972 and organic content in accordance with ASTM D2974.

3.1.3 Chemical Contamination Testing

Borrow used for the cover soil and topsoil layers shall be free of contamination. Each proposed borrow source shall be sampled and analyzed for chemical contamination in accordance with the requirements for off site material in Section 31 00 00 EARTHWORK.

3.2 INSTALLATION

3.2.1 Cover Soil Placement

No equipment shall be operated directly on the top surface of geosynthetics. Cover soil shall be pushed out over geosynthetics in an upward tumbling

motion so that wrinkles in geosynthetics do not fold over. Soil shall not be dropped directly onto geosynthetics from a height greater than 3 feet. On slopes, cover soil shall be placed from the bottom of the slope upward.

3.2.1.1 Initial Lift of Cover Soil Placed Over Geosynthetics

The first lift of soil placed over geosynthetics shall be a minimum of 18 inches in loose thickness. Equipment with ground pressures less than 7 psi shall be used to place and traffic compact the first lift of cover soil. Traffic compaction shall consist of a minimum of 2 passes over all areas.

3.2.2 Topsoil Placement

Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading. Topsoil shall be placed in one lift and shall be evenly spread to a final compacted thickness of 6 inches. Topsoil shall be traffic compacted using approved placement equipment. On slopes, topsoil shall be placed from the bottom of the slope upward.

3.3 CONSTRUCTION TOLERANCES

Finished surfaces shall be uniformly graded and shall be free from depressions, mounds, or windrows. The top surface of the cover soil layer and topsoil layer shall be no greater than 3 inches above the lines and grades shown on the drawings. No minus tolerance will be permitted. Rigid grade stakes shall not be driven into the cover soil layer to control placement.

3.4 CONSTRUCTION TESTS

3.4.1 Cover Soil and Topsoil Material Tests

No cover soil or topsoil shall be placed until the Borrow Source Assessment Report is approved. During construction of the cover soil layer, representative samples shall be taken for testing at the frequencies listed in Table 2 from the borrow source prior to placement. Test results must comply with the requirements listed in Part 2 Products or the material will be rejected for use. Submit test results as specified.

TABLE 2
COVER SOIL AND TOPSOIL MATERIAL TESTING FREQUENCIES

Property	Frequency	Test Method
Cover Soil		
Grain size analysis	5,000 cubic yards	ASTM D422
Atterberg limits	5,000 cubic yards	ASTM D4318
Compaction (Note 1)	2,500 cubic yards	ASTM D422
Topsoil		

TABLE 2
COVER SOIL AND TOPSOIL MATERIAL TESTING FREQUENCIES

Property	Frequency	Test Method
Grain size analysis for maximum particle size	7,500 cubic yards	ASTM D422
pH	7,500 cubic yards	ASTM D4972
Organic content	7,500 cubic yards	ASTM D2974

3.4.2 Moisture Content and Density Tests of In-Place Cover Soil

Moisture content and density tests shall be performed in accordance with Table 3. Density requirements will not be enforced for bottom 9 inches of the cover soil thickness. Submit test results as specified.

TABLE 3
MOISTURE CONTENT AND DENSITY TESTS OF IN-PLACE SELECT FILL

Property	Frequency per Lift	Test Method
Nuclear moisture content	20,000 square feet	ASTM D6938
Nuclear density	20,000 square feet	ASTM D6938

3.4.2.1 Test Frequencies and Locations

Each day that cover soil is placed, a minimum of one set of standard moisture content and density tests shall be performed. Nuclear density and moisture content tests shall be checked at the frequencies shown in Table 3.

3.4.2.2 Nuclear Density and Moisture Content Tests

Nuclear density readings shall be taken in the direct transmission mode. ASTM D6938 results in a wet unit weight of soil and when using this method ASTM D6938 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D6938; the calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer.

3.4.2.3 Test Results

Field moisture content and density test results shall be compared to the compaction curve for the appropriate material type being tested. If test results are not within the acceptable range for density, as described in subparagraph Moisture-Density (Compaction) Testing, 3 additional tests

shall be performed near the location of the failed parameter. If all retests pass, no additional action shall be taken. If any of the retests fail, the lift of soil shall be repaired out to the limits defined by passing tests for that parameter. The area shall then be retested as directed.

3.5 PROTECTION

3.5.1 Damage

Erosion rills or other damage that occurs shall be repaired and grades re-established. Repairs to the cover soil layer or topsoil layer shall be documented including location and volume of soil affected, corrective action taken, and results of retests.

3.5.2 Stockpiles

Storage or stockpiling of material on the completed surface of the cover soil or topsoil layers will not be permitted.

-- End of Section --

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 MEASUREMENT PROCEDURES

1.1.1 Excavation

The unit of measurement for excavation is stated in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

1.2 PAYMENT PROCEDURES

Payment will constitute full compensation for all labor, equipment, tools, supplies, and incidentals necessary to complete the work as stated in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

1.3 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

d. Material character is indicated by the boring logs.

1.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D1140	(2017) Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4318	(2017) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index

	of Soils
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)

FDOT	(2019) Florida Standard Specifications for Road and Bridge Construction

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 600/4-79/020	(1983) Methods for Chemical Analysis of Water and Wastes
EPA SW-846.3-3	(1999, Third Edition, Update III-A) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

1.5 DEFINITIONS

1.5.1 Satisfactory Materials

Satisfactory materials comprise any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, CH, MH. Satisfactory materials for grading comprise stones less than 2 inches.

1.5.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. Notify the Contracting Officer when encountering any contaminated materials.

1.5.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C136/C136M and ASTM D1140.

1.5.4 Degree of Compaction

Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D698 abbreviated as a percent of laboratory maximum density.

1.5.5 Select Granular Material

1.5.5.1 General Requirements

Select granular material consist of materials classified as GW, GP, SW,

SP, by ASTM D2487 where indicated.

1.5.5.2 Drainage Course

The material for Drainage Course shall meet the requirements of FDOT for Crushed Stone Drainage Layer.

1.5.5.3 Rip Rap

The material for rip rap shall meet the requirements of FDOT for 100 pound Stone Rip Rap.

1.6 SYSTEM DESCRIPTION

Subsurface soil boring logs are shown on the drawings. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.6.1 Classification of Excavation

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.7 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring and Sheeting Plan; G

SD-03 Product Data

Utilization of Excavated Materials; G
Augmented Clay; G

SD-06 Test Reports

Testing

Borrow Site Testing

Within 24 hours of conclusion of physical tests, submit 3 copies of test results, including calibration curves and results of calibration tests.

SD-07 Certificates

Testing

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR OFFSITE SOILS

Test offsite soils brought in for use as backfill for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and full Toxicity Characteristic Leaching Procedure (TCLP) including

ignitability, corrosivity and reactivity. Backfill shall contain a maximum of 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and a maximum of 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall pass the TCPL test. Determine TPH concentrations by using EPA 600/4-79/020 Method 418.1. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5030/8020. Perform TCLP in accordance with EPA SW-846.3-3 Method 1311. Provide Borrow Site Testing for TPH, BTEX and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Do not bring material onsite until tests have been approved by the Contracting Officer.

2.2 MATERIAL FOR RIP-RAP

2.2.1 Rock

Provide rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Use rock fragments free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. Provide rock with a minimum specific gravity of 2.50. Do not permit the inclusion of more than trace 1 percent quantities of dirt, sand, clay, and rock fines.

2.3 AUGMENTED CLAY

Augmented clay shall be a CH (high plasticity clay) in accordance with ASTM D2487. Augmented clay shall be compacted to 95 percent of the Standard Proctor maximum density and with a moisture content between 0 and 4 percent above optimum moisture content.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

Excavation for contaminated areas is provided in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. The excavation listed in this section is for general excavations in areas that are not identified as contaminated.

Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in paragraph FINISHING. Transport satisfactory excavated materials and place in fill within the limits of the work. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation. Dispose surplus satisfactory excavated material not required for fill in areas approved for surplus material storage or designated waste areas. Dispose unsatisfactory excavated material in designated waste or spoil areas. Unsatisfactory material that is contaminated shall be placed within the planned barrier wall area. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times. Excavate material required for fill in excess of that produced by excavation within the grading limits from the borrow areas indicated or from other approved areas selected by the Contractor as specified.

3.1.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown on the Drawings. Do not excavate ditches and gutters below grades shown. Backfill the excessive open ditch or gutter excavation with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed, except in no case allow material be deposited a maximum 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.1.2 Drainage Structures

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of structure footings and foundations. Clean rock or other hard foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata. Do not disturb the bottom of the excavation when precast is to be placed in an excavated area. Do not excavate to the final grade level until just before the precast structure is to be placed.

3.1.3 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. Construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

3.1.4 Dewatering

Dewatering requirements for contaminated sites are provided in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

Control groundwater flowing toward or into excavations to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Do not permit French drains, sumps, ditches or trenches within 3 feet of the foundation of any structure or excavation of contaminated area, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Take control measures by the time the excavation reaches the water level in order to maintain the integrity of the in situ material.

3.1.5 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make

vertical, and of such width as recommended in the manufacturer's printed installation manual. Provide vertical trench walls where no manufacturer's printed installation manual is available. Shore trench walls more than 3 feet high, cut back to a stable slope, or provide with equivalent means of protection for employees who may be exposed to moving ground or cave in. Excavate trench walls which are cut back to at least the angle of repose of the soil. Give special attention to slopes which may be adversely affected by weather or moisture content. Do not exceed the trench width below the pipe top of 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter, and do not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, provide redesign, stronger pipe, or special installation procedures by the Contractor. The Contractor is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the Government.

3.1.5.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones of 2 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.

3.1.5.2 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

3.1.6 Underground Utilities

The Contractor is responsible for movement of construction machinery and equipment over pipes and utilities during construction. Excavation made with power-driven equipment is not permitted within 2 feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

3.2 SELECTION OF BORROW MATERIAL

Select borrow material to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Obtain borrow material from the borrow areas from approved private sources. Unless otherwise provided in the contract, the Contractor is responsible for obtaining the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling from the owners. Borrow material from approved

sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, do not obtain borrow within the limits of the project site without prior written approval. Consider necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon related operations to the borrow excavation.

3.3 SHORING

3.3.1 General Requirements

If shoring is required by the Contractor, submit a Shoring and Sheeting Plan for approval 15 days prior to starting work. Submit drawings and calculations, certified by a registered professional engineer, describing the methods for shoring and sheeting of excavations. Finish shoring, including sheet piling, and install as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Remove shoring, bracing, and sheeting as excavations are backfilled, in a manner to prevent caving.

3.4 GRADING AREAS

Where indicated, divide work into grading areas within which satisfactory excavated material will be placed in excavations, and required backfills. Do not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing. Place and grade stockpiles of satisfactory and unsatisfactory as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

3.5 GROUND SURFACE PREPARATION

3.5.1 General Requirements

Remove contaminated material as indicated in Section 02 6 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL and replace with satisfactory materials, as directed by the Contracting Officer, in surfaces to receive fill or in excavated areas. Scarify the surface to a depth of 6 inches before the fill is started. Plow, step, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that the fill material will bond with the existing material.

3.5.2 Frozen Material

Do not place material on surfaces that are muddy, frozen, or contain frost. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted.

3.6 UTILIZATION OF EXCAVATED MATERIALS

Dispose unsatisfactory materials removing from excavations and place within the planned barrier wall area. Use satisfactory material removed from excavations, insofar as practicable, in the construction of fills,

subgrades, shoulders, bedding (as backfill), and for similar purposes. Submit procedure and location for disposal of unused satisfactory material. Submit proposed source of borrow material. Do not waste any satisfactory excavated material without specific written authorization. Dispose of satisfactory material, authorized to be wasted, in designated areas approved for surplus material storage or designated waste areas as directed. Clear and grub newly designated waste areas on Government-controlled land before disposal of waste material thereon. Stockpile and use coarse rock from excavations for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. Do not dispose excavated material to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

3.7 BACKFILLING AND COMPACTION

Place backfill adjacent to any and all types of structures, in successive horizontal layers of loose materia not more than 8 inches in depth. Compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials, to prevent wedging action or eccentric loading upon or against the structure. Backfill material must be within the range of -2 to +2 percent of optimum moisture content at the time of compaction.

Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of paragraphs GROUND SURFACE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.7.1 Trench Backfill

Backfill trenches to the grade shown.

3.7.1.1 Replacement of Unyielding Material

Replace unyielding material removed from the bottom of the trench with select granular material or initial backfill material.

3.7.1.2 Replacement of Unstable Material

Replace unstable material removed from the bottom of the trench or excavation with select granular material placed in layers not exceeding 6 inches loose thickness.

3.7.1.3 Bedding and Initial Backfill

Place initial backfill material and compact it with approved tampers to a height of at least one foot above the conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe. Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with Drawings. Compact backfill to top of pipe to 90 percent of ASTM D698 maximum density. Provide plastic piping with bedding to spring line of pipe.

3.7.1.3.1 Class I

Angular, 0.25 to 1.5 inch, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

3.7.1.4 Final Backfill

Fill the remainder of the trench, except for special materials for roadways, railroads and airfields, with satisfactory material. Place backfill material and compact as follows:

3.7.1.4.1 Final Backfill for Contaminated Areas

Deposit backfill in layers of a maximum of 18 inches loose thickness, and 90 percent maximum density. Apply this requirement to all other areas not specifically designated above.

3.8 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.8.1 Rip-Rap Construction

Construct rip-rap in the areas indicated as shown on the Drawings. Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.8.1.1 Stone Placement

Place rock for rip-rap on geotextile to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.9 SUBGRADE PREPARATION

3.9.1 Construction

Shape subgrade and compact as specified. Remove soft or otherwise unsatisfactory material and replace with satisfactory excavated material or other approved material as directed. Bring up low areas resulting from removal of unsatisfactory material to required grade with satisfactory materials, and shape the entire subgrade to line, grade, and cross section and compact as specified.

3.9.2 Compaction

Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas and railroads, compact each layer of the embankment to at least 90 percent of laboratory maximum density.

3.10 FINISHING

Finish the surface of excavations and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades specified in paragraph SUBGRADE PREPARATION. Finish gutters and ditches in a manner that will result in effective drainage. Finish the surface of areas to be turfed from settlement or washing to a smoothness suitable for the application of turfing materials. Repair graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.10.1 Subgrade and Embankments

During construction, keep excavations shaped and drained. Maintain ditches and drains along subgrade to drain effectively at all times. Do not disturb the finished subgrade by traffic or other operation. Protect and maintain the finished subgrade in a satisfactory condition. Do not permit the storage or stockpiling of materials on the finished subgrade. Do not lay surfacing, pavement, or ballast on a muddy, spongy, or frozen subgrade.

3.11 TESTING

Perform testing by the Contractor's validated testing facility. Submit qualifications of the Contractor's validated testing facilities. If the Contractor elects to establish testing facilities, do not permit work requiring testing until the Contractor's facilities have been inspected by the Contracting Officer.

3.11.1 In-Place Densities

Material Type	Location of Material	Test Frequency
Excavation Subgrades	Site	One test per 2500 sq ft

3.12 DISPOSITION OF SURPLUS MATERIAL

Remove surplus material or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber to the planned barrier wall area.

-- End of Section --

SECTION 31 05 20

GEOSYNTHETIC DRAINAGE LAYER

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

The geosynthetic drainage layer is one component of the cap drainage system. Measurement shall consist of the agreed upon percent complete of the entire drainage system at the time of the Contractor's payment application.

1.1.2 Payment

Payment for the drainage system is lump sum percent complete and shall be made for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D1505	(2018) Standard Test Method for Density of Plastics by the Density-Gradient Technique
ASTM D4218	(2015) Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D4355/D4355M	(2014) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4491/D4491M	(2015) Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4533/D4533M	(2015) Standard Test Method for Trapezoid Tearing Strength of Geotextiles
ASTM D4632/D4632M	(2015a) Grab Breaking Load and Elongation of Geotextiles
ASTM D4716/D4716M	(2008; R 2013) Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
ASTM D4751	(2016) Standard Test Method for Determining Apparent Opening Size of a

	Geotextile
ASTM D5035	(2011) Breaking Force and Elongation of Textile Fabrics (Strip Method)
ASTM D5199	(2012) Measuring Nominal Thickness of Geosynthetics
ASTM D5261	(2010) Measuring Mass Per Unit Area of Geotextiles
ASTM D6241	(2014) Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
ASTM D7005	(2003; R 2008) Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sampling and Testing
Penetrations; G
Construction Quality Control (QC) Laboratory; G

SD-04 Samples

Geosynthetic Drainage Layer

SD-06 Test Reports

Sampling and Testing
Geosynthetic Drainage Layer; G

1.4 CONSTRUCTION QUALITY CONTROL (QC) LABORATORY

Provide a construction quality control (QC) laboratory that has also performed quality assurance (QA) testing, if required, of geosynthetic drainage layers for at least five completed projects, having a total minimum area of 1 million square feet. Submit qualifications of laboratory which shall carry current accreditation via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP) for the tests it will be required to perform.

1.5 DELIVERY, STORAGE, AND HANDLING

The QC inspector shall be present during delivery and unloading of the geosynthetic drainage layer. Ensure the geosynthetic drainage layer material has not been damaged during shipping, storage, or handling. Any geosynthetic drainage layer material found to be damaged shall be repaired or replaced. Accept delivery of material only after the required submittals have been approved. Each roll shall be labeled with the

manufacturer's name, product identification, lot number, roll number, and roll dimensions. Rolls that have attached geotextiles shall be individually wrapped in plastic. Store the rolls in a level and dry area.

PART 2 PRODUCTS

2.1 GEOSYNTHETIC DRAINAGE LAYER

The polymer used to manufacture the geonet component of the geosynthetic drainage layer shall be polyethylene which is clean and free of any foreign contaminants. Submit one properly identified 24 by 24 inch minimum size geosynthetic drainage layer sample; fasteners proposed for use; and the method of seaming and overlapping. Submit manufacturer's quality control test results. Regrind material which consists of edge trimmings and other scraps may be used to manufacture the geonet; however, post-consumer recycled materials shall not be used. Conform the geosynthetic drainage layer to the property requirements listed in Table 1. Component criteria for the geonet alone and geotextile alone are also listed in Table 1. The geonet shall be covered on both sides with nonwoven geotextile. Create geosynthetic by heat bonding geotextile to the geonet. The geotextile shall not be bonded to the drainage net within 6 inches of the edges of the rolls. Where applicable, Table 1 property values represent minimum average roll values (MARV). The value for AOS represents the maximum average roll value (MaxARV).

TABLE 1 - GEOSYNTHETIC DRAINAGE LAYER PROPERTIES

PROPERTY	TEST METHOD	TEST VALUE	MINIMUM MQC TESTING FREQUENCY
GEONET COMPONENT			
Thickness, minimum avg, Note 1	ASTM D5199	220 mil	100,000 sq ft
Polymer Density, minimum avg	ASTM D1505	0.940 g/cc	100,000 sq ft
Carbon Black Content	ASTM D4218	1-3 percent	100,000 sq ft
Tensile Strength, minimum avg, Note 2	ASTM D5035	100 lbs/inch	100,000 sq ft
GEOTEXTILE COMPONENT			
Mass/Unit Area, MARV	ASTM D5261	6.0 oz/SY	500,000 sq ft
Grab Strength, MARV	ASTM D4632/D4632M	157 lbs	500,000 sq ft
Grab Elongation, MARV	ASTM D4632/D4632M	50 percent	500,000 sq ft
Tear Strength, MARV	ASTM D4533/D4533M	55 lbs	500,000 sq ft
CBR Puncture, MARV	ASTM D6241	435 lbs	500,000 sq ft
Permittivity, MARV	ASTM D4491/D4491M	1.5/sec	500,000 SF
AOS US Sieve	ASTM D4751	70 mm	500,000 SF

TABLE 1 - GEOSYNTHETIC DRAINAGE LAYER PROPERTIES			
PROPERTY	TEST METHOD	TEST VALUE	MINIMUM MQC TESTING FREQUENCY
UV Stability, percent retained (500 hours)	ASTM D4355/D4355M	50 percent	Note 3
GEOSYNTHETIC			
Transmissivity, min, including attached geotextiles, Note 4	ASTM D4716/D4716M	2×10^{-3} m^2/sec (16.9 gal/min ft)	200,000 sq ft
Geonet/Geotextile Adhesion, minimum avg, Note 5	ASTM D7005	0.5 lbs/inch	100,000 sq ft
Note 1: The diameter of the presser foot shall be 2.22 inches and the pressure shall be 2.9 psi. For other thickness options, see manufacturer's literature.			
Note 2: This is the average peak value for five equally spaced machine direction tests across the roll width.			
Note 3: Manufacturer's historical data.			
Note 4: Manufacturing quality control transmissivity tests shall be measured using a gradient of 0.1 under a normal pressure of 1.45 psi. Use a minimum seating period of 15 minutes. Perform the test between rigid end platens.			
Note 5: Average of five tests across the roll width. Discounting the outer 1 foot of each side of the roll, collect samples at the 10, 30, 50, 70, and 90 percent positions across the roll width. Test both sides for double sided geosynthetics.			

2.2 SAMPLING AND TESTING

Manufacturing quality control test methods and frequencies shall be in accordance with Table 1 unless otherwise approved. Submit manufacturer's quality control manual and construction quality control test results.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Surface Preparation

Prior to placement of the geosynthetic drainage layer, the subgrade shall be dry, smooth, and free of all materials which could damage the geosynthetic drainage layer.

3.1.2 Placement

The geosynthetic drainage layer shall not be damaged during placement. Unroll the geosynthetic drainage layer in the direction of maximum slope, keeping the net flat against the subgrade to minimize wrinkles and folds.

The geosynthetic drainage layer shall not be dragged across the subgrade. Place adequate ballast (e.g. sandbags) to prevent uplift by wind prior to covering.

3.1.3 Seams and Overlaps

3.1.3.1 Geonet End Seams

Overlap geonet end seams a minimum of 1 foot. End seam fastener spacing shall be a maximum of 1 foot. The overlaps shall be in the direction of flow.

3.1.3.2 Geonet Fasteners

Tie geonet rolls together with plastic fasteners. The fasteners shall be a contrasting color from the geonet and attached geotextiles. Metallic fasteners will not be allowed.

3.1.3.3 Geotextile Seams

The geotextile component of the geosynthetic shall be overlapped in the direction of flow.

3.1.3.4 Geotextile Cap Strips

Place geotextile cap strips over any exposed edges of geosynthetic. Cap strips shall be a minimum of 2 feet in width and shall be thermally bonded to the geotextile component of the geosynthetic.

3.1.4 Stacked Geosynthetic Drainage Layers

When geosynthetic drainage layers are to be stacked, stagger roll ends and edges so that joints do not lie above one another.

3.1.5 Penetrations

Submit penetration details. Mechanically attach a geotextile apron to pipes and other appurtenances penetrating through the geosynthetic drainage layer so that soil is prevented from getting into the geosynthetic drainage layer. The apron of the attached geotextile shall extend out from the pipe or appurtenance a minimum of 2 feet. The apron geotextile shall be thermally bonded to the geotextile component of the geosynthetic.

3.2 REPAIRS

3.2.1 Geonet Damage

Make repairs by placing a patch of the geosynthetic drainage layer over the damaged area. Extend the patch a minimum of 2 feet beyond the edge of the damage. Use approved fasteners, spaced every 6 inches around the patch, to hold the patch in place. If more than 25 percent of the roll width is damaged, approval must be obtained to repair or replace the damaged roll.

3.2.2 Geotextile Damage

Repair damaged geotextile by placing a patch of geotextile over the damaged area with a minimum of 12 inches of overlap in all directions. The geotextile patch shall be thermally bonded in place.

3.3 PROTECTION AND BACKFILLING

Cover the geosynthetic drainage layer with the geosynthetic clay liner within 7 days of acceptance. No equipment shall be operated on the top surface of the geosynthetic drainage layer without permission from the Contracting Officer.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for clearing and grubbing shall consist of the agreed upon acreage completed at the time of the Contractor's payment application.

1.1.2 Payment

1.1.2.1 Clearing and Grubbing

Payment for clearing and grubbing shall be made for the costs associated with the removal of trees, shrubs, bushes, and their root systems, chipping, stockpiling, transporting, and disposal of cleared material.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 4150.07 DOD Pest Management Program

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Herbicide Application Plan

SD-03 Product Data

Nonsaleable Materials; G

Herbicides; G

SD-04 Samples

Tree Wound Paint

SD-07 Certificates

Qualifications; G

1.4 QUALITY CONTROL

1.4.1 Regulatory Requirements

Comply with DODI 4150.07 for requirements on Contractor's licensing, certification, and record keeping. Maintain daily records using the Pest Management Maintenance Record, DD Form 1532-1, or a computer generated equivalent. These forms may be obtained from the main web site: http://www.dtic.mil/whs/directives/forms/eforms/dd1532-1.pdf

1.4.2 Qualifications

For the application of herbicides, use the services of an applicator who is commercially certified in the state where the work is to be performed as required by DODI 4150.07. Submit a copy of the pesticide applicator certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

1.5.1 Storage

Storage of herbicides on the installation will not be permitted unless it is written into the contract.

1.5.2 Handling

Handle herbicides in accordance with the manufacturer's label and Safety Data Sheet (SDS), preventing contamination by dirt, water, and organic material. Protect herbicides from weather elements as recommended by the manufacturer's label and SDS. Spill kits must be maintained on herbicide control vehicles. Mixing of herbicides on the installation will not be permited unless it is written into the contract.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Tree Wound Paint

Submit samples in cans with manufacturer's label of bituminous based paint of standard manufacture specially formulated for tree wounds.

2.1.2 Herbicide

Provide herbicides currently registered by the EPA or approved for such use by the appropriate agency of the host county and approved by the Contracting Officer. Select a herbicide that is suitable for the climatic conditions at the project site. Submit manufacturer's label and SDS for herbicides proposed for use.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Herbicide Application Plan

Prior to commencing application of herbicide, submit a herbicide application plan with proposed sequence of treatment work including dates and times of application. Include the herbicide trade name, EPA registration number, chemical composition, formulation, application rate of active ingredients, method of application, area or volume treated, and amount applied. Include a copy of the pesticide applicator certificates.

3.1.2 Protection

3.1.2.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2.2 Trees, Shrubs, and Existing Facilities

Provide protection in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Protect trees and vegetation to be left standing from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

3.1.2.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor is responsible for the repair of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, notify the Contracting Officer in ample time to minimize interruption of the service. Refer to Section 01 30 00 ADMINISTRATIVE REQUIREMENTS and Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for additional utility protection.

3.2 Application

3.2.1 Herbicide Application

Adhere to safety precautions as recommended by the manufacturer concerning handling and application of the herbicide.

3.2.1.1 Clean Up, Disposal, And Protection

Once application has been completed, proceed with clean up and protection of the site without delay. Clean the site of all material associated with the treatment measures, according to label instructions, and as indicated. Remove and dispose of excess and waste material off Government property.

3.2.1.1.1 Disposal of Herbicide

Dispose of residual herbicides and containers off Government property, and in accordance with the approved disposal plan, label instructions and EPA

requirements.

3.3 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Apply herbicide in accordance with the manufacturer's label to the top surface of stumps designated not to be removed.

3.3.1 Tree Removal

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.3.2 Pruning

Prune trees designated to be left standing within the cleared areas of dead branches 1-1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 1-1/4 inches in diameter with an approved tree wound paint.

3.3.3 Grubbing

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Remove material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Fill depressions made by grubbing with suitable material and compact to make the surface conform with the original adjacent surface of the ground.

3.4 DISPOSAL OF MATERIALS

3.4.1 Saleable Timber

All timber on the project site noted for clearing and grubbing shall become the property of the Contractor, and shall be removed from the project site and disposed of off stations.

3.4.2 Nonsaleable Materials

Written permission to dispose of such products on private property shall be filed with the Contracting Officer. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

-- End of Section --

SECTION 31 32 11

SOIL SURFACE EROSION CONTROL

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for erosion control items shall be as indicated on the Bid Table and stated in Section 01 22 00 MEASUREMENT AND PAYMENT.

1.1.2 Payment

Payment will constitute full compensation for all labor, equipment, tools, supplies, and incidentals necessary to implement or install each erosion control feature.

1.2 SUMMARY

The work consists of furnishing and installing temporary and permanent soil surface erosion control materials to prevent the pollution of air, water, and land, including fine grading, blanketing, stapling, mulching, vegetative measures, structural measures, and miscellaneous related work, within project limits and in areas outside the project limits where the soil surface is disturbed from work under this Contract at the designated locations. This work includes all necessary materials, labor, supervision and equipment for installation of a complete system. Submit a listing of equipment to be used for the application of erosion control materials. Coordinate this section with the requirements of Section 31 00 00 EARTHWORK, Section 32 92 19 SEEDING, and Section 32 92 23 SODDING. Complete backfilling the openings in synthetic grid systems and articulating cellular concrete block systems a maximum 7 days after placement to protect the material from ultraviolet radiation.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D1248	(2012) Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM D1560	(2015) Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus
ASTM D1777	(1996; E 2011; R 2011) Thickness of Textile Materials

ASTM D2028/D2028M	(2015) Cutback Asphalt (Rapid-Curing Type)
ASTM D2844/D2844M	(2013) Resistance R-Value and Expansion Pressure of Compacted Soils
ASTM D3776/D3776M	(2009a; R 2013) Standard Test Method for Mass Per Unit Area (Weight) of Fabric
ASTM D3787	(2016) Bursting Strength of Textiles - Constant-Rate-of-Traverse (CRT), Ball Burst Test
ASTM D3884	(2009; R 2013; E 2014) Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
ASTM D4355/D4355M	(2014) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4491/D4491M	(2015) Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4533/D4533M	(2015) Standard Test Method for Trapezoid Tearing Strength of Geotextiles
ASTM D4595	(2017) Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
ASTM D4632/D4632M	(2015a) Grab Breaking Load and Elongation of Geotextiles
ASTM D4751	(2016) Standard Test Method for Determining Apparent Opening Size of a Geotextile
ASTM D4833/D4833M	(2007; E 2013; R 2013) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D4972	(2013) pH of Soils
ASTM D5035	(2011) Breaking Force and Elongation of Textile Fabrics (Strip Method)
ASTM D5268	(2013) Topsoil Used for Landscaping Purposes
ASTM D5852	(2000; R 2007; E 2014) Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
ASTM D6629	(2001; E 2012; R 2012) Selection of Methods for Estimating Soil Loss by Erosion
ASTM D977	(2013; E 2014) Emulsified Asphalt

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Sequence Schedule; G

Erosion and Sediment Control Plan; G

SD-02 Shop Drawings

Layout; G

Obstructions Below Ground; G

Maintenance Record

SD-03 Product Data

Geosynthetic Binders; G

Recycled Plastic

Wood Cellulose Fiber

Paper Fiber

Mulch Control Netting and Filter Fabric

Wood Hydraulic Mulch; G

Erosion Control Blankets Type XI

Geotextile Fabrics; G

Equipment

Erosion Control Blankets

SD-04 Samples

Geosynthetic Binders

1 quart

Mulch

2 pounds

Wood Hydraulic Mulch

2 pounds

Geotextile Fabrics

6 inch square

Erosion Control Blankets

6 inch square

SD-06 Test Reports

Geosynthetic Binders

Wood Hydraulic Mulch

Geotextile Fabrics

Erosion Control Blankets

SD-07 Certificates

Fill Material

Mulch

Wood Hydraulic Mulch

Geotextile Fabrics

Geosynthetic Binders

Synthetic Soil Binders

Installer's Qualification

Seed

Asphalt Adhesive

Tackifier

Wood By-Products

Wood Cellulose Fiber

SD-10 Operation and Maintenance Data

Maintenance Instructions; G

SD-11 Closeout Submittals

Warranty

1.5 QUALITY ASSURANCE

1.5.1 Installer's Qualification

The installer must be certified by the manufacturer for training and experience installing the material. Submit the installer's company name and address, and/or certification.

1.5.2 Erosion Potential

Assess potential effects of soil management practices on soil loss in accordance with ASTM D6629. Assess erodibility of soil with dominant soil structure less than 2.8 to 3.1 inches in accordance with ASTM D5852.

1.5.3 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

1.6 DELIVERY, STORAGE, AND HANDLING

Prior to delivery of materials, submit certificates of compliance attesting that materials meet the specified requirements. Store materials in designated areas and as recommended by the manufacturer protected from the elements, direct exposure, and damage. Do not drop containers from trucks. Material must be free of defects that would void required performance or warranty. Deliver geosynthetic binders and synthetic soil binders in the manufacturer's original sealed containers and stored in a secure area.

a. Furnish erosion control blankets and geotextile fabric in rolls with suitable wrapping to protect against moisture and extended ultraviolet exposure prior to placement. Label erosion control blanket and geotextile fabric rolls to provide identification sufficient for inventory and quality control purposes.

b. All synthetic grids, synthetic sheets, and articulating cellular concrete block grids must be sound and free of defects that would interfere with the proper placing of the block or impair the strength or permanence of the construction. Minor cracks in synthetic grids and concrete cellular block, incidental to the usual methods of manufacture, or resulting from standard methods of handling in shipment and delivery, will not be deemed grounds for rejection.

c. Inspect seed upon arrival at the jobsite for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, must be rejected.

1.7 SCHEDULING

Submit a construction work sequence schedule, with the approved Erosion and Sediment Control Plan a minimum of 30 days prior to start of construction. The Erosion and Sediment Control Plan shall be prepared and submitted in accordance with requirements defined in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. The work schedule must coordinate the timing of land disturbing activities with the provision of erosion control measures to reduce on-site erosion and off-site sedimentation. Coordinate installation of temporary erosion control features with the construction of permanent erosion control features to assure effective and continuous control of erosion, pollution, and sediment deposition. Include a vegetative plan with planting and seeding dates and fertilizer, lime, and mulching rates. Distribute copies of the work schedule and erosion control plan to site subcontractors. Address the following in the Erosion and Sediment Control Plan:

a. Statement of erosion control and stormwater control objectives.

b. Description of temporary and permanent erosion control, stormwater control, and air pollution control measures to be implemented on site.

c. Description of the type and frequency of maintenance activities required for the chosen erosion control methods.

d. Comparison of proposed post-development stormwater runoff conditions with predevelopment conditions.

1.8 WARRANTY

Erosion control material must have a warranty for use and durable condition for project specific installations. Temporary erosion control materials must carry a minimum eighteen month warranty. Permanent erosion control materials must carry a minimum three year warranty.

PART 2 PRODUCTS

2.1 RECYCLED PLASTIC

Submit individual component and assembled unit structural integrity test results; creep tolerance; deflection tolerance; and vertical load test results and Life-cycle durability. Recycled plastic must contain a minimum 85 percent of recycled post-consumer product. Recycled material must be constructed or manufactured with a maximum 1/4 inch deflection or creep in any member, according to ASTM D1248. The components must be molded of ultraviolet (UV) and color stabilized polyethylene. The material must consist of a minimum 75 percent plastic profile of high-density polyethylene, low-density polyethylene, and polypropylene raw material. The material must be non-toxic and have no discernible contaminants such as paper, foil, or wood. The material must contain less than 3 percent air voids and must be free of splinters, chips, peels, buckling, and cracks. Material must be resistant to deformation from solar heat gain.

2.2 BINDERS

2.2.1 Synthetic Soil Binders

Calcium chloride, or other standard manufacturer's spray-on adhesives designed for dust suppression. Submit certification for binders showing EPA registered uses, toxicity levels, and application hazards.

2.2.2 Geosynthetic Binders

Geosynthetic binders must be manufactured in accordance with ASTM D1560, ASTM D2844/D2844M; and must be referred to as products manufactured for use as modified emulsions for the purpose of erosion control and soil stabilization. Emulsions must be manufactured from all natural materials and provide a hard durable finish.

2.3 MULCH

Mulch must be free from weeds, mold, and other deleterious materials. Mulch materials must be native to the region.

2.3.1 Straw

Straw must be stalks from oats, wheat, rye, barley, or rice, furnished in

air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.3.2 Hay

Hay must be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.3.3 Wood Cellulose Fiber

Wood cellulose fiber must be 100 percent total recovered materials content and must not contain any growth or germination-inhibiting factors and must be dyed with non-toxic, biodegradable dye an appropriate color to facilitate placement during application. Composition on air-dry weight basis: a minimum 9 to a maximum 15 percent moisture, and between a minimum 4.5 to a maximum 6.0 pH. Wood cellulose fiber must not contain environmentally hazardous levels of heavy metals. Materials may be bulk tested or tested by toxicity characteristic leaching procedure (TCLP).

2.3.4 Paper Fiber

Paper fiber mulch must be 100 percent post-consumer recycled news print that is shredded for the purpose of mulching seed.

2.3.5 Shredded Bark

Locally shredded material must be treated to retard the growth of mold and fungi.

2.3.6 Wood By-Products

Submit composition, source, and particle size. Products must be free from toxic chemicals or hazardous material. Wood locally chipped or ground bark must be treated to retard the growth of mold and fungi. Gradation: A maximum 2 inch wide by 4 inch long.

2.3.7 Coir

Coir must be manufactured from 100 percent coconut fiber cured in fresh water for a minimum of 6 months.

2.3.8 Asphalt Adhesive

Asphalt adhesive must conform to the following: Emulsified asphalt, conforming to ASTM D977, Grade SS-1; and cutback asphalt, conforming to ASTM D2028/D2028M, Designation RC-70.

2.3.9 Mulch Control Netting and Filter Fabric

Mulch control netting and filter fabric must be constructed of lightweight recycled plastic, cotton, or paper or organic fiber. The recycled plastic must be a woven or nonwoven polypropylene, nylon, or polyester containing stabilizers or inhibitors to make the fabric resistant to deterioration from UV, and with the following properties:

Minimum grab tensile strength (TF 25 #1/ ASTM D4632/D4632M)	180 pounds
Minimum Puncture (TF 25 #4/ASTM D3787)	75 psi in the weakest direction
Apparent opening sieve size	minimum 40 and maximum 80 (U.S. Sieve Size)
Minimum Trapezoidal tear strength (TF 25 #2/ASTM D4533/D4533M)	50 pounds

2.3.10 Wood Hydraulic Mulch

Wood hydraulic mulch must be made of 100 percent total recovered material. Wood must be naturally air-dried to a moisture content of 10.0 percent, plus or minus 3.0 percent. A minimum of 50 percent of the fibers must be equal to or greater than 0.15 inch in length and a minimum of 75 percent of the fibers must be retained on a 28 mesh screen. No reprocessed paper fibers must be included in the hydraulic mulch. Hydraulic mulch must have the following mixture characteristics:

CHARACTERISTIC (typical)	VALUE
pH	5.4 $\pm$ 0.1
Organic Matter (oven dried basis)	percent 99.3 within $\pm$ 0.2
Inorganic Ash (oven dried basis)	percent 0.7 within $\pm$ 0.2
Water Holding Capacity	percent 1,401

2.3.11 Tackifier

Tackifier must be a blended polyacrylimide material with non-ionic galactomannan of Gramineae endosperm in powder and crystalline form with molecular weights over 250,000. Tackifier must be pre-packaged in the hydraulic mulch at the rate recommended by manufacturer.

2.3.12 Dye

Dye must be a water-activated, green color. Pre-package dye in water dissolvable packets in the hydraulic mulch.

2.4 GEOTEXTILE FABRICS

Geotextile fabrics must be woven of polypropylene filaments formed into a stable network so that the filaments retain their relative position to each other. Sewn seams must have strength equal to or greater than the geotextile itself. Install fabric to withstand maximum velocity flows as recommended by the manufacturer. The geotextile must conform to the following minimum average roll values:

Property	Performance	Test Method
Weight	264 g/m^2	ASTM D3776/D3776M
Thickness	0.635 mm	ASTM D1777
Permeability	0.12 cm/sec	ASTM D4491/D4491M
Abrasion Resistance, Type (percent strength retained)	58 percent X 81 percent	ASTM D3884
Tensile Grab Strength	1467 N X 1933 N	ASTM D4632/D4632M
Grab Elongation	15 percent X 20 percent	ASTM D4632/D4632M
Burst Strength	5510 kN/m^2	ASTM D3787
Puncture Strength	733 N	ASTM D4833/D4833M
Trapezoid Tear	533 N X 533 N	ASTM D4533/D4533M
Apparent Opening Size	40 US Std Sieve	ASTM D4751
UV Resistance @ 500 hours	90 percent	ASTM D4355/D4355M

2.5 EROSION CONTROL BLANKETS

2.5.1 Erosion Control Blankets Type I

Use Type I blankets for erosion control and vegetation establishment on roadside embankments, abutments, berms, shoulders, and median swales where natural vegetation will provide long term stabilization. Erosion control blankets must be a machine-produced mat of 100 percent straw. The blanket must be of consistent thickness with the straw evenly distributed over the entire area of the mat. Cover the blanket on the top side with a photodegradable polypropylene netting having an approximate 1/2 by 1/2 inch mesh and be sewn together on a maximum 1.5 inch centers with degradable thread. The erosion control blanket must have the following properties:

Material Content	
Straw	100 percent with approximately 0.50 lb/yd^2 weight
Netting	One side only, lightweight photodegradable with approximately 1.64 lb/1,000 ft^2 weight
Thread	Degradable
Note 1: Photodegradable life a minimum of 2 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 3:1 gradient.	

2.5.2 Erosion Control Blankets Type II

Erosion control blankets must be a machine-produced mat of 100 percent

straw. The blanket must be of consistent thickness with the straw evenly distributed over the entire area of the mat. Cover the blanket on the top side with a polypropylene netting having an approximate 1/2 by 1/2 inch mesh with photodegradable accelerators to provide breakdown of the netting within approximately 45 days, depending upon geographic location and elevation. Sew the blanket together on a maximum 1.5 inch centers with degradable thread. The erosion control blanket must have the following properties:

Material Content	
Straw	100 percent with approximately 0.50 lb/yd^2 weight
Netting	One side only, lightweight photodegradable with photo accelerators and approximately 1.64 lb/1,000 ft^2 weight
Thread	Degradable
Note 1: Photodegradable life a minimum of 10 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 3:1 gradient.	

2.5.3 Erosion Control Blankets Type III

Type III blankets must be used for erosion control and vegetation establishment on roadside embankments, abutments, berms, shoulders, and median swales where natural vegetation will provide long term stabilization. Erosion control blanket must be a machine-produced mat consisting of 70 percent straw and 30 percent coconut fiber. The blanket must be of consistent thickness with the straw and coconut fiber evenly distributed over the entire area of the mat. Cover the blanket on the top side with heavyweight photodegradable polypropylene netting having UV additives to delay breakdown and an approximate 5/8 by 5/8 inch mesh, and on the bottom side with a lightweight photodegradable polypropylene netting with an approximate 1/2 by 1/2 inch mesh. Sew the blanket together on 1.5 inch centers with degradable thread. The erosion control blanket must have the following properties:

Material Content	
Straw	70 percent by approximately 0.35 lb/yd^2
Coconut Fiber	30 percent by approximately 0.15 lb/yd^2 weight
Netting	Top side heavyweight photodegradable with UV additives and approximately 3 lb/1,000 ft^2 weight
	Bottom side lightweight photodegradable with approximately 1.64 lb/1,000 ft^2 weight
NOTE: Photodegradable life a minimum of 10 months with a minimum 90 percent light penetration. Apply to slopes with a gradient less than 1.5:1.	

2.5.4 Erosion Control Blankets Type IV

Erosion control blanket must be a machine-produced mat of 100 percent straw. The blanket must be of consistent thickness with the straw evenly distributed over the entire area of the mat. Cover the blanket on the top and bottom sides with lightweight photodegradable polypropylene netting having an approximate 1/2 by 1/2 inch mesh. Sew the blanket together on 1.5 inch centers with degradable thread. The erosion control blanket must have the following properties:

Material Content	
Straw	100 percent with approximately 0.50 lb/yd^2 weight
Netting	Both sides lightweight photodegradable with approximately 1.64 lb/1,000 ft^2 weight.
Thread	Degradable
Note: Photodegradable life a minimum of 2 months with a minimum 90 percent light penetration. Apply to slopes with a gradient of less than 1.5:1.	

2.5.5 Erosion Control Blankets Type V

Erosion control blanket must be a machine-produced mat of 100 percent straw. The blanket must be of consistent thickness with the straw evenly distributed over the entire area of the mat. Cover the blanket on the top side with polypropylene netting having an approximate 1/2 by 1/2 inch mesh with photodegradable accelerators to provide breakdown of the netting within approximately 45 days, depending upon geographic location and elevation. Cover the bottom with a polypropylene netting having an approximate 1/2 by 1/2 inch mesh with photo accelerators. Sew the blanket together on 1.5 inch centers with degradable thread. The erosion control blanket must have the following properties:

Material Content	
Straw	70 percent by approximately 0.35 lb/yd^2
Netting	Top side lightweight photodegradable with photo accelerators with approximately 1.64 lb/1,000 ft^2 weight
	Bottom side lightweight photodegradable with photo accelerators and approximately 1.64 lb/1,000 ft^2 weight
NOTE: Photodegradable life a minimum of 10 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 2:1 gradient.	

2.5.6 Erosion Control Blankets Type VI

Erosion control blanket must be a machine-produced 100 percent biodegradable mat with a 100 percent straw fiber matrix. The blanket must be of consistent thickness with the straw fiber evenly distributed over

the entire area of the mat. Cover the blanket on the top side with a 100 percent biodegradable woven natural organic fiber netting. The netting must consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form an approximate 1/2 by 1/2 inch mesh. Sew the blanket together with biodegradable thread on 1.5 inch centers. The erosion control blanket must have the following properties:

Material Content	
Matrix	100 percent straw fiber with approximately 0.50 lb/yd^2 weight
Netting	One side only, Leno woven 100 percent biodegradable natural organic fiber
Weight	approximately 9.3 lb/1,000 ft
Thread	Biodegradable
NOTE: Photodegradable life a minimum of 10 months with a minimum 90 Percent light penetration. Apply to slopes up to a maximum 2:1 gradient.	

2.5.7 Erosion Control Blankets Type VII

Erosion control blanket must be a machine-produced 100 percent biodegradable mat with an herbaceous straw fiber matrix. The blanket must be of consistent thickness with the straw evenly distributed over the entire area of the mat. Cover the blanket on the top and bottom sides with 100 percent biodegradable woven natural fiber netting. The netting must consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form an approximate 1/2 by 1/2 inch mesh. Sew the blanket together with biodegradable thread on 1.5 inch centers. The blanket must have the following properties:

Material Content	
Straw	100 percent straw fiber with approximately 0.50 lb/yd^2 weight
Netting	Top and bottom sides,Leno woven 100 percent biodegradable natural organic fiber with approximately 9.3 lb/1,000ft^2 weight
Thread	Biodegradable
Note: Photodegradable life a minimum of 18 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 1.5:1 gradient.	

2.5.8 Erosion Control Blankets Type VIII

Erosion control blanket must be a machine-produced 100 percent biodegradable mat with a 70 percent herbaceous straw and 30 percent coconut fiber blend matrix. The blanket must be of consistent thickness with the straw and coconut fiber evenly distributed over the entire area of the mat. Cover the blanket on the top and bottom sides with 100 percent biodegradable woven natural organic fiber netting. The netting must consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form an approximate 1/2 by 1/2 inch mesh. Sew the blanket together with biodegradable thread on 1.5 inch centers. Straw/Coconut fiber erosion control blanket must have the following properties:

Material Content	
Matrix	70 percent straw fiber with approximately 0.35 lb/yd^2 weight. 30 percent coconut fiber cured in fresh water with approximately 0.15 lb/yd^2 weight
Netting	Both sides woven 100 percent biodegradable natural organic fiber with approximately 9.3 lbs/1,000 ft^2 weight
Thread	Biodegradable
Note: Photodegradable life a minimum of 24 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 1.5:1 gradient.	

2.5.9 Erosion Control Blankets Type IX (Turf Reinforcement Mat)

Permanent erosion control/turf reinforcement mat is constructed of 100 percent coconut fiber stitch bonded between a heavy duty UV stabilized bottom net, and a heavy duty UV stabilized cuspated (crimped) middle netting overlaid with a heavy duty UV stabilized top net. The cuspated netting forms prominent closely spaced ridges across the entire width of the mat. The three nettings are stitched together on 1.5 inch centers with UV stabilized polypropylene thread to form a permanent three dimensional structure. The following list contains further physical properties of the turf erosion control mat.

Property	Test Method	Value
Ground Cover	Image Analysis	93 percent
Thickness	ASTM D1777	0.63 in
Mass per Unit Area	ASTM D3776/D3776M	0.92 lb/sy
Tensile Strength	ASTM D5035	480 lb/ft

Property	Test Method	Value
Elongation	ASTM D5035	22 percent
Tensile Strength	ASTM D5035	960 lb/ft
Elongation	ASTM D5035	31 percent
Tensile Strength	ASTM D5035	177 lbs
Resiliency	ASTM D1777	greater than 80 percent
UV Stability*	ASTM D4355/D4355M	151 lbs 86 percent
Color(permanent net)		UV Black
Porosity(permanent net)Calculated		greater than 95 percent
Minimum Filament Measured		0.03 in
Diameter (permanent net)		0.03 in
NOTE 1: *ASTM D5035 Tensile Strength and percent Strength Retention of material after 1000 hours of exposure in Xenon-Arc Weatherometer		
NOTE 2: Photodegradable life a minimum of 36 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 1:1 gradient		

2.5.10 Erosion Control Blankets Type X (Turf Reinforcement Mat)

Permanent erosion control/turf reinforcement mat must be constructed of 100 percent UV stabilized high denier polypropylene fiber sewn between a black UV stabilized 1/2 inch mesh polypropylene netting on the top 5 lbs/1000 square ft and a black UV stabilized 5/8 inch mesh polypropylene netting on the bottom 3 lbs/1000 square ft with polypropylene thread. The mat must be resistant to photo and chemical degradation. The following list contains further physical properties of the turf reinforcement mat.

Property	Test Method	Value
Thickness	ASTM D1777	0.56 in
Mass per Unit Area	ASTM D3776/D3776M	11.2 oz/sq yd
Tensile Strength	ASTM D4632/D4632M	35.2 lbs
Elongation	ASTM D4632/D4632M	25.5 percent
Tensile Strength	ASTM D4595	259.2 lbs/ft
Elongation	ASTM D4595	20.9 percent
Tensile Strength	ASTM D5035	300 lbs/ft

Property	Test Method	Value
Elongation	ASTM D5035	51 percent
Tensile Strength	ASTM D5035	89 lbs
Elongation	ASTM D5035	21 percent
Resiliency	100 PSI-3 cycles	94 percent
UV Stability*	ASTM D4355/D4355M	81* lbs 90* percent
NOTE 1: *ASTM D5035 Tensile Strength and percent Strength Retention of material after 1000 hours of exposure in Xenon-Arc Weatherometer		
NOTE 2: Photodegradable life a minimum of 36 months with a minimum 90 percent light penetration. Apply to slopes up to a maximum 1:1 gradient		

2.5.11 Erosion Control Blankets Type XI (Re-vegetation Mat)

Seed-incorporated blanket option must consist of 2-ply 100 percent recycled, unbleached, cellulose tissue. Uniformly distribute a seed mix upon the bottom ply of cellulose tissue and fully overlaid with a top cellulose ply to provide complete envelopment of the seed layer. Sew the seed-incorporated cellulose medium to the bottom side of the specified erosion control blanket.

Material Content	
Top Ply	1-ply 100 percent recycled unbleached cellulose tissue with approximately 4.3 lbs/1,000 ft^2 weight
Seed	0.033 lbs/yd^2 (160 lbs/acre)
	0.017 lbs/yd^2 (80 lbs/acre)
Bottom Ply	1-ply recycled unbleached cellulose issue with approximately 4.3 lbs/(1,000 ft^2) weight
NOTE: Photodegradable life a minimum of 36 months with a minimum 90 percent light penetration. Apply to slopes up to a minimum 1:1 gradient.	

2.5.12 Erosion Control Blankets Type XII (Compost Mat)

Compost blanket must consist of a layer of 100 percent biobased stable and mature compost uniformly distributed to a depth of 3/4 to 3 inches along slopes with erosion potential. Compost must encourage plant growth and seed must be applied following compost application. The blanket must have the following properties:

Parameter	Range
Particle size	3/8-1/2 inch sieve and 2-3 inch sieve (ratio = 3:1)

Parameter	Range
Moisture content	20 - 50 percent
Soluble salt	3.0 - 6.0 mmhos/cm
Organic matter	40 - 70 percent
pH	6.0 - 8.0
Nitrogen content	0.5 - 2.0 percent
Human made inerts	0.0 - 1.0 percent

2.5.13 Seed

See Section 32 92 19 SEEDING.

2.5.14 Staking

Stakes must be 100 percent biodegradable manufactured from plastic or wood and must be designed to safely and effectively secure erosion control blankets for temporary or permanent applications. The biodegradable stake must be fully degradable by biological activity within a reasonable time frame. The bio-plastic resin used in production of the biodegradable stake must consist of polylactide, a natural, completely biodegradable substance derived from renewable agricultural resources. The biodegradable stake must exhibit ample rigidity to enable being driven into hard ground, with sufficient flexibility to resist shattering. Serrate the biodegradable stake on the leg to increase resistance to pull-out from the soil.

2.5.15 Staples

Staples must be as recommended by the manufacturer.

2.6 SEDIMENT FENCING

Wood or burlap.

2.7 COMPOST FILTER BERMS

Compost berms must consist of 100 percent biobased trapezoidal-shaped compost piles arranged across slopes. Berms must have the following properties:

Parameter	Range
Particle size	3/8-1/2 inch sieve and 2-3 inch sieve (ratio = 1:1)
Moisture content	20 - 50 percent

Parameter	Range
Soluble salt	4.0 - 6.0 mmhos/cm
Organic matter	40 - 70 percent
pH	6.0 - 8.0
Nitrogen content	0.5 - 2.0 percent
Human made inerts	0.0 - 1.0 percent
Size	1 - 2 feet H x 2.5 - 4 feet W

2.8 WATER

Unless otherwise directed, water is the responsibility of the Contractor. Water must be potable or supplied by an existing irrigation system.

PART 3 EXECUTION

3.1 WEATHER CONDITIONS

Perform erosion control operations under favorable weather conditions; when excessive moisture, frozen ground or other unsatisfactory conditions prevail, the work must be stopped as directed. When special conditions warrant a variance to earthwork operations, submit a revised construction schedule for approval. Do not apply erosion control materials in adverse weather conditions which could affect their performance.

3.1.1 Finished Grade

Provide condition of finish grade status prior to installation, location of underground utilities and facilities. Verify that finished grades are as indicated on the drawings; complete finish grading and compaction in accordance with Section 31 00 00 EARTHWORK, prior to the commencement of the work. Verify and mark the location of underground utilities and facilities in the area of the work. Repair damage to underground utilities and facilities at the Contractor's expense.

3.1.2 Placement of Erosion Control Blankets

Before placing the erosion control blankets, ensure the subgrade has been graded smooth; has no depressed, void areas; is free from obstructions, such as tree roots, projecting stones or other foreign matter. Verify that mesh does not include invasive species. Vehicles will not be permitted directly on the blankets.

3.2 SITE PREPARATION

3.2.1 Soil Test

Test soil in accordance with ASTM D5268 and ASTM D4972 for determining the particle size and mechanical analysis. Sample collection onsite must be

random over the entire site. The test must determine the soil particle size as compatible for the specified material.

3.2.2 Layout

Submit scale drawings defining areas to receive recommended materials as required by federal, state or local regulations. Erosion control material locations may be adjusted to meet field conditions. When soil tests result in unacceptable particle sizes, submit a shop drawing indicating the corrective measures.

3.2.3 Protecting Existing Vegetation

When there are established lawns in the work area, the turf must be covered and/or protected or replaced after construction operations. Identify existing trees, shrubs, plant beds, and landscape features that are to be preserved on site by appropriate tags and barricade with reusable, high-visibility fencing along the dripline. Mitigate damage to existing trees at no additional cost to the Government. Damage must be assessed by a state certified arborist or other approved professional using the National Arborist Association's tree valuation guideline.

3.2.4 Obstructions Below Ground

When obstructions below ground affect the work, submit shop drawings showing proposed adjustments to placement of erosion control material for approval.

3.3 INSTALLATION

Immediately stabilize exposed soil using fabric, mulch, compost, and seed. Stabilize areas for construction access immediately as specified in the paragraph Construction Entrance. Install principal sediment basins and traps before any major site grading takes place. Provide additional sediment traps and sediment fences as grading progresses. Provide inlet and outlet protection at the ends of new drainage systems. Remove temporary erosion control measures at the end of construction and provide permanent seeding.

3.3.1 Construction Entrance

Unless shown otherwise, provide a minimum of 6 inches thick, at points of vehicular ingress and egress on the construction site. Construction entrances must be cleared and grubbed, and then excavated a minimum of 3 inches prior to placement of the filter fabric and aggregate. The aggregate must be placed in a manner that will prevent damage and movement of the fabric. Place fabric in one piece, where possible. Overlap fabric joints a minimum of 12 inches.

3.3.2 Compost Filter Berms

Place compost filter berm uncompacted on bare soil as indicated on drawings, parallel to base of slope, and according to manufacturer recommendations. Place second berm in the same manner at top of slope parallel to first berm. When no longer required, berm material may be left to decompose naturally, or distributed over an adjacent area for use as a soil amendment or ground cover.

3.3.3 Synthetic Binders

Apply synthetic binders heaviest at edges of areas and at crests of ridges and banks to prevent displacement. Apply binders to the remainder of the area evenly at the rate recommended by the manufacturer.

3.3.4 Seeding

When seeding is required prior to installing mulch on synthetic grid systems verify that seeding will be completed in accordance with Sections 31 00 00 EARTHWORK and 32 92 19 SEEDING.

3.3.5 Mulch Installation

Install mulch in accordance with Section 32 92 19 SEEDING.

3.3.6 Mulch Control Netting

Netting may be stapled over mulch according to manufacturer's recommendations.

3.3.7 Mechanical Anchor

Mechanical anchor must be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.8 Asphalt Adhesive Tackifier

Asphalt adhesive tackifier must be sprayed at a rate between 10 to 13 gallons/1000 square feet. Do not completely exclude sunlight from penetrating to the ground surface.

3.3.9 Non-Asphaltic Tackifier

Apply hydrophilic colloid at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. Apply a uniform mixture over the area.

3.3.10 Asphalt Adhesive Coated Mulch

Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 10 to 13 gallons/1000 square feet, using power mulch equipment equipped with suitable asphalt pump and nozzle. Apply the adhesive-coated mulch evenly over the surface. Do not completely exclude sunlight from penetrating to the ground surface.

3.3.11 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Apply wood cellulose fiber, paper fiber, or recycled paper as part of the hydraulic mulch operation.

3.3.12 Hydraulic Mulch Application

3.3.12.1 Unseeded Area

Install hydraulic mulch as indicated and in accordance with manufacturer's recommendations. Mix hydraulic mulch with water at the rate recommended by the manufacturer for the area to be covered. Mixing must be done in

equipment manufactured specifically for hydraulic mulching work, including an agitator in the mixing tank to keep the mulch evenly disbursed.

3.3.12.2 Seeded Area

In accordance with Section 32 92 19 SEEDING.

3.3.13 Erosion Control Blankets

a. Install erosion control blankets as indicated and in accordance with manufacturer's recommendations. The extent of erosion control blankets must be as indicated.

b. Orient erosion control blankets in vertical strips and anchored with staples, as indicated. Abut adjacent strips to allow for installation of a common row of staples. Overlap horizontal joints between erosion control blankets sufficiently to accommodate a common row of staples with the uphill end on top.

c. Where exposed to overland sheet flow, locate a trench at the uphill termination. Staple the erosion control blanket to the bottom of the trench. Backfill and compact the trench as required.

d. Where terminating in a channel containing an installed blanket, the erosion control blanket must overlap installed blanket sufficiently to accommodate a common row of staples.

3.3.14 Synthetic Sheet System

Anchor synthetic sheet systems in accordance with the manufacturer's recommendation. Place systems on a well graded surface and then backfill, a maximum seven days after placement, to protect the material from ultraviolet radiation. Include contiguous perimeter termination trenches as the installation progresses.

3.3.14.1 Sheet System Revegetation

For areas not requiring re-vegetation, backfill openings to grade with well graded fill material and surface prepared for finish as indicated on the drawings. For areas requiring re-vegetation, backfill openings using well graded fill and topsoil as indicated on the drawings.

3.3.14.2 Sheet System Grids

Each pair of grids must cover grade without gaps or open spaces between them. Provide 100 percent coverage of the area with the cells backfilled.

3.3.14.3 Sheet System Seeding

Install seed in accordance with Section 32 92 19 SEEDING.

3.3.14.4 Grid System Grids

Anchor synthetic grid systems in accordance with the manufacturer's recommendation. Place interlocking grid systems on well graded surface. Complete the backfilling of openings a maximum 7 days after placement to protect the material from ultraviolet radiation. As the installation progresses, backfilling must include contiguous perimeter termination trenches.

3.3.15 Grids

3.3.15.1 Grid System Revegetation

For areas not requiring re-vegetation, backfill openings with a minimum 1/2 inch nominal size crushed rock, to a minimum 2 inch depth.

3.3.15.2 Synthetic Grids

Each pair of grids must cover grade without gaps or open spaces between them. The system must provide 100 percent coverage of the area with the cells backfilled.

3.3.15.3 Grid System Seeding

Install seed in accordance with Section 32 92 19 SEEDING.

3.4 CLEAN-UP

Dispose of excess material, debris, and waste materials offsite at an approved landfill or recycling center. Clear adjacent paved areas. Immediately upon completion of the installation in an area, protect the area against traffic or other use by erecting barricades and providing signage as required, or as directed.

3.5 WATERING SEED

Start watering immediately after installing erosion control blanket type XI (revegetation mat). Apply water to supplement rainfall at a sufficient rate to ensure moist soil conditions to a minimum 1 inch depth. Prevent run-off and puddling. Do no drive watering trucks over turf areas, unless otherwise directed. Prevent watering of other adjacent areas or plant material.

3.6 MAINTENANCE RECORD

Furnish a record describing the maintenance work performed, record of measurements and findings for product failure, recommendations for repair, and products replaced.

3.6.1 Maintenance

Maintenance must include eradicating weeds; protecting embankments and ditches from surface erosion; maintaining the performance of the erosion control materials and mulch; protecting installed areas from traffic.

3.6.2 Maintenance Instructions

Furnish written instructions containing drawings and other necessary information, describing the care of the installed material; including, when and where maintenance should occur, and the procedures for material replacement. Submit instruction for year-round care of installed material. Include manufacturer supplied spare parts.

3.6.3 Patching and Replacement

Unless otherwise directed, material must be placed, seamed or patched as recommended by the manufacturer. Remove material not meeting the required

performance as a result of placement, seaming or patching from the site. Replace the unacceptable material at no additional cost to the Government.

3.7 SATISFACTORY STAND OF GRASS PLANTS

When erosion control blanket type XI (revegetation mat) is installed, evaluate the grass plants for species and health when the grass plants are a minimum 1 inch high. A satisfactory stand of grass plants from the revegetation mat area must be a minimum 10 grass plants per square foot. The total bare spots must not exceed 2 percent of the total revegetation mat area.

-- End of Section --

SECTION 32 05 33

LANDSCAPE ESTABLISHMENT

PART 1 GENERAL

1.1 MEASUREMENT

The unit of measurement for landscape establishment is stated in Section 32 92 19 SEEDING and Section 32 92 23 SODDING.

1.2 PAYMENT

Payment will constitute full compensation for all labor, equipment, tools, piping, supplies, water, and incidentals required to establish site landscaping.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D5851	(1995; R 2015) Planning and Implementing a Water Monitoring Program
ASTM D6155	(2015) Nontraditional Coarse Aggregate for Bituminous Paving Mixtures

1.4 DEFINITIONS

1.4.1 Pesticide

Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests and are specifically labeled for use by the U.S. Environmental Protection Agency (EPA). Also, any substance used as a plant regulator, defoliant, disinfectant, or biocide. Examples of pesticides include fumigants, herbicides, insecticides, fungicides, nematicides, molluscicides and rodenticides.

1.4.2 Stand of Turf

95 percent ground cover of the established species.

1.4.3 Planter Beds

A planter bed is defined as an area containing one or a combination of the following plant types: shrubs, vines, wildflowers, annuals, perennials, ground cover, and a mulch topdressing excluding turf. Trees may also be found in planter beds.

1.5 RELATED REQUIREMENTS

Section 32 92 19 SEEDING and Section 32 92 23 SODDING apply to this

section for installation of seed and sod requirements, with additions and modifications herein.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Integrated Pest Management Plan; G

SD-03 Product Data

Fertilizer; G

Mulches Topdressing

Organic Mulch Materials

SD-07 Certificates

Maintenance Inspection Report

Plant Quantities; G

SD-10 Operation and Maintenance Data

Maintenance

SD-11 Closeout Submittals

Tree Staking and Guying Removal

1.7 DELIVERY, STORAGE AND HANDLING

1.7.1 Delivery

Deliver fertilizer to the site in original containers bearing manufacturer's chemical analysis, name, trade name, or trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with a certificate indicating the above information.

1.7.2 Storage

1.7.2.1 Fertilizer, Mulch Storage

Store material in designated areas. Store fertilizer in cool, dry locations away from contaminants.

1.7.2.2 Antidesiccant's Storage

Do not store with fertilizers or other landscape maintenance materials.

1.7.3 Handling

Do not drop or dump materials from vehicles.

1.8 MAINTENANCE

Submit Operation and Maintenance (O&M) Manuals for planting materials. Include instructions indicating procedures during one typical year including variations of maintenance for climatic conditions throughout the year. Provide instructions and procedures for watering; promotion of growth, including fertilizing, pruning, and mowing; and integrated pest management. O&M Manuals must include pictures of planting materials cross referenced to botanical and common names, with a description of the normal appearance in each season.

Develop a water monitoring program for surface and ground water on the project site in accordance with ASTM D5851 and consistent with the water management program utilized during construction operations.

PART 2 PRODUCTS

2.1 POST-PLANT FERTILIZER

Fertilizer for groundcover, wildflowers, and grasses is not permitted. Provide fertilizer for trees, plants, and shrubs as recommended by plant supplier, except synthetic chemical fertilizers are not permitted. Fertilizers containing petrochemical additives or that have been treated with pesticides or herbicides are not permitted.

2.1.1 Granular Fertilizer

Organic, granular controlled release fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

100 percent available nitrogen applied at a rate of 2 pounds per 1,000 square feet, three times per year.

2.2 WATER

Source of water must be approved by the Contracting Officer, and be of suitable quality for irrigation. Use collected storm water or graywater when available.

2.3 MULCHES TOPDRESSING

Free from noxious weeds, mold, pesticides, or other deleterious materials.

2.3.1 Inert Mulch Materials

Provide recycled riverbank stone, or other recycled material complying with ASTM D6155, ranging in size from 1 to 2 inches.

2.3.2 Organic Mulch Materials

Provide shredded hardwood and shredded redwood bark from site when available. Wood cellulose fiber must be processed to contain no growth or germination-inhibiting factors, dyed with non-toxic, biodegradable dye to an appropriate color to facilitate visual metering of materials application. Paper-based hydraulic mulch must contain a minimum of 100 percent post-consumer recycled content. Wood-based hydraulic mulch must contain a minimum of 100 percent total recovered materials content.

2.3.3 Recycled Organic Mulch

Recycled mulch may include compost, tree trimmings, or pine needles with a gradation that passes through a 2-1/2 by 2-1/2 inch screen. Clean recycled mulch of all sticks a minimum one inch in diameter and plastic materials a minimum 3 inch length. The material must be treated to retard the growth of mold and fungi.

2.4 PESTICIDES

Submit an Integrated Pest Management Plan, including weed and pest management strategies and proposed alternatives to herbicides and pesticides. Use biological pest controls as approved in the Plan.

PART 3 EXECUTION

3.1 EXTENT OF WORK

Provide landscape construction maintenance to include irrigation equipment cleaning and adjustments, mowing, edging, fertilizing, watering, weeding, pruning, and stake and guy adjusting for all renovated landscape areas and existing plant material, unless indicated otherwise, and at all areas inside or outside the limits of the construction that are disturbed by the Contractor's operations.

3.1.1 Policing

Police all landscaped areas. Policing includes removal of leaves, branches and limbs regardless of length or diameter, dead vegetation, paper, trash, cigarette butts, garbage, rocks or other debris. Policing must extend to both sides of fencing or walls. Collected debris must be promptly removed and disposed of at an approved disposal site.

3.1.2 Drainage System Maintenance

Remove all obstructions from surface and subsurface drain lines to allow water to flow unrestricted in swales, gutters, catch basins, storm drain curb inlets, and yard drains. Remove grates and clear debris in catch basins. Open drainage channels are to be maintained free of all debris and vegetation at all times. Edges of these channels must be clear of any encroachment by vegetation.

3.2 IRRIGATION ESTABLISHMENT PERIOD

The irrigation establishment period will commence on the date that inspection by the Contracting Officer shows that the new irrigation equipment furnished under this contract have been satisfactorily installed and is functional and must continue for a period of 365 days.

3.2.1 Maintenance During the Irrigation Establishment Period

Begin maintenance immediately after irrigation equipment has been installed and is functional. Inspect irrigation equipment at least once a week during the installation and establishment period and perform needed maintenance promptly. Automatic controllers not equipped with rain shut-off sensors must be turned off during periods of rain that exceed twelve hours of continuous rainfall in one day or during rain storms of one day or more. Once the rain has subsided timers must be reactivated. Irrigation controllers must be inspected and reprogrammed after power

outages. Contractor must be responsible for winterization and startup. Sprinkler heads must direct water away from buildings and hard surfaced areas.

3.2.2 Water Restrictions

Abide by state, local or other water conservation regulations in force during the establishment period. Automatic controller must be adjusted to comply with the water conservation regulations schedule.

3.2.3 Fire Hydrants

To use a fire hydrant for irrigation, obtain prior clearance from the Contracting Officer and the City of Canton, MS and provide the tools and connections approved for use on fire hydrants. If a fire hydrant is used, Provide a reduced pressure backflow preventer for each connection between hose and fire hydrant. Backflow preventer used must be tested once per month by a certified backflow preventer tester.

3.2.4 Final Acceptance

Upon completion of the irrigation establishment period and final acceptance of groundcover and exterior plants, irrigation equipment must be removed.

3.2.5 Controller Charts

Provide one chart for each controller supplied. Indicate in chart area controlled by the automatic controller. The chart is a reduction of the actual plans that will fit the maximum dimensions inside the controller housing. Use a black line print for the chart and a different pastel or transparent color to indicate each station zone of coverage. After chart is completed and approved for final acceptance, seal chart between two 20 mil pieces of clear plastic.

3.3 GROUNDCOVER ESTABLISHMENT PERIOD

Groundcover establishment period will commence on the date that inspection by the Contracting Officer shows that the new turf furnished under this contract has been satisfactorily installed to a 95 percent stand of coverage. The establishment period must continue for a period of 365 days.

3.3.1 Frequency of Maintenance

Begin maintenance immediately after turf has been installed. Inspect areas once a week during the installation and establishment period and perform needed maintenance promptly.

3.3.2 Promotion of Growth

Maintain groundcover in a manner that promotes proper health, growth, natural color. Turf must have a neat uniform manicured appearance, free of bare areas, ruts, holes, weeds, pests, dead vegetation, debris, and unwanted vegetation that present an unsightly appearance. Mow, remove excess clippings, eradicate weeds, water, fertilize, and perform other operations necessary to promote growth, as approved by Contracting Officer and consistent with approved Integrated Pest Management Plan. Remove noxious weeds common to the area from planting areas by mechanical means.

3.3.3 Mowing

3.3.3.1 Turf

Mow turf at a uniform finished height. Mow turfed areas to a minimum average height of 4 inches when average height of grass becomes 4 inches for spring/summer maintenance and to a minimum average height of 4 inches when the average height of grass reaches 3 inches for fall/winter maintenance. The height of turf is measured from the soil. Perform mowing of turf in a manner that prevents scalping, rutting, bruising, uneven and rough cutting. Prior to mowing, all rubbish, debris, trash, leaves, rocks, paper, and limbs or branches on a turf area must be picked up and disposed. Adjacent paved areas must be swept/vacuumed clean.

3.3.3.2 Native Grasses

Mow above height of native grass seedlings (approximately 3.5 to 4 inches). Mow during spring or early summer. Do not mow after early summer during the second growing season.

3.3.3.3 Wildflowers

Mow three times per season above height of the wildflowers (approximately 12 to 15 inches).

3.3.4 Turf Edging and Trimming

Perimeter of planter bed edges, sidewalks, driveways, curbs, and other paved surfaces must be edged. Uniformly edge these areas to prevent encroachment of vegetation onto paved surfaces and to provide a clear cut division line between planter beds, turf, and ground cover. Edging is to be accomplished in a manner that prevents scalping, rutting, bruising, uneven and rough cutting. Perform edging on the same day that turf is mowed. Use of string line trimmers is permitted in "soft" areas such as an edge between turfgrass and a planter bed. Exercise care to avoid damage to any plant materials, structures, and other landscape features.

Trimming around trees, fences, poles, walls, and other similar objects is to be accomplished to match the height and appearance of surrounding mowed turf growth. Trimming must be performed on the same day the turf's mowed. Care must be exercised to avoid "Girdling" trees located in turf areas. The use of protective tree collars on trees in turf areas may be utilized as a temporary means to avoid injury to tree trunks. At the end of the plant establishment period Contractor will be responsible for removing all protective tree collars.

3.3.5 Post-Fertilizer Application

Do not fertilize wildflowers, groundcover, and grasses. Apply turf fertilizer in a manner that promotes health, growth, vigor, color and appearance of cultivated turf areas. The method of application, fertilizer type and frequencies must be determined by the laboratory soil analysis results the requirements of the particular turf species. Organic fertilizer must be used. In the event that organic fertilizer is not producing the desired effect, the Contractor must contract the Contracting Officer for approval prior to the use of a synthetic type of fertilizer. Apply fertilizer by approved methods in accordance with the manufacturer's recommendations.

3.3.6 Turf Watering

Perform irrigation in a manner that promotes the health, growth, color and appearance of cultivated vegetation and that complies with all Federal, State, and local water agencies and authorities directives. The Contractor must be responsible to prevent over watering, water run-off, erosion, and ponding due to excessive quantities or rate of application. Abide by state, local or other water conservation regulations or restrictions in force during the establishment period.

3.3.7 Turf Clearance Area

Trees located in turf areas must be maintained with a growth free clearance of 18 inches from the tree trunk base. The use of mechanical weed whips to accomplish the turf growth free bed area is prohibited.

3.3.8 Replanting

Replant in accordance with Section 32 92 19 SEEDING and Section 32 92 23 SODDING and within specified planting dates areas which do not have a satisfactory stand of turf. Replant areas which do not have a satisfactory stand of other groundcover and grasses.

3.3.9 Final Inspection and Acceptance

Final inspection will be make upon written request from the Contractor at least 10 days prior to the last day of the turf establishment period. Final turf acceptance will be based upon a satisfactory stand of turf. Final acceptance of wildflower and grass areas will be based upon a stand of 95 percent groundcover of established species.

3.3.10 Unsatisfactory Work

When work is found to not meet design intent and specifications, maintenance period will be extended at no additional cost to the Government until work has been completed, inspected and accepted by Contracting Officer.

3.4 FIELD QUALITY CONTROL

3.4.1 Maintenance Inspection Report

Provide maintenance inspection report to assure that landscape maintenance is being performed in accordance with the specifications and in the best interest of plant growth and survivability. Site observations must be documented at the start of the establishment period, then quarterly following the start, and at the end of establishment period. Submit results of site observation visits to the EPA and the State of Florida within 7 calendar days of each site observation visit.

3.4.2 Plant Quantities

Provide Contracting Officer with the number of plant quantities. In addition, provide total exterior area of hardscape and landscaping such as turf and total number of shrubs.

3.4.3 Tree Staking and Guying Removal

Provide a certified letter that all stakes and guys are removed from all

project trees at the end of the establishment period.

-- End of Section --

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for installing permanent fencing and gate installation shall be based on the number of linear feet of fencing and the number of gates installed at the time of the Contractor's payment application.

1.1.2 Payment

1.1.2.1 Installing Permanent Fencing and Gates Around Cap Area

Payment shall be made for all costs associated with installing chain link wire fence, posts, and gates including equipment, supplies, and labor.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A116	(2011) Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A153/A153M	(2016) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A702	(2013) Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A824	(2001; R 2012) Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence
ASTM A90/A90M	(2013) Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM C94/C94M	(2017) Standard Specification for Ready-Mixed Concrete
ASTM F1043	(2017a) Standard Specification for Strength and Protective Coatings on Steel

	Industrial Fence Framework
ASTM F1083	(2016) Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
ASTM F1184	(2005; R 2010) Industrial and Commercial Horizontal Slide Gates
ASTM F567	(2014a) Standard Practice for Installation of Chain Link Fence
ASTM F626	(2014) Standard Specification for Fence Fittings
ASTM F883	(2013) Padlocks

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	(Rev K) Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)
FS RR-F-191/1	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Fabric)
FS RR-F-191/2	(Rev E) Fencing, Wire and Post, Metal (Chain-Link Fence Gates)
FS RR-F-191/3	(Rev E; Am 1) Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fence Assembly; G

Location of Gate, Corner, End, and Pull Posts; G

Gate Assembly; G

Gate Hardware and Accessories; G

Erection/Installation Drawings; G

SD-03 Product Data

Fence Assembly; G

Gate Assembly; G

Gate Hardware and Accessories; G

Zinc Coating; G

Fabric; G

Stretcher Bars; G

Concrete; G

SD-04 Samples

Fabric; G

Posts; G

Braces; G

Sleeves; G

Top Rail and Braces; G

Tension Wire; G

Stretcher Bars; G

Gate Posts; G

Gate Hardware and Accessories; G

Padlocks; G

Wire Ties; G

SD-07 Certificates

Certificates of Compliance

SD-08 Manufacturer's Instructions

Fence Assembly

Gate Assembly

Hardware Assembly

Accessories

1.4 QUALITY CONTROL

1.4.1 Certificates of Compliance

Submit certificates of compliance in accordance with the applicable reference standards and descriptions of this section for the following:

a. Zinc coating

b. Fabric

c. Stretcher bars

d. Gate hardware and accessories

e. Concrete

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials to site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Provide fencing materials conforming to the requirements of ASTM A116, ASTM A702, ASTM F626.

Submit reports of listing chain-link fencing and accessories regarding weight in ounces for zinc coating.

Submit manufacturer's catalog data for complete fence assembly, gate assembly, hardware assembly and accessories.

2.2 COMPONENTS

2.2.1 Fabric

FS RR-F-191 and detailed specifications as referenced and other requirements as specified.

FS RR-F-191/1; Type I, zinc-coated steel, 9 gage. Provide selvage knuckled at one selvage and twisted and barbed at the other. Height of fabric, as indicated.

Provide fabric consisting of No. 9-gage wires woven into a 2 inch diamond mesh, with dimensions of fabric and wire conforming to ASTM A116, with 2.0 ounces per square foot zinc galvanizing.

Provide one-piece fabric widths for fence heights up to 12 feet.

2.2.1.1 Top and Bottom Selvages

Provide knuckled selvages at top and bottom for fabric with 2 inch mesh and up to 60 inches high, and if over 60 inches high, provide twisted and barbed top selvage and knuckled bottom selvage.

Knuckle top and bottom selvages for 1-3/4 inch and 1 inch mesh fabric.

2.2.2 Posts, Rails and Braces

FS RR-F-191/3 line posts; Class 1, steel pipe, Grade A. End, corner, and pull posts; Class 1, steel pipe, Grade A. Sizes shall be no less than shown on the drawings. Line posts, technical (corner, gate, end, and pull) posts shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the limitation specified in ASTM F1184. Braces and rails; Class 1, steel pipe, Grade A.

2.2.3 Sleeves

Provide sleeves for setting into concrete construction of the same material as post sections, sized 1 inch greater than the diameter or dimension of the post. Weld flat plates to each sleeve base to provide anchorage and prevent intrusion of concrete.

2.2.4 Top Rail and Braces

ASTM F1083, Schedule 40 zinc coated, Group IA, steel pipe, size to less than shown on drawings.

2.2.5 Tension Wire

Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A824.

2.2.6 Stretcher Bars

Provide bars that have one-piece lengths equal to the full height of the fabric with a minimum cross section of 3/16 by 3/4 inch, in accordance with ASTM F626.

2.2.7 Stretcher Bar Bands

Provide bar bands for securing stretcher bars to posts that are steel, wrought iron, or malleable iron spaced not over 15 inches on center. Bands may also be used in conjunction with special fittings for securing rails to posts. Provide bands with projecting edges chamfered or eased.

2.2.8 Post Tops

Provide tops that are steel, wrought iron, or malleable iron designed as a weathertight closure cap. Provide one cap for each post, unless equal protection is provided by a combination post-cap and wire supporting arm. Provide caps with an opening to permit through passage of the top rail.

2.2.9 Gate Posts

Gate posts shall be for gate type specified subject to the limitation specified in ASTM F1184.

2.2.10 Gates

FS RR-F-191/2; Type II, double swing. Shape and size of gate frame, as indicated. Framing and bracing members, round of steel alloy. Steel member finish, zinc-coated. Provide gate frames and braces of minimum sizes listed in FS RR-F-191/3 for each Class and Grade, except that steel pipe frames are a minimum of 1.90 inches o.d., 0.120 inches minimum wall thickness and aluminum pipe frames and intermediate braces are 1.869 inches o.d. minimum, 0.940 lb/ft of length. Gate fabric, is as specified for fencing fabric. Coating for steel latches, stops, hinges, keepers, and accessories, is galvanized. Provide fork type gate latches. Provide intermediate members as necessary for gate leaves more than 8 feet wide, to provide rigid construction, free from sag or twist. Provide truss rods or intermediate braces for gate leaves less than 8 feet wide. Attach gate fabric to gate frame in accordance with manufacturer's standards, except that welding is not permitted. Arrange padlocking latches to be accessible from both sides of gate, regardless of latching arrangement.

Provide diagonal cross-bracing, consisting of 3/8 inch diameter adjustable-length truss rods on welded gate frames, where necessary to obtain frame rigidity without sag or twist. Provide nonwelded gate frames with diagonal bracing.

2.2.11 Gate Hardware and Accessories

Provide gate hardware and accessories that conforms to ASTM A116 and ASTM F626, and be as specified:

Provide malleable iron forged steel hinges to suit gate size, non-lift-off type, offset to permit 180-degree opening.

Provide latch that permits operation from either side of the gate, with a padlock eye provided as an integral part of the latch.

Provide stops and holders of malleable iron for vehicular gates. Provide stops that automatically engage the gate and hold it in the open position until manually released.

Provide double gates with a cane bolt and ground-set keeper, with latch or locking device and padlock eye designed as an integral part.

Provide manufacturer's standard heavy-duty track ball bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, and accessories as required for easy operation of manual sliding gates.

2.2.12 Miscellaneous Hardware

Provide miscellaneous hot-dip galvanized hardware as required.

2.2.13 Wire Ties

Provide 16-gage galvanized steel wire for tying fabric to line posts,spaced 12 inches on center. For tying fabric to rails and braces, space wire ties 24 inches on center. For tying fabric to tension wire, space 0.105-inch hog rings 24 inches on center.

Manufacturer's standard procedure will be accepted if of equal strength and durability.

2.2.14 Padlocks

Provide padlocks conforming to ASTM F883, with chain.

2.3 MATERIALS

2.3.1 Zinc Coating

Provide hot-dip galvanized (after fabrication) ferrous-metal components and accessories, except as otherwise specified.

Provide zinc coating of weight not less than 1.94 ounces per square foot, as determined from the average result of two specimens, when tested in accordance with ASTM A90/A90M.

Provide zinc coating conforming to the requirements of the following:

a. Pipe: FS RR-F-191/3 Class 1 Grade A in accordance with ASTM F1083.

b. Hardware and accessories: ASTM A153/A153M, Table 1

c. Surface: ASTM F1043

d. External: Type B-B surface zinc with organic coating, 0.97 ounce per square foot minimum thickness of acrylated polymer.

e. Internal: Surface zinc coating of 0.97 ounce per square foot minimum.

Provide galvanizing repair material that is cold-applied zinc-rich coating conforming to ASTM A780/A780M.

2.3.2 Tension Wire

Provide galvanized, coiled spring wire, No. 7-gage. Provide zinc coating that weighs not less than 2.0 ounces per square foot.

2.3.3 Concrete

Provide concrete conforming to ASTM C94/C94M, and obtaining a minimum 28-day compressive strength of 3,000 psi.

2.3.4 Grout

Provide grout of proportions one part portland cement to three parts clean, well-graded sand and a minimum amount of water to produce a workable mix.

PART 3 EXECUTION

Submit manufacturer's erection/installation drawings and instructions that detail proper assembly and materials in the design for fence, gate, hardware and accessories.

Provide complete installation conforming to ASTM F567.

3.1 PREPARATION

Ensure final grading and established elevations are complete prior to commencing fence installation.

3.1.1 Clearing and Grading

Clear fence line of trees, brush, and other obstacles to install fencing for a distance as indicated on the drawings outside the fence. Establish a graded, compacted fence line prior to fencing installation.

3.2 INSTALLATION

3.2.1 Fence Installation

Install fence on prepared surfaces to line and grade indicated. Install fence in accordance with fence manufacturer's written installation instructions except as modified herein.

3.2.1.1 Post Spacing

Provide line posts spaced equidistantly apart, not exceeding 10 feet on center. Provide gate posts spaced as necessary for size of gate openings. Do not exceed 500 feet on straight runs between braced posts. Provide corner or pull posts, with bracing in both directions, for changes in direction of 15 degrees or more, or for abrupt changes in grade. Submit drawings showing location of gate, corner, end, and pull posts.

3.2.1.2 Bottom Tension Wire

Install bottom tension wires before installing chain-link fabric, and pull wires taut. Place top and bottom tension wires within 8 inches of respective fabric line.

3.2.2 Excavation

Provide excavations for post footings which are drilled holes in virgin or compacted soil, of minimum sizes as indicated.

Space footings for line posts 10 feet on center maximum and at closer intervals when indicated, with bottoms of the holes approximately 3 inches below the bottoms of the posts. Set bottom of each post not less than 36 inches below finished grade when in firm, undisturbed soil. Set posts deeper, as required, in soft and problem soils and for heavy, lateral loads.

Uniformly spread soil from excavations adjacent to the fence line or on areas of Government property, as directed.

When solid rock is encountered near the surface, drill into the rock at least 12 inches for line posts and at least 18 inches for end, pull, corner, and gate posts. Drill holes at least 1 inch greater in diameter than the largest dimension of the placed post.

If solid rock is below the soil overburden, drill to the full depth required except that penetration into rock need not exceed the minimum depths specified above.

3.2.3 Setting Posts

Remove loose and foreign materials from holes and moisten the soil prior to placing concrete.

Provide tops of footings that are trowel finished and sloped or domed to shed water away from posts. Set hold-open devices, sleeves, and other accessories in concrete.

Keep exposed concrete moist for at least 7 calendar days after placement or cured with a membrane curing material, as approved.

Maintain vertical alignment of posts in concrete construction until concrete has set.

3.2.3.1 Earth and Bedrock

Provide concrete bases of dimensions indicated on the manufactures installation drawings, except in bedrock. Compact concrete to eliminate voids, and finish to a dome shape. In bedrock, set posts with a minimum

of 1 inch of grout around each post. Work grout into hole to eliminate voids, and finish to a dome shape.

3.2.3.2 Bracing

Brace gate, corner, end, and pull posts to nearest post with a horizontal brace used as a compression member, placed at least 12 inches below top of fence, and a diagonal tension rod.

a. Tolerances

Provide posts that are straight and plumb within a vertical tolerance of 1/4 inch after the fabric has been stretched. Provide fencing and gates that are true to line with no more than 1/2 inch deviation from the established centerline between line posts. Repair defects as directed.

3.2.4 Concrete Strength

Provide concrete that has attained at least 75 percent of its minimum 28-day compressive strength, but in no case sooner than 7 calendar days after placement, before rails, tension wire, or fabric are installed. Do not stretch fabric and wires or hang gates until the concrete has attained its full design strength.

Take samples and test concrete to determine strength as specified.

3.2.5 Top Rails

Provide top rails that run continuously through post caps or extension arms, bending to radius for curved runs. Provide expansion couplings as recommended by the fencing manufacturer.

3.2.6 Brace Assembly

Provide bracing assemblies at end and gate posts and at both sides of corner and pull posts, with the horizontal brace located at midheight of the fabric.

Install brace assemblies so posts are plumb when the diagonal rod is under proper tension.

Provide two complete brace assemblies at corner and pull posts where required for stiffness and as indicated.

3.2.7 Tension Wire Installation

Install tension wire by weaving them through the fabric and tying them to each post with not less than 7-gage galvanized wire or by securing the wire to the fabric with 10-gage ties or clips spaced 24 inches on center.

3.2.8 Fabric Installation

Provide fabric in single lengths between stretch bars with bottom barbs placed approximately 1-1/2 inches above the ground line. Pull fabric taut and tied to posts, rails, and tension wire with wire ties and bands.

Install fabric on the security side of fence, unless otherwise directed.

Ensure fabric remains under tension after the pulling force is released.

3.2.9 Stretcher Bar Installation

Thread stretcher bars through or clamped to fabric 4 inches on center and secured to posts with metal bands spaced 15 inches on center.

3.2.10 Gate Installation

Install gates plumb, level, and secure, with full opening without interference. Install ground set items in concrete for anchorage as recommended by the fence manufacturer. Adjust hardware for smooth operation and lubricated where necessary.

3.2.11 Tie Wires

Provide tie wires that are U-shaped to the pipe diameters to which attached. Twist ends of tie wires not less than two full turns and bent so as not to present a hazard.

3.2.12 Fasteners

Install nuts for tension bands and hardware on the side of the fence opposite the fabric side. Peen ends of bolts to prevent removal of nuts.

3.2.13 Zinc-Coating Repair

Clean and repair galvanized surfaces damaged by welding or abrasion, and cut ends of fabric, or other cut sections with specified galvanizing repair material applied in strict conformance with the manufacturer's printed instructions.

3.2.14 Accessories Installation

3.2.14.1 Post Caps

Install post caps as recommended by the manufacturer.

3.2.14.2 Padlocks

Provide padlocks for gate openings and provide chains that are securely attached to gate or gate posts. Provide padlocks keyed alike, and provide two keys for each padlock.

3.2.15 Grounding

Ground fencing as indicated on drawings.

3.3 CLOSEOUT ACTIVITIES

Remove waste fencing materials and other debris from the work site.

-- End of Section --

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for seeding and mulching shall be made of the total surface area in acres covered by seeding and mulching based on field measurements.

1.1.2 Payment

1.1.2.1 Seeding and Mulching

This cost shall include all seed material, delivery to site, storage, surface preparation, fertilizing, mulch, and watering required for establishing vegetation in disturbed areas.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)

FDOT	(2019) Florida Standard Specifications for Road and Bridge Construction

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act

1.3 DEFINITIONS

1.3.1 Stand of Turf

95 percent ground cover of the established species.

1.4 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK, Section 32 92 23 SODDING, and Section 32 05 33 LANDSCAPE ESTABLISHMENT applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Wood Cellulose Fiber Mulch

Fertilizer

Include physical characteristics, and recommendations.

SD-07 Certificates

State Certification and Approval for Seed

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Delivery

1.6.1.1 Seed Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.6.1.2 Fertilizer Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

1.6.2 Storage

1.6.2.1 Seed and Fertilizer Storage

Store in cool, dry locations away from contaminants.

1.6.2.2 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.6.2.3 Handling

Do not drop or dump materials from vehicles.

1.7 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.7.1 Restrictions

Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.8 TIME LIMITATIONS

1.8.1 Seed

Apply seed within twenty four hours after seed bed preparation.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Classification

Provide State-approved seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected.

2.1.2 Seed Mixture

Two copies of the germination and purity certification will be reviewed by Company before seeding is begun. Seed which has become wet, moldy, or otherwise damaged in storage or transit will not be acceptable. Seed will be in accordance with FDOT Section 981-2 - SEED.

a. Seed Mix

Botanical Name	Common Name	Min. Percent Pure Seed	Min. Percent Germination and Hard Seed
Pensacola	Bahiagrass	95	80
Cynodon Dactylon	Bermuda	95	85
Lolium	Ryegrass Annual	95	90

2.2 FERTILIZER

2.2.1 Granular Fertilizer

Granular fertilizer shall be in accordance with FDOT Section 982 - FERTILIZERS.

2.3 MULCH

Mulch shall be in accordance with FDOT Section 981-4 - MULCH. Mulch must be free from noxious weeds, mold, and other deleterious materials.

2.3.1 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw must contain no fertile seed.

2.3.2 Hay

Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay must be sterile, containing no fertile seed.

2.3.3 Wood Cellulose Fiber Mulch

Use recovered materials of either paper-based (100 percent post-consumer content) or wood-based (100 percent total recovered content) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors

and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 5.5 to 8.2. Use with hydraulic application of grass seed and fertilizer.

2.4 WATER

Source of water must be approved by Contracting Officer and of suitable quality for irrigation, containing no elements toxic to plant life.

2.5 EROSION CONTROL MATERIALS

Erosion control material must conform to the following:

2.5.1 Erosion Control Blanket

100 percent agricultural straw or 70 percent agricultural straw/30 percent coconut fiber matrix stitched with a degradable nettings, designed to degrade within 12 months.

2.5.2 Erosion Control Fabric

Fabric must be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips must have a minimum life of 6 months.

2.5.3 Erosion Control Net

Net must be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately one inch square.

2.5.4 Hydrophilic Colloids

Hydrophilic colloids must be physiologically harmless to plant and animal life without phytotoxic agents. Colloids must be naturally occurring, silicate powder based, and must form a water insoluble membrane after curing. Colloids must resist mold growth.

2.5.5 Erosion Control Material Anchors

Erosion control anchors must be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation prior to planting (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.1.1 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy frozen or snow covered or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

3.2.2 Seed Application Method

Seeding method must be broadcasted and drop seeding, drill seeding, or hydroseeding.

3.2.2.1 Broadcast and Drop Seeding

Seed must be uniformly broadcast at the rate of 4 pounds per 1000 square feet. Use broadcast or drop seeders. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth of 1/4 inch in clay soils and 1/2 inch in sandy soils by means of spike-tooth harrow, cultipacker, raking or other approved devices.

3.2.2.2 Drill Seeding

Seed must be drilled at the rate of 2 pounds per 1000 square feet.

3.2.2.3 Hydroseeding

First, mix water and fiber. Wood cellulose fiber, paper fiber, or recycled paper must be applied as part of the hydroseeding operation. Fiber must be added at 1,000 pounds, dry weight, per acre. Then add and mix seed and fertilizer to produce a homogeneous slurry. Seed must be mixed to ensure broadcasting at the rate of 4 pounds per 1000 square feet. When hydraulically sprayed on the ground, material must form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

3.2.3 Mulching

3.2.3.1 Hay or Straw Mulch

Hay or straw mulch must be spread uniformly at the rate of 2 tons per acre. Mulch must be spread by hand, blower-type mulch spreader, or other approved method. Mulching must be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch must not be bunched or clumped. Sunlight must not be completely excluded from penetrating to the ground surface. All areas installed with seed must be mulched on the same day as the seeding. Mulch must be anchored immediately following spreading.

3.2.3.2 Mechanical Anchor

Mechanical anchor must be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.2.4 Rolling

Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.

3.2.5 Erosion Control Material

Install in accordance with manufacturer's instructions, where indicated or as directed by the Contracting Officer.

3.2.6 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 2 inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations at the Contractor's expense. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

SECTION 32 92 23

SODDING

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for sodding shall be made of the total surface area in acres covered by sod based on field measurements.

1.1.2 Payment

1.1.2.1 Sodding

This cost shall include all seed material, delivery to site, storage, surface preparation, fertilizing, and watering required for establishing vegetation in disturbed areas.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C602	(2013a) Agricultural Liming Materials
ASTM D4427	(2013) Peat Samples by Laboratory Testing
ASTM D4972	(2013) pH of Soils

TURFGRASS PRODUCERS INTERNATIONAL (TPI)

TPI GSS	(1995) Guideline Specifications to Turfgrass Sodding

FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)

FDOT	(2019) Florida Standard Specifications for Road and Bridge Construction

U.S. DEPARTMENT OF AGRICULTURE (USDA)

DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.3 DEFINITIONS

1.3.1 Stand of Turf

100 percent ground cover of the established species.

1.4 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK and Section 32 05 33 LANDSCAPE ESTABLISHMENT applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

Topsoil composition tests (reports and recommendations).

SD-07 Certificates

Nursery or Sod farm certification for sods. Indicate type of sod in accordance with TPI GSS.

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Delivery

1.6.1.1 Sod Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.6.1.2 Fertilizer Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

1.6.2 Storage

1.6.2.1 Sod Storage

Lightly sprinkle with water, cover with moist burlap, straw, or other approved covering; and protect from exposure to wind and direct sunlight until planted. Provide covering that will allow air to circulate so that internal heat will not develop. Do not store sod longer than 24 hours. Do not store directly on concrete or bituminous surfaces.

1.6.2.2 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.6.2.3 Handling

Do not drop or dump materials from vehicles.

1.7 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.7.1 Restrictions

Do not plant when the ground is frozen or snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.8 TIME LIMITATIONS

1.8.1 Sod

Place sod a maximum of thirty six hours after initial harvesting, in accordance with TPI GSS as modified herein.

PART 2 PRODUCTS

2.1 SODS

2.1.1 Classification

Nursery grown, certified as classified in the TPI GSS. Machine cut sod at a uniform thickness of 3/4 inch within a tolerance of 1/4 inch, excluding top growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends. Broken pads, irregularly shaped pieces, and torn or uneven ends will be rejected. Wood pegs and wire staples for anchorage shall be as recommended by sod supplier.

2.1.2 Purity

Sod species shall be genetically pure, free of weeds, pests, and disease.

2.1.3 Planting Dates

Lay sod from April 15 to June 15 for warm season spring planting and from September 1 to October 15 for cool season fall planting.

2.1.4 Composition

2.1.4.1 Proportion

Proportion grass species as follows.

Botanical Name	Common Name	Percent
Pensacola	Bahiagrass	100

2.1.4.2 Sod Farm Overseeding

At the sod farm provide sod with overseeding of type recommended by seed producer.

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 00 00 EARTHWORK.

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials.

2.3 SOIL CONDITIONERS

Add conditioners to topsoil as required to bring into compliance with "composition" standard for topsoil as specified herein.

2.3.1 Lime

Commercial grade hydrate or burnt limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C602.

2.3.2 Aluminum Sulfate

Commercial grade.

2.3.3 Sulfur

100 percent elemental

2.3.4 Iron

100 percent elemental

2.3.5 Peat

Natural product of peat moss derived from a freshwater site and conforming to ASTM D4427. Shred and granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation.

2.3.6 Sand

Clean and free of materials harmful to plants.

2.3.7 Perlite

Horticultural grade.

2.3.8 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.3.8.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.3.8.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.3.9 Gypsum

Coarsely ground gypsum comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing thru 16 mesh screen.

2.3.10 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.4 FERTILIZER

2.4.1 Granular Fertilizer

Fertilizer shall be in accordance with FDOT Section 982 - FERTILIZERS.

2.5 WATER

Source of water shall be approved by Contracting Officer and of suitable quality for irrigation containing no element toxic to plant life.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Extent Of Work

Provide soil preparation (including soil conditioners), fertilizing, and sodding of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.2 Soil Preparation

Provide 4 inches of on-site topsoil to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer, pH adjusters, and soil conditioners into soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.1.2.1 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils at the job site. For bidding purposes only apply at rates for the following:

Nitrogen: One pound per 1000 square feet applied three times per year.

3.1.2.2 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site.

3.2 SODDING

3.2.1 Finished Grade and Topsoil

Prior to the commencement of the sodding operation, the Contractor shall verify that finished grades are as indicated on drawings; the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 31 00 00 EARTHWORK.

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove from the surface debris and stones over a minimum 5/8 inch in any dimension.

3.2.2 Placing

Place sod a maximum of 36 hours after initial harvesting, in accordance with TPI GSS as modified herein.

3.2.3 Sodding Slopes and Ditches

For slopes 2:1 and greater, lay sod with long edge perpendicular to the contour. For V-ditches and flat bottomed ditches, lay sod with long edge perpendicular to flow of water. Anchor each piece of sod with wood pegs or wire staples maximum 2 feet on center. On slope areas, start sodding at bottom of the slope.

3.2.4 Finishing

After completing sodding, blend edges of sodded area smoothly into surrounding area. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed and holes and missing corners shall be patched with sod.

3.2.5 Rolling

Immediately after sodding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width.

3.2.6 Watering

Start watering areas sodded as required by daily temperature and wind conditions. Apply water at a rate sufficient to ensure thorough wetting of soil to minimum depth of 6 inches. Run-off, puddling, and wilting shall be prevented. Unless otherwise directed, watering trucks shall not be driven over turf areas. Watering of other adjacent areas or plant material shall be prevented.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

SECTION 33 26 00.00 10

CONTAINMENT CELL GAS VENTS/RELIEF WELLS

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Containment cell gas vents are one component of the cap gas collection system. Measurement shall consist of the agreed upon percent complete of the entire gas collection system at the time of the Contractor's payment application.

1.1.2 Payment

Payment for the gas collection system is lump sum percent complete and shall be made for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

1.2 SCOPE OF WORK

Furnish all labor, equipment, materials, and other facilities and incidentals required to install gas vents as shown in the Drawings and as specified herein.

This Section is intended to give a general description of what is required, but does not cover all variations that may occur during vent construction. This Section is intended to cover the successful completion of the gas vents as herein specified, whether every detail is specifically mentioned or not.

1.3 RELATED WORK

a. Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES.

b. Section 02 56 15 GEOSYNTHETIC CLAY LINER (GCL).

c. Section 31 00 00 EARTHWORK.

d. Section 31 05 20 GEOSYNTHETIC DRAINAGE LAYER.

1.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C150/C150M	(2015) Standard Specification for Portland Cement
ASTM D1785	(2012) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe,

	Schedules 40, 80, and 120
ASTM D2464	(2015) Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2466	(2015) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2467	(2015) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

FDEP	Rules of the Florida Department of Environmental Protection (FDEP), as applicable

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards

Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Permits; G

Proposed Work Schedule; G

Drilling Rigs and Personnel; G

SD-03 Product Data

Pipe Casing; G

Slotted Pipe (Screen); G

Fittings; G

Gravel Filter Pack; G

Grout; G

Drilling Fluids; G

Caps; G

Sealing Materials; G

Vent Pipe Coating; G

SD-06 Test Reports

Daily Drillers Report; G

Gas Vent Completion Report; G

1.6 QUALITY ASSURANCE

a. The contractor responsible for constructing the gas vents shall be licensed as specified in the Rules of the State of Florida FDEP as a licensed driller employing only competent workers for the execution of this work and all such work shall be performed under the direct supervision of an experienced driller satisfactory to the Contracting Officer.

b. The driller shall be capable of identifying subsurface conditions and maintaining complete and current logs and daily notes for the gas vent completion reports.

c. The Owner may make any other investigations deemed necessary to determine the ability of the Contractor to perform the work and the Contractor shall furnish to the Owner all such information and data for this purpose as the Owner may request.

d. Complete the work described in accordance with the applicable portions of the State of Florida FDEP standards and regulations, as well as per OSHA standard 29 CFR 1910.

e. The Driller shall be trained and experienced as required by OSHA standard 29 CFR 1910.

f. The Driller's Assistant(s) shall be trained and experienced as required by OSHA standard 29 CFR 1910.

g. Furnish a list of all personnel who will be involved in the project and their corresponding qualifications and experience.

1.7 DESCRIPTION OF THE PILOT HOLE AND GAS VENT

a. The pilot hole shall be 6 inches in diameter, drilled to the specified depth as indicated on the Drawings.

b. Pilot holes and gas vent shall be drilled at the locations and depth as indicated on the Drawings, unless otherwise approved by the Contracting Officer.

c. Alternate drilling or construction methods may be approved by the Contracting Officer where justified.

1.8 DELIVERY, STORAGE, AND HANDLING

a. All parts and materials shall be properly protected so that no damage, deterioration, or contamination will occur from time of shipment until installation is completed.

b. If in the opinion of the Contracting Officer, parts and materials are damaged, deteriorated, or contaminated before acceptance of the vent,

the material and/or the gas vent will be rejected. Replace the labor, parts and materials at no additional cost to the Government.

c. Materials shall be stored to ensure preservation of their quality and fitness for work. When deemed necessary, they shall be placed on wooden platforms or other hard clean surfaces and not on the ground. Stored materials shall be located so as to facilitate prompt inspection.

1.9 PERMITS

a. Obtain any Federal or State permits required for constructing the gas vents, discharging material from the site, or clearing the site for work or access.

b. Do not perform any work on the gas vents until these permits are obtained.

c. Furnish separate copies of all permits to the Owner and the Contracting Officer as the permits are received. Copies of all permits shall be furnished to the Contracting Officer 10 days prior to mobilization.

1.10 NOTIFICATION

a. Supply to the Contracting Officer, in writing at the preconstruction conference, the proposed work schedule, including the following:

1. The starting date of the gas vent construction.

2. The dates and order of gas vent drilling.

3. The completion date of gas vent drilling.

4. Any anticipated work stoppages of duration greater than 24 hours with exception of weekends and holidays.

b. Notify the Contracting Officer, in writing, at the preconstruction conference, the number of drilling rigs and personnel to be used on the project. Any change in the number of rigs and personnel shall require written notification of the Contracting Officer, 48 hours prior to the change.

c. Notify the Contracting Officer, in writing, 10 days prior to the commencement of drilling activities.

d. Notify the Contracting Officer 24 hours prior to start of any gas vent drilling activities.

e. No work shall be performed without completing the notification requirements specified above.

1.11 VENT ACCEPTANCE CRITERIA

a. Each gas vent shall be approved based on the following criteria, in the opinion of the Contracting Officer:

1. The vent is structurally sound and in conformance with designated standards.

b. All caps, casing, screen, gravel filter packs and specified parts/materials shall be set to the depths as shown on the Drawings and as specified herein.

c. No payment for the vent shall be due if failure to meet all of the above requirements.

PART 2 PRODUCTS

2.1 PIPE CASING

a. All vent casings shall be new, non perforated, Schedule 80, PVC pipe in accordance with ASTM D1785 and as manufactured by Celanese Piping Systems, Chemical Division; Cabot Company or equal. All couplings should be threaded for future connections for gas vent collection. Casing shall be 6 inch nominal diameter.

b. Use 5 foot and/or 10 foot joints of casing.

2.2 SLOTTED PIPE (SCREEN)

a. The pipe should be new, unplasticized, Schedule 80, PVC.

b. Fittings shall be flush coupled, square threaded as designated in ASTM D2467 or ASTM D2466, as shown on the Drawings and as designated in ASTM D2464 and shall be compatible with the pipe where installed.

c. The screened section of the pipe shall be furnished slotted, as specified on the Drawings, in the locations shown. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code and pressure class.

1. The slots shall be cut into the pipe at the factory after manufacture. The slotted pipe shall have six rows of .080 slots on 1/4 inch centers along the length of the pipe.

2.3 FITTINGS

Fittings shall be as designated in ASTM D2467 or ASTM D2466, except where threaded as shown on the Drawings and as designated in ASTM D2464 and shall be compatible with the pipe where installed.

2.4 GRAVEL FILTER PACK

Gravel filter pack material shall be washed, hard, durable, rounded, or sub-angular particles of proper size and gradation. The gravel shall be placed around and below the pipe and will vary in length as dependent on each gas vent's completion. The gravel should be free of loam, clay, excess fines, roots, trash and other deleterious material. Gravel filter shall be graded within the following limits:

Sieve Size	Percent Finer by Weight
1 inch	100
1/2 inch	75 - 85
3/8 inch	55 - 80
No. 4	10 - 60
No. 10	0 - 15

2.5 GROUT

Any grout used shall be proportioned of Type I or Type III (ASTM C150/C150M) portland cement mixed with no more than four percent (by volume) of bentonite clay. The grout mixture shall be proportioned to the Halliburton Cement Tables. All other additives shall have prior approval of the Contracting Officer and no cement accelerators shall be used.

2.6 DRILLING FLUIDS

a. The use of any drilling fluids, if necessary, must have prior approval of the Contracting Officer.

b. All water used in the construction of the gas vents shall be potable by the State of Florida FDEP standards.

2.7 CAPS

The bottom of each vent casing shall be fitted with a threaded, PVC cap. Caps shall be by Celanese Piping Systems, Chemtrol Division; Cabot Company or equal.

PART 3 EXECUTION

3.1 DRILLING EQUIPMENT AND TOOLS

a. Drilling equipment and tools shall be steam cleaned prior to being mobilized onto each site.

b. No thread lubricant/pipe dope shall be used except teflon tape or equal.

c. Contain all drilling fluids in tanks. No open pits for drilling mud shall be tolerated.

d. All drilling fluid shall be stored on the site and disposed of in an approved location and manner.

e. Special tools and materials required for normal installation shall be furnished with the pipe.

3.2 BOREHOLE DRILLING

a. A 6 inch diameter pilot hole shall be drilled at each gas vent location prior to gas vent installation at each site.

b. If the Contractor uses a mud rotary drilling method for pilot hole construction, then a biodegradable drilling mud shall be used, such as Vari Flow, as manufactured by the American Colloid Company or equal.

3.3 VENT PIPE INSTALLATION

a. The string of 6 in diameter pipe shall be secured approximately 6 inches above the bottom of the borehole to allow the gravel pack to form beneath the screen as shown on the Drawings.

b. The vent pipe shall be installed by screwing together the individual pieces of PVC and installing them as one unit. The use of PVC cement

or glue shall not be permitted. Particular care shall be taken not to overstress threaded connections.

c. Every effort shall be made on the part of the Contractor to assure casing is plumb and centralized in the borehole.

3.4 VENT PIPE PENETRATIONS

The GCL and synthetic turf should be sealed around the vent pipe penetrations following vent installation in accordance with the guidelines and procedures of the GCL and turf manufacturers and in accordance with Section 02 56 15 GEOSYNTHETIC CLAY LINER (GCL). The GCL sealing should be sequenced to allow proper grouting and concrete mixing at the gas vents. Sealing materials and methods at the GCL penetrations will be recorded on the drilling log for the hole, photographed by Contractor, and provided to Contracting Officer.

3.5 VENT PIPE COATING

All PVC piping exposed to ultraviolet radiation (sunlight) shall be lightly sanded and painted red. Acceptable paint types and schedules shall be as listed below applied at the dry film thickness (DFT) in mils per coat noted.

a. Tnemec

1. 1 Coat: 66 Color Hi build Epoxoline (4 DFT).

2. 2 Coats: 71 Color Endura Shield (2.5 DFT per coat).

b. Koppers

1. 1 Coat: Higard Epoxy (4 DFT).

2. 1 Coat: 1122 BRS Linear Polyurethane (2.5 DFT).

c. Porter

1. 1 Coat: M.C.R. 43 Hibuild Primer 4336 (5 DFT).

2. 2 Coats: Hythane 4600 Series Polyurethane (2.0 DFT per coat).

3.6 GAS VENT ABANDONMENT

a. If the Contractor fails to meet the Gas Vent Acceptance Criteria as stated in paragraph VENT ACCEPTANCE CRITERIA, or should abandon the gas vent because of loss of tools, casing collapse, or other causes related to vent construction operations, the gas vent shall be abandoned and a new gas vent shall be installed as a replacement. Under these conditions, the Contractor shall receive no payment for time, materials, or work for abandonment and shall receive no compensation for the abandoned gas vent.

b. Replace the abandoned gas vent at the unit prices set forth in the Schedule of Prices.

c. Notify the Contracting Officer immediately if any obstruction is encountered during drilling for a gas vent. If directed by the Contracting Officer to abandon a borehole. Fill the borehole interval

with a sand/bentonite mixture approved by the Contracting Officer.

3.7 PROTECTION AND SITE CLEAN UP

a. At all times during the progress of the site work, use all reasonable precautions to prevent either tampering with the gas vents or the entrance of foreign material.

b. All gas vents shall be protected by the provision of temporary supports or other means of protection approved by the Contracting Officer. Replace any gas vent which is damaged by construction operations at the Contractor's expense.

c. Immediately upon completion of site work, remove all of the equipment, materials and supplies from the site of the work, remove all surplus materials and debris, fill in all holes or excavations and restore any disturbed areas to their original condition. Not more than 2 weeks shall be allowed for this work and complete all clearing within that time. Properly dispose of the refuse and material removed from the borehole. Failure to comply with these requirements shall give authority to other contractors or workers, required by the Contracting Officer, to enter upon the site and complete the clean up, grading, etc. The cost of this work shall be deducted from money due or become due for construction of the wells.

3.8 REPORTS

a. During all gas vent drilling, a daily drillers report shall be maintained and submitted as requested gy the Contracting Officer. The report shall give a description of the number of feet drilled, number of hours on the job, shutdown due to breakdown, feet of screen and casing set, and other pertinent data as requested by the Contracting Officer.

b. Upon completion of each gas vent, submit to the Contracting Officer a gas vent completion report to include the name and location of the job, date of the pilot borehole drilling (start and finish) gas vent number and coordinates if known, and the technique and materials used to splice the gas vent through the cap.

-- End of Section --

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