QUALITY ASSURANCE PROJECT PLAN

Kokomo Dump Site OS
Kokomo, Indiana

Prepared for:
United States Environmental Protection Agency
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Based on the Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans
(Final Version 1.1, June 2006)

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Attachment B Standard Operating Procedures/Practices
Attachment C Exhibits of Quality Control Logs and Report Forms

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INTRODUCTION

The United States Environmental Protection Agency (EPA) requires that all parties involved with environmental monitoring and measurement efforts mandated or supported by the EPA participate in a centrally managed quality assurance program. Any party generating data under this program has the responsibility to implement minimum procedures to assure that the precision, accuracy, completeness, comparability, and representativeness of its data is known and documented. To ensure that this responsibility is met, each party must prepare a written plan covering the project(s) it is to perform.

This Quality Assurance Project Plan (QAPP) has been prepared by Oneida Total Integrated Enterprises (OTIE), Superfund Technical Assessment and Response Team (START). This QAPP has been prepared in accordance with EPA Uniform Federal Policy (UFP) for QAPP guidance and contains information regarding functional activities and specific quality assurance (QA) and quality control (QC) procedures in support of site activities associated with the investigation of the former Kokomo Dump (Site). This QAPP also describes the specific protocols, which will be followed for sampling, sample handling and storage, chain-of-custody, and laboratory (and field) analysis.

The former Site historically operated as a landfill and incinerator. The contaminants of concern (COCs) associated with the Site are metals, polychlorinated biphenyls (PCBs) and dioxins. Leaking drums were discovered by the Indiana Department of Environmental Management (IDEM) in April 2011 exposed in a creek bank at the Site. IDEM collected samples of material leaking from the drums and conducted x-ray fluorescence (XRF) screening. XRF screening results indicated high concentrations of lead, chromium, arsenic, and mercury. The USEPA conducted a Site Assessment on August 19, 2011. Results of the USEPA investigation indicated exceedances of regional screening levels (RSLs) for lead and arsenic in drum samples, and lead in one surface soil sample. Subsurface samples indicated levels of arsenic, lead, and PCBs above RSLs. Incineration of PCBs results in the creation of dioxin [2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)]; therefore, there is potential for dioxins at the Site based on historical operations.

Identified in this QAPP are various laboratory QA/QC requirements that must be met during environmental data generation activities at the site. As needed, additional information will be added to this QAPP. This site specific QAPP is similar in format to the QAPP workbook (Final, March 2005, Part 2A of the UFP-QAPP) provided under EPA's UFP QAPP guidance documents. This site-specific QAPP contains laboratory contact information, accreditation and certifications, the laboratory's current QAPP or QA/QC Plan, laboratory standard operating procedures (SOPs), and information addressing analytical measurements and relating the laboratory reporting limits to the project data quality objectives (DQOs) and the specified State cleanup programs. The QAPP also contains further details regarding the scope of the field investigation, information and DQOs to be followed during sampling, field equipment and use, field and laboratory analyses, and procedures for investigation-derived waste (IDW) management.

The site-specific QAPP will function in conjunction with the Site Health and Safety Plan (HASP), which provides information regarding potential site-specific hazards and the protective measures to be taken and equipment to be used to ensure worker safety and health.

All QA/QC procedures performed by the contractor under this contract will follow applicable professional technical standards, EPA requirements, government regulations and guidelines, and specific project goals and requirements.

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QAPP Worksheet #1 – Title and Approval Page

Site Name/Project Name: **Kokomo Dump Site**
Site Location: **Kokomo, Indiana**

Document Title: Quality Assurance Project Plan for the Kokomo Dump Site

Lead Organization: U.S. EPA Region 5

Preparer's Name and Organizational Affiliation: Stacey DeLaReintire, START Contractor, OTIE

Preparer's Address, Telephone Number, and E-mail Address: 29 S. LaSalle Street, Suite 930
Chicago, IL 60603
312-220-7000
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Preparation Date (Day/Month/Year): 19 December 2013

Investigative Organization's Project Manager/Date:_____ _____12/XX/13
Signature
Printed Name/Organization: Brad Adams/Sesco Group

Investigative Organization's Project QA Officer/Date:_____ 12/XX/13
Signature
Printed Name/Organization: Brent Graves/Sesco Group

Lead Organization's Project Manager/Date:_____
Signature
Printed Name/Organization: Shelly Lam/U.S. EPA On-Scene Coordinator

Approval Signatures/Date: _____
Signature
Printed Name/Title: Ida Levin/QA Team Leader, FSS, U.S. EPA Region 5

Approval Authority: U.S. EPA Region 5

Other Approval Signatures/Date: _____
Signature
Printed Name/Title: Bill Pickard/Senior Project Manager, Sesco Group

Document_Control_Numbering_System : ____OTIE-KD-UFPQAPP-001_____

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QAPP Worksheet #2 – QAPP Identifying Information

Site Name/Project Name: Kokomo Dump Site OS

Site Location: Kokomo, Indiana

Revision Number: 1.0

Site Number/Code: C564

Revision Date: N/A

Operable Unit: Not Applicable

Contractor Name: OTIE

Contractor Number: EP-S5-10-10

Contract Title: START, Region 5

Work Assignment Number: NA

1. Identify regulatory program: U.S. EPA Region 5, CERCLA,
2. Identify approval entity: U.S. EPA Region 5
3. The QAPP is (select one): ☐Generic ☒Project Specific
4. List dates of scoping sessions that were held: November 25, 2013
5. List dates and titles of QAPP documents written for previous site work, if applicable:

Title	Approval Date
Not Applicable	

6. List organizational partners (stakeholders) and connection with lead organization:

   EPA Region 5

7. List data users:

   OSCs, Regional Counsel, PRPs, Region 5 contractors, state, and local officials performing work for Region 5, etc.

8. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusions below:

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QAPP Worksheet #2 – QAPP Identifying Information (continued)

UFP-QAPP Worksheet #	Required Information	Cross-Reference to Related Information
A. Project Management		
	Documentation	
1	Title and Approval Page	2
2	QAPP Identifying Information	3
3	Distribution List	6
4	Project Personnel Sign-Off Sheet	7
	Project Organization	
5	Project Organizational Chart	8
6	Communication Pathways	9
7	Personnel Responsibilities and Qualifications Table	10
8	Special Personnel Training Requirements Table	11
	Project Planning/ Problem Definition	
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	12
10	Problem Definition, Site History, and Background. Site Maps (historical and present)	13
11	Site-Specific Project Quality Objectives	15
12	Measurement Performance Criteria Table	17
13	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	**30**
14	Summary of Project Tasks	31
15	Reference Limits and Evaluation Table	33
16	Project Schedule/Timeline Table	49
B. Measurement Data Acquisition		
	Sampling Tasks	
17	Sampling Design and Rationale	51
18	Sampling Locations and Methods/ SOP Requirements Table Sample Location Map(s)	52
19	Analytical Methods/SOP Requirements Table	54
20	Field Quality Control Sample Summary Table	60
21	Project Sampling SOP References Table Sampling SOPs	62
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	63
	Analytical Tasks	
23	Analytical SOPs Analytical SOP References Table	64
24	Analytical Instrument Calibration Table	65
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	66
	Sample Collection	

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UFP-QAPP Worksheet #	Required Information	Cross-Reference to Related Information
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	67
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	68
	Quality Control Samples	
28	QC Samples Table Screening/Confirmatory Analysis Decision Tree	71
	Data Management Tasks	
29	Project Documents and Records Table	82
30	Analytical Services Table Analytical and Data Management SOPs	83
C. Assessment Oversight		
31	Planned Project Assessments Table Audit Checklists	84
32	Assessment Findings and Corrective Action Responses Table	85
33	QA Management Reports Table	86
D. Data Review		
34	Verification (Step I) Process Table	87
35	Validation (Steps IIa and IIb) Process Table	88
36	Validation (Steps IIa and IIb) Summary Table	90
37	Usability Assessment	92

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QAPP Worksheet #3 – Distribution List

List those entities to which copies of the approved QAPP, subsequent QAPP revisions, addenda, and amendments will be sent.

☐ Worksheet Not Applicable (State Reason)

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Shelly Lam	On-Scene Coordinator (OSC)	EPA	(317) 308-3073		lam.shelly@epa.gov	
Ida Levin	Quality Coordinator	EPA	(312) 886-6254		Levin.Ida@epa.gov	
Maria Gonzalez	Attorney	EPA	(312) 866-6630		gonzalez.maria@epa.gov	
Bill Pickard	Senior Project Manager	SESCO	(317) 347-9590		bpickard@sescogroup.com	
Brad Adams	Project Manager	SESCO	(317) 347-9590		badams@sescogroup.com	
Brent Graves	Quality Assurance Manager	SESCO	(317) 908-4645		bgraves@sescogroup.com	
Lawrence McCormick	Attorney	City of Kokomo, IN	(765) 456-7440		lmccormack@cityofkokomo.org	
David Guevara	Attorney	Taft, Stettinius & Hollister	(317) 713-3453		dguevara@taftlaw.com	

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QAPP Worksheet #4 – Project Personnel Sign-Off Sheet

Have copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the QAPP and will perform the tasks as described. Ask each organization to forward signed sheets to the central project file.

☐ Worksheet Not Applicable (State Reason)

QAPP Recipients	Title	Organization	Telephone Number	Signature
Shelly Lam	On-Scene Coordinator (OSC)	EPA	(317) 308-3073	
Ida Levin	Quality Coordinator	EPA		
Bill Packard	Senior Project Manager	SESCO	(317) 347-9590	
Brad Adams	Project Manager	SESCO	(317) 347-9590	
Brent Graves	Quality Assurance Manager	SESCO	(317) 908-4645	

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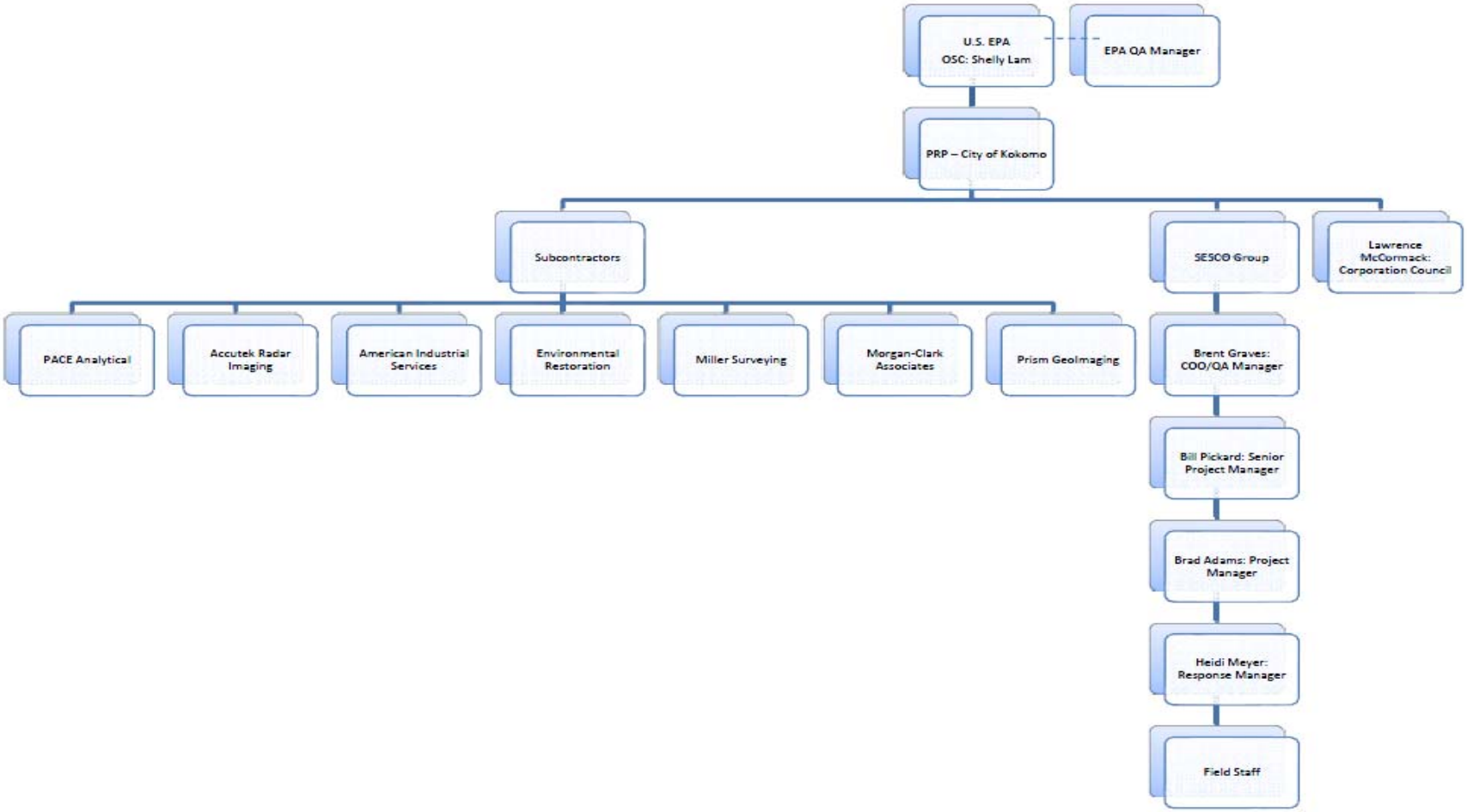
QAPP Worksheet #5 – Project Organizational Chart

Identify reporting relationships between all organizations involved in the project, including the lead organization and all contractor and subcontractor organizations. Identify the organizations providing field sampling, on-site and off-site analysis, and data review services, including the names and telephone numbers of all project managers, project team members, and/or project contacts for each organization.

☐ Worksheet Not Applicable (State Reason)



QAPP Worksheet #6 – Communication Pathways

Describe the communication pathways and modes of communication that will be used during the project, after the QAPP has been approved. Describe the procedures for soliciting and/or obtaining approval between project personnel, between different contractors, and between samplers and laboratory staff. Describe the procedure that will be followed when any project activity originally documented in an approved QAPP requires real-time modifications to achieve project goals or a QAPP amendment is required. Describe the procedures for stopping work and identify who is responsible.

☐ Worksheet Not Applicable (State Reason)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
QAPP changes in the field	SESCO Senior Project Manager	Bill Pickard	317-347-9090	Notify the OSC by phone and email of changes to QAPP made in the field and reasons within 2 business days.
QAPP Amendments	SESCO COO/QA Manager	Brent Graves	317-908-4645	Any major changes to the QAPP must be approved by the OSC and EPA QA/QC Manager before the changes can be implemented.
Field corrective actions	SESCO Project Manager	Brad Adams	317-347-9090	The need for corrective action for field issues will be determined by FTL, PM, OSC.
Analytical corrective actions	Laboratory Project Chemist	TBD		The need for corrective action for analytical issues will be determined by laboratory QAO.
Release of analytical data	Laboratory Project Chemist	TBD		No analytical data can be released until verification is completed and laboratory QAO has approved the release.

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QAPP Worksheet #7 – Personnel Responsibilities and Qualifications Table

Identify project personnel associated with each organization, contractor, and subcontractor participating in responsible roles. Include data users, decision-makers, project managers, QA officers, project contacts for organizations involved in the project, project health and safety officers, geotechnical engineers and hydrogeologists, field operation personnel, analytical services, and data reviewers. Identify project team members with an asterisk (*). Attach resume to this worksheet or note the location of the resumes.

☐ Worksheet Not Applicable (State Reason)

Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Ida Levin	QA Manager	U.S. EPA Region 5	Reviews QAPP	
Shelly Lam	OSC	U.S. EPA Region 5	QA oversight	
Brent Graves	Chief Operating Officer	SESCO	Oversees project and responds to EPA	
Bill Pickard	Senior Project Manager	SESCO	Performs QA oversight	
Bradley Adams	Project Manager	SESCO	Manages project – coordinates between lead agency and subcontractor	
Heidi Myers	Response Manager	SESCO	Oversees H&S for field activities	
TBD	Sampling Team Leader	SESCO	Supervises field sampling and coordinates all field activities	
TBD	Sampling Team Member	SESCO	Performs field sampling and all field activities	
TBD	Data Reviewer	SESCO	Performs data validation	
TBD	Laboratory Manager	Pace Analytical	Manages generation of analytical data	
TBD	Lab QAO	Pace Analytical	Performs lab QA oversight	

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QAPP Worksheet #8 – Special Personnel Training Requirements Table

Provide the following information for those projects requiring personnel with specialized training. Attach training records and/or certificates to the QAPP or note their location.

☐ Worksheet Not Applicable (State Reason)

Project Function	**Specialized Training – Title or Description of** Course	**Training Provider**	**Training Date**	**Personnel/Groups Receiving Training**	**Personnel Titles/ Organizational Affiliation**	**Location of Training Records/Certificates**
Project Activities oversight	HAZWOPER and Annual 8-hour Refresher	?	?	Bradley Adams	Project Manager/SESCO	SESCO Office
Health and Safety oversight	Health and Safety	?	?	Heidi Myers	Response Manager/SESCO	SESCO Office
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	?	?	Bill Pickard	QA Manager/SESCO	SESCO Office
Sampling Operations	Health & Safety, HAZWOPER & Annual 8-hour Refresher	?	?	TBD	Sampler/SESCO	SESCO Office

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QAPP Worksheet #9 – Project Scoping Session Participants Sheet

Complete this worksheet for each project scoping session held. Identify project team members who are responsible for planning the project.

☐ Worksheet Not Applicable (State Reason)

Project Name: Kokomo Dump Site OS **Projected Date(s) of Sampling:** TBD **Project Manager:** Brent Adams	**Site Name:** Kokomo Dump Site OS **Site Location:** Kokomo, IN

Date of Session: August & October, 2013

Scoping Session Purpose: Define Scope, extent of contamination determination and Sampling requirements

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Bradley Adams	Project Manager	SESCO	(317) 347-9090	badams@sescogroup.com	Project Oversight
Shelly Lam	OSC	U.S. EPA	(317) 417-0980	Lam.Shelly@EPA.gov	Overall Project oversight/AOC Compliance determination
Brent Graves	QA Manager	SESCO	(317) 908-4654	bgraves@sescogroup.com	Project oversight and EPA contact point
Bill Pickard	Senior Project Manager	SESCO	(317) 347-9590	bpickard@sescogroup.com	QA oversight

Comments/Decisions:

Action Items:

Consensus Decisions:

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QAPP Worksheet #10 – Problem Definition

Clearly define the problem and the environmental questions that should be answered for the current investigation and develop the project Decision "If…, then…" statements in the QAPP, linking data results with possible actions. The prompts below are meant to help the project team define the problem. They are not comprehensive.

☐ Worksheet Not Applicable (State Reason)

The problem to be addressed by the project: 1. Determine if there are buried drums on the Site and if present, map the area and define the extent of buried drums and contamination in soil. 2. Develop and implement a plan to control, contain, and/or remove currently identified drums and any discovered drums & contaminated soil. 3. Perform sampling and analysis to determine disposal options
The environmental questions being asked: 1. Does the geophysical survey (GPR, etc.) reliably identify buried drums? 2. If yes, do these drums contain hazardous materials? 3. Are these drums, leaking? 4. Is the surrounding soil and off-site soil contaminated? And to what lateral and vertical extent? 5. Will the sampling to be conducted provide reliable and sufficient data to properly address disposal of the waste?

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Observations from any site reconnaissance reports: The Indiana Department of Environmental Management (IDEM) discovered drums exposed in a creek bank at the Site during an oil spill at a neighboring property. The drums were in poor condition, leaking contents onto the creek banks IDEM collected samples from material leaking out of drums and conducted x-ray fluorescence (XRF) screening. XRF results were as high as 41,765 milligrams per kilogram (mg/kg) lead; 1,600 mg/kg chromium; 3,370 mg/kg arsenic; 13,652 mg/kg zinc; and 30 mg/kg mercury.

The EPA On-Scene Coordinator (OSC) and the Superfund Technical Assessment and Response Team (START) contractor conducted a Site Assessment in 2011. Site Assessment activities included drum, surface and subsurface soil sampling. On August 19, 2011, U.S. EPA and START conducted Site assessment activities at the Kokomo Dump Site in Kokomo, Indiana. Field screening tests were conducted to analyze several drum, surface soil, subsurface soil samples prior to sampling activities. Drum and soil samples were collected and submitted for PCBs, total and TCLP VOCs, total and TCLP SVOCs, and total and TCLP metals analyses.

Analytical results of one drum sample and one surface soil sample exceeded EPA RSLs for lead that was calculated based on a cumulative noncancer risk. Analytical results of two drum samples exceeded EPA RSLs for arsenic that was calculated based on a cumulative noncancer risk.

Sample analytical results were evaluated against the criteria of characteristics of hazardous waste (40 CFR, Section 261.24). Analytical results of one surface soil sample exceeded the TCLP criteria of 5 mg/L for lead and exhibited hazardous waste characteristic. This sample with lead concentrations above the TCLP criteria and two other drums with high levels of lead are located near a swale that drains into the Wildcat Creek, there is a high potential for lead contamination to migrate off-site. The Site is accessible from the east side of the property, where it is not fenced. Trespassers can potentially be exposed to the high levels of lead and arsenic contamination present at the Site. Thus, conditions exist at the Site that support a removal action be conducted to abate threats to human health and the environment.

A synopsis of secondary data or information from site reports: Abandoned drum was observed during the site assessment by U.S. EPA

The possible classes of contaminants and the affected matrices: PCBs, VOCs, SVOCs, metals, and dioxins.

The rationale for inclusion of chemical and nonchemical analyses: Because of historical analytical results and the nature of site operations

Information concerning various environmental indicators:

Project decision conditions ("If..., then..." statements):

1. If buried drums are discovered during the geophysical surveys, limited soil excavation activities will occur to expose these drums and samples will be collected from these drums to identify their waste characteristics
2. If limited excavation is conducted, affected soil will be sampled and if feasible, the leaking drums will be removed, over-packed and staged for proper sampling and disposal.
3. If sampling results from excavation, surface samples, or subsurface soil borings indicate hazardous waste or contaminated soil, then a removal action will be conducted at the site to eliminate threats to human health and/or environment both at on-site and off-site locations.

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QAPP Worksheet #11- Project Quality Objectives (PQOs)/Systematic Planning Process Statements

Use this worksheet to develop project quality objectives (PQOs) in terms of type, quantity, and quality of data determined using a systematic planning process. Provide a detailed discussion of PQOs in the QAPP. List PQOs in the form of qualitative and quantitative statements. These statements should answer questions such as those listed below. These questions are examples only, however; they are neither inclusive nor appropriate for all projects.

☐ Worksheet Not Applicable (State Reason)

Who will use the data?
Data will be used by SESCO and U.S. EPA OSC.

What will the data be used for?
Physical data will be used by SESCO and U.S. EPA OSC to determine if drums are buried on-site and to define the extent of extent of these buried drums and soil contamination at the site. Chemical data will be used to determine hazardous characteristics of the waste and of the soil. Project action levels will be derived from the following: TCLP Criteria, TSCA Levels, EPA RMLs, ATSDR data, other federal regulations, and IDEM RSLs for residential and commercial/industrial scenarios.

What types of data are needed (matrix, target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques)?
Analytical data from surface soil, subsurface soil matrices, and solid/liquid matrices data from drums to assess the extent and concentrations of contaminants and migrations; analytical data from potential groundwater (if encountered) to determine risk of vapor intrusion of volatile compounds; geophysical survey to determine if additional drums are present on site; samples to determine disposal methods; samples of media collected after remediation to verify clean up. Analytical groups include metals, VOCs, SVOCs, and PCBs. Field screening will be conducted with a VOC detector such as Multi-RAE or similar equipment and XRF to screen samples and select most contaminated samples. Samples will be collected following referenced SOPs and will be analyzed at an off-site commercial laboratory

How "good" do the data need to be in order to support the environmental decision?
For disposal or confirmation samples, the TSCA levels of: 50 ppm total PCBs or TCLP levels listed under 40 CFR 262 will have to be met. The quantitation limits for all analyses are specified on Worksheet #15. Worksheets #12 and#28show the measurement performance criteria needed for the quality indicators. Worksheet #20 shows the quality control (QC) samples required for definitive data. All data should pass the data validation tests for use in the reports

How much data are needed (number of samples for each analytical group, matrix, and concentration)?
Analytical data from 40 surface soil samples, 40 subsurface soil samples, drum samples (number TBD in field), and groundwater samples (number TBD in the field).

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QAPP Worksheet #11- Project Quality Objectives (PQOs)/Systematic Planning Process Statements (Cont.)

Where, when, and how should the data be collected/generated?
Data will be collected from the Kokomo Dump Site during the time when already exposed drum removal activities occur.

Who will collect and generate the data?
SESCO and their subcontractors will collect and generate the data.

How will data be reported?
Data can be submitted electronically, by fax, or U.S. Mail to SESCO by the laboratory and other subcontractors.

How will the data be archived?
The chemical data will be archived electronically by SESCO and hard copies of the data will be stored at SESCO's and the City of Kokomo offices

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples

Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQIs), measurement performance criteria (MPC), and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for a specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

☐ Worksheet Not Applicable (State Reason)

Matrix	Soil
Analytical Group	Metals
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 6020 / S-IN-O-031 Mercury 7471A / S-IN-I-040-rev.13	Precision (field)	RPD ±20%	Field Duplicate	S & A
		Accuracy/Bias (field) Contamination	No analyte > MRL	Equipment Blank	S & A
		Precision (laboratory)	PACE QC Limits	MS/MSD or Sample and Duplicate	A
		Bias (laboratory)	PACE QC Limits	Matrix Spike	A
		Bias (laboratory)	PACE QC Limits	Laboratory Control Sample (LCS)	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Soil
Analytical Group	Volatile Organics
Concentration Level	Low to medium (µg/kg to mg/kg)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 8260/5035 / S-IN-O-029-rev.17	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > RQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Soil
Analytical Group	Semi-Volatile Organics
Concentration Level	Low to medium (µg/kg to mg/kg)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 8270C / S-IN-O-068-rev.12	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Soil
Analytical Group	Polychlorinated bi phenyls (PCBs)
Concentration Level	Low to medium (µg/kg to mg/kg)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 8082 / S-IN-O-050-rev.11	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Soil
Analytical Group	Dioxins (TCDD)
Concentration Level	Low to medium (µg/kg to mg/kg)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 8082 / S-IN-O-050-rev.11	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Groundwater
Analytical Group	Metals
Concentration Level	Low (µg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
Geoprobe® Operations Manual (UOS 2005b, Kejr Engineering 2003)	SW 846/6020 / S-IN-O-031 Mercury 7470A / S-IN-I-040-rev.13	Precision (field)	RPD ±20%	Field Duplicate	S & A
		Accuracy/Bias (field) Contamination	No analyte > MRL	Equipment Blank	S & A
		Precision (laboratory)	PACE QC Limits	MS/MSD or Sample and Duplicate	A
		Bias (laboratory)	PACE QC Limits	Matrix Spike	A
		Bias (laboratory)	PACE QC Limits	Laboratory Control Sample (LCS)	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Groundwater
Analytical Group	Volatile Organics
Concentration Level	Low to medium (µg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Geoprobe® Operations Manual (UOS 2005b, Kejr Engineering 2003)	SW 846 Method 8260/5035 / S-IN-O-029-rev.17	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Groundwater
Analytical Group	Semi-Volatile Organics
Concentration Level	Low to medium (µg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Geoprobe® Operations Manual (UOS 2005b, Kejr Engineering 2003)	SW 846 Method 8270C / S-IN-O-068-rev.12	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Groundwater
Analytical Group	Polychlorinated bi phenyls (PCBs)
Concentration Level	Low to medium (µg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Geoprobe® Operations Manual (UOS 2005b, Kejr Engineering 2003)	SW 846 Method 8082 / S-IN-O-050-rev.11	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Groundwater
Analytical Group	Dioxins (TCDD)
Concentration Level	Low to medium (µg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Geoprobe® Operations Manual (UOS 2005b, Kejr Engineering 2003)	SW 846 Method 8082 / S-IN-O-050-rev.11	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Waste Solids
Analytical Group	Metals
Concentration Level	Low to Medium (mg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 6020 / S-IN-O-031 Mercury 7471A / S-IN-I-040-rev.13 TCLP 1311 / S-IN-I-062-rev.10	Precision (field)	RPD ±20%	Field Duplicate	S & A
		Accuracy/Bias (field) Contamination	No analyte > MRL	Equipment Blank	S & A
		Precision (laboratory)	PACE QC Limits	MS/MSD or Sample and Duplicate	A
		Bias (laboratory)	PACE QC Limits	Matrix Spike	A
		Bias (laboratory)	PACE QC Limits	Laboratory Control Sample (LCS)	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Waste Solids
Analytical Group	Volatile Organics
Concentration Level	Low to medium (µg/L to mg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 8260/5035 / S-IN-O-029-rev.17	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #12 – Measurement Performance Criteria Table – Field QC Samples (Cont.)

Matrix	Waste Solids
Analytical Group	Semi-Volatile Organics
Concentration Level	Low to medium (µg/L to mg/L)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SESCO SOP #WP-01, #WP-04	SW 846 Method 8270C / S-IN-O-068-rev.12 TCLP 1311 / S-IN-I-062-rev.10	Precision (field)	±35% RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment Blank	S & A
		Precision (laboratory)	List compound specific RPD	MS/MSD*	A
		Accuracy (laboratory)	List compound specific %R	**DMCs; MS/MSD*	A

[1] Reference number from QAPP Worksheet #21
[2] Reference number from QAPP Worksheet #23
*Optional MS/MSD –**Deuterated Monitoring Compounds (DMCs) – Reference Contract Laboratory Program (CLP) SOM01.2

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QAPP Worksheet #13 – Secondary Data Criteria and Limitations Table

Identify all secondary data and information that will be used for the project and their originating sources. Specify how the secondary data will be used and the limitations on their use.

☐ Worksheet Not Applicable (State Reason)

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Soil analytical results and field observations	Kokomo Dump Site Assessment, U.S. EPA	U.S. EPA Definitive data	Using field observed drum locations, additional areas will be located for screening and sampling	Observed drum location may not represent or identify other buried areas

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QAPP Worksheet #14 – Summary of Project Tasks

Provide a brief overview of the listed project activities.

☐ Worksheet Not Applicable (State Reason)

Sampling Tasks: Collect grab/composite soil, water and drum samples using standard techniques as required for analysis using SW-846 methods. Exact sample media, number of samples, and parameters will be determined based on project-specific data.
Analysis Tasks: A subcontracted laboratory will analyze samples for required analyses using standard EPA-approved methods.
Quality Control Tasks: Implement SOPs for sample collection, packaging, transport, and storage prior to analysis. Quality control sample handling protocols are described on Worksheet #26.
Secondary Data: Secondary data will be collected as needed
Data Management Tasks: Records generated during sample collection and analyses document the validity and authenticity of the project data. The field and laboratory data (electronic and hard copy) generated for this study will be retained at the SESCO office with electronic copies provided to the EPA. Field logs, sample records, and chain-of-custody records will be kept for a period of 5 years.
Documentation and Records: 1. Procedures, observations, and test results will be documented for all sample collection activities, laboratory analyses, and reporting. 2. Field data will be recorded in a field notebook, and will include, but not be limited to, pertinent observations and performance and maintenance indicators. Field records will be maintained during all stages of sample collection and preparation for transport to the laboratory.
Assessment/Audit Tasks: 1. The following reports may be completed if a deviation from the field sample matrix or QAPP is encountered, or to document an audit: a. Corrective action reports documenting any problems encountered during field activities and corrective actions taken b. System and performance audit reports completed during the investigation, a summary of any changes made to documented procedures, and the rationale for the changes. 2. Contractor may prepare the data quality and usability report, which would be included in the closure report. The report would summarize the results of the data validation and data quality review and would describe any significant quality assurance

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QAPP Worksheet #14 – Summary of Project Tasks (Cont.)

Data Review Tasks:

1. Laboratory will perform data reduction as described in each test method for this project and will submit sample results and QA/QC results.

2. The laboratory quality assurance officer and/or laboratory director are responsible for reviewing the laboratory data and QA/QC reports, and checking data reduction prior to submittal to contractor and OSC. The laboratory will correct any transcription or computational errors identified during this review.

3. An abbreviated data validation review will be completed by contractor, as described in Worksheet #36.

4. Validated data and all related field logs/notes/records will be reviewed to assess total measurement error and determine overall usability of the data for project purposes. Data limitations will be determined and data will be compared to Project Quality Objectives and required Action Limits. Corrective action is initiated, as necessary. Final data are placed in a database with any necessary qualifiers, and tables, charts, and graphs are generated.

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QAPP Worksheet #15 – Reference Limits and Evaluation Table

Complete this worksheet for each matrix, analytical group, and concentration level you encounter on your project. Identify the target analytes/contaminants of concern and project-required action limits. Next, determine the quantitation limits (QLs) that must be met to achieve the project quality objectives. Finally, list the published and achievable detection and quantitation limits for each analyte.

☐ Worksheet Not Applicable (State Reason)

Matrix: Soil
Analytical Group: Volatile Organic Compounds
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/Kg)	Project Limit Goal (mg/Kg)	Analytical Method		Achievable Laboratory Limits	
				MDLs	QLs	MDLs	QLs
Acetone	67-64-1	12000	12000	0.05	0.1	0.05	0.1
Acrolein	107-02-8	0.65	0.65	0.05	0.1	0.05	0.1
Acrylonitrile	107-13-1	12	12	0.05	0.1	0.05	0.1
Benzene	71-43-2	54	54	0.001	0.005	0.001	0.005
Bromobenzene	108-86-1	680	680	0.0025	0.005	0.0025	0.005
Bromodichloromethane	75-27-4	14	14	0.0025	0.005	0.0025	0.005
Bromoform	75-25-2	2200	2200	0.0032	0.005	0.0032	0.005
Bromomethane	74-83-9	32	32	0.004	0.005	0.004	0.005
Bromochloromethane	74-97-5	680	680	0.0025	0.005	0.0025	0.005
2-Butanone (MEK)	NL	NL	NL	0.012	0.025	0.012	0.025
n-Butylbenzene	104-51-8	110	110	0.0025	0.005	0.0025	0.005
sec-Butylbenzene	NL	NL	NL	0.0025	0.005	0.0025	0.005
tert-Butylbenzene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Carbon disulfide	75-15-0	740	740	0.005	0.01	0.005	0.01
Carbon tetrachloride	56-23-5	30	30	0.0025	0.005	0.0025	0.005
Chlorobenzene	108-90-7	760	760	0.0025	0.005	0.0025	0.005
Chloroethane	NL	NL	NL	0.0025	0.005	0.0025	0.005
Chloroform	67-66-3	15	15	0.0025	0.005	0.0025	0.005
Chloromethane	74-87-3	500	500	0.0025	0.005	0.0025	0.005

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2-Chlorotoluene	NL	NL	NL	0.0025	0.005	0.0025	0.005
4-Chlorotoluene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Dibromochloromethane	124-48-1	33	33	0.0025	0.005	0.0025	0.005
1,2-Dibromoethane (EDB)	106-93-4	1.7	1.7	0.0025	0.005	0.0025	0.005
Dibromomethane	74-95-3	110	110	0.0032	0.005	0.0032	0.005
1,2-Dichlorobenzene	95-50-1	380	380	0.0025	0.005	0.0025	0.005
1,3-Dichlorobenzene	NL	NL	NL	0.0025	0.005	0.0025	0.005
1,4-Dichlorobenzene	106-46-7	120	120	0.0025	0.005	0.0025	0.005
Dichlorodifluoromethane	75-71-8	400	400	0.0025	0.005	0.0025	0.005
1,1-Dichloroethane	75-34-3	170	170	0.0025	0.005	0.0025	0.005
1,2-Dichloroethane	107-06-2	22	22	0.0025	0.005	0.0025	0.005
1,1-Dichloroethene	NL	NL	NL	0.0025	0.005	0.0025	0.005
cis-1,2-Dichloroethene	NL	NL	NL	0.0025	0.005	0.0025	0.005
trans-1,2-Dichloroethene	NL	NL	NL	0.0025	0.005	0.0025	0.005
1,2-Dichloropropane	78-87-5	47	47	0.0025	0.005	0.0025	0.005
1,3-Dichloropropane	142-28-9	1500	1500	0.0025	0.005	0.0025	0.005
2,2-Dichloropropane	NL	NL	NL	0.0025	0.005	0.0025	0.005
1,1-Dichloropropene	NL	NL	NL	0.0025	0.005	0.0025	0.005
cis-1,3-Dichloropropene	NL	NL	NL	0.0025	0.005	0.0025	0.005
trans-1,3-Dichloropropene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Ethylbenzene	100-41-4	270	270	0.0025	0.005	0.0025	0.005
Ethyle methacrylate	97-63-2	1100	1100	0.05	0.1	0.05	0.1
Hexachloro-1,3-butadiene	NL	NL	NL	0.0025	0.005	0.0025	0.005
2-Hexanone	591-78-6	1400	1400	0.005	0.1	0.005	0.1
Iodomethane	NL	NL	NL	0.005	0.1	0.005	0.1
Isopropylbenzene (Cumene)	NL	NL	NL	0.0025	0.005	0.0025	0.005
p-Isopropyltoluene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Methylene Chloride	75-09-2	530	530	0.01	0.02	0.01	0.02
4-Methyl-2-pentanone (MIBK)	NL	NL	NL	0.012	0.03	0.012	0.03
1-Methylnaphthalene	NL	NL	NL	0.01	0.01	0.01	0.01

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2-Methylnaphthalene	NL	NL	NL	0.01	0.01	0.01	0.01
Methyl-tert-butyl-Ether (MTBE)	1634-04-4	2200	2200	0.0025	0.005	0.0025	0.005
Napthalene	NL	NL	NL	0.0025	0.005	0.0025	0.005
n-Propylbenzene	103-65-1	260	260	0.0025	0.005	0.0025	0.005
Styrene	100-42-5	870	870	0.0025	0.005	0.0025	0.005
1,1,1,2-Tetrachloroethane	630-20-6	93	93	0.0025	0.005	0.0025	0.005
1,1,2,2-Tetrachloroethane	79-34-5	28	28	0.0025	0.005	0.0025	0.005
Tetrachloroethene	NL	NL	NL	0.0014	0.005	0.0014	0.005
Toluene	108-88-3	820	820	0.0025	0.005	0.0025	0.005
trans-1,4-Dichloro-2-butene	NL	NL	NL	0.05	0.1	0.05	0.1
1,2,3-Trichlorobenzene	87-61-6	150	150	0.0025	0.005	0.0025	0.005
1,2,4-Trichlorobenzene	120-82-1	270	270	0.0025	0.005	0.0025	0.005
1,1,1-Trichloroethane	71-55-6	640	640	0.0025	0.005	0.0025	0.005
1,1,2-Trichloroethane	79-00-5	6.8	6.8	0.0025	0.005	0.0025	0.005
Trichloroethene	NL	NL	NL	0.001	0.005	0.001	0.005
Trichlorofluoromethane	75-69-4	1200	1200	0.0025	0.005	0.0025	0.005
1,2,3-Trichloropropane	96-18-4	0.95	0.95	0.0025	0.005	0.0025	0.005
1,2,4-Trimethylbenzene	95-63-6	220	220	0.0025	0.005	0.0025	0.005
1,3,5-Trimethylbenzene	108-67-8	180	180	0.0025	0.005	0.0025	0.005
Vinyl Acetate	108-05-4	2800	2800	0.05	0.1	0.05	0.1
Vinyl chloride	75-01-4	17	17	0.005	0.0025	0.005	0.0025
Xylenes, Total	1330-20-7	260	260	0.005	0.01	0.005	0.01

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Matrix: Soil

Analytical Group: Semi-Volatile Organic Compounds

Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/Kg)	Project Limit Goal (mg/Kg)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Acenaphthene	NL	NL	NL	0.16	0.33	0.16	0.33
Acenaphthylene	NL	NL	NL	0.16	0.33	0.16	0.33
Anthracene	NL	NL	NL	0.16	0.33	0.16	0.33
Benzo[a]anthracene	NL	NL	NL	0.16	0.33	0.16	0.33
Benzo[a]pyrene	NL	NL	NL	0.16	0.33	0.16	0.33
Benzo[b]fluoranthene	NL	NL	NL	0.16	0.33	0.16	0.33
Benzo[k]fluoranthene	NL	NL	NL	0.16	0.33	0.16	0.33
Benzo[g,h,i]perylene	NL	NL	NL	0.16	0.33	0.16	0.33
Benzyl alcohol	100-51-6	62000	62000	0.33	0.66	0.33	0.66
Bis(2-chloroethoxy) methane	111-91-1	1800	1800	0.16	0.33	0.16	0.33
Bis(2-chloroethyl) ether	111-44-4	10	10	0.16	0.33	0.16	0.33
Bis(2-ethylhexyl) phthalate	117-81-7	1200	1200	0.16	0.33	0.16	0.33
Bis(2-chloroisopropyl) ether	NL	NL	NL	0.16	0.33	0.16	0.33
4-Bromophenyl phenyl ether	NL	NL	NL	0.16	0.33	0.16	0.33
Butyl benzyl phthalate	85-68-7	9100	9100	0.16	0.33	0.16	0.33
4-Chloroaniline	NL	NL	NL	0.33	0.66	0.33	0.66
4-Chloro-3-methylphenol	NL	NL	NL	0.33	0.66	0.33	0.66
2-Chloronaphthalene	NL	NL	NL	0.16	0.33	0.16	0.33
2-Chlorophenol	95-57-8	5100	5100	0.16	0.33	0.16	0.33
4-Chlorophenyl phenyl ether	NL	NL	NL	0.16	0.33	0.16	0.33
Chrysene	NL	NL	NL	0.16	0.33	0.16	0.33
Dibenz[a,h]anthracene	NL	NL	NL	0.16	0.33	0.16	0.33
Dibenzofuran	NL	NL	NL	0.16	0.33	0.16	0.33

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Di-n-butyl phthalate	NL	NL	NL	0.16	0.33	0.16	0.33
3,3'-Dichlorobenzidine	91-94-1	38	38	0.33	0.66	0.33	0.66
2,4-Dichlorophenol	120-83-2	1800	1800	0.16	0.33	0.16	0.33
Diethyl phthalate	84-66-2	100000	100000	0.16	0.33	0.16	0.33
2,4-Dimethylphenol	105-67-9	12000	12000	0.16	0.33	0.16	0.33
Dimethylphthalate	NL	NL	NL	0.16	0.33	0.16	0.33
4,6-Dinitro-2-methylphenol	NL	NL	NL	0.8	1.6	0.8	1.6
2,4-Dinitrophenol	51-28-5	1200	1200	0.8	1.6	0.8	1.6
2,4-Dinitrotoluene	121-14-2	55	55	0.16	0.33	0.16	0.33
2,6-Dinitrotoluene	606-20-2	620	620	0.16	0.33	0.16	0.33
Di-n-octyl phthalate	NL	NL	NL	0.16	0.33	0.16	0.33
Fluoranthene	NL	NL	NL	0.16	0.33	0.16	0.33
Fluorene	NL	NL	NL	0.16	0.33	0.16	0.33
Hexachlorobenzene	118-74-1	11	11	0.16	0.33	0.16	0.33
Hexachloro-1,3-butadiene	NL	NL	NL	0.16	0.33	0.16	0.33
Hexachlorocyclopentadiene	77-47-4	3700	3700	0.16	0.33	0.16	0.33
Hexachloroethane	67-72-1	430	430	0.16	0.33	0.16	0.33
Indeno[1,2,3-cd]pyrene	NL	NL	NL	0.16	0.33	0.16	0.33
Isophorone	78-59-1	18000	18000	0.16	0.33	0.16	0.33
2-Methylphenol	NL	NL	NL	0.16	0.33	0.16	0.33
3 & 4-Methylphenol	NL	NL	NL	0.33	0.66	0.33	0.66
2-Methylnaphthalene	NL	NL	NL	0.16	0.33	0.16	0.33
N-Nitroso-di-n-propylamine	621-64-7	2.5	2.5	0.16	0.33	0.16	0.33
N-Nitrosodiphenylamine	86-30-6	3500	3500	0.16	0.33	0.16	0.33
Naphthalene	NL	NL	NL	0.16	0.33	0.16	0.33
2-Nitroaniline	88-74-4	6000	6000	0.8	1.6	0.8	1.6
3-Nitroaniline	NL	NL	NL	0.8	1.6	0.8	1.6
4-Nitroaniline	100-01-6	860	860	0.8	1.6	0.8	1.6
Nitrobenzene	98-95-3	240	240	0.16	0.33	0.16	0.33
2-Nitrophenol	NL	NL	NL	0.16	0.33	0.16	0.33
4-Nitrophenol	NL	NL	NL	0.8	1.6	0.8	1.6

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Pentachlorophenol	87-86-5	27	27	0.8	1.6	0.8	1.6
Phenanthrene	NL	NL	NL	0.16	0.33	0.16	0.33
Phenol	108-95-2	100000	100000	0.16	0.33	0.16	0.33
Pyrene	129-00-0	17000	17000	0.16	0.33	0.16	0.33
2,4,5-Trichlorophenol	95-95-4	62000	62000	0.16	0.33	0.16	0.33
2,4,6-Trichlorophenol	88-06-2	620	620	0.16	0.33	0.16	0.33

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Matrix: Soil
Analytical Group: Metals
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/Kg)	Project Limit Goal (mg/Kg)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Lead	7439-92-1	1300	1300	1	2	1	2
Arsenic	7440-38-2	16	16	1	2	1	2
Chromium (VI)	18540-29-9	56	NL	1	2	1	2
Zinc	7440-66-6	100000	100000	1	2	1	2
Mercury	7439-97-6	3.1	3.1	0.001	0.33	0.001	0.33

Matrix: Soil
Analytical Group: Polychlorinated biphenyls (PCBs)
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/Kg)	Project Limit Goal (mg/Kg)	Achievable Laboratory Limits		Achievable Laboratory Limits	
				MDLs (mg/Kg)	QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Aroclor 1248	12672-29-6	7.4	7.4	0.05	0.1	0.05	0.1
Aroclor 1254	11097-69-1	7.4	7.4	0.05	0.1	0.05	0.1

Matrix: Soil
Analytical Group: Dioxins
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/Kg)	Project Action Limit (mg/Kg)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
TCDD	1746-01-6	0.0002	0.0002	NL	NL	NL	NL

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Matrix: Groundwater
Analytical Group: Volatile Organic Compounds
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (ug/L)	Project Limit Goal (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
Acetone	67-64-1	12000	12000	0.05	0.1	0.05	0.1
Acrolein	107-02-8	0.041	0.041	0.025	0.05	0.025	0.05
Acrylonitrile	107-13-1	0.45	0.45	0.05	0.1	0.05	0.1
Benzene	71-43-2	5	5	0.001	0.005	0.001	0.005
Bromobenzene	108-86-1	54	54	0.0025	0.005	0.0025	0.005
Bromodichloromethane	75-27-4	80	80	0.0025	0.005	0.0025	0.005
Bromoform	75-25-2	80	80	0.0032	0.005	0.0032	0.005
Bromomethane	74-83-9	7	7	0.0039	0.005	0.0039	0.005
Bromochloromethane	74-97-5	83	83	0.0025	0.005	0.0025	0.005
2-Butanone (MEK)	NL	NL	NL	0.012	0.025	0.012	0.025
n-Butylbenzene	104-51-8	780	780	0.0025	0.005	0.0025	0.005
sec-Butylbenzene	NL	NL	NL	0.0025	0.005	0.0025	0.005
tert-Butylbenzene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Carbon disulfide	75-15-0	720	720	0.005	0.01	0.005	0.01
Carbon tetrachloride	56-23-5	5	5	0.0025	0.005	0.0025	0.005
Chlorobenzene	108-90-7	100	100	0.0025	0.005	0.0025	0.005
Chloroethane	NL	NL	NL	0.0025	0.005	0.0025	0.005
Chloroform	67-66-3	80	80	0.0025	0.005	0.0025	0.005
Chloromethane	74-87-3	190	190	0.0025	0.005	0.0025	0.005
2-Chlorotoluene	NL	NL	NL	0.0025	0.005	0.0025	0.005
4-Chlorotoluene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Dibromochloromethane	124-48-1	80	80	0.0025	0.005	0.0025	0.005
1,2-Dibromoethane (EDB)	106-93-4	0.05	0.05	0.0025	0.005	0.0025	0.005
Dibromomethane	74-95-3	7.9	7.9	0.0027	0.005	0.0027	0.005
1,2-Dichlorobenzene	95-50-1	600	600	0.0025	0.005	0.0025	0.005

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1,3-Dichlorobenzene	NL	NL	NL	0.0025	0.005	0.0025	0.005
1,4-Dichlorobenzene	106-46-7	75	75	0.0025	0.005	0.0025	0.005
Dichlorodifluoromethane	75-71-8	190	190	0.005	0.005	0.005	0.005
1,1-Dichloroethane	75-34-3	24	24	0.0025	0.005	0.0025	0.005
1,2-Dichloroethane	107-06-2	5	5	0.0025	0.005	0.0025	0.005
1,1-Dichloroethene	NL	NL	NL	0.0025	0.005	0.0025	0.005
cis-1,2-Dichloroethene	NL	NL	NL	0.0025	0.005	0.0025	0.005
trans-1,2-Dichloroethene	NL	NL	NL	0.0025	0.005	0.0025	0.005
1,2-Dichloropropane	78-87-5	5	5	0.0025	0.005	0.0025	0.005
1,3-Dichloropropane	142-28-9	290	290	0.0025	0.005	0.0025	0.005
2,2-Dichloropropane	NL	NL	NL	0.0025	0.005	0.0025	0.005
1,1-Dichloropropene	NL	NL	NL	0.0025	0.005	0.0025	0.005
cis-1,3-Dichloropropene	NL	NL	NL	0.0025	0.005	0.0025	0.005
trans-1,3-Dichloropropene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Ethylbenzene	100-41-4	700	700	0.0025	0.005	0.0025	0.005
Ethyle methacrylate	97-63-2	420	420	0.05	0.1	0.05	0.1
Hexachloro-1,3-butadiene	NL	NL	NL	0.0025	0.005	0.0025	0.005
2-Hexanone	591-78-6	34	34	0.012	0.025	0.012	0.025
Iodomethane	NL	NL	NL	0.0068	0.01	0.0068	0.01
Isopropylbenzene (Cumene)	NL	NL	NL	0.0025	0.005	0.0025	0.005
p-Isopropyltoluene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Methylene Chloride	75-09-2	5	5	0.0032	0.005	0.0032	0.005
4-Methyl-2-pentanone (MIBK)	NL	NL	NL	0.012	0.025	0.012	0.025
1-Methylnaphthalene	NL	NL	NL	0.005	0.005	0.005	0.005
2-Methylnaphthalene	NL	NL	NL	0.01	0.01	0.01	0.01
Methyl-tert-butyl-Ether (MTBE)	1634-04-4	120	120	0.0021	0.004	0.0021	0.004
Napthalene	NL	NL	NL	0.0014	0.0014	0.0014	0.0014
n-Propylbenzene	103-65-1	530	530	0.0025	0.005	0.0025	0.005
Styrene	100-42-5	100	100	0.0025	0.005	0.0025	0.005
1,1,1,2-Tetrachloroethane	630-20-6	5	5	0.0025	0.005	0.0025	0.005
1,1,2,2-Tetrachloroethane	79-34-5	0.66	0.66	0.0025	0.005	0.0025	0.005

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Tetrachloroethene	NL	NL	NL	0.0012	0.005	0.0012	0.005
Toluene	108-88-3	1000	1000	0.0025	0.005	0.0025	0.005
trans-1,4-Dichloro-2-butene	NL	NL	NL	0.05	0.1	0.05	0.1
1,2,3-Trichlorobenzene	87-61-6	5.2	5.2	0.0025	0.005	0.0025	0.005
1,2,4-Trichlorobenzene	120-82-1	70	70	0.0025	0.005	0.0025	0.005
1,1,1-Trichloroethane	71-55-6	200	200	0.0025	0.005	0.0025	0.005
1,1,2-Trichloroethane	79-00-5	5	5	0.0025	0.005	0.0025	0.005
Trichloroethene	NL	NL	NL	0.0019	0.005	0.0019	0.005
Trichlorofluoromethane	75-69-4	1100	1100	0.0025	0.005	0.0025	0.005
1,2,3-Trichloropropane	96-18-4	0.0065	0.0065	0.0025	0.005	0.0025	0.005
1,2,4-Trimethylbenzene	95-63-6	15	15	0.0025	0.005	0.0025	0.005
1,3,5-Trimethylbenzene	108-67-8	87	87	0.0025	0.005	0.0025	0.005
Vinyl Acetate	108-05-4	410	410	0.025	0.05	0.025	0.05
Vinyl chloride	75-01-4	2	2	0.0015	0.002	0.0015	0.002
Xylenes, Total	1330-20-7	10000	10000	0.0031	0.01	0.0031	0.01

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Matrix: Groundwater
Analytical Group: Semi-Volatile Organic Compounds
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (ug/L)	Project Limit Goal (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
Acenaphthene	NL	NL	NL	0.005	0.01	0.005	0.01
Acenaphthylene	NL	NL	NL	0.005	0.01	0.005	0.01
Anthracene	NL	NL	NL	0.005	0.01	0.005	0.01
Benzo[a]anthracene	NL	NL	NL	0.005	0.01	0.005	0.01
Benzo[a]pyrene	NL	NL	NL	0.005	0.01	0.005	0.01
Benzo[b]fluoranthene	NL	NL	NL	0.005	0.01	0.005	0.01
Benzo[k]fluoranthene	NL	NL	NL	0.005	0.01	0.005	0.01
Benzo[g,h,i]perylene	NL	NL	NL	0.005	0.01	0.005	0.01
Benzyl alcohol	100-51-6	1500	1500	0.01	0.02	0.01	0.02
Bis(2-chloroethoxy) methane	111-91-1	47	47	0.005	0.01	0.005	0.01
Bis(2-chloroethyl) ether	111-44-4	0.12	0.12	0.005	0.01	0.005	0.01
Bis(2-ethylhexyl) phthalate	117-81-7	6	6	0.0025	0.005	0.0025	0.005
Bis(2-chloroisopropyl) ether	NL	NL	NL	0.0034	0.005	0.0034	0.005
4-Bromophenyl phenyl ether	NL	NL	NL	0.005	0.01	0.005	0.01
Butyl benzyl phthalate	85-68-7	140	140	0.005	0.01	0.005	0.01
4-Chloroaniline	NL	NL	NL	0.01	0.02	0.01	0.02
4-Chloro-3-methylphenol	NL	NL	NL	0.01	0.02	0.01	0.02
2-Chloronaphthalene	NL	NL	NL	0.005	0.01	0.005	0.01
2-Chlorophenol	95-57-8	71	71	0.005	0.01	0.005	0.01
4-Chlorophenyl phenyl ether	NL	NL	NL	0.005	0.01	0.005	0.01
Chrysene	NL	NL	NL	0.005	0.01	0.005	0.01
Dibenz[a,h]anthracene	NL	NL	NL	0.005	0.01	0.005	0.01
Dibenzofuran	NL	NL	NL	0.005	0.01	0.005	0.01
Di-n-butyl phthalate	NL	NL	NL	0.005	0.01	0.005	0.01
3,3'-Dichlorobenzidine	91-94-1	1.1	1.1	0.01	0.02	0.01	0.02

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2,4-Dichlorophenol	120-83-2	35	35	0.005	0.01	0.005	0.01
Diethyl phthalate	84-66-2	11000	11000	0.005	0.01	0.005	0.01
2,4-Dimethylphenol	105-67-9	270	270	0.005	0.01	0.005	0.01
Dimethylphthalate	NL	NL	NL	0.005	0.01	0.005	0.01
4,6-Dinitro-2-methylphenol	NL	NL	NL	0.005	0.01	0.005	0.01
2,4-Dinitrophenol	51-28-5	30	30	0.005	0.01	0.005	0.01
2,4-Dinitrotoluene	121-14-2	2	2	0.005	0.01	0.005	0.01
2,6-Dinitrotoluene	606-20-2	15	15	0.005	0.01	0.005	0.01
Di-n-octyl phthalate	NL	NL	NL	0.005	0.01	0.005	0.01
Fluoranthene	NL	NL	NL	0.005	0.01	0.005	0.01
Fluorene	NL	NL	NL	0.005	0.01	0.005	0.01
Hexachlorobenzene	118-74-1	1	1	0.005	0.01	0.005	0.01
Hexachloro-1,3-butadiene	NL	NL	NL	0.0025	0.005	0.0025	0.005
Hexachlorocyclopentadiene	77-47-4	50	50	0.01	0.02	0.01	0.02
Hexachloroethane	67-72-1	5.1	5.1	0.05	0.01	0.05	0.01
Indeno[1,2,3-cd]pyrene	NL	NL	NL	0.005	0.01	0.005	0.01
Isophorone	78-59-1	670	670	0.005	0.01	0.005	0.01
2-Methylphenol	NL	NL	NL	0.005	0.01	0.005	0.01
3 & 4-Methylphenol	NL	NL	NL	0.01	0.02	0.01	0.02
2-Methylnaphthalene	NL	NL	NL	0.005	0.01	0.005	0.01
N-Nitroso-di-n-propylamine	621-64-7	0.093	0.093	0.005	0.01	0.005	0.01
N-Nitrosodiphenylamine	86-30-6	100	100	0.005	0.01	0.005	0.01
Naphthalene	NL	NL	NL	0.0025	0.005	0.0025	0.005
2-Nitroaniline	88-74-4	150	150	0.025	0.05	0.025	0.05
3-Nitroaniline	NL	NL	NL	0.025	0.05	0.025	0.05
4-Nitroaniline	100-01-6	33	33	0.025	0.05	0.025	0.05
Nitrobenzene	98-95-3	1.2	1.2	0.005	0.01	0.005	0.01
2-Nitrophenol	NL	NL	NL	0.005	0.01	0.005	0.01
4-Nitrophenol	NL	NL	NL	0.025	0.05	0.025	0.05
Pentachlorophenol	87-86-5	1	1	0.025	0.05	0.025	0.05
Phenanthrene	NL	NL	NL	0.005	0.01	0.005	0.01

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Phenol	108-95-2	4500	4500	0.005	0.01	0.005	0.01
Pyrene	129-00-0	87	87	0.005	0.01	0.005	0.01
2,4,5-Trichlorophenol	95-95-4	890	890	0.005	0.01	0.005	0.01
2,4,6-Trichlorophenol	88-06-2	9	9	0.005	0.01	0.005	0.01

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Matrix: Groundwater
Analytical Group: Metals
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (ug/L)	Project Limit Goal (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
Lead	7439-92-1	15	15	1	2	1	2
Arsenic	7440-38-2	10	10	1	2	1	2
Chromium (total)	7440-47-3	100	100	1	2	1	2
Zinc	7440-66-6	4700	4700	1	2	1	2
Mercury	7439-97-6	2	2	0.001	0.33	0.001	0.33

Matrix: Groundwater
Analytical Group: Polychlorinated biphenyls (PCBs)
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (ug/L)	Project Limit Goal (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
Aroclor 1248	12672-29-6	0.34	0.34	0.05	0.1	0.05	0.1
Aroclor 1254	11097-69-1	0.31	0.31	0.05	0.1	0.05	0.1

Matrix: Groundwater
Analytical Group: Dioxins
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (ug/L)	Project Action Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
TCDD	1746-01-6	0.00003	0.00003	NL	NL	NL	NL

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Matrix: Waste
Analytical Group: TCLP Volatile Organic Compounds
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/L)	Project Limit Goal (mg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
Benzene	NA	0.5	0.5	0.01	0.05	0.01	0.05
Carbon tetrachloride	NA	0.5	0.5	0.025	0.05	0.025	0.05
Chlorobenzene	NA	100	100	0.001	0.005	0.001	0.005
Chloroform	NA	6	6	0.0025	0.005	0.0025	0.005
1,2-Dichloroethane	NA	0.5	0.5	0.0032	0.005	0.0032	0.005
1,1-Dichloroethene	NA	0.7	0.7	0.004	0.005	0.004	0.005
Methyl ethyl ketone	NA	200	200	0.5	1	0.5	1
Tetrachloroethene	NA	0.7	0.7	0.025	0.05	0.025	0.05
Trichloroethene	NA	0.5	0.5	0.025	0.05	0.025	0.05
Vinyl chloride	NA	0.2	0.2	0.01	0.02	0.01	0.02

Matrix: Waste
Analytical Group: TCLP Semi-Volatile Organic Compounds
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/L)	Project Limit Goal (mg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
2-Methylphenol (o-Cresol)	NA	200	200	0.05	0.1	0.05	0.1
3&4-Methylphenol (m&p-Cresol)	NA	200	200	0.2	0.1	0.2	0.1
1,4-Dichlorobenzene	NA	NL	NL	0.05	0.1	0.05	0.1
2,4-Dinitrotoluene	NA	0.13	0.13	0.05	0.1	0.05	0.1
Hexachlorobenzene	NA	0.13	0.13	0.05	0.1	0.05	0.1
Hexachlorobutadiene	NA	NL	NL	0.05	0.1	0.05	0.1
Hexachloroethane	NA	3	3	0.05	0.1	0.05	0.1
Nitrobenzene	NA	2	2	0.05	0.1	0.05	0.1

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Pentachlorophenol	NA	100	100	0.25	0.5	0.25	0.5
Pyridine	NA	5	5	0.05	0.1	0.05	0.1
2,4,5-Trichlorophenol	NA	400	400	0.25	0.5	0.25	0.5
2,4,6-Trichlorophenol	NA	2	2	0.05	0.1	0.05	0.1

Matrix: Waste
Analytical Group: TCLP Metals
Concentration Level: Low to medium

Analyte	CAS Number	Project Action Limit (mg/L)	Project Limit Goal (mg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
Arsenic	NA	5	5	0.05	0.1	0.05	0.1
Barium	NA	100	100	2.5	5	2.5	5
Cadmium	NA	1	1	0.1	0.05	0.1	0.05
Chromium	NA	5	5	0.05	0.1	0.05	0.1
Lead	NA	10	10	0.05	0.1	0.05	0.1
Mercury	NA	2	2	0.003	0.006	0.003	0.006
Selenium	NA	1	1	0.05	0.1	0.05	0.1
Silver	NA	5	5	0.25	0.5	0.25	0.5

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QAPP Worksheet #16 – Project Schedule / Timeline Table

List all project activities as well as the QA assessments that will be performed during the course of the project. Include the anticipated start and completion dates.

☐ Worksheet Not Applicable (State Reason)

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Field Activities	SESCO	TBD	21 Days Actual dates TBD	None	N/A
Analytical Activities	SESCO	TBD	21 Days from sample submission	Analytical Results Report	3 weeks form the receipt of the data
Drum(s) Disposal	SESCO	TBD- Initiate on the day of the receipt of analytical results	2 Weeks from the receipt of analytical results	Waste Disposal Summary Table	1 Week after disposal
Report	SESCO	3 weeks form the receipt of the data	6 weeks from the receipt of the data	Assessment Report	3 months from field activities initiation

See following page for estimated schedule of activities

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Estimated Schedule

Kokomo Dump Site: 1130 South Dixon Road, Kokomo, Indiana 46901

Site Spill Identification Number: C564

Administrative Settlement Agreement and Order on Consent for Removal Action Docket Number V-W-13•C-018

Order #	Milestone	# Days
89	Effective Date (ED)	
16b	Site Security	
12	Contractor Notification, including Quality Management Plan	ED + 5 BD
13	Project Coordinator Notification	ED + 5 BD
18	HASP	ED + 30 CD
17a	Work Plan, Including QAPP	ED + 30 CD
17A	USEPA Review of Work Plan, HASP, & QAPP	30 CD
17b	Work Plan Revisions	7 BD
16c	**Field Investigation:**	
	Site Boundary Survey	14 CD
	Phase I Environmental Site Assessment + Report	21 CD
	Brush and Yard Waste Removal	14 CD
	Geophysical Survey	21 CD
	Utility Clearance	3 CD
	Drum and Soil Removal & Waste Characterization Sampling	1 CD
	Disposal Analysis	21 CD
	Surface and Sub-Surface Soil Sampling & Soil Boring Advancement	5 CD
	Laboratory Analysis	21 CD
	Test Pit Excavations (If Necessary)	TBD
16f	Waste Characterization Approval & Disposal Scheduling	14 CD
16f	Drum Disposal	1 CD
22	Final Report	60 CD
16e	Sampling Notification to EPA, 5 days prior	5 BD
21a	Progress Reports - 30th of every month	

BD = Business Days CD = Calendar Days TBD = To be determined

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QAPP Worksheet #17 – Sampling Design and Rationale

Describe the project sampling approach. Provide the rationale for selecting sample locations and matrices for each analytical group and concentration level.

☐ Worksheet Not Applicable (State Reason)

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach): The strategy for sampling at the Kokomo Site is to use a random-start equilateral triangular gridded sampling approach to determine the lateral extent, and stratified sampling using a Geoprobe® or test pits to determine the vertical extent of contamination. A minimum of two subsurface samples will be collected from each boring location: one within the top two feet of the boring, and the other(s) at intervals of elevated instrument readings and/or visual and olfactory judgement. Judgmental soil samples will also be collected from beneath one (1) previously identified drum. Additionally, should any other drums be encountered, the same procedure will be implemented for each drum. A grid system will be created to collect 40 surface soil samples across the Site. Data will be used to evaluate direct public exposure risk.
Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [May refer to map or Worksheet #18 for details]: See Worksheet # 18 for details.

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QAPP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table

List all site locations that will be sampled and include sample/ID number, if available. (Provide a range of sampling locations or ID numbers if a site has a large number.) Specify matrix and, if applicable, depth at which samples will be taken. Only a short reference for the sampling location rationale is necessary for the table. The text of the QAPP should clearly identify the detailed rationale associated with each reference. Complete all required information, using additional worksheets if necessary.

☐ Worksheet Not Applicable (State Reason)

Sampling Location/ID Number	Matrix	Depth (bgs)	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference[1]	Rationale for Sampling Location
KD-SS002 Thru KD-SS045	Soil	0-6 inches	Metals, VOCs, SVOCs, PCBs	Low to Medium	40+4	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Grid based sampling to identify contamination
KD-DR001	Solid	Compo site	Metals, VOCs, SVOCs, PCBs	Medium to High	1	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Sampling for disposal characteristics
KD-SS031	Soil	0-6 inches	Metals, VOCs, SVOCs, PCBs	Medium	1	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Judgmental sampling, below the drum to characterize and evaluate disposal
KD-SB001 Thru KD-SB004	Soil	3 to 16.5 feet BGS	Metals, VOCs, SVOCs, PCBs	Medium	4	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Stratified sampling collocated with historical EPA subsurface locations- to replicate results and to characterize subsurface contamination

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Sampling Location/ID Number	Matrix	Depth (bgs)	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference[1]	Rationale for Sampling Location
KD-SB005 Thru KD-SB009	Soil	TBD	Metals, VOCs, SVOCs, PCBs	Medium	8+1	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Random-start equilateral triangular gridded sampling approach to define the extent of contamination
KD-SB010 Thru KD-SB014	Soil	TBD	Metals, VOCs, SVOCs, PCBs	Medium	8+1	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Random-start equilateral triangular gridded sampling approach to determine if contamination has migrated off-Site or extends over the property boundary
KD-GW001- thru TBD	Groundwater	NA	Metals, VOCs, SVOCs, PCBs	Low	TBD	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	Co-located with subsurface soil, and within 100 ft. of building-to evaluate groundwater impacts

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet_#21).

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QAPP Worksheet #19 – Analytical SOP Requirements Table

For each matrix, analytical group, and concentration level, list the analytical and preparation method/SOP and associated sample volume, container specifications, preservation requirements, and maximum holding time.

☐ Worksheet Not Applicable (State Reason)

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil / Solid	Volatile Organics	Low/Medium	8260-5030/5035 S-IN-O-029, S-IN-O-054	40-ml	Terra Core, 3 40 mL vials	Terra Core Methanol: Method-40-ml Glass vials, PTFE septa cap; Low Level Method: 40-ml Glass vials, PTFE septa cap & stir bar	Terra Core: 48 hours to preserve, 14 days to analysis; Methanol Method: 14 days; Low Level Method: 14 days
Soil / Solid	Semivolatile Organics	Low/Medium	8270-3510/352/3540/ 3541/3550 S-IN-O-068, S-IN-O-163, S-IN-O-133	8-oz	1 8-oz Clear Wide Mouth Glass bottle	Cool 4oC	14 days to extract, 40 days to analysis
Soil / Solid	Dioxins & Furans 2,3,7,8 – TCDD	Low/Medium	8280/8290 S-IN-O-161, S-IN-O-050	8-oz	1 8-oz Clear Wide Mouth Glass bottle	Cool 4oC	30 days to extract, 45 days to analysis
Soil / Solid	PCBs / Pesticides	Low/Medium	8082/8081 S-IN-O-161, S-IN-O-050	8-oz	1 8-oz Clear Wide Mouth Glass bottle	Cool 4oC	14 days to extract, 40 days to analysis

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Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil / Solid	Metals (Except Mercury)	Low/Medium	6010/6020-3005/3010/3015/3050/3051 S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-019, S-IN-I-031	8-oz	1 8-oz Clear Wide Mouth Glass bottle	Cool 4oC	6 months
Soil / Solid	Mercury	Low/Medium	7470/7471 S-IN-I-040	8-oz	1 8-oz Clear Wide Mouth Glass bottle	Cool 4oC	28 days
Soil / Solid	TCLP Semivolatile Fraction	Low/Medium	1311/8270-1310 S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-I-062	16-oz	1 16-oz Clear Wide Mouth Glass bottle	Cool 4oC	14 days to TCLP, 7 days to extract, 40 days to analysis
Soil / Solid	TCLP volatile Fraction	Low/Medium	1311/8260-1310 S-IN-O-029, S-IN-O-054, S-IN-I-062	4-oz	1 4-oz Glass PTFE lined septa bottle	Cool 4oC	14 days to TCLP, 14 days to analysis
Soil / Solid	TCLP Inorganic Fraction (all other metals)	Low/medium	1311/6010-1310 S-IN-O-130, S-IN-I-030, S-IN-I-019, S-IN-I-031, S-IN-I-062	4-oz	1 4-oz Clear Wide Mouth Glass bottle	Cool 4oC	180 days to TCLP, 180 days to analysis
Soil / Solid	TCLP Inorganic Fraction (Hg)	Low/medium	1311/7470-1310 S-IN-I-040, S-IN-I-062	4-oz	1 4-oz Clear Wide Mouth Glass bottle	Cool 4oC	28 days to TCLP, 28 days to analysis

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Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil	Hydrogen Ion (pH)	Low/medium	9040/9041	8-oz	1 8-oz Clear Wide Mouth Glass bottle	Cool 4oC	Requires analysis right away
Soil / Solid	Corrosivity	Low/medium	1110	4-oz	1 4-oz Clear Wide Mouth Glass bottle	None	14 Days
Soil / Solid	Flashpoint ASTM D9379	Low/medium	1010/1030	4-oz	1 4-oz Clear Wide Mouth Glass bottle	None	14 Days
Soil / Solid	Total Organic Halogens (TOX)	Low/medium	9020	4-oz	1 4-oz Clear Wide Mouth Glass bottle	Cool 4oC	28 days

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

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Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Waste / Liquid	Volatile Organics	Low/Medium	8260-5030/5035 S-IN-O-029, S-IN-O-054	40-ml X 2	2 40-ml Glass vials, PTFE septa cap	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present). No headspace, HCl to pH < 2	14 days
Waste / Liquid	Semivolatile Organics	Low/Medium	8270-3510/352/3540/3541/ 3550 S-IN-O-068, S-IN-O-163, S-IN-O-133	2 Liters	2 1-Liter Amber Glass bottle	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present	7 days to extract, 40 days to analysis
Waste / Liquid	Dioxins & Furans 2,3,7,8 – TCDD	Low/Medium	8280/8290 S-IN-O-161, S-IN-O-050	2 Liters	2 1-Liter Amber Glass bottle	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present	30 days to extract, 45 days to analysis
Waste / Liquid	PCBs / Pesticides	Low/Medium	8082/8081 S-IN-O-161, S-IN-O-050	2 Liters	2 1-Liter Amber Glass bottle	Cool 4oC	7 days to extract, 40 days to analysis
Waste / Liquid	Metals (Except Mercury)	Low/Medium	6010/6020-3005/3010/3015/3050/3051 S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-019, S-IN-I-031	1-Liter	1 1-Liter HDPE bottle	Cool 4°C, HNO_3 to pH < 2	6 months
Waste / Liquid	Mercury	Low/Medium	7470/7471 S-IN-I-040	250-ml	1 250-ml HDPE bottle	Cool 4°C, HNO_3 to pH < 2	28 days

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Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Waste / Liquid	TCLP Semivolatile Fraction	Low/Medium	1311/8270-1310 S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-I-062	3 Liters	3 1-Liter Amber Glass bottles	Cool 4oC	7 days to extract, 40 days to analysis
Waste / Liquid	TCLP volatile Fraction	Low/Medium	1311/8260-1310 S-IN-O-029, S-IN-O-054, S-IN-I-062	500-ml	1 500-ml Glass PTFE3 lined septa bottle	Cool 4oC no headspace	14 days to analysis
Waste / Liquid	TCLP Inorganic Fraction (all other metals)	Low/medium	1311/6010-1310 S-IN-O-130, S-IN-I-030, S-IN-I-019, S-IN-I-031, S-IN-I-062	1 Liter	1 1-Liter HDPE bottle	Cool 4°C HNO3 to pH < 2	180 days to analysis
Waste / Liquid	TCLP Inorganic Fraction (Hg)	Low/medium	1311/7470-1310 S-IN-I-040, S-IN-I-062	1 Liter	1 1-Liter HDPE bottle	Cool 4oC HNO3 to pH < 2	28 days to analysis
Waste / Liquid	Corrosivity	Low/medium	1110	250 ml	1 250-ml Clear Wide Mouth Glass bottle	None	14 Days
Waste / Liquid	Flashpoint ASTM D9379	Low/medium	1010/1030	4-oz	1 4-oz Clear Wide Mouth Glass bottle	None	14 Days
Waste / Liquid	Total Organic Halogens (TOX)	Low/medium	9020	16-oz	1 16-oz Boston Round bottle	Cool 4oC	28 days

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Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Waste / Liquid	Hydrogen Ion (pH)	Low/medium	9040/9041	60 ml	1 60-ml HDPE	None Required	Requires analysis right away
Waste / Liquid	Paint Filter Test	Low/medium	9095B	16 oz	1 16-oz Boston Round bottle	None Required	28 days

Note

High concentration samples require cooling to Cool 4°C only.
PTFE (polytetrafluoroethylene); HDPE (high-density polyethylene bottles)
Semivolatiles, PCBs/pesticides may be collected in the same container. Metals, TRPH, and cyanide may be collected in the same container. Link to all SW-846 Methods: www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm
* Collected only if VOC or SVOC analytes found during assessment activities

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QAPP Worksheet #20 – Field Quality Control Sample Summary Table

Summarize by matrix, analytical group, and concentration level the number of field QC samples that will be collected and sent to the laboratory.

☐ Worksheet Not Applicable (State Reason)

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations	No. of Duplicate Pairs	No. of MS/MSD pairs	No. of Field Blanks	No. of Equip. Blanks	No. of Trip Blank Samples	Total No. of Samples to Lab
All Matrices	All analytical Groups	Low to High	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	To be declared in Project-Specific QAPP	One per 10 Samples	One per 20 Samples		One per week or 10 samples, whichever is more frequent	TBD	TBD
Soil / Solid	Metals	Low to Medium	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031	80	8	4		TBD		92
Soil / Solid	VOCs	Low to Medium	S-IN-O-029, S-IN-O-054, S-IN-I-062	40	4	2		TBD		46
Soil / Solid	SVOCs	Low to Medium	S-IN-O-054, S-IN-O-068, S-IN-I-062, S-IN-O-163, S-IN-O-133	80	8	4		TBD		92
Soil / Solid	PCBs	Low to Medium	S-IN-O-161, S-IN-O-050	80	8	4		TBD		92
Soil / Solid	Dioxin	Low to Medium	S-IN-O-161, S-IN-O-050	80	8	4		TBD		92

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Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations	No. of Duplicate Pairs	No. of MS/MSD pairs	No. of Field Blanks	No. of Equip. Blanks	No. of Trip Blank Samples	Total No. of Samples to Lab
Ground Water / Decon. Water	Metals, VOCs, SVOCs, PCBs	Low	S-IN-O-130, S-IN-I-062, S-IN-I-030, S-IN-I-040, S-IN-I-019, S-IN-I-031, S-IN-O-029, S-IN-O-054, S-IN-O-068, S-IN-O-163, S-IN-O-133, S-IN-O-161, S-IN-O-050	1-5	1	1	One per day (as needed)	5 (one per 10 samples)	21 (1 per day of sampling)	TBD

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QAPP Worksheet #21 – Project Sampling SOP References Table

List all SOPs associated with project sampling including, but not limited to, sample collection, sample preservation, equipment cleaning and decontamination, equipment testing, inspection and maintenance, supply inspection and acceptance, and sample handling and custody. Include copies of the SOPs as attachments or reference all in the QAPP. Sequentially number sampling SOP references in the Reference Number column. The reference number can be used throughout the QAPP to refer to a specific SOP.

☐ Worksheet Not Applicable (State Reason)

Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Check if yes)	Comments
WP-02 & WP-04	Surface and sub-surface soil sampling	SESCO	Sampling tools, latex glove, etc	N	
QP-01	Drum and container management	SESCO	Drum grappler, etc	N	
WP-05	Test pit excavation	SESCO	Excavator	N	
QP-02	Field instrument calibration (PID)	SESCO	PID	N	
User's Manual	PID (Multi Rae) Operation	SESCO	Multi-RAE	N	
WP-01	Sample Chain-Of-Custody	SESCO	NA	N	
WP-03	Sample Custody Seal SOP	SESCO	NA	N	
QP-03	Field Documentation	SESCO	NA	N	
User's manual	XRF Operation/Maintenance	SESCO	XRF	N	

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QAPP Worksheet #22 – Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Identify all field equipment and instruments (other than analytical instrumentation) that require calibration, maintenance, testing, or inspection and provide the SOP reference number for each type of equipment. In addition, document the frequency of activity, acceptance criteria, and corrective action requirements on the worksheet.

☐ Worksheet Not Applicable (State Reason)

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Frequency	Acceptance Criteria		Corrective Action	SOP	Responsible Person
Multimeter	Calibrate with standard solutions	Check battery/ expiration of Soln	NA	Daily prior to activities; if anomaly suspected	pH Meter	±0.1 unit	Clean probe, replace battery, replace membrane, replace probe	User Manual	Field Team Lead
					Dissolved Oxygen	± 3%			
					Specific conductivity	±1%			
					Temperature	±0.1 ^{0}C			
					Turbidity	±NTU			
					Others	± 10% Soln			
MultiRAE	Calibrate with Zero Air; span calibrate w/ multi-gas	Check/ replace battery/ Clean tip or bulb if necessary	Bump Test	Daily prior to activities; if anomaly suspected	LEL 52% - 64% (5%) O_2 13% - 17% (5%) H_2S 9 – 12 ppm (1ppm) CH_4 – N/A		Replace battery or Replace Unit	User Manual	Field Team Lead
MiniRae (PID)	Authorized user: Calibrate w/ zero air, then 100 ppm isobutylene (span gas)	Check battery/clean side pack and probe filter cups/ bulb if necessary	Bump Test	Daily prior to activities; if anomaly suspected	(Isobutylene): 0-2000 ±2ppm >2000ppm, ±20%		Check batteries, bulb, and filters. Service if needed	User Manual QP-02	Field Team Lead
XRF	Manuf. Required as checks indicate	Check battery, window protector	Use standardization clip	Prior to and end of day's activities; if anomaly suspected	Pass/Fail		Replace battery, re-calibrate; service	User Manual	Field Operator
Water Level Indicator	NA	Check batteries	Test button with red light indicator	Prior to day's activities	Pass/Fail		Replace batteries	NA	Field Operator
HazCat Kit	NA	Refill; expiration dates	NA	NA	NA		Replace supplies	NA	Field Team Lead

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QAPP Worksheet #23 – Analytical SOP References Table

List all SOPs that will be used to perform on-site or off-site analysis. Indicate whether the procedure produces screening or definitive data. Sequentially number analytical SOP reference in the Reference Number column. Include copies of the SOPs as attachments or reference in the QAPP. The reference number can be used throughout the QAPP to refer to a specific SOP.

☐ Worksheet Not Applicable (State Reason)

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
S-IN-O-130	Microwave	NA	XRF Metal Samples	Microwave	SESCO/ER	N
S-IN-O-029	VOA 8260	Definitive	VOCs	GC/MS	Pace Analytical	N
S-IN-O-054	Separator Funnel Extraction	Definitive	VOCs/ SVOCs	Extractor	Pace Analytical	N
S-IN-O-161	Extraction of PCB Oils and Wipes	Definitive	PCBs, Oil	Extractor	Pace Analytical	N
S-IN-O-050	PCBs 8082_608	Definitive	PCBs	GC/MS	Pace Analytical	N
S-IN-O-068	BNA 8270	Definitive	BNAs	GC/MS	Pace Analytical	N
S-IN-I-062	TCLP	Definitive	Metals, VOCs, SVOCs	Extractor	Pace Analytical	N
S-IN-I -030	Metals Digestion Aqueous	Definitive	Metals	ICP	Pace Analytical	N
S-IN-I -040	Mercury 7470	Definitive	Mercury/metal	AA	Pace Analytical	N
S-IN-I -019	ICP Metals 6010	Definitive	Metals	ICP	Pace Analytical	N
S-IN-I -031	Metals Digestion Solid	Definitive	Metals	ICP	Pace Analytical	N
S-IN-O-163	BNA_ PAH-SIM Combo 8270	Definitive	SVOCs	GC/MS	Pace Analytical	N
S-IN-O-133	PAH-SIM 8270	Definitive	SVOCs	GC/MS	Pace Analytical	N

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QAPP Worksheet #24 – Analytical Instrument Calibration Table

Identify all analytical instrumentation that requires calibration and provide the SOP reference number for each. In addition, document the frequency, acceptance criteria, and corrective action requirements on the worksheet.

☐ Worksheet Not Applicable (State Reason)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
ICP	Refer to Pace SOP	Refer to Pace SOP	Refer to Pace SOP	Refer to Pace SOP	Karl Anderson, Pace	S-IN-I-030, S-IN-I-019, S-IN-I-031
Spectrophotometer	Refer to Pace SOP	Refer to Pace SOP	Refer to Pace SOP	Refer to Pace SOP	Karl Anderson, Pace	S-IN-I-040
GC/MS	Refer to Pace SOP	Refer to Pace SOP	Refer to Pace SOP	Refer to Pace SOP	Karl Anderson, Pace	S-IN-O-029, S-IN-O-050, S-IN-O-163, S-IN-O-133

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

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QAPP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Identify all analytical instruments that require maintenance, testing, or inspection and provide the SOP reference number for each. In addition, document the frequency, acceptance criteria, and corrective action requirements on the worksheet.

☐ Worksheet Not Applicable (State Reason)

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
ICP	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	For acceptable & recalibration criteria, refer to the SOP	Inspect the system, correct problem, recalibrate and/or reanalyze samples	Karl Anderson, PACE	S-IN-I-030, S-IN-I-019, S-IN-I-031
Spectrophotometer	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	For acceptable & recalibration criteria, refer to the SOP	Inspect the system, correct problem, recalibrate and/or reanalyze samples	Karl Anderson, PACE	S-IN-I-040
GC/MS	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	As per instrument manufacturer's requirements	For acceptable & recalibration criteria, refer to the SOP	Inspect the system, correct problem, recalibrate and/or reanalyze samples	Karl Anderson, PACE	S-IN-O-029, S-IN-O-050, S-IN-O-163, S-IN-O-133

[1]Specify the appropriate reference letter or number from Analytical SOP References table (Worksheet_#23).

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QAPP Worksheet #26 – Sample Handling System

Use this worksheet to identify components of the project-specific sample handling system. Record personnel, and their organizational affiliations, who are primarily responsible for ensuring proper handling, custody, and storage of field samples from the time of collection, to laboratory delivery, to final sample disposal. Indicate the number of days field samples and their extracts/digestates will be archived prior to disposal.

☐ Worksheet Not Applicable (State Reason)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): SESCO
Sample Packaging (Personnel/Organization): SESCO
Coordination of Shipment (Personnel/Organization): SESCO
Type of Shipment/Carrier: Laboratory Courier or FedEx/UPS
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Pace Analytical Laboratory
Sample Custody and Storage (Personnel/Organization): Pace Analytical Laboratory
Sample Preparation (Personnel/Organization): Pace Analytical Laboratory
Sample Determinative Analysis (Personnel/Organization): Pace Analytical Laboratory
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): See Worksheet 17
Sample Extract/Digestate Storage (No. of days from extraction/digestion): See Worksheet 17
Biological Sample Storage (No. of days from sample collection): See Worksheet 17
SAMPLE DISPOSAL
Personnel/Organization: Pace Analytical Laboratory

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QAPP Worksheet #27 - Sample Custody Requirements Table

Describe the procedures that will be used to maintain sample custody and integrity. Include examples of chain-of-custody forms, traffic reports, sample identification, custody seals, laboratory sample receipt forms, and laboratory sample transfer forms. Attach or reference applicable SOPs.

☐ Worksheet Not Applicable (State Reason)

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): The field sampler will be personally responsible for the care and custody of the samples until the samples are transferred or properly dispatched. As few people as possible will handle the samples. All sample containers will be tagged or labeled with sample identification numbers and locations, including time, and date of sample collection. Sample tags or labels for each sample can be generated by using a permanent, waterproof ink either prior to or immediately after sample collection. If freezing weather, it might be necessary to use pencil. Samples will be collected in accordance with the sampling procedures documented in the QAPP. The equipment used to collect samples will be noted, along with time of sampling, sample description, depth of sample collection, volume, and the number of sample containers. The corresponding sample identification number/label/tag will be prominently listed.
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): Laboratory custody procedures for sample receiving and log in; sample storage, tracking during sample preparation and analysis; and storage of analytical data are described below: Samples submitted to the Laboratory will be accomplished by a chain-of-custody form. The chain-of-custody forms will be completed and sealed within the sample transport container, which will be opened and examined by the Laboratory Sample Custodian. The Laboratory Sample Custodian will ensure that all entries on the chain-of-custody form correspond with the sample label. If discrepancies are noted by the Laboratory Sample Custodian, project staff will be immediately contacted.

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Sample Identification Procedures:

All sample containers will be tagged or labeled with sample identification numbers and locations, including time, and date of sample collection. Sample tags or labels for each sample can be generated by using a permanent, waterproof ink either prior to or immediately after sample collection. If freezing weather, it might be necessary to use pencil.

Sample numbers will be assigned in sequence and in chronological order of sample collection.

Identifier	Detail	Feature	First incremental
KD	Kokomo Dump	Site	
GW SS SB DRUM	Groundwater Soil Subsurface soil Drum	Matrix	GW001 SS002 SB010 DR003
###	Incremental Number	Unique Identifier	
_MMDDYY	Date		

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Chain-of-custody Procedures: It is U.S. EPA Region 5 Policy to follow the U.S. EPA sample custody, or chain-or-custody protocols as described in "NEIC Policies and Procedures", EPA-330/9-78DDI-r, Revised June 1985. This custody is in three parts: Sample collection, laboratory analysis, and final evidence files. Final evidence files, including all originals of laboratory reports and purge files, are maintained under document control in a secure area.

A sample or evidence file is under your custody if they:

- are in your possession
- are in your view, after being in your possession
- are in your possession and you place them in a secured location or are in a designate secure area.

At the request of an FOSC or other designated official, PACE Chain-of-Custody form and procedures will be used. The chain-of-custody (COC) form is used to track and document unbroken custody of samples as identified by the unique sample number. The PACE standard form is shown on Figure B-5, Blank forms can be obtained by contacting laboratory staff personnel. The original COC form will be kept by the receiving laboratory and will accompany the analytical report. A copy of the COC form from each group of samples will be supplied to OTIE's QA/QC chemist and copy will be placed in the project files.

Information required in filling out the Chain-of-Custody Form.

Specific project name

Project number that corresponds to the project name

Project Manager

Supervisor of sample team during sampling efforts

(SOURCE: QAPP 2001 +In order to avoid compromising sample integrity, samples for various analytes should be obtained in the following order: volatiles and total organic halide (TOX) should be taken prior to extractables; extractables should be taken prior to total metals; total metals should be taken prior to dissolved metals; dissolved metals should be taken prior to the other inorganics; other inorganics should be taken prior to radionuclides; and field measurements should be taken last. All samples are collected first from the suspected or known least contaminated area and then continuing onto the most-contaminated area).

An example of the chain-of-custody form is included in the next page.

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QAPP Worksheet #28-A – Laboratory QC Samples Table for VOCs

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	**Liquid/Water**
Analytical Group	VOCs
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/ SOP Reference	Refer to Work Sheet #19
Sampler's Name	TBD from SESCO and ER staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

Lab QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**		**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**	
Method Blank	1 every 12 hours	No analyte > RQL*		Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	No analyte > CRQL*	
Matrix Spike (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	61-145 %R	Flag outliers	Karl Anderson, PACE	Accuracy	1,1-Dichloroethene	61-145 %R
		Benzene	76-127 %R				Benzene	76-127 %R
		Trichloroethene	71-120 %R				Trichloroethene	71-120 %R
		Toluene	76-125 %R				Toluene	76-125 %R
		Chlorobenzene	75-130 %R				Chlorobenzene	75-130 %R
Matrix Spike Duplicate (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	0-14 %RPD	Flag outliers	Karl Anderson, PACE	Precision	1,1-Dichloroethene	0-14%RPD
		Benzene	0-11 %RPD				Benzene	0-11%RPD
		Trichloroethene	0-14 %RPD				Trichloroethene	0-14%RPD
		Toluene	0-13 %RPD				Toluene	0-13%RPD
		Chlorobenzene	0-13 %RPD				Chlorobenzene	0-13%RPD

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Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Deuterated Monitoring Compounds	all samples	Vinyl chloride-d3	65-131%R	Check calculations and instruments, reanalyze affected samples; *up to 3 DMCs per sample may fail to meet recovery limits	Karl Anderson, PACE	Accuracy	Vinyl chloride-d3	65-131%R
		Chloroethane-d5	71-131%R				Chloroethane-d5	71-131%R
		1,1-Dichloroethene-d2	55-104%R				1,1-Dichloroethene-d2	55-104%R
		2-Butanone-d5	49-155%R				2-Butanone-d5	49-155%R
		Chloroform-d	78-121%R				Chloroform-d	78-121%R
		1,2-Dichloroethane-d4	78-129%R				1,2-Dichloroethane-d4	78-129%R
		Benzene-d6	77-124%R				Benzene-d6	77-124%R
		1,2-Dichloropropane-d6	79-124%R				1,2-Dichloropropane-d6	79-124%R
		Toluene-d8	77-121%R				Toluene-d8	77-121%R
		trans-1,3-Dichloropropene-d4	73-121%R				trans-1,3-Dichloropropene-d4	73-121%R
		2-Hexanone-d5	28-135%R				2-Hexanone-d5	28-135%R
		1,4-Dioxane-d8	50-150%R				1,4-Dioxane-d8	50-150%R
		1,1,2,2-Tetrachloroethane-d2	73-125%R				1,1,2,2-Tetrachloroethane-d2	73-125%R
		1,2-Dichlorobenzene-d4	80-131%R				1,2-Dichlorobenzene-d4	80-131%R
Internal Standards	all samples	60-140%		Check calculations and instruments, reanalyze affected samples	Karl Anderson, PACE	Accuracy	± 40 % of response area, ± 20 sec retention time shift	

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QAPP Worksheet #28-B – Laboratory QC Samples Table for VOCs

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	**Soil/Solid**
Analytical Group	VOCs
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/ SOP Reference	Refer to Work Sheet #19
Sampler's Name	TBD from SESCO and ER staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

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Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Method Blank	1 every 12 hours	No analyte > CRQL*		Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	No analyte > CRQL*	
Matrix Spike (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	61-145 %R	Flag outliers	Karl Anderson, PACE	Accuracy	1,1-Dichloroethene	61-145 %R
		Benzene	76-127 %R				Benzene	76-127 %R
		Trichloroethene	71-120 %R				Trichloroethene	71-120 %R
		Toluene	76-125 %R				Toluene	76-125 %R
		Chlorobenzene	75-130 %R				Chlorobenzene	75-130 %R
Matrix Spike Duplicate (Not Required)	1 per < 20 samples; if requested	1,1-Dichloroethene	0-14 %RPD	Flag outliers	Karl Anderson, PACE	Precision	1,1-Dichloroethene	0-14 %RPD
		Benzene	0-11 %RPD				Benzene	0-11 %RPD
		Trichloroethene	0-14 %RPD				Trichloroethene	0-14 %RPD
		Toluene	0-13 %RPD				Toluene	0-13 %RPD
		Chlorobenzene	0-13 %RPD				Chlorobenzene	0-13 %RPD
Deuterated Monitoring Compounds	all samples	Vinyl chloride-d3	65-131 %R	Check calculations and instruments, reanalyze affected samples; *up to 3 DMCs per sample may fail to meet recovery limits	Karl Anderson, PACE	Accuracy	Vinyl chloride-d3	65-131 %R
		Chloroethane-d5	71-131 %R				Chloroethane-d5	71-131 %R
		1,1-Dichloroethene-d2	55-104 %R				1,1-Dichloroethene-d2	55-104 %R
		2-Butanone-d5	49-155 %R				2-Butanone-d5	49-155 %R
		Chloroform-d	78-121 %R				Chloroform-d	78-121 %R
		1,2-Dichloroethane-d4	78-129 %R				1,2-Dichloroethane-d4	78-129 %R
		Benzene-d6	77-124 %R				Benzene-d6	77-124 %R
		1,2-Dichloropropane-d6	79-124 %R				1,2-Dichloropropane-d6	79-124 %R
		Toluene-d8	77-121 %R				Toluene-d8	77-121 %R
		trans-1,3-Dichloropropene-d4	73-121 %R				trans-1,3-Dichloropropene-d4	73-121 %R
		2-Hexanone-d5	28-135 %R				2-Hexanone-d5	28-135 %R
		1,4-Dioxane-d8	50-150 %R				1,4-Dioxane-d8	50-150 %R
		1,1,2,2-Tetrachloroethane-d2	73-125 %R				1,1,2,2-Tetrachloroethane-d2	73-125 %R
		1,2-Dichlorobenzene-d4	80-131 %R				1,2-Dichlorobenzene-d4	80-131 %R
Internal Standards	all samples	60-140%		Check calculations and instruments, reanalyze affected samples	Karl Anderson, PACE	Accuracy	± 40 % of response area, ± 20 sec retention time shift	

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QAPP Worksheet #28-C – Laboratory QC Samples Table for SVOCs

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	**Aqueous/Soil/Waste**
Analytical Group	SVOCs
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/ SOP Reference	Refer to Work Sheet #19
Sampler's Name	TBD from SESCO and ER staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

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Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 every 12 hours	No analyte > RQL	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy Precision	Compound specific %R or %RSD
Calibration	As dictated by the method	SW-846, Method 8270D/ No analyte > RQL	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	Factor of two(-50% to + 100%) from the initial/continuing calibration
Internal Standards	As dictated by the method	SW-846, Method 8270D	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy Precision	Compound specific %R or %RSD
Matrix Spike/Matrix Spike Duplicate	1 per ≤ 20 samples; if requested	SW-846, Method 8270D	Flag outliers	Karl Anderson, PACE	Accuracy Precision	Compound specific %R or %RSD
Surrogate Compounds	1 per < 20 samples; if requested	SW-846, Method 8270D	Flag outliers	Karl Anderson, PACE	Accuracy	Compound specific
Method Blank	As dictated by the method	SW-846, Method 8270D	Flag outliers	Karl Anderson, PACE	Accuracy	No analyte <RQL

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QAPP Worksheet #28-D – Laboratory QC Samples Table for Pesticides/PCBs

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	Aqueous/Soil/Waste
Analytical Group	Pesticides/PCB
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/ SOP Reference	Refer to Work Sheet #19
Sampler's Name	TBD from SESCO and ER staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 every 12 hours	No analyte > RQL	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy Precision	Compound specific %R or %RSD
Calibration	As dictated by the method	SW-846, Method 8270D/ No analyte > RQL	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	+/- 15%
Matrix Spike/Matrix Spike Duplicate	1 per ≤ 20 samples; if requested	SW-846, Method 8270D	Flag outliers	Karl Anderson, PACE	Accuracy Precision	Compound specific %R or %RSD
Surrogate Compounds	1 per < 20 samples; if requested	SW-846, Method 8270D	Flag outliers	Karl Anderson, PACE	Accuracy	Limits 30%-150%
Method Blank	As dictated by the method	SW-846, Method 8270D	Flag outliers	Karl Anderson, PACE	Accuracy	No analyte <RQL

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QAPP Worksheet #28-E – Laboratory QC Samples Table for Metals/Mercury

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	Aqueous/Soil Matrix
Analytical Group	Metals/Mercury
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/SOP Reference	Refer to Work Sheet #19
Samplers Name	TBD from SESCO and ER Staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

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Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS	1 every 12 hours	SW-846, Method 6010C/7471	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	Limits: Average Recovery ± 20%
Interference Check Sample (ICP/AES)	As dictated by the method	SW-846, Method 6010C/7471	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	Within ± 2 times CRQL of true value or ± 20% of true value, whichever is greater, except for Al, Fe, Ca, K, Mg and Na
Preparation Blank	As dictated by the method	SW-846, Method 6010C/7471	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy	No analyte <RQL
Matrix Spike/Matrix Spike Duplicate	1 per ≤ 20 samples; if requested	SW-846, Method 6010C/7471	Flag outliers	Karl Anderson, PACE	Accuracy Precision	75 – 125 %R < 20 %RPD
Duplicate	1 per 10 samples; if requested	SW-846, Method 6010C/7471	Flag outliers	Karl Anderson, PACE	Precision	RPD < 20%
Serial Dilution Test (ICP/AES)	1 per < 20 samples; if requested	SW-846, Method 6010C/7471	Flag outliers	Karl Anderson, PACE	Accuracy	%D < 10 %
Instrument Calibration	As dictated by the method	SW-846, Method 6010C/7471	Flag outliers	Karl Anderson, PACE	Accuracy	90-100%
Post-Digestion Spike	As dictated by the method	SW-846, Method 6010C/7471	Flag outliers	Karl Anderson, PACE	Accuracy	Limits: Average Recovery ± 20%
Internal Standard (ICP-MS only)	As dictated by the method	SW-846, Method 6010C/7471	Flag outliers	Karl Anderson, PACE	Accuracy	Limits: 60 -125% RI

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QAPP Worksheet #28-F – Laboratory QC Samples Table for PAHs

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	Aqueous/Soil/Waste
Analytical Group	PAHs
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/ SOP Reference	Refer to Work Sheet #19
Sampler's Name	TBD from SESCO and ER staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS	1 every 12 hours	SW-846, Method 8270 SIM	Suspend analysis unit source recertified	Karl Anderson, PACE	Accuracy Precision	Compound specific %R
Matrix Spike/Matrix Spike Duplicate	1 per ≤ 20 samples; if requested	SW-846, Method 8270 SIM	Flag outliers	Karl Anderson, PACE	Accuracy Precision	Compound specific %R or %RSD
Surrogate Compounds	1 per < 20 samples; if requested	SW-846, Method 8270 SIM	Flag outliers	Karl Anderson, PACE	Accuracy	50 -150%R
Method Blank	As dictated by the method	SW-846, Method 8270 SIM	Flag outliers	Karl Anderson, PACE	Accuracy	No analyte <RQL Bis(2-ethylhexyl)phthalate < 5x CRQL

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QAPP Worksheet #28-G – Laboratory QC Samples Table for TCLP

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

☐ Worksheet Not Applicable (State Reason)

Matrix	Aqueous/Soil/Waste
Analytical Group	TCLP
Concentration Level	Low to Medium
Sampling SOP	SESCO SOPs
Analytical Method/ SOP Reference	Refer to Work Sheet #19
Sampler's Name	TBD from SESCO and ER staff
Field Sampling Organization	SESCO/ER
Analytical Organization	Pace Analytical
No. of Sample Locations	Refer to Work Sheet #18

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	As dictated by the method	SW-846, Method 1311	Flag outliers	Karl Anderson, PACE	Accuracy	Method dependent
Matrix Spike	1 per ≤ 20 samples; if requested	SW-846, Method 1311	Flag outliers	Karl Anderson, PACE	Accuracy	Method dependent
Extraction Time Limit	NA	SW-846, Method 1311	Flag outliers	Karl Anderson, PACE	Accuracy	VOC; N/A SVOC; 7 days Hg; N/A Metals; N/A

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QAPP Worksheet #29 – Project Documents and Records Table

Identify the documents and records that will be generated for all aspects of the project including, but not limited to, sample collection and field measurement, on-site and off-site analysis, and data assessment.

☐ Worksheet Not Applicable (State Reason)

Document	Where Maintained
Field notes/logbook	Project file (SESCO)
Chain of custody forms	Project file (SESCO) and laboratory
Laboratory raw data package	Project file (SESCO)
Audit/assessment checklists/reports	Project file (SESCO) and laboratory
Corrective action forms/reports	Project file (SESCO) and laboratory
Laboratory equipment calibration logs	Laboratory
Sample preparation logs	Laboratory
Run logs	Laboratory
Sample disposal records	Laboratory
Validated data	Project file (SESCO)
Hard copy of analytical and raw data	Project file(SESCO)

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QAPP Worksheet #30 – Analytical Services Table

Complete this worksheet for each matrix, analytical group, and concentration level. Identify all laboratories or organizations that will provide analytical services for the project, including on-site screening, on-site definitive, and off-site laboratory analytical work. If applicable, identify the subcontractor laboratories and backup laboratory or organization that will be used if the primary laboratory or organizations cannot be used.

☐ Worksheet Not Applicable (State Reason)

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory (Name and Address, Contact Person and Telephone Number)	Backup Laboratory (Name and Address, Contact Person and Telephone Number
Soil, water, liquid, solid	Metals, VOCs, SVOCs, PAHs, Pesticides, PCBs	Low to High	To be determined in the field	Refer to PACE Laboratories' SOPs, see QAPP Worksheet #23	Normal (21 days)	Pace Analytical Services 7726 Moller Road, Indianapolis, IN 46268 Karl Anderson (317) 875-5894	To be subcontracted for each project

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QAPP Worksheet #31 – Planned Project Assessments Table

Identify the type, frequency, and responsible parties of planned assessment activities that will be performed for the project.

☐ Worksheet Not Applicable (State Reason)

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Field Operation Audit	1 during Site activities	Internal	EPA OSC/START	Shelly Lam, OSC or START Contractor	SESCO Project Manager	SESCO Project Manager	EPA OSC
Laboratory Audit	TBD	External	SESCO chemist	TBD	SESCO Project Manager	TBD	TBD

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QAPP Worksheet #32 – Assessment Findings and Corrective Action Responses

For each type of assessment describe procedures for handling QAPP and project deviations encountered during the planned project assessments.

☐ Worksheet Not Applicable (State Reason)

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Laboratory Technical Systems/ Performance Audits	Audit Report	Shelly Lam, OSC	30 days	Letter	Pace Analytical	14 days
Laboratory Technical Systems/ Performance Audits	Audit Report	Shelly Lam, OSC ,Laboratory	30 days	Letter	Pace Laboratory	14 days
Peer Review	Directly on deliverable	Shelly Lam, OSC	Prior to deliverable due date	Comments directly on deliverable	SESCO Project Manager	Prior to deliverable due date
Field Observations	Logbook	Shelly Lam, OSC, SESCO project manager	Immediately	Logbook	SESCO Team Leader	Immediately
Deviations from QAPP	Field Change Form	Shelly Lam, OSC	Immediately	Field Change Form	Project manager, SESCO	Within one business day of deviation

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QAPP Worksheet #33 – QA Management Reports Table

Identify the frequency and type of planned QA Management Reports, the projected delivery date, the personnel responsible for report preparation, and the report recipients.

☐ Worksheet Not Applicable (State Reason)

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Technical Report	Monthly	10th of the month following performance period	Project Manager/SESCO	Shelly Lam, OSC
QA Report	Quarterly	March, June, September	QA/QC Officer/SESCO	Shelly Lam, OSC

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QAPP Worksheet #34 – Verification (Step I) Process Table

Describe the processes that will be followed to verify project data. Verification inputs include items such as those listed in Table 9 of the UFP-QAPP Manual. Describe how each item will be verified, when the activity will occur, and what documentation is necessary, and identify the persons responsible. *Internal* or *external* is in relation to the data generator.

☐ Worksheet Not Applicable (State Reason)

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Chain-of-custody forms	Chain-of-custody forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the chain-of-custody should be initialed by the reviewer, a copy of the chain-of-custody retained in the site file, and the original and remaining copies taped inside the cooler for shipment. Copies of the chain-of-custody forms will be attached to the data report. See SOPs for further details.	Internal	SESCO Project Manager
Sample Receipt Forms	Sample receipt forms will be reviewed internally upon their completion and verified against the chain of custody forms. A copy of the sample receipt form will be retained in the project file, and the original included by the laboratory personnel in the data packages.	Internal	SESCO Project Manager
Field notes/logbook	Field notes will be reviewed internally and placed in the site file. A copy of the field notes will be attached to the final report.	Internal	SESCO Project Manager
Laboratory data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal. All received data packages will be verified externally according to the data validation procedures specified in Worksheet #36.	Internal, External	SESCO Project Manager Laboratory
Laboratory EDDs / NEDDs	If required, laboratory EDDs/NEDDs will be verified against the laboratory data packages by the laboratory performing the work for completeness and technical accuracy prior to submittal. 10% of the received EDDs/NEDDs will be verified externally by OTIE.	Internal, External	SESCO Project Manager

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QAPP Worksheet #35 – Validation (Steps IIa and IIb) Process Table

Describe the processes that will be followed to validate project data. Validation inputs include items such as those listed in Table 9 of the UFP-QAPP Manual. Describe how each item will be validated, when the activity will occur, and what documentation is necessary and identify the person responsible. Differentiate between steps IIa and IIb of validation.

☐ Worksheet Not Applicable (State Reason)

Step IIa / IIb[1]	Validation Input	Description	Responsible for Validation (name, organization)
IIa	Communication	Establish that required communication procedures were followed by field or laboratory personnel	SESCO Chemist
IIa	Sampling Methods and Procedures	Establish that the required sampling methods were used and that any deviations were noted. Ensure that the sampling procedures and field measurements met performance criteria and that any deviations were documented.	SESCO Project Manager
IIa	Holding Times	Ensure that samples were analyzed within holding times specified in method, procedure, or contract requirements. If holding times were not met, confirm that deviations were documented, that appropriate notifications were made as stated in the project-specific Statement of Work to the laboratory.	Laboratory SESCO Chemist
IIa	Analytes	Ensure that required lists of analytes were reported as specified in governing documents (i.e., method, procedure, or contract).	SESCO Chemist
IIa	Analytical Methods and Procedures	Establish that the required analytical methods were used and that any deviations were noted. Ensure that the QC sample met performance criteria and that any deviations were documented.	SESCO Chemist
IIa / IIb	Data Qualifiers	Determine that the laboratory data qualifiers were defined in the laboratory data packages and applied as specified.	SESCO Chemist
IIa	Field Transcription	Authenticate transcription accuracy of sampling data (i.e., from field logbook to report).	SESCO Chemist, project manager
IIb	Sampling Plan	Determine whether the sampling plan was executed as specified (i.e. the number, location, and type of field samples were collected and analyzed as specified in this QAPP.	SESCO Chemist START

[1] Compliance and Comparison from the IDQTF UFP-QAPP Manual, 2005

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QAPP Worksheet #35 – Validation (Steps IIa and IIb) Process Table (Continued)

Step IIa / IIb[1]	Validation Input	Description	Responsible for Validation (name, organization)
IIb	Sampling Procedures	Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support (e.g., techniques, equipment, decontamination, volume, temperature, preservative, etc.)	Field Team Leader, SESCO
IIb	Co-located Field Duplicates	Compare results of co-located field duplicates with criteria established in the SAP (FSP/QAPP).	SESCO Chemist
IIb	Project Quantitation Limits	Determine that quantitation limits were achieved, as outlined in the SAP (FSP/QAPP) and that the laboratory successfully analyzed a standard at the quantitation limit (QL)	SESCO Chemist
IIb	Performance Criteria	Evaluate QC data against project-specific performance criteria in the SAP (FSP/QAPP), i.e., evaluate quality parameters beyond those outlines in the methods.	SESCO Chemist

[1] Compliance and Comparison from the IDQTF UFP-QAPP Manual, 2005

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QAPP Worksheet #36 – Analytical Data Validation (Steps IIa and IIb) Summary Table

Identify the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data.

☐ Worksheet Not Applicable (State Reason)

Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb[1]	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa/IIb	Groundwater	Metals, VOCs, SVOCs, PCBs, pesticides	Low, medium	EPA's National Functional Guidelines for Data Validation of Organics EPA's National Functional Guidelines for Data Validation of Inorganics	Chemist, SESCO
IIa/IIb	Soil	Metals, VOCs, SVOCs, PCBs, pesticides	Low, medium	EPA's National Functional Guidelines for Data Validation of Organics EPA's National Functional Guidelines for Data Validation of Inorganics	Chemist, SESCO

[1] Compliance and Comparison from the IDQTF UFP-QAPP Manual, 2005
Refer to the following page for additional audit and data quality assessment activities

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Assessment	On-Site Assessment/Audit (TSA)	Lab Assessment/Audit*	Data Quality Assessment (TSA)	Field instrument Doc. Assessment (TSA)	Data Validation
Qualified Person	QA/QC Coordinator or trained designee	Chemist	QA Manager/Qualified Personnel	Project Manager	Trained Chemist/ Qualified Personnel
Evaluation	• Calibration Records • COC Procedure • Sampling Procedure • Field Analytical Procedure • Training Records • T &D of Waste • Adherence to QAPP • Documentation	• Follow Lab Requirements • Consistent with Lab QAPP	• Lab Data Review • All data received • TAT achieved • Proper COC • Correct analytical method • Hold times not exceeded • QC sample results w/in limits • Review blank sample data	• Internal Calibration is complete and accurate • Standards are not expired • Duplicates are accurate • QC checks performed • QC checks w/in limits • Documentation complete • Calculations and entries are complete • COC maintained	• EPA National Functional Guidelines for Data Validation
Frequency	1 during Site activities	As directed by EPA	Waste disposal samples (completed under validation for all else)	Complete review each day of use as instrument is calibrated/operated	All Assessment Data
Report Requirement	Checklist and/or memo	Audit finding report	Memo of findings/section in report	Checklist	Validation Report
Expected Date:					

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QAPP Worksheet #37 – Usability Assessment

Describe the procedures/methods/activities that will be used to determine whether data are of the right type, quality, and quantity to support environmental decision-making for the project. Describe how data quality issues will be addressed and how limitations of the use of the data will be handled.

☑ Worksheet Not Applicable (State Reason)

The Data Usability Assessment will be performed by SESCO. Bill Pickard, Project Manager, will be responsible for information in the Usability Assessment. He will also be responsible for assigning task work to the individual task members who will be supporting the Data Usability Assessment. Note that the Data Usability Assessment will be conducted on verified data. After the Data Usability Assessment has been performed, the results of the Data Usability Assessment will be presented in the final project report. The following items will be assessed and conclusions drawn based on their results:

Precision

Precision is a measure of the reproducibility among a set of replicate results or the agreement among repeat observations made under the same conditions. *Analytical* precision is the measurement of the variability associated with duplicate or replicate analyses. *Total* precision is the measurement of the variability associated with the entire sampling and analysis process. It is determined by analysis of duplicate field samples and measures variability introduced by both the laboratory and field operations. Field duplicate samples and matrix duplicate spiked samples will be analyzed to assess field and analytical precision. The precision measurement is determined using the relative percent difference (RPD) between the duplicate sample results. The RPD is calculated according to the following formula:

$$\text{RPD} = \frac{|A - B|}{(A + B)/2} \times 100\%$$

where: A = first duplicate concentration
B = second duplicate concentration

For this project, the parameters evaluated to assess precision are field and laboratory duplicate samples, and matrix spike/matrix spike duplicate (MS/MSD) samples. Goals for sample collection and analysis are set at 10% for field duplicate samples (soil) and 5% for MS/MSD samples for all applicable analyses, as listed in Worksheet # 20.

Results of all field and laboratory duplicates will be presented separately in tabular format for each analysis. For each duplicate pair, the RPD will be calculated for each analyte whose original and duplicate values are both greater than or equal to the quantitation limit. The RPDs will be checked against the measurement performance criteria presented on Worksheet #12 and Attachment A. The RPDs exceeding criteria will be identified on the tables. Additionally, the RPD of each analyte will be averaged across all duplicate pairs whose original and duplicate values are both greater than or equal to the quantitation limit, and the combined overall average RPD for each analysis will be calculated for the field and laboratory duplicates. A discussion will follow summarizing the results of the field and laboratory precision. Any conclusions about the precision of the analyses will be drawn and any limitations on the use of the data will be described.

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QAPP Worksheet #37 – Usability Assessment (continued)

Accuracy

Accuracy is the degree of agreement between an analytical measurement and a reference accepted as a true value. A program of sample spiking will be conducted to evaluate laboratory accuracy. This program provides analysis of the MS and MSD samples, laboratory control spike (LCS), and surrogate standards. The results of the spiked samples are used to calculate the percent recovery for evaluating accuracy according to the following formula:

$$Percent\ \mathrm{Recovery} = \frac{S - C}{T} \quad x \quad 100$$

where S = Measured spike sample concentration
C = Sample concentration
T = True or actual concentration of the spike

MS and MSD samples will be prepared and analyzed at a frequency of 5%. LCS or spike blanks are also analyzed at a frequency of 5%. Surrogate standards are added to every sample analyzed for organic constituents. Worksheet 12 and Attachment A present accuracy goals based on the percent recovery of matrix spike, LCS, and surrogate results.

Accuracy/Bias Contamination

Results for all laboratory method blanks and instrument blanks will be presented separately in tabular format for each analysis. The results for each analyte will be checked against the measurement performance criteria presented on Worksheet #12. Results for analytes that exceed criteria will be identified on the tables. A discussion will follow summarizing the results of the laboratory accuracy/bias. Conclusions about the accuracy/bias of the analyses based on contamination will be drawn and limitations on the use of the data will be described.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition that they are intended to represent. For this project, representative data will be obtained through careful selection of sampling locations and analytical parameters. Representative data will also be obtained through proper collection and handling of samples to avoid interference and minimize contamination.

Representativeness of data will also be ensured through established field and laboratory procedures and their consistent application. To aid in evaluating of the representativeness of the sample results, field and laboratory blank samples, and background samples will be evaluated for the presence of contaminants. Data determined to be nonrepresentative, by comparison with existing data, will be used only if accompanied by appropriate qualifiers and limits of uncertainty.

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QAPP Worksheet #37 – Usability Assessment (continued)

Sensitivity

The method detection limit (MDL) is the minimum concentration of an analyte that can be reliably distinguished from background noise for a specific analytical method. The quantitation limit represents the lowest concentration of an analyte that can be accurately and reproducibly quantified in a given sample matrix. Project quantitation limit goals (PQLGs) are contractually specified maximum quantitation limits for a sample matrix and are typically several times the MDL to allow for matrix effects. PQLGs are set liberally to establish minimum criteria for laboratory performance; actual laboratory quantitation limits may be substantially lower.

Worksheet # 15 contains a comparison of the PQLGs for the selected analytical methods in comparison to the applicable regulatory criteria. The purpose of this comparison is to show that the selected analytical methods, and associated PQLGs, are capable of quantifying contaminants of concern at or below the applicable screening level. In comparing the PQLGs to PRGs, however, it is important to note that actual laboratory quantitation limits may be lower than PQLGs and that estimates of analyte concentrations down to MDLs can typically be provided in order to allow comparisons to screening levels that are below PQLGs.

Analytical results may be reported as estimated values if concentrations are less than PQLGs but greater than MDLs. The MDL for each analyte will be listed as the detection limit in the laboratory's EDD.

The field sample results for each analyte will be checked against the quantitation limits presented on Worksheet #15. Results for analytes that exceed criteria will be identified on the tables. A discussion will follow summarizing the results of the laboratory sensitivity. Conclusions about the sensitivity of the analyses will be drawn and limitations on the use of the data will be described.

Completeness

Completeness is a measure of the percentage of project-specific data that are valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this SAP, and when none of the QC criteria that affect data usability are exceeded. When all data validation is completed, the percent completeness value will be calculated by dividing the number of useable sample results by the total number of sample results planned for this investigation.

Comparability

Comparability expresses the confidence with which one data set can be compared with another. Comparability of data will be achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. Analytical methods selected for each of the project sites are consistent with the methods used during previous investigations at these sites.

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QAPP Worksheet #37 – Usability Assessment (continued)

Reconciliation

Each of the PQOs presented on Worksheet #12 will be examined to determine if the objective was met. This examination will include a combined overall assessment of the results of each analysis pertinent to an objective. Each analysis will first be evaluated separately in terms of the major impacts observed from the Data Validation, Data Quality Indicators, and measurement performance criteria assessments. Based on the results of these assessments, the quality of the data will be determined. Based on the quality determined, the usability of the data for each analysis will be determined. Based on the combined usability of the data from all analyses for an objective, it will be determined if the PQO was met and whether project action limits were exceeded. The final report will include a summary of all the points that went into the reconciliation of each objective. As part of the reconciliation of each objective, conclusions will be drawn and any limitations on the usability of any of the data will be described.

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REFERENCES:

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USEPA. EPA Using Data From Other Sources – A Checklist for Quality Concerns. May 2000.
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USEPA. Guidance for Choosing a Sampling Design for Environmental Data Collection. EPA 240/R- 02/005. EPA QA/G-5S. February 2006.

USEPA. Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. EPA-540-R-08-01. June 2008.
www.epa.gov/superfund/programs/clp/guidance.htm#som

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www.epa.gov/superfund/programs/clp/guidance.htm#som

USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review. OSWER 9240.1-51. EPA 540-R-10-011. January 2010.
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USEPA. Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review. EPA-540-R-11-016. September 2011.
www.epa.gov/superfund/programs/clp/guidance.htm#som

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Attachment A: Method Precision and Accuracy Goals

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HACH 8000 COD

Compound Name	CAS No.	MDL	PQL	Units	Control Limits %Recovery	Control Limits RPD
COD	C-004	1.17	5	mg/L	80-120	25

EPA 245.2

Compound Name	CAS No.	MDL	PQL	Units	%Recovery	RPD
Mercury	7439-97-6	0.000066	0.002	mg/L	80-120	20

SM 4500 H+B

Compound Name	CAS No.	MDL	PQL	Units	%Recovery	RPD
pH	pH	1	1	S.U.	QC Check +/- 0.05 pH units	6

SM 2540D TSS

Compound Name	CAS No.	MDL	PQL	Units	%Recovery	RPD
Total Suspended Solids	C-009	5	10	mg/L	80-120	5

EPA 200.7

Compound Name	CAS No.	MDL	PQL	Units	%Recovery	RPD
Aluminum	7429-90-5	0.0179	0.2	mg/L	85-115	20
Arsenic	7440-38-2	0.00298	0.01	mg/L	85-115	20
Barium	7440-39-3	0.000309	0.01	mg/L	85-115	20
Cadmium	7440-43-9	0.000163	0.005	mg/L	85-115	20
Chromium	7440-47-3	0.000318	0.01	mg/L	85-115	20
Copper	7440-50-8	0.00111	0.01	mg/L	85-115	20
Iron	7439-89-6	0.00954	0.1	mg/L	85-115	20
Lead	7439-92-1	0.00145	0.015	mg/L	85-115	20
Manganese	7439-96-5	0.000566	0.015	mg/L	85-115	20
Nickel	7440-02-0	0.0012	0.04	mg/L	85-115	20
Selenium	7782-49-2	0.00374	0.04	mg/L	85-115	20
Silver	7440-22-4	0.000581	0.01	mg/L	85-115	20
Zinc	7440-66-6	0.00397	0.02	mg/L	85-115	20

Attachment B: Standard Operating Procedures/Practices

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Attachment C: Exhibits of Quality Control Logs and Report Forms

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Exhibit 8-1. Drilling Log

OTIE
Oneida Total Integrated Enterprises

Drilling Log

BOREHOLE/WELL ID:

Project:				Sheet: of		
Project #:				Logged by:		Checked by:
Client:				Purpose:		
Contractor:				Start Date:		End Date:
Crew Chief:				Method:		
Location:				Easting:		Northing:
¼ of:	¼ of section:	T.	R.	City:		County:
Elevations:	Surface:	Casing:			Cover:	
Water Depth:	at Drilling:	at Completion:			Measurement Date:	
Number/Type of Samples:		Total Depth (ft):			Borehole Diameter:	

Sample		Recovery	Depth	Well Diagram	Graphic Log	Description	USCS	Blow Count	PID	Test	Comments	Elevation
Number	Length											

Exhibit 8-2. Monitoring Well Construction Log

Well Construction Log

Site/Facility:_____ Well Owner: _____
Well ID:_____ Installation Start/End Dates:_____
Driller: _____ Drilling Method:_____
TN&A Geologist:_____ Well Purpose:_____
Location Coordinates:_____ _____

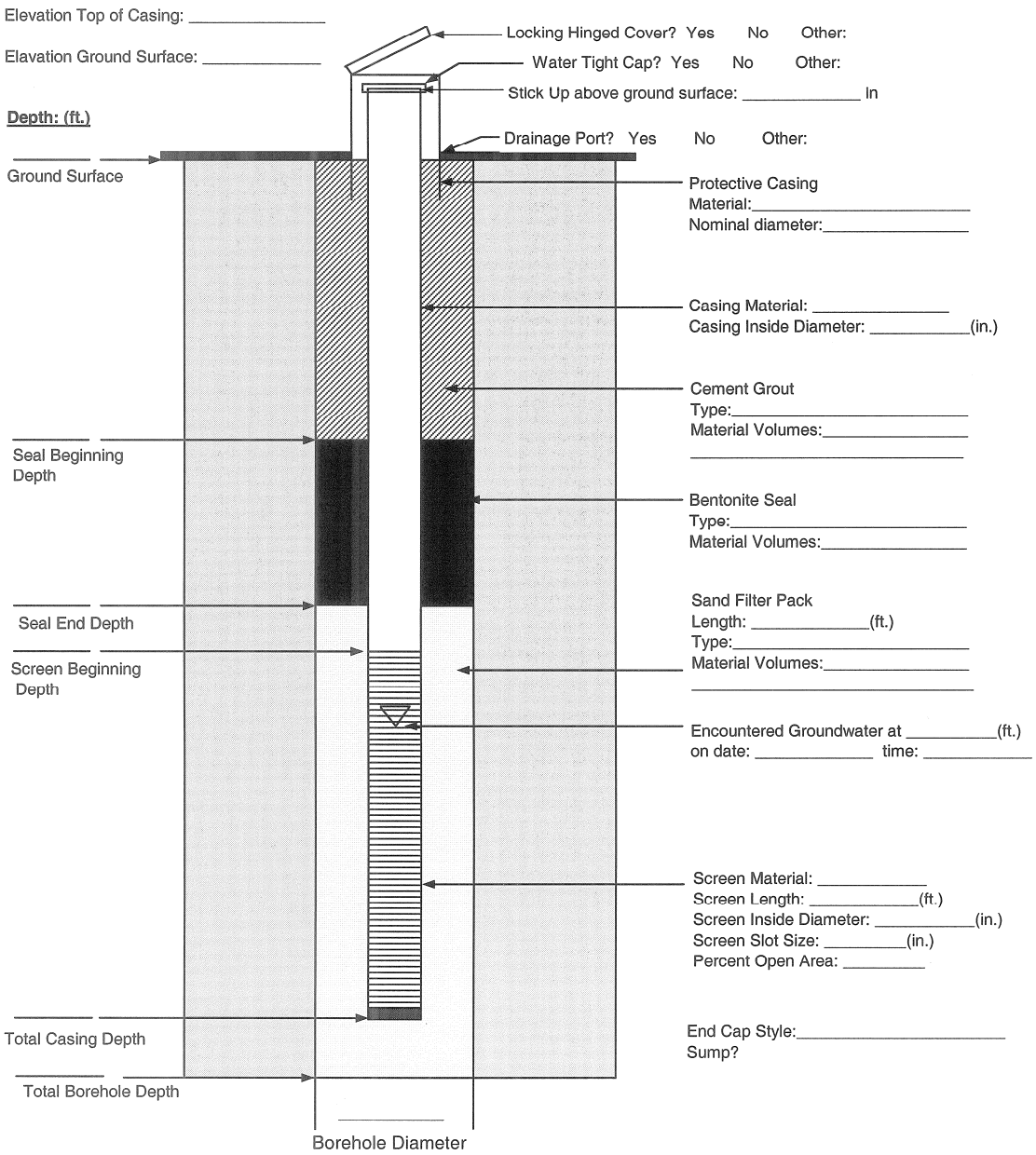

Exhibit 8-3. Example Chain of Custody Form

OTIE
Oneida Total Integrated Enterprises

Oneida Total Integrated Enterprises
1033 North Mayfair Road, Ste #200
Milwaukee, WI 53226
Phone: (414) 257-4200
Fax: (414) 257-2492

Report To:
Contact:
Company: OTIE.
Address:
Phone:
Fax:
E-Mail:

Bill To:
Contact: _____
Company: _____
Address: _____
_____
Phone: _____
Fax: _____
PO#: _____ Quote: _____

Shaded Areas For Internal Use Only ___ of ___

Lab Lot #

Package Sealed Yes No	Samples Sealed Yes No
Received on Ice Yes No	Samples Intact Yes No
Temperature °C of Cooler	
Within Hold Time Yes No	Preserv. indicated Yes No NA
pH Check ok Yes No NA	Res. Cl_2 Check ok Yes No NA
Sample Labels and COC Agree Yes No COC not present	

Sampler Name:	Signature:
Project Name:	Project Number: 2005034
Project Location: IR Site 24 Mugu	Date Required
Lab PM:	Hard Copy: ____/____/____
	Fax: ____/____/____

Laboratory ID	MS MSD	Client Sample ID	Sampling Date	Sampling Time	Ref #	#/ Cont. Volume	Preserv	Matrix	Grab									Additional Analyses / Remarks

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous Solids
OL = Oil
A = Air
SE = Sediment
SO = Solid
DS = Drum Solid
DL = Drum Liquid
L = Leachate
WI = Wipe
O = _____

Container Key
1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widemouth Glass
6. Other _____

Preservative Key
1. HCl, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn Acetate, Cool to 4°
6. Cool to 4°
7. None

COMMENTS:

Date Received / /
Courier: Hand Delivered ☐
Bill of Lading:

Exhibit 8-4. Soil/Sediment Sample Collection Log

Soil Sampling Log

CAOC ID:	
DATE:	

Sample ID	Center Point Coordinates		Depth (ft)	ASTM Soil Classification Code	Visual Description % Fragments/shot	Sieved Fraction Weight	Laboratory Analyses

EQUIPMENT USED: _____ **Sampler Initials:** _____

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Groundwater Well Development/Purge Log

Project Name:_____ Project No._____ Phase _____ Task _____ Page ___ of ____

SITE ID: _____ **LOCATION ID:** _____ (Well Number) Target Purge Volume : _____ gal

Purging Method/Equipment: _____ Sampling Equipment/ID No: _____

Well Casing Diameter (a) in : _____ Unit Casing Volume (b): _____

Sounding (Depth to Well Bottom from TOC) (c): _____ **Static Water Level** (Depth to Water from TOC) (d): _____

Length of Static Water Column in Casing (e) = (c) - (d) = _____ - _____ = _____

Casing Water Volume (f) = (b) x (e) = _____ x _____ = _____

Casing Volumes = three x (f) _____ = _____

6" Diameter = ~1.5 gal/ft

4" Diameter = ~0.67 gal/ft

3" Diameter = ~0.37 gal/ft

2" Diameter = ~0.17 gal/ft

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By:_____ Checked By: _____

Exhibit 8-6. Water Level Measurement Log

Water Level Measurement Record

Date: _____Time Begun:_____ Time End:_____

Site:_____Project No: _____

Well ID	Elevation Top of Casing (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Well Bottom (ft)	Well Integrity			
					Properly capped & locked?	Surface seal intact?	Frost heave or tampering?	Obstruction in well?

Additional Comments: _____

Prepared by: _____ Date: _____

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Exhibit 8-7. Inspection Log

OTIE
Oneida Total Integrated Enterprises

MAINTENANCE AND CALIBRATION RECORD

DATE: TIME:	
EMPLOYEE NAME:	EQUIPMENT TITLE:
CONTRACT/PROJECT:	EQUIPMENT SERIAL #
ACTIVITY:	EQUIPMENT ID #:
MAINTENANCE PERFORMED:	COMMENTS:
SIGNATURE:	DATE:

CALIBRATION/FIELD CHECK

CALIBRATION STANDARD:	CONCENTRATION OF STANDARD:
LOT NUMBER OF CALIBRATION:	EXPIRATION DATE OF CALIBRATION STANDARD:
PRE-CALIBRATION READING:	POST-CALIBRATION READING:
PRE-FIELD CHECK READING:	POST-FIELD CHECK READING:
ADJUSTMENT (S):	
CALIBRATION: ☐ PASSED ☐ FAILED	
COMMENTS:	
SIGNATURE:	DATE:

Exhibit 8-8. Field Test Results Log

EXAMPLE - FIELD TEST FORM

OTIE

Landfill Gas Monitoring Record

Page of

Date: _____
Circle: Sun Mon Tues Wed Thur Fri Sat

Site: _____ Project No: _____

Sampler: _____

Air Temp: _____ % Humidity: _____
Barometric Pressure: _____ Source of Data: _____
Approx. Wind Speed: _____

				Measurements					
Gas Vent ID	Time	Comments on Vent Well Intergrity	Screen Depth (ft bgs)	PID Reading	Oxygen	CO_2	Temp C	CH_4 specify % Vol. or % LEL	Pressure Reading (mm Hg)

Equipment used: _____

Signature: _____ Date: _____

Exhibit 8-9 QC Inspection Report

QC Completion Inspection Date

USACE COR:	Inspectors:
Project:	
Project Number:	
Contract Number:	

ITEM INSPECTED	DEFICIENCY	ANTICIPATED CORRECTION DATE

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Exhibit 8-10. Variance Form

OTIE
Oneida Total Integrated Enterprises

VARIANCE FORM

VARIANCE No. (XXXX) _____

PROJECT NUMBER _____ PAGE ___ OF ___

PROJECT NAME _____ DATE _____

VARIANCE (INCLUDE JUSTIFICATION)

APPLICABLE DOCUMENT:

cc:

REQUESTED BY _____ DATE _____

APPROVED BY _____ DATE _____

Project Manager

_____ DATE _____

QA/QC Officer

_____ DATE _____

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Exhibit 8-11. Variance Log

OTIE
Oneida Total Integrated Enterprises

VARIANCE LOG
CHRONOLOGIC LIST OF PROJECT VARIANCES

PROJECT MANAGER _____ PAGE ____ OF ____

PROJECT NAME _____

DATE	VARIANCE GRANTED AND APPLICABLE DOCUMENT	RESPONSIBLE INDIVIDUAL

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Exhibit 8-12. Nonconformance Report

OTIE
Oneida Total Integrated Enterprises

NONCONFORMANCE REPORT

NR NO. _____

PROJECT NUMBER _____ PAGE ___ OF ___
PROJECT NAME _____ DATE: _____

1. NONCONFORMANCE DESCRIPTION

IDENTIFIED BY: _____ DATE: _____

2. PROPOSED CORRECTIVE ACTION, INCLUDING INITIATION AND COMPLETION DATES

TO BE PERFORMED BY: _____

3. APPROVAL FOR PROPOSED CORRECTIVE ACTION

Project Manager: _____ DATE: _____
QA/QC Officer: _____ DATE: _____

4. CORRECTIVE ACTION TAKEN (IF DIFFERENT FROM THAT PROPOSED)

5. CORRECTIVE ACTION COMPLETE

PERFORMED BY: _____ DATE: _____
VERIFIED BY: _____ DATE: _____

cc:

PROGRAM MANAGER:
PROJECT MANAGER:
QA/QC OFFICER:
OTHER:

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Exhibit 8-13. Daily Quality Control Report

CONTRACTOR QUALITY CONTROL REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)		DATE
CONTRACT NO.	TITLE AND LOCATION	REPORT NO.

CONTRACTOR Oneida Total Integrated Enterprises	FIELD SUPERVISOR/PROJECT MANAGER
AM WEATHER sun PM WEATHER	MAX TEMP F MIN TEMP F

WORK PERFORMED TODAY				
WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

WAS A JOB SAFETY MEETING HELD THIS DATE? ☐ YES ☐ NO (If YES attach a copy of the meeting minutes)	Total Work Hours on Job Site This Date	
Were there any lost time accidents? ☐ YES x☐ NO (If YES attach a copy of the OSHA report)	Cumulative Total of Work Hours From Previous Report	
Was hazardous material/waste released into the Environment ☐ YES x☐ NO (If YES attach description of incident and proposed action)	Total Work Hours From Start of Construction	

WAS TRENCHING/SCAVVOD/HV ELECTRIC/HIGH WORK DONE? ☐ YES ☐ NO
(If YES attach statement or checklist showing inspection performed)

List safety actions taken today/safety inspection conducted ☐ Safety requirements have been met.

Equipment/material received today to be incorporated in job

Work performed today

Equipment on site today, include number of hours used today

Verbal instructions received: (List any instruction given by the Government personnel on construction deficiencies, retesting required, etc., with action to be taken.)

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Test required by plans and/or specifications performed and results of tests

List the total number samples collected and tested for the day:

COLLECTED: TESTED:

AMPLIFYING INFO:

List the total amount of waste(s) removed from the site:

LIQUID (bb/gal): SOLIDS (yds/tons):

List the following transportation and/or disposal information to date for the project

QUALITY	ID NO.	MATERIAL	MANIFEST NO.	DISPOSAL LOCATION

List all safety violations observed and corrective actions taken:

Submittal Action:

Remarks:

_____ _____
CONTRACTOR/SUPERVISOR DATE

DRAFT