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DRAFT REVISED FINAL

FEASIBILITY STUDY REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey
USACE Contract No. W912DQ-11-D-3004

June 25, 2012

CDM Smith

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Acronyms

AOC	Area of Contamination
ARAR	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	bioaccumulation factor
bgs	below ground surface
BMP	best management practice
CAA	Clean Air Act
CAFRA	Coastal Area Facility Review Act
CAMU	Correction Action Management Unit
CDM Smith	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/yr	centimeter per year
COC	contaminant of concern
COPCs	chemicals of potential concern
CSM	conceptual site model
cu yd	cubic yards
CY	cubic yards
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DGW	discharge to groundwater
DIW	de-ionized water
DLUR	Division of Land Use Regulation
DOT	Department of Transportation
DSW	discharge to surface water
EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessment
ERT	Environmental Response Team
FEMA	Federal Emergency Management Agency
FHA	Flood Hazard Area
FS	Feasibility Study
g	grams
g/cm2/yr	gram per square centimeter per year
GIS	geographic information system
GRA	general response action
HHRA	Human Health Risk Assessment
HQ	hazard quotient
HRS	Hazard Ranking System
IC	institutional control
IDW	investigation derived wastes
LDR	land disposal restriction
LOAEL	lowest observed adverse effect level
LTM	long-term monitoring
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level

MCLG	maximum contaminant level goals
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
MNR	monitored natural recovery
MTR	minimum technology requirements
NAAQS	National Primary and Secondary Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NCP	National Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJGQS	New Jersey Groundwater Quality Standards
NPL	National Priorities List
NYD	New York District
O&M	Operation and Maintenance
OBMUA	Old Bridge Municipal Utility Authority
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PDI	pre-design investigation
POTW	publicly-owned treatment works
PPE	personal protective equipment
PRG	Preliminary Remedial Goal
PRM	Potomac-Raritan-Magothy Formations
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFA	Request for Authorization
RGA	Richard Grubb and Associates, Inc.
RI	Remedial Investigation
SDL	semi-dynamic leach
SESC	Soil Erosion and Sediment Control
SLERA	Screening Level Ecological Risk Assessment
SPLP	synthetic precipitation leaching procedure
S/S	stabilization/solidifying
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
T/M/V	toxicity/mobility/volume
TRW	Technical Review Workgroup
TSCA	Toxic Substances and Control Act
TWA	Treatment Works Approval
µg/L	micrograms per liter
UPL	upper prediction limit
USACE	United States Army Corps Of Engineers

USC	United States Code
UTS	universal treatment standards
VLDPE	low density polyethylene
VOC	volatile organic compound
WHG	Woods Hole Group
XRF	x-ray fluorescence

Executive Summary

Under the United States Army Corps of Engineers (USACE), Kansas City District Contract No. W912DQ-08-D-0018, Task Order No. 018 and W912DQ-11-D-3004, Task Order No. 004 CDM Federal Programs Corporation (CDM Smith) was tasked to complete a Feasibility Study (FS) Report for the Raritan Bay Slag Superfund Site (the site) located in Old Bridge and Sayreville, Middlesex County, New Jersey. The lead agency for the site is the United States Environmental Protection Agency (EPA). CDM Smith has completed a Remedial Investigation (RI) Report, a Human Health Risk Assessment (HHRA), and a Screening Level Ecological Risk Assessment (SLERA).

Site Location and Description

The site is located on the shore of Raritan Bay, in the eastern part of Old Bridge Township within the Laurence Harbor section in Middlesex County, New Jersey. A small portion of the western end of the site, the western jetty at the Cheesequake Creek Inlet, is located in the Borough of Sayreville. The site is bordered to the north by Raritan Bay and to the east, west, and south by residential properties.

The site is approximately 1.5 miles in length and consists of the waterfront area between Margaret's Creek and the area just beyond the western jetty at the Cheesequake Creek Inlet. The portion of the site in Laurence Harbor is part of the Old Bridge Waterfront Park. Slag was observed as part of the seawall that protects the waterfront park, on top of the western jetty at the Cheesequake Creek Inlet and in the Margaret's Creek area, a 47-acre wetland located southeast of the seawall.

For ease of discussion and reference of locations, the site has been divided into 11 Site Areas based on areas identified in historical investigations, site physical characteristics, and the locations of known or potential sources. The 11 Site Areas are shown on Figure 1-2. Discussions are organized into three sectors based on the type of environment and proximity to source areas; sectors include the Seawall Sector (Areas 1, 2, 3, 4, 5, and 6), the Jetty Sector (Areas 7, 8, and 11), and the Margaret's Creek Sector (Area 9).

Site History

In the late 1960s and early 1970s, slag from secondary lead smelting was deposited on the beachfront to protect an area subject to erosion. The western jetty at Cheesequake Creek Inlet was constructed in the late nineteenth century. Slag was reportedly placed on the jetty during the same general time period as the construction of the seawall.

In 2007, elevated levels of lead, arsenic, copper, antimony, and chromium were identified by the New Jersey Department of Environmental Protection (NJDEP) in the soil along the seawall and at a beach near the western end of the seawall.

In 2008 and 2009, EPA collected and analyzed soil, sediment, water, biota, and slag samples to determine whether further action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) was needed. Analytical results indicated that elevated concentrations of lead and other heavy metals were present in the soils, sediment, and surface water near the seawall and the western jetty at the Cheesequake Creek Inlet. EPA's Removal Action Branch conducted a removal action to restrict access to the seawall and western jetty by installing permanent fences and posting signs and implemented public outreach activities to inform residents and others that health hazards exist.

In 2008, EPA's Removal Action Branch received a request from NJDEP to evaluate the seawall and western jetty along the Cheesequake Creek Inlet for a removal action under CERCLA. In 2009, the 47-acre property associated with Margaret's Creek was included in the site. The site was listed on the National Priorities List (NPL) on November 2, 2009.

Physical Characteristics of the Study Area

Topography, Bathymetry and Surface Water Hydrology

Topography and Bathymetry - The site topography is characterized by a gradual rise along the beach to shore bluffs, except for the Margaret's Creek wetlands. The Raritan Bay bathymetry near the beach is characterized by a very gradual seaward slope and a significant ebb shoal (shallow depositional area) has built up near the mouth of Cheesequake Creek. North of this ebb shoal, the depth increases sharply.

Surface Water Hydrology - Surface water drainage in the vicinity of the site is toward the tidal creeks and their associated wetlands. The major surface water bodies at the site include Raritan Bay, Cheesequake Creek, and Margaret's Creek. These water bodies are subject to tidal fluctuations averaging 5.5 feet. Because the slope of the Raritan Bay floor is very gentle, 400 to 600 feet of the Bay floor are exposed during low spring tide.

Sediment Characteristics, Hydrodynamics and Sediment Dynamics

Sediment Characteristics - The beach areas are sandy with little organic carbon. Upland of the beaches, soils are more organic-rich and contain a higher proportion of silt and clays. The subtidal and intertidal areas along Raritan Bay are predominantly sandy, with little silt, clay, or organic carbon.

Hydrodynamics - Since Raritan Bay is relatively calm during normal conditions, the majority of sediment movement occurs during storms. Waves in the Bay originate predominantly from the east and northeast (Atlantic Ocean) and contaminants from the seawall and Margaret's Creek Sector tend to migrate westward. Currents near the Cheesequake Creek Inlet and western jetty are complex due to the strong dominant tidal currents within Cheesequake Creek. Per tidal cycle more water and sediment exit Cheesequake Creek than enter. In Margaret's Creek, the regular flow of water through the wetlands produces minimal currents, although storm surges could produce stronger currents. Margaret's Creek wetlands also are a net exporter of sediment.

Sediment Dynamics - In Raritan Bay, wave-driven and tidal currents transport sediment. Storms can increase the quantity of sediment currents transport by up to a factor of four (Woods Hole Group [WHG] 2011). Across most of the shoreline, non-cohesive sand on beaches and on the Bay floor is readily mobilized into currents. The seawall and revetment (Area 6) limit sand supply.

Since the Bay shoreline is relatively quiet and protected from ocean swells, significant waves and mixing occur only during storm events. Wave-induced mixing is expected to be prominent on beaches and could result in contamination being present at depth on beaches. Cohesive sediments and lower-energy environments are present in the lee (western side) of the Cheesequake Creek western jetty, limiting sediment erosion and mixing.

Jetties along Raritan Bay affect sediment transport. The lee side of the Cheesequake Creek western jetty is a very low energy environment protected from waves and storms. Depositional areas are present just off the eastern Cheesequake Creek jetty. A depositional shoal is also present offshore of the mouth of Margaret's Creek. A dynamic mixing zone is present just offshore of the Cheesequake Creek western jetty with irregular accumulation and sediment is rearranged frequently.

Geochronology studies were conducted in the Margaret's Creek wetlands. Studies show that sediment deposition is actively occurring across the open water portions of the wetlands, except in areas where stormwater runoff from the upland areas create localized currents that inhibit deposition.

Site Hydrogeology and Groundwater/Surface Water Interaction

Synoptic and continuous water level data from the monitoring wells indicate that much of the site area groundwater is affected by tides. The depth to water ranges from a few feet close to the Bay to as much as 30 feet inland at the background well. In general, the depth to water increases inland, and with increased elevation.

At the western end of the seawall, under low tide conditions, groundwater flow is toward the Bay. Under high tide conditions, the overall groundwater flow direction is also toward the Bay, but flow is more complex due to the influence of tides and the vertical gradient. The eastern end of the seawall at low and high tide shows a simpler relationship between groundwater elevation and tidal elevation; lateral groundwater flow at low tide is toward the Bay while at high tide lateral groundwater flow is inland.

Groundwater at the site is classified as Class II by the NJDEP. However, the groundwater in the site vicinity has high salinity due to intrusion from the Bay water and exceeds the secondary maximum contaminant level (MCL) for total dissolved solids of 500 milligrams per liter (mg/L).

Nature and Extent of Contamination

Slag Distribution Study

A slag distribution study, via test excavations and a visual slag survey, was conducted to define the distribution of slag and estimate the volume of slag and battery casings at the site.

Test Excavations - Slag was observed in 7 of the 26 test excavations in Areas 1 and 4. Slag depths ranged from 1 to 5 feet below the ground surface (bgs). Most of the slag observations were along or near the seawall.

Slag Survey / Battery Casing Survey – Visual Slag and battery casing surveys were conducted at the western jetty, seawall, and Margaret's Creek Sector to determine slag and/or battery casing distribution and volumes. The estimated volume of slag for the western jetty is 5,000 cubic yards (CY), for the seawall is 5,300 CY and for Margaret's Creek Sector is 470CY. The estimated volume of battery casings for the beachfront is 70 CY and for Margaret's Creek Sector is 250CY.

Summary of Seawall Sector

Generally, site-related soil and sediment contamination is defined by co-located lead and arsenic contamination exceeding the site-specific screening criteria, which were established based on the lowest of either the ecological risk based values, the human health risk based values, or benchmarks. For lead, the ecological based value is the lowest. For arsenic, the site-specific background concentration was used.

In the Seawall Sector, site-specific screening criteria were exceeded in specific depositional areas (Areas 2 and 5) and in areas associated with slag. Along the eastern 1,000 feet of the seawall, co-located lead and arsenic that exceed the screening criteria occur along the mean high tide line. Most of the contamination in this area is in the shallow soils and sediment. In Area 2, in the soils and near-shore sediments, lead and arsenic concentrations both exceed the screening criteria. Deeper soils in this area also exceeded both the lead and arsenic human health screening criteria. In Area 5, near the first jetty, co-located lead and arsenic in soil and sediment exceeded either the site-specific or the human health screening criteria. Deeper soil and sediment from this area did not exceed lead or arsenic screening criteria.

Other site-related metals were detected at some locations where lead and arsenic contamination were not co-located. Copper exceeded the site-specific screening criterion in most of the shallow soil samples in Areas 1, 2, and 5, and in shallow sediments in Area 1.

In surface water, lead was commonly detected above the site-specific screening criterion in samples in the intertidal zone, between the eastern end of Area 1 and the western end of Area 6; the highest concentrations were in Areas 1 and 2. Arsenic was detected above its site-specific screening criterion less frequently than lead. Copper frequently exceeded its site-specific screening criterion in Areas 6, 5, and 2.

Summary of Jetty Sector

The highest concentrations of lead, arsenic, antimony, copper, and chromium in the Jetty Sector sediments, soils, and surface water were located on and to the west of the western jetty. Sediment contamination, as defined by the co-location of lead and arsenic that exceed site-specific screening criteria, included the area from the western jetty westward approximately 200 feet into Area 8, and seaward of the western jetty in Area 7. Co-located soil and sediment lead and arsenic above the site-specific screening criteria extended 1,000 feet northwest of the western jetty and westward along the shore into Area 11. In Area 11, co-located lead and arsenic contamination was found along the mean

high tide line and the intertidal zone. The vertical extent of sediment contamination along the entire length of the jetty has not been fully delineated, but the horizontal extent of deeper contamination is bounded to the west.

Concentrations of lead, arsenic, copper, antimony, and chromium in soils in the Jetty Sector exceeded site-specific soil screening criteria. The shallow soils most impacted by site-related metals were on and adjacent to the western jetty. In deep soils, lead and arsenic concentrations exceeding the site-specific screening criteria are limited to the western jetty and Area 8 beach. The contaminant distribution near the intersection of the jetty and the shoreline suggests burial of contaminated sediment.

Two surface water samples in the Jetty Sector exceeded the site-specific screening criteria for lead, arsenic, and copper. Most surface water samples from this area did not exceed the screening criteria.

Cheesequake Creek Inlet Exchange Study Results - The exchange study was conducted to estimate the flux of contaminants through the Cheesequake Creek Inlet. The concentrations of site-related metals in the Inlet surface water were much lower than other areas of the site. In terms of bulk sediment and water, Cheesequake Creek was determined to be a net exporter of both sediments and water into Raritan Bay.

Summary of Margaret's Creek Sector

Sediment samples with co-located lead and arsenic that exceeded the site-specific screening criterion were limited to the shallow wetland areas. The co-location of lead and arsenic in sediment that exceeded the human health screening criteria was limited to one location. In deep sediments, co-located arsenic and lead concentrations above the site-specific screening criteria were limited to two widely-separated locations; both of the high-resolution contaminant analysis cores showed that, in the top eight inches of core, both arsenic and lead exceeded the human health screening criteria. The site-specific screening criterion for copper was exceeded in most shallow sediment samples in the wetland, co-located with arsenic and lead. In the deep samples, the copper criterion was exceeded in three widely-separated locations and the chromium criterion was exceeded in two widely-separated, shallow sediment samples.

In soils, co-located lead and arsenic that exceeded the site-specific screening criteria were identified in nine samples: one on the dunes, two adjacent to Area 1, and six in upland soils. Four shallow soil samples contained co-located arsenic and lead above the human health screening criteria. Two subsurface locations in the upland area exceeded the human health screening criteria for co-located lead and arsenic. The highest concentration of lead was located in the sample adjacent to Area 1. Antimony was above the human health screening criterion in five surface and two subsurface soil samples where elevated lead and arsenic were co-located. The observed distribution of soil contamination is consistent with a model of non-contiguous "hot spots" rather than area-wide contamination.

In surface water, two samples from inside the Margaret's Creek channel exceeded surface water criteria for lead, arsenic, and copper. In the western, open-water portion of the wetlands, two surface water samples exceeded the site-specific criteria for both copper and lead. No surface water samples in the eastern, open-water area exceeded any site-specific screening criteria. In Raritan Bay samples

in the vicinity of Margaret's Creek, lead and copper in surface water samples were detected above the site-specific screening criteria.

Margaret's Creek Exchange Study Results - The Margaret's Creek exchange study evaluated the exchange of contaminants and sediment between the Margaret's Creek wetlands and Raritan Bay via Margaret's Creek (i.e., water and sediment flux). Water and sediment exchange in Margaret's Creek does not occur on a regular basis since the Margaret's Creek wetlands are at a higher elevation than mean high tide. The Margaret's Creek wetlands also are a net exporter of sediment.

High-Resolution Analysis in Sediment Cores - Two sediment cores were collected and sliced into thin sections (i.e., high resolution) for metals analysis and radionuclide dating. Concentrations of lead, arsenic, copper, and antimony at descending depths beneath the bed were plotted. Both cores indicate that metals contamination is present in the subsurface at concentrations tens of times greater than were present in the distant past (deepest interval).

Groundwater Sampling Results

Groundwater samples were collected in two rounds. The second round was collected from a limited number of wells to confirm lead results. In the background well, aluminum, arsenic, iron, lead, manganese, and sodium exceeded their respective screening criteria, indicating that some of the concentrations above site-specific screening criteria in the other samples may not be related to site sources. Lead exceeded the site-specific screening criterion (5 micrograms per liter [µg/L]) in nine monitoring wells (in addition to the background well). These wells are clustered around the three source areas: the western jetty, the seawall, and Margaret's Creek. Arsenic exceeded the site-specific screening criterion (3 µg/L) in six monitoring wells (excluding the background well), with most of the wells clustered around the three source areas, similar to lead. Chromium exceeded the site-specific screening criterion (70 µg/L) in one well on the eastern end of the seawall.

Conceptual Site Model

The conceptual site model (CSM) integrates the information collected during an RI to explain the observed distribution of contamination in site media. The primary source material (slag) contains lead, arsenic, antimony, copper, and chromium, along with other metals. Contaminated soils and sediments derived from weathering of the slag can release contaminants into the environment and act as secondary sources. Erosion of particulates and leaching of metals are two of the mechanisms for release of metals into the environment.

Dissolved metals are washed into surface water via tidal flushing or storm water, or percolate into the subsurface. In the surface water, elevated dissolved-phase lead, arsenic, and copper were observed in all three sectors, and elevated lead was observed in Area 1. Dissolved-phase metals in groundwater travel with groundwater flow and discharge to Raritan Bay. No groundwater contamination was detected in the monitoring wells in the Jetty Sector.

Eroded particulates from the seawall and re-suspended contaminated sediments are transported by an easterly current, and a portion is deposited in the shoal near the intersection of Area 1 and Area 9. Sediments on the western part of the seawall are entrained in the westerly along-shore current and

are deposited on the eastern side of the first and second jetties. Sediment mixing by breaking waves in the surf zones tends to move contamination deeper into the sediment bed.

The complex currents in the Jetty Sector create a depositional area west of the western jetty, a shoal off the eastern jetty, and another shoal off the western jetty. Eroded slag particles and dissolved metals from the western side of the western jetty accumulate in the depositional area. Eddy currents keep the particles from migrating west.

Eroded material from the eastern side of the western jetty is entrained in the strong currents of Cheesequake Creek Inlet where the net sediment flux is toward Raritan Bay. Once in Raritan Bay, some sediments are transported far into Raritan Bay on strong ebb tide currents. Some deposit and accumulate on the ebb shoal just east of the Inlet, and some deposit slightly west of the Inlet in a dynamic area where mixing of Cheesequake Creek flow and Raritan Bay occurs. Sediments are regularly re-suspended and entrained in this mixing zone, settling to the Bay floor during slack tides. The result is no regular pattern of deposition.

In the Margaret's Creek Sector, storm water runoff carries particles of eroded waste and dissolved metals from the upland areas to the ponded surface water. Storm water may flow overland along the drainage pathways or percolate into groundwater; however, elevated lead concentrations were not detected in groundwater. The net result of the hydraulic regime and sediment characteristics in Margaret's Creek is that contamination from the upland areas accumulates in sediments in the wetlands. The high-resolution core data show that higher metals concentrations occur beneath the sediment surface and are covered by cleaner sediments.

Risk Assessment Summaries

Human Health Risk Assessment

Lead in soil, arsenic in fish and hard clam, and iron and cobalt in groundwater are risk drivers at the site. Future child recreational users in Area 2 and current/future construction/utility workers at the site have potential lead risks above the threshold level of concern due to the presence of lead in soil in Area 2 and in soil in the Margaret's Creek Sector upland areas of the site. Adult anglers and children consuming self-caught fish and hard clam from the site have cancer risks or noncancer health hazards exceeding EPA's target threshold due to arsenic. Future residents using groundwater as drinking water have noncancer health hazards exceeding EPA's threshold due to iron and cobalt in groundwater. Although site-related slag material could have contributed some iron, several lines of evidence indicate that the elevated groundwater concentrations result mostly from existing geochemical conditions in the area. Cobalt is a naturally occurring metal and is not a major component of the slag.

Groundwater is not currently used for drinking water at the site. Future potable use of groundwater is unlikely because of high salinity and total dissolved solids, and a municipal water supply is readily available and serves the site and vicinity.

Ecological Risk Assessments

A SLERA (Areas 8 and 9) and an Ecological Risk Assessment (ERA) (Area 1) prepared by EPA/Environmental Response Team (ERT) (EPA/ERT 2010) evaluated the potential for risks to ecological receptors from exposure to site chemicals.

Screening Level Ecological Risk Assessment - The SLERA determined that chemicals present in site media may pose a risk to ecological receptors utilizing Areas 8 and 9. Risk drivers included metals, polycyclic aromatic hydrocarbons (PAHs), pesticides, and a polychlorinated biphenyl (PCB), specifically Aroclor 1254.

Several metals were identified as risk drivers mostly through direct contact in both Areas 8 and 9 sediment, and Area 9 soil; model results indicated that arsenic and lead were the primary risk drivers to terrestrial receptors. Risk drivers to modeled aquatic receptors via dietary exposure were arsenic, copper, lead, and selenium.

Risk from exposure to PAHs was mostly limited to receptors in contact with Area 9 sediments. Pesticides and PCBs as a group posed a risk to receptors in contact with Area 9 soil and Areas 8 and 9 sediment; however, risks were limited to a few compounds.

Ecological Risk Assessment of Area 1 - The Area 1 ERA indicated risks to the intertidal invertebrate community, and fecundity and early-life stage development of the horseshoe crab from exposure to arsenic and lead in sediment, arsenic, manganese, and lead in pore water, and arsenic, copper, and lead in surface water.

Conservative food chain exposure models indicated risks to invertivorous and herbivorous birds from dietary exposure to arsenic and lead in sediment; risk to herbivorous birds from dietary exposure to chromium was also noted. Finally, consumption of slag particles may also pose a risk to avian receptors, a result of ingestion of particles for use within bird crops. This exposure pathway was not quantified.

Contaminants of Concern

The Raritan Bay Slag site was listed on the NPL because of heavy metal contamination, which was a result of placement of secondary lead smelter slag, battery casings, and associated wastes in the western jetty, seawall, and the Margaret's Creek upland area. Although several types of contaminants were identified in the large quantity of analytical data obtained during the RI, a few key heavy metals, including lead and arsenic, were selected as the contaminants of concern (COCs) for the site based on the RI data and the risk assessments. These metals are known to be associated with the source materials and were also detected frequently at the site in all media and often at elevated levels. The human health and ecological risk assessments indicated that lead and arsenic contribute the majority of the potential risks in the media evaluated. Therefore, lead and arsenic were identified as COCs and were used to define the areas that would require remediation at the site. Although other metals, including copper, chromium, antimony, and iron, were found in varying proportions in the slag relative to the COCs, they were either detected less frequently, generally at lower levels, or are less toxic than the COCs and were not the primary drivers of the risks at the site. Although PAHs, pesticides and PCBs were detected at the site, these chemicals are not related to site activities and will not be addressed

in this FS because CERCLA does not require contaminants not related to site activities to be addressed as part of the site remedy.

Remedial Action Objectives

Remedial Action Objectives (RAOs) are media-specific goals for protecting human health and the environment. They serve as the basis for the development of remedial action alternatives and specify what the cleanup action will accomplish. The process of identifying the RAOs follows the identification of affected media and contaminant characteristics; evaluation of exposure pathways, contaminant migration pathways, and exposure limits to receptors. RAOs for this site are:

- Reduce to acceptable levels human health risks from exposure resulting from incidental ingestion of and dermal contact with slag and battery casings/associated wastes, contaminated soil and sediment.
- Reduce to acceptable levels the risks to ecological receptors resulting from the ingestion of and direct contact with slag and battery casings/associated wastes, contaminated soil and sediment and ingestion of contaminants via food chain exposure.
- Reduce or eliminate migration of contamination from the slag and battery casings/associated wastes to surface water, groundwater, soil, and sediments.
- Reduce or eliminate migration of contamination from the contaminated soil and sediment to surface water, groundwater, soil, and sediments.
- Reduce to an appropriate background concentration, total arsenic in site-related biota tissue currently resulting in an unacceptable risk to human health via consumption (fish, hard clam). Site-specific background data will be collected during the design phase prior to any remedial action.

Preliminary Remediation Goals

In order to achieve the RAOs, preliminary remediation goals (PRGs) for the COCs were developed. PRGs are chemical-specific concentration goals for specific media. They have been derived based on comparison to Applicable or Relevant and Appropriate Requirements (ARARs), risk-based levels (human health and ecological), and background concentrations, with consideration also given to other requirements such as analytical detection limits, guidance values and other pertinent information. PRGs for the site media are presented below.

COCs	Slag/Battery Casing/ Associated Wastes	Contaminated Soil and Sediment (mg/kg)	Basis
Arsenic	Removal of source materials would be by visual observation	15	Site-specific background value
Lead		400	Human health risk-based value

Remediation Goals for Biota - The remediation goal is to prevent unacceptable risks to human health, resulting from consumption of biota. Site-specific background biota data will be collected during the

design phase prior to any remedial action. Monitoring requirements for biota will be developed during the design phase.

Exposure to groundwater as drinking water posed an unacceptable human health risk from cobalt and iron. Cobalt is not a site-related contaminant. Iron is a site-related contaminant; however, much of the iron present in site groundwater is likely a result of naturally-occurring iron and the geochemical conditions present causing it to dissolve readily. Due to the conditions present at the site, source removal is not expected to markedly decrease groundwater iron concentrations. While lead and arsenic did not pose an unacceptable health risk, concentrations in groundwater did exceed acceptable levels near the jetty and seawall but also in the background well. As a result, monitoring of lead and arsenic in groundwater as an indication of reduced contamination from source removal is not a reliable metric. Groundwater will be monitored solely to assess impacts from remedial activities.

While exposure to surface water did not pose any unacceptable human health risks, long term monitoring is proposed to assess impacts from remedial activities and to ensure that surface water concentrations decrease below acceptable levels once source materials are removed. Monitoring requirements for groundwater and surface water will be developed during the design phase. During the visual slag survey, approximately 11,100 CY of slag, battery casing/associated wastes were observed. Based on the existing data, there are approximately 58,000 CY of soil and 190,000 CY of sediment exceeding the PRGs that would require remediation.

Identification and Screening of Remedial Technologies

Various remediation options or technologies are screened against site specific-conditions using three criteria: Effectiveness, Implementability, and Relative Cost. Process options and technologies that are applicable to site conditions are retained, including: no action, institutional/engineering controls, long-term monitoring (LTM), monitored natural recovery (MNR), containment/capping, excavation/ dredging, ex-situ and in-situ treatment, and off-site disposal.

Summary of Remedial Action Alternatives

The retained technologies were combined into six alternatives to address the site contamination and are described below.

Below are elements common to all the alternatives except the no action alternative.

- Institutional Controls (IC) are requirements to control, limit, and monitor activities at the site. Some IC measures may include restrictions on fishing or other recreational activities, drilling, and on groundwater use. A program to increase community awareness of potential hazards could also be implemented.
- Five-year reviews would also be performed as part of all alternatives as required by CERCLA.
- LTM and maintenance would include periodic sampling and analysis of surface water, groundwater, soil, sediment, biota, toxicity studies and/or caged bivalve studies at site locations. For alternatives that include installation of engineered containment structure(s) or installation of a cap or for alternatives that involve passive measures such as MNR or enhanced MNR, additional monitoring of sediment and maintenance of containment cells and caps would

be performed to assess effectiveness or track progress. Details of LTM would be determined during the design phase.

- Dewatering would be applicable to all alternatives except the No Action alternative that involve removal of sediment and excavation of beach sand below the groundwater.
- Alternative 2 would require restoration of the wetlands in the Bay areas and Margaret's Creek. Alternatives 3 through 6 would require restoration of the Bay area wetlands only.

Alternative 1 - No Action

The No Action alternative was retained in accordance with the NCP requirement to serve as a baseline for comparison with the other alternatives.

Present Worth for Alternative 1: $0.

Alternative 2 - Excavation/Dredging, Off-site Disposal, Institutional Controls and Long-Term Monitoring

Under this alternative, slag, battery casing/associated wastes, contaminated soils and sediment above the PRGs would be excavated and/or dredged and disposed of at off-site facilities. The disposal requirements would depend on the metal concentrations and results of required regulatory tests on the wastes. Contaminated wastes that fail toxicity characteristic leaching procedure (TCLP) would require treatment to meet the Land Disposal Restriction (LDR) Treatment Standards for contaminated soil prior to disposal in a Subtitle C landfill. Contaminated wastes that pass TCLP can be disposed in a Subtitle D landfill without treatment. Certified clean material/fill/sands would be placed as appropriate at the excavated areas. The Margaret's Creek wetland would be impacted due to dredging and would require restoration.

Present worth for Alternative 2: $217.4 million

Alternative 3 - Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Under this alternative, MNR would be implemented for selected remediation target areas in Areas 7 and 11, and the Margaret's Creek wetland portion. The slag, battery casings/associated wastes, contaminated soil and sediment above the PRGs in areas other than the MNR areas would be removed and disposed of at off-site facilities as described under Alternative 2. The Margaret's Creek wetland portion would not require restoration, but the Margaret's Creek upland portion would require restoration.

Present Worth for Alternative 3: $122.6 million

Alternative 4 – Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Under this alternative MNR would be implemented for selected remediation target areas for Areas 7 and 11, and the Margaret's Creek wetland, and contaminated soil and sediment in areas other than the MNR areas would be removed and disposed of at off-site facilities as discussed under Alternative 2. The slag and battery casing/associated wastes would be placed in the on-site containment cells

consisting of bottom liners, collection systems, lined containment walls, or berms and a low permeability cover. These cells would be constructed within the site in the upland area of Margaret's Creek and in the asphalt area near the western jetty. There would be a wetland transition zone between the containment cell and the wetland at the Margaret's Creek upland area. Treatment of slag to meet land disposal requirements prior to placement in the containment cell would not be required, as this operation is consolidation of waste materials within an Area of Contamination, which exempts waste consolidation from meeting LDR requirements. The Margaret's Creek wetland portion would not require restoration, but the Margaret's Creek upland portion would require restoration.

Present Worth for Alternative 4: $119.1 million

Alternative 5 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

Under this alternative, MNR would be implemented for selected remediation target areas in Areas 7 and 11 and the Margaret's Creek wetland. Additionally, a selected remediation target area in Area 8 would be capped. This alternative would also include on-site containment of slag, battery casings/associated wastes, and contaminated soil and sediment excavated or dredged from other site areas. There would be a wetland transition zone between the containment cells and the wetland at the Margaret's Creek upland area. However, the on-site containment cells would not have the capacity to contain all the contaminated soil and sediment from other site areas. Therefore, the excavated soil and dredged sediment that could not be accommodated in the containment cells would be disposed of at off-site facilities. The Margaret's Creek wetland portion would not require restoration, but the Margaret's Creek upland portion would require restoration.

Present Worth for Alternative 5: $80.0 million

Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

This alternative would be similar to Alternative 5 except capping of Area 8 would not be implemented. Instead, the contaminated sediment from Area 8 would be dredged and disposed of at off-site facilities.

Present Worth for Alternative 6: $82.6 million

The table below summarizes the volume of slag, battery casings/associated wastes, contaminated soil and sediment that would be addressed by remedial components.

List of Alternatives	Source Material Volume		Soil/Sediment Volume		On-Site Containment Volume	MNR Volume (Areas 7, 9, and 11)	Capping Volume (Area 8)
	On-Site	Off -Site	On-Site	Off-Site	On-Site	On-Site	On-Site
Alternative 1							
Alternative 2		11,100		247,200			
Alternative 3		11,100		134,300		112,900	
Alternative 4	11,100*			134,300	11,100	112,900	
Alternative 5	11,100*		86,700*	37,200	97,800	112,900	10,400
Alternative 6	11,100*		86,700*	47,600	97,800	112,900	

Notes:

1. All volumes are in cubic yards.

* Volume included under onsite containment cells.

Comparison of Remedial Action Alternatives

The six alternatives are evaluated with respect to the seven evaluation criteria; the comparison among the six site-wide alternatives is summarized below.

Overall Protection of Human Health and the Environment

Alternative 1 would not protect human health and the environment. Alternatives 2 through 6 would provide protection to human health and the environment. However, during dredging operations under Alternatives 2, risks to ecological receptors would temporarily increase due to the disruption caused to the aquatic habitat from the dredging operation, especially in the Margaret's Creek wetland, where the wetland would be excavated/dredged and would need to be restored. Conversely, Alternatives 3 through 6 would have less impact to the environment as fewer areas would be dredged and the Margaret's Creek wetland would not be disturbed. However, the time to achieve protectiveness would be longer for Alternatives 3 through 6 than for Alternatives 2. For Alternatives 2 and 3, human health risk would be eliminated or greatly reduced through removal of contaminated materials and MNR. For Alternatives 4 through 6, human health risk would be eliminated or greatly reduced through removal and containment of contaminated materials; however, long-term maintenance of the containment cells would be required for these alternatives. The contaminated land would be restored to beneficial use with Alternatives 2 through 6.

Alternative 1 would not meet the RAOs. Alternatives 2 and 3 would meet the RAOs. Alternatives 4 through 6 would meet the RAOs provided that on-site containment is properly maintained.

Compliance with ARARs

Alternative 1 would not comply with chemical-specific ARARs because no action would be taken. Alternative 2 would comply with chemical-specific ARARs through removal and off-site disposal. Alternatives 3 through 6 would take longer (because of MNR) to comply with chemical-specific ARARs through various remedial activities. Action-specific and location-specific ARARs are not applicable to Alternative 1 since no action would be taken. Alternatives 2 through 6 would comply with action-specific ARARs by implementing health and safety measures during the remedial action, and by meeting regulatory requirements necessary for remedy implementation. Alternatives 2 through 6

would also comply with location-specific ARARs by meeting wetland, coastal zone, and siting requirements. Coastal wetland restoration would be required for Alternatives 2 through 6. Wetland restoration for the Margaret's Creek wetland would not be required for Alternatives 3 through 6 because the wetland would not be disturbed during remedy implementation.

Long Term Effectiveness and Permanence

Alternative 1 would not be considered a permanent remedy and does not achieve long-term effectiveness since no action would be taken. Alternative 2 would remove the contaminated materials from the current unprotected locations and would achieve long-term effectiveness and permanence. Alternatives 3 through 6 would achieve long-term effectiveness through a combination of removal, off-site disposal, on-site containment, capping, and MNR and would be permanent if long-term site controls are maintained.

Reduction of Toxicity/Mobility/Volume through Treatment

Alternative 1 would not reduce Toxicity/Mobility/Volume (T/M/V) through treatment since no treatment would be implemented. Alternatives 2 through 6 would not reduce T/V through treatment on-site; however, off-site disposal, on-site containment, and capping under Alternatives 2 through 6 would reduce the mobility of the contaminants. The use of reactive capping technologies for Alternative 5 would further reduce contaminant mobility. The toxicity of site related metals in contaminated materials would be reduced if treatment is conducted at the offsite treatment and disposal facility.

Short Term Effectiveness

Alternative 1 would not have any short-term impact since no action would be taken. Alternatives 2 through 6 would have impacts to the community during pre-design investigations, source removal, soil excavation, sediment dredging, material handling, on-site containment, capping, and transportation and disposal operations.

Alternative 2 would have the biggest impact to the community since it would involve major construction operations on-site, and heavy traffic on local roads during the transportation and disposal of contaminated materials off-site. Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily. This would be more pronounced in the Margaret's Creek wetland, where the habitat would be impacted and would need to be restored. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

Alternatives 3 through 6 would have less short-term impact when compared to Alternative 2 because dredging would not be performed in selected remediation target zones in Areas 7, 8, 9, and 11. Instead, capping would be performed in Area 8 under Alternative 5, and MNR would be implemented for Areas 7, 9, and 11 under Alternatives 3 through 6.

Implementability

Alternative 1 would be the easiest to implement since it involves no action. Alternatives 2 through 6 would be technically implementable and would use conventional construction equipment, although there would be several technical challenges related to dredging and dewatering the sediment, segregating the slag, accessing work areas, siting of on-site containment cells, capping under water,

and transportation logistics. Alternative 2 would also encounter some technical challenges with regards to wetland restoration. Additionally, Alternatives 4 through 6 also could face potential issues due to settlement of the ground following placement of contaminated material in the containment cells. Alternative 3 would be the easiest to implement among the action alternatives, as it would involve the least disturbance to the site and would not require restoration of the Margaret's Creek wetland. Alternatives 4, 5, and 6 would be the second easiest to implement, as it also would involve lesser disturbance to the site and would not require restoration of the wetland. Alternative 2 would be the most difficult to implement.

Cost

Alternative 1 would not involve any costs. Alternative 2 would have the highest capital cost due to transportation and disposal of the contaminated materials. Alternative 5 would have the lowest cost because of the use of MNR and capping. The table below summarizes the costs for each alternative.

Description	Capital Cost	Total O&M Cost (not discounted)	Present Worth
Alternative 1	$0	$0	$0
Alternative 2	$216.0 million	$1.5 million	$217.4 million
Alternative 3	$117.8 million	$5.9 million	$122.6 million
Alternative 4	$111.9 million	$9.2 million	$119.1 million
Alternative 5	$71.2 million	$11.3 million	$80.0 million
Alternative 6	$74.6 million	$10.2 million	$82.6 million

Green Remediation

Alternative 2 has the highest estimated greenhouse gas emission due to high fuel consumption, followed in sequence by Alternatives 3, 4, 6, 5, and 1.

Section 1
Introduction

Under the United States Army Corps of Engineers (USACE), Kansas City District Contract Nos.W912DQ-08—D-0018, Task Order No. 018 and W912DQ-11-D-3004, Task Order No. 004, CDM Federal Programs Corporation (CDM Smith) was tasked to provide technical services to complete a Remedial Investigation/Feasibility Study (RI/FS) for the Raritan Bay Slag Superfund Site (the site) located in Old Bridge and Sayreville, Middlesex County, New Jersey. The lead agency for the site is the United States Environmental Protection Agency (EPA).

CDM Smith has completed the RI and characterized the site sufficiently to define the nature and extent of the source material and the site-related contaminants in sediment, surface water, soil, and groundwater. CDM Smith has also completed baseline ecological and human health risk assessments. The site characterization and baseline risk assessments are sufficient to complete the Final FS for the site. This Final FS Report was prepared in accordance with the Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA 1988). It presents the rationale for developing, screening, and evaluating a range of remedial alternatives to remediate the source material, sediment, and soil contamination at the site.

1.1 Purpose and Organization of Report

The purpose of the FS is to identify, develop, screen, and evaluate a range of remedial alternatives for the contaminated media and to provide the regulatory agencies with sufficient information to select a feasible and cost-effective remedial alternative that protects public health and the environment from potential risks at the site. This FS report is comprised of five sections as described below.

- Section 1 - Introduction provides a summary of site RI, including site description, site history, site physical characteristics, RI sampling results, nature and extent of contamination, conceptual site model (CSM), and human health and ecological risks.
- Section 2 - Development of Remedial Action Objectives and Screening of Technologies develops a list of remedial action objectives (RAOs) by considering the characterization of contaminants, the risk assessments, and compliance with site-specific applicable or relevant and appropriate requirements (ARARs); documents the quantities of contaminated media; identifies general response actions (GRAs); and identifies and screens remedial technologies and process options.

- Section 3 - Development of Remedial Action Alternatives presents the remedial alternatives developed by combining the feasible technologies and process options.
- Section 4 - Detailed Analysis of Remedial Action Alternatives provides the detailed analysis of each alternative with respect to the following nine criteria: overall protection of human health and the environment; compliance with the ARARs; long term effectiveness and permanence; reduction of toxicity, mobility, or volume (T/M/V) through treatment; short term effectiveness; implementability; cost; state acceptance; and community acceptance. An overall comparison between the various remedial alternatives is also examined in this section.
- Section 5 - References provides a list of references used to prepare the FS.

1.2 Site Location and Description

The site is located on the shore of Raritan Bay, in the eastern part of Old Bridge Township within the Laurence Harbor section in Middlesex County, New Jersey. A small portion of the western end of the site, the western jetty at the Cheesequake Creek Inlet, is located in the Borough of Sayreville. The site is bordered to the north by Raritan Bay and to the east, west, and south by residential properties. A site location map and a site layout map showing the investigation areas are presented as Figures 1-1 and 1-2, respectively.

The site is approximately 1.5 miles in length and consists of the waterfront area between Margaret's Creek and the area just beyond the western jetty at the Cheesequake Creek Inlet (Figure 1-1). The portion of the site in Laurence Harbor is part of Old Bridge Waterfront Park. The park includes walking paths, a playground area, several public beaches, and three jetties, not including the two jetties at the Cheesequake Creek Inlet. The park waterfront is protected by a seawall, which is partially constructed with pieces of slag. The western jetty at the Cheesequake Creek Inlet and the adjoining waterfront area west of the jetty are located in Sayreville. Slag has been placed on top the western jetty and is observed along the adjoining waterfront. Slag was also observed in the Margaret's Creek area, an undeveloped, 47-acre wetland located southeast of the seawall.

1.3 Site History

The slag was deposited at the beachfront in the late 1960s and early 1970s, mostly in the form of blast furnace pot bottoms from a secondary lead smelter, in an area that had sustained significant beach erosion and damage due to a series of storms in the 1960s. Demolition debris in the form of concrete and a variety of bricks, including fire bricks, was also placed along the beachfront. A portion of the seawall also contains large riprap believed to have been placed over the slag when the grassed and paved portion of the park was developed.

The western jetty at Cheesequake Creek Inlet is part of a federally authorized navigation project by the USACE and has been in existence since the USACE constructed it in the late nineteenth century. The slag was reportedly placed on the jetty during the same general time period as the construction of the seawall. The entire jetty is covered with slag that is similar in appearance to slag on the seawall.

The waste material and slag were used to supplement the jetty and as fill and stabilizing material for the seawall.

Elevated levels of lead, antimony, arsenic, chromium, and copper were identified by the New Jersey Department of Environmental Protection (NJDEP) in the soil along the seawall in 2007 and at the edge of the beach near the western end of the seawall. Old Bridge Township placed a temporary "snow" fence in this area, posted "Keep-off" signs in the park along the split rail fence that borders the edge of the seawall, and notified the residents of Laurence Harbor.

EPA collected samples at the site in September 2008 as part of an Integrated Assessment. The purpose of this sampling event was to determine whether further action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was needed. The sampling included the collection of soil, sediment, water, biological, and slag samples from along the seawall in Laurence Harbor, the western jetty at the Cheesequake Creek Inlet, the beaches near these two locations, and the developed portion of the park. EPA and NJDEP analytical results determined that significantly elevated levels of lead and other heavy metals are present in the soils, sediment, and surface water in and around both the seawall in Laurence Harbor and the western jetty at the Cheesequake Creek Inlet.

At EPA's request, the New Jersey Department of Health and Senior Services, in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), evaluated the analytical data from the samples collected at the site. Their findings concluded that, due to the elevated lead levels, a Public Health Hazard exists at the seawall in Laurence Harbor, the beach between the western end of the seawall and the first jetty, and the western jetty at the Cheesequake Creek Inlet, including the waterfront area immediately west of the inlet (ATSDR 2009). As a result of this determination, EPA's Removal Action Branch conducted a removal action to restrict access to these areas (by installing permanent fences and posting signs) and provided public outreach to inform residents and those using these areas of the health hazard that exists.

On April 24, 2008, EPA's Removal Action Branch received a request from NJDEP to evaluate the Laurence Harbor seawall for a removal action under the CERCLA. The CERCLA Information System Identification number for the site is NJN000206276. On November 3, 2008, NJDEP forwarded an amended request to include the western jetty along the Cheesequake Creek Inlet as part of the overall site. In March 2009, the 47 acre property associated with Margaret's Creek was also included in the overall site. The site was listed on the National Priorities List on November 2, 2009.

For ease of discussion and reference of locations, the site has been divided into 11 Site Areas based on areas identified in historical investigations, site physical characteristics, and the locations of known or potential sources. The 11 Site Areas are shown on Figure 1-2. Discussions are organized into three sectors based on the type of environment and proximity to source areas; sectors include the Seawall Sector (Areas 1, 2, 3, 4, 5, and 6), the Jetty Sector (Areas 7, 8, and 11), and the Margaret's Creek Sector (Area 9). In the Jetty and Seawall Sectors, the term "soil" refers to all contaminated solids other than slag and battery casings/associated wastes that lie upland of the mean high tide line. The term "sediment" in the Jetty and Seawall Sectors refers to all contaminated solids other than slag and battery casings/associated wastes seaward of the mean high tide line. The term shallow and deeper

for soil and sediment refers to 0 to 2 feet below ground surface (bgs) and greater than 2 feet bgs, respectively. In the Margaret's Creek Sector, the term "sediment" refers to solids that are submerged in water, and the term "soil" refers to solids other than the slag and battery casings/associated wastes that are on dry land.

1.4 Summary of Previous Investigations

A detailed summary of the data and reports completed before the RI is provided in the Final (Revised) Data Gap Evaluation Technical Memorandum (CDM Smith 2010). Reports produced for EPA, NJDEP, and Old Bridge Municipal Utility Authority (OBMUA) were reviewed. The reports consisted of site investigations, ecological risk assessments, a geophysical survey, a remedial action work plan and report, and Hazard Ranking System (HRS) documentation record.

A brief summary of the investigations and results is presented below.

- NJDEP – NJDEP conducted a preliminary site investigation in March 2007 followed by two subsequent sampling events in May 2007 and July 2007. The investigations consisted of 11 test pits to visually inspect the fill material and 3 rounds of soil sampling, totaling 83 samples, analyzed by an off-site analytical laboratory. The analytical sample results revealed elevated levels of lead, antimony, and arsenic. Radiation meter results concluded that the slag did not present an immediate radiological concern.

- OBMUA – OBMUA conducted an investigation in May 2007 which consisted of 43 surface (0 to 6 inches) soil samples, 23 borings, and 3 shallow monitoring wells. The surface soil samples were screened for metals in the field using a portable X-Ray Fluorescence (XRF) analyzer. Eight samples from the soil borings and the three groundwater samples were sent off-site for analysis. The analytical sample results revealed elevated levels of lead, antimony, chromium, and arsenic. Groundwater samples exceeded screening criteria for nine metals, not including lead.

  Between November 2007 and February 2008 OBMUA conducted a remedial action within the sanitary sewer construction easement in order to manage the contaminated soil prior to construction. These activities were within the upland road area that traverses the Margaret's Creek wetland (Area 9) from Route 35 to the beach. Soil was excavated to a depth of 6 to 18 inches below grade and classified as hazardous (failed for toxicity characteristic leaching procedure [TCLP] lead). A total of 1,075 tons of hazardous soil was disposed of off-site. Thirty-five post excavation soil samples were collected to confirm the effectiveness of the removal.

- EPA conducted several investigations and a risk assessment, as summarized below.

  - EPA conducted a Phase I Investigation in September 2008. Samples included: 48 surface water samples from Areas 1, 2, 4, 6, 7, 8, and 9; 84 sediment samples from Areas 1, 2, 6, 8, 9, and 10 (background location); 95 surface soil samples from Areas 1, 2, 3, 5, 6, 7, 8, and 10 (background location); and 10 subsurface soil samples from Areas 1, 2, 5, and 8.

  - EPA conducted a chemical assessment investigation in September 2008. Samples included: 17 slag samples from Areas 1 and 8; 11 beach sediment samples from Area 1; 5 pore water

samples from Area 1; and 24 samples from 5 types of biota from Area 1. Analytical results from this sampling event were also used in the ecological risk assessment for Area 1.

- EPA conducted a Phase II Investigation in April 2009. Samples included: 134 surface and near-surface soil samples, 116 sediment samples, and 34 surface water samples. Sediment, soil, and surface water samples were collected from Areas 5, 6, and 9. Near surface soil samples were collected from Areas 5 and 6. Sediment samples were also collected from Area 10 (background location).
- EPA conducted additional sediment sampling in June and July 2009. A total of 354 sediment samples were collected from Areas 1, 2, 5, 6, 7, and 8.

- The following activities have also been conducted at the site.
  - EPA conducted an aerial photography review for the years 1957 to 2008.
  - OBMUA conducted Phase IA and Phase IB Cultural Resources Surveys for the Lawrence Harbor Interceptor Line in the Margaret's Creek Sector.
  - OBMUA conducted a geotechnical investigation in Area 9 which included soil borings and cone penetration tests.
  - OBMUA conducted a hydrogeologic investigation which included slug test analyses and pump test analyses at three monitoring wells, MW-1 through MW-3, in Area 9.
  - ATSDR evaluated the existing data and provided recommendations on use restrictions for specific Site Areas.
  - EPA conducted a side-scan sonar investigation in specific areas of the site to examine the morphology of the sediment in Cheesequake Creek and surrounding areas.
  - EPA conducted a geophysical survey in portions of Old Bridge Waterfront Park and from Lawrence Parkway to Margaret's Creek to identify the presence of buried materials, including slag. The report identified subsurface anomalies and recommended areas for further investigation.
  - EPA conducted a preliminary ecological risk assessment to assess the impact of metals being released and transported from the slag boulders and debris to the biological communities inhabiting and/or utilizing the intertidal zone adjacent to the seawall.

1.5 Summary of Remedial Investigation

RI field activities were conducted from September 2010 through June 2011. Activities focused on collecting sufficient data to fill gaps in the existing data as identified in the Final (Revised) Data Gap Evaluation Technical Memorandum (CDM Smith 2010). The major elements of the field investigation are outlined below. Field investigation survey and study activities are described first, followed by a summary of sampling activities by sector and other site-wide sampling activities.

1.5.1 Survey and Study Activities

- Topographic and bathymetric surveys were conducted to provide information on the geometry and physical features of the Raritan Bay floor, beaches, and upland areas, including the surrounding residential communities. The data were used to develop a geographic information system (GIS) and to delineate the upland and intertidal zones.
- Hydrodynamics and sediment dynamics studies were conducted to provide data on currents and sediment transport in the nearshore environment of Raritan Bay.
- A slag distribution study and a slag survey were conducted to define the distribution of slag at the site. The slag distribution study included test excavations to identify the buried slag in the vicinity of the seawall. The slag survey was conducted to visually identify and estimate the volume of slag and battery casings at the seawall, beachfront areas, western jetty, and Margaret's Creek area.
- Exchange studies were conducted in the Cheesequake Creek inlet and Margaret's Creek to estimate the exchange (flux) of contaminants between the creeks and the bay.
- A hydrogeologic assessment was conducted to provide the data to evaluate geologic and hydrogeologic conditions at the site. The hydrogeologic assessment activities are outlined below.
    - Stratigraphic Borings – Two initial borings were advanced to assess site stratigraphy prior to drilling monitoring wells.
    - Monitoring Wells – A total of 15 shallow and 6 deep wells were installed in the overburden to determine the groundwater flow direction, horizontal and vertical hydraulic gradients, and establish baseline groundwater quality.
    - Groundwater and Surface Water Interaction - Continuous water level measurements were recorded in 15 monitoring wells for a period of 1 month (1 tidal cycle). To document long-term changes in groundwater elevations, six rounds of synoptic water level measurements were taken from February to June 2011.
- A Stage IA cultural resources survey was conducted to identify any cultural or archeological resources within the study area. The survey excluded areas of Margaret's Creek where previous Stage 1A and Stage 1B cultural resources surveys were conducted by OBMUA.
- An ecological characterization survey was conducted to characterize habitats in the study area and to identify threatened and endangered species. The survey covered the uplands, beaches, and nearshore environment of Raritan Bay.

1.5.2 Sampling Activities

Sample depths and sample analyses varied depending on the sample locations and purpose. The environmental samples collected during the field investigation are summarized below.

1.5.2.1 Seawall Sector Samples

The Seawall Sector (Areas 1, 2, 3, 4, 5, and 6) samples were collected from upland, beach, and tidal areas potentially impacted by slag material in and around the seawall. A total of 291 sediment samples, 219 soil samples, and 37 surface water samples were collected from the Seawall Sector.

1.5.2.2 Jetty Sector Samples

The Jetty Sector (Areas 7, 8, and 11) samples were collected from upland, beach, and tidal areas potentially impacted by slag material in and around the western Cheesequake Creek Inlet Jetty. A total of 165 sediment samples, 52 soil samples, and 25 surface water samples were collected from the Jetty Sector.

1.5.2.3 Margaret's Creek Sector Samples

The Margaret's Creek Sector (Area 9) samples were collected from upland, beach, and wetland areas potentially impacted by fill material. A total of 184 sediment samples, 276 soil samples, and 21 surface water samples were collected from the Margaret's Creek Sector.

1.5.2.4 Groundwater Samples

One round of groundwater samples was collected from 21 monitoring wells installed during the field investigation. On April 6, 2011, two additional samples were collected from wells MW-10S and MW-10D to confirm previous lead analysis results.

1.5.2.5 Biota Samples

Biological samples included blue crab, hard clams, ribbed mussels, killifish, long neck clams, sea lettuce and six species of game fish across the site.

1.5.2.6 Bioavailability Samples

Forty soil samples were collected from Areas 2, 3, 5, 6, and 9 for in-vitro bioavailability and electron microprobe analysis for lead and arsenic.

1.5.2.7 Technical Review Workshop Lead Composite Samples

Technical Review Workgroup (TRW) has specific guidance on lead sampling. Composite soil samples were collected from 203 locations above the spring low tide line and analyzed for lead. Each composite consisted of five subsamples collected within a 50-foot radius of a center point at a depth of 0 - 2 inches to be representative of soil that is likely to be ingested.

1.5.2.8 Background Samples

Sediment, surface water, soil, and groundwater samples were collected to develop site-specific background concentrations. Forty-nine background sediment, 25 background soil samples, and 11 background TRW samples were collected from Area 10. Twelve background surface water samples were collected from Raritan Bay. Background groundwater samples were collected from monitoring well MW-11S, located upgradient of the site wells.

1.6 Physical Characteristics of the Study Area

1.6.1 Topography and Bathymetry

The site topography is characterized by a gradual rise along the beach to shore bluffs. The bluffs extend the length of the site along the Bay except for Area 9, in front of the Margaret's Creek wetlands. The elevation at the top of the shore bluffs is about 30 feet above mean sea level. South of the bluffs the terrain is primarily flat.

The Raritan Bay bathymetry near the beach is characterized by a very gradual seaward slope. A significant ebb shoal (shallow depositional area) has built up near the mouth of Cheesequake Creek. North of this ebb shoal, the depth increases sharply.

1.6.2 Surface Water Hydrology, Floodplain and Wetlands

Surface water drainage in the vicinity of the site is toward tidal creeks and their associated wetlands. The major surface water bodies at the site include Raritan Bay, Cheesequake Creek, and Margaret's Creek. These water bodies are subject to tidal fluctuations averaging 5.5 feet. Because the slope of the Raritan Bay floor is very gentle, 400 to 600 feet of the Bay floor are exposed during low spring tide.

The entire site, except for small portions of the upland areas in Margaret's Creek Sector, is within zones of high or moderate flooding. Wetlands at the site are all sub-tidal or intertidal estuarine habitats. The wetlands of Margaret's Creek are a mixture of unconsolidated shore with organic soil and emergent wetlands that are vegetated and partially flooded. The portions of the site that are permanently submerged (e.g., Raritan Bay) have unconsolidated substrate. Beach areas consist of intertidal shore with a sand substrate that is either irregularly or regularly flooded.

1.6.3 Sediment Characteristics, Hydrodynamics, and Sediment Dynamics

1.6.3.1 Sediment Characteristics

The beach areas are sandy with little organic carbon. Upland of the beaches, soils are more organic-rich and contain a higher proportion of silt and clays. The subtidal and intertidal areas along Raritan Bay are predominantly sandy, with little silt, clay, or organic carbon.

1.6.3.2 Hydrodynamics

Since Raritan Bay is relatively calm during normal conditions, the majority of sediment movement occurs during storms (Figure 1-3). Waves in the Bay originate predominantly from the east and northeast (Atlantic Ocean). Thus, contaminants from the seawall and Margaret's Creek Sector tend to migrate westward. Currents near the Cheesequake Creek Inlet and western jetty are complex due to the strong dominant tidal currents within Cheesequake Creek. Per tidal cycle more water and sediment exits Cheesequake Creek than enters. In Margaret's Creek, the regular flow of water through the wetlands produces minimal currents, although storm surges could produce stronger currents. The Margaret's Creek wetlands are also a net exporter of sediment.

1.6.3.3 Sediment Dynamics

In Raritan Bay, wave-driven and tidal currents transport sediment. Storms can increase the quantity of sediment currents transport by up to a factor of four (Woods Hole Group [WHG] 2011). Across

most of the shoreline, non-cohesive sand on beaches and on the Bay floor is readily mobilized into currents. The seawall and revetment (Area 6) limit sand supply.

Since the Bay shoreline is relatively quiet and protected from ocean swells, significant waves and mixing occur only during storm events. Wave-induced mixing is expected to be prominent on beaches and could result in contamination being present at depth on beaches. Cohesive sediments and lower-energy environments are present in the lee (western side) of the Cheesequake Creek western jetty, limiting sediment erosion and mixing.

Jetties along Raritan Bay affect sediment transport. The lee side of the Cheesequake Creek western jetty is a very low energy environment protected from waves and storms. Depositional areas are present just off the eastern Cheesequake Creek jetty. A depositional shoal is also present offshore of the mouth of Margaret's Creek. A dynamic mixing zone is present just offshore of the Cheesequake Creek western jetty with irregular accumulation and sediment is rearranged frequently.

Geochronology studies were conducted in the Margaret's Creek wetlands because it is relatively protected from the wind and waves that would disturb sediment stratigraphy. Geochronology cores were not collected off-shore because it is a dynamic wave influenced area with no undisturbed sediment. Figure 1-4 presents the results of the Beryllium-7 (Be-7) analysis for recent deposition and charts of the age versus depth relationships for the two sediment cores (A9-GeoW and A9-GeoE). The Be-7 data in Figure 1-4 show that sediment deposition is actively occurring across the open water portions of the wetlands, except in two locations, A9-95 and A9-97. Stormwater runoff from the upland areas may create localized currents that inhibit deposition.

The two plots on Figure 1-4 show the age versus depth profile and sedimentation rates determined from analysis of lead-210 (Pb-210) and cesium-137 (Cs-137) in sediment cores A9-GeoE and A9-GeoW. Sediment accumulates at A9-GeoW at a rate of 0.04 gram per square centimeter per year (g/cm2/yr). Sedimentation at A9-GeoE is approximately twice as fast at 0.12 g/cm2/yr. Adjusting for the density of the sediments, sediments have been accumulating at a rate of approximately 0.25 centimeter per year (cm/yr) in A9-GeoW and 0.75 cm/yr in A9-GeoE over the past 40 years. The higher sedimentation rate in A9-GeoE is potentially due to its proximity to the culvert that connects the two wetland areas on either side of the dirt road.

1.6.4 Geology

The surficial geologic map of the Raritan Bay Slag site and vicinity prepared by the New Jersey Geological Survey is shown in Figure 1-5 (Stanford 1996). Information from this map was supplemented by lithologic logs obtained from 15 locations were monitoring wells were installed as part of the RI (Figure 1-5).

The site is located in the Coastal Plain Physiographic Province of New Jersey, a seaward-sloping wedge of unconsolidated sediments ranging in age from Cretaceous to Holocene. The coastal plain sediments are composed of clay, sand, silt, and gravel, and are overlain by Quaternary age deposits. In the vicinity of the site the Quaternary deposits are underlain by the Upper Cretaceous age Magothy and Raritan Formations which are, in turn, underlain by the Lower Cretaceous age Potomac Group.

1.6.5 Hydrogeology

The major aquifer system in this region is the New Jersey Coast Plain Aquifer System. The aquifer system at the site is composed of the Potomac-Raritan-Magothy Formations (PRM). Natural recharge occurs primarily through direct precipitation on the outcrop area of the aquifer's geologic formations. The aquifer systems discharge to the surface through streams, springs, and evapotranspiration.

Synoptic and continuous water level data from the monitoring wells indicate that much of the site area groundwater is affected by tides. The depth to water at the site ranges from a few feet close to the Bay at well MW-6S and MW-6D to as much as 30 feet inland at well MW-11S. In general, the depth to water increases inland, away from the bay, and with increased elevation. The synoptic water level elevation data, collected over a six month period, were plotted and posted next to each well on Figure 1-6.

Groundwater at the site is classified as Class II by the NJDEP. However, the groundwater in the site vicinity has high salinity due to impacts from the Bay water. Total dissolved solids concentrations exceed the secondary drinking water standard of 500 milligrams per liter (mg/L).

1.6.6 Groundwater and Surface Water Interaction

Groundwater and surface water interaction at the site were evaluated by collecting a series of synoptic water level measurements from all monitoring wells and staff gauges. Continuous water level data from selected monitoring wells (MW-1S, MW-1D, MW-3S, MW-5S, MW-5D, MW-6S, MW-6D, MW-8S, MW-8D, MW-9S, MW-10S, MW-10D, MW-11S, MW-13S, and MW-14S) was also collected.

At the western end of the seawall, under low tide conditions, groundwater flow is toward the Bay. Under high tide conditions, the overall groundwater flow direction is also toward the Bay, but the flow is more complex due to the influence of tides and the vertical gradient. Flow in the deeper zone tends to stagnate on the inland side of the seawall while shallow groundwater flow is still toward the Bay. The eastern end of the seawall at low and high tide shows a simpler relationship between groundwater elevation and tidal elevation; lateral groundwater flow at low tide is toward the Bay while at high tide lateral groundwater flow is inland.

Near the foot of the Cheesequake Creek western jetty, the deep and shallow water levels were essentially the same. They fluctuated about 6 feet in response to tidal changes in the channel on one side and beach on the other side.

In the Margaret's Creek area about 250 feet to 1,200 feet inland from the Bay no significant tidal influence and were noted. However, the difference in water level elevation along this section is about 4 feet. This observation indicates that there is a consistent component of shallow groundwater flow toward the Bay in this area. Shallow groundwater flow is also probably toward the Margaret Creek wetland area.

1.6.7 Ecological Characterization

The most prominent habitats within the Seawall Sector are scrub/shrub and beach habitats. The eastern extent of the scrub/shrub habitat ends at Areas 3 and 4 (the Old Bridge Waterfront Park

recreational area). Beach habitats within the Seawall Sector are sparsely vegetated with the exception of Area 5, which is characterized by a more diverse and abundant vegetative community.

Habitats in the Jetty Sector are disturbed and degraded. Viable terrestrial habitat within Area 8 is lacking due to the placement of slag, fill material, and asphalt over most of the area. Habitats in Area 11 can be characterized as beach and scrub/shrub.

Margaret's Creek is characterized by four habitat types: beach, tidal marsh, scrub/shrub, and upland forest, with the tidal marsh habitat the most dominant. The entire area has been subjected to intrusive activities such as the placement and excavation of soil, disposal of miscellaneous debris, and littering. Two large marsh communities are divided by an access road but are hydraulically connected by a culvert. Beach habitat transitions into scrub/shrub habitat and forest habitats are limited to raised areas west of the access road and upland areas along the eastern and western edges of the marsh.

1.6.8 Cultural Resources

1.6.8.1 Seawall and Jetty Sector

The Stage IA cultural resources survey in the Seawall and Jetty Sectors of the site was conducted by Richard Grubb and Associates, Inc. (RGA) (June 2011). The Stage 1A survey background research indicated that:

- Two registered prehistoric sites were identified within or adjacent to the site. Based on the proximity of two registered prehistoric sites, an area of potentially undisturbed uplands within the site was identified as having high sensitivity for prehistoric archaeological resources.
- The historic archaeological sensitivity is considered moderate to high in three locations. In two areas foundation ruins were noted: on the western side of the Cheesequake Creek Inlet (Area 8) and along NJ Route 35 west of McKinley Avenue in a wooded lot. In a third location historic map and aerial photographs show several structures once located in Morgan Beach east of the Cheesequake Creek Inlet (Area 6) in an area that is now partly wooded.

A Stage IB cultural resources survey was recommended to be performed within archaeologically sensitive portions of the site that are included in the proposed areas for remediation activities.

1.6.8.2 Margaret's Creek Sector

The Stage IA and IB cultural resources surveys within the Margaret's Creek Sectors of the site were conducted by RGA (February and April 2005) for OBMUA.

<u>Stage 1A Survey</u>

The Stage 1A survey background research indicated that:

- Two registered prehistoric sites lie within or in immediate proximity to the Margaret's Creek area and there is a high likelihood for prehistoric archaeological resources within the area.
- The historic archaeological sensitivity is considered moderate to high because of the unidentified embankment (i.e., the possible rail-line or transportation-related feature).

The Stage IB cultural resources survey was recommended, including systematic shovel testing in the upland sections for prehistoric resources and historical research of an unidentified embankment (i.e., the possible rail-line or transportation-related feature).

Stage 1B Survey

The Stage IB cultural resources survey included documentary research and archaeological testing at systematic sampling intervals. The documentary research determined that no rail line or transportation-related feature was present within the area. A total of 46 shovel test pits were excavated and no potentially significant archaeological resources were identified. No further cultural resources survey activities were recommended.

1.7 Nature and Extent of Contamination

1.7.1 Approach to the Evaluation of Contamination Investigation

The evaluation of the nature and extent of contamination focused on those constituents identified as site-related contaminants (i.e., lead, arsenic, copper, antimony, chromium, and iron) in site sediment, surface water, soil, and groundwater.

1.7.1.1 Selection of Site-Related Contaminants

To provide a focused and coherent assessment of the large quantity of analytical data, several key contaminants were identified and used in previous reports and the RI report. The metals lead, arsenic, copper, antimony, chromium, and iron are known to be associated with the slag source material. These metals were also detected frequently in all media and often at elevated levels. In addition, many of these metals, especially lead and arsenic, are considered toxic and contribute significantly to potential risk in the media evaluated at the site.

Other metals, including cadmium, cobalt, nickel, selenium, silver, thallium, tin, and zinc, were found in varying but lower proportions in slag. Relative to the site-related contaminants, these metals did not drive human health or ecological risks and were detected less frequently than the site-related contaminants that were used to evaluate contamination at the site.

All data were screened against site-specific screening criteria; however, the primary focus was the selected site-related contaminants, in particular lead and arsenic. Site Areas were evaluated relative to all detected contaminants and a careful assessment has been made of co-location of contaminants with lead and arsenic to ensure that “outlier” contaminants are identified so that areas that may require remediation are not missed.

Polycyclic aromatic hydrocarbons (PAHs), pesticides, and the polychlorinated biphenyl (PCB) are not related to site activities and, therefore, these organic compounds will not be addressed in this FS. CERCLA does not require contaminants not related to site activities to be addressed as part of the site remedy. Additionally, these contaminants are in many cases co-located with the site-related contaminants and will be addressed as part of the remedy implementation for the site. Non-site-related contaminants that pose a risk will be referred to the appropriate regulatory agency.

1.7.1.2 Selection of Screening Criteria

Chemical data for sediment, soil, groundwater, and surface water media were screened against applicable regulatory standards and guidance values to delineate the extent of site-related contamination. Human health and ecological based standards and guidance values were used to compile screening criteria for sediment, soil, and surface water. Media-specific screening criteria for sediment, soil, and surface water were determined by a two step approach: first selecting the ecological-based criteria using a hierarchy approach and then comparing this set of ecological-base criteria to human health-based criteria and benchmarks and selecting the lowest value. In some instances, arsenic and lead contamination was evaluated against the human health screening criteria for soil and sediment, in addition to the site specific screening criteria. Screening criteria for groundwater were based on the lowest of the human health standards and guidance values.

1.7.1.3 Background Samples

Sediment, surface water, soil, and groundwater samples were collected and site-specific background concentrations for metals in sediment (both Bay and wetlands) and soil were developed for use in the FS. Area 10 was selected a s the background location for the site. However, this area was not considered appropriate to establish background concentrations in wetland sediments for ecological risk assessment purposes. Therefore, a wetland of comparable characteristics (Whaler's Creek) was identified. This area is located out of the watershed and is not impacted or influenced by the site. Sediments collected from this location were used for ecological risk purposes only.

The background sediment and soil data were evaluated to determine whether the 95 percent upper prediction limit (UPL) values (a measure of background concentration) could be calculated using EPA's ProUCL software. Results of the evaluation indicate that valid 95 percent UPLs could be calculated for most metals in sediment and soil. For several metals in the sediments and soil there was insufficient data or an insufficient number of detections to calculate valid 95 percent UPLs. Tables 1-1 to 1-3 summarize the calculated 95 percent UPL values for the sediment and soil.

1.7.2 Slag Distribution Study

As described in Section 1.5.1, a slag distribution study, via test excavations, and a slag survey were conducted to define the distribution of slag and estimate the volume of slag and battery casings at the site. Results from these activities are provided below.

1.7.2.1 Test Excavations

Slag was observed in 7 of the 26 test excavations in Areas 1 and 4. Slag depths ranged from 1 to 5 feet bgs. Most of the slag observations were along or near the seawall. In general, lead, arsenic, copper, antimony, and chromium exceeded their respective screening criteria in test pit samples collected along or near the seawall. Arsenic also exceeded its screening criterion in a sample collected from the beach in Area 2.

1.7.2.2 Slag Survey / Battery Casing Survey

Slag and battery casing surveys were conducted at the western jetty, seawall, and Margaret's Creek Sector to determine slag and/or battery casing distribution and volumes (Appendix A). The survey was conducted through visual observation only. The estimated volume of slag for the western jetty is 5,000 cubic yards (CY). The estimated volume of slag for the seawall is 5,300 CY. The estimated

volume of battery casings for the beachfront is 70 CY. The estimate volume of slag for Margaret's Creek Sector is 470 CY and of battery casings is 250 CY. The locations of the slag and battery casings (source material) are shown in Figure 1-7.

1.7.3 Summary of Seawall Sector

The primary sources of site-related metals contamination are slag and battery casings. The seawall is up to 80 percent slag. Battery casings were found in the upper 2 inches of depositional zones in Areas 2 and 5. Buried slag was observed in test excavations on the upland side of the seawall in Area 1 and the eastern end of Area 4.

Generally, site-related soil and sediment contamination in the Seawall Sector is defined by co-located lead and arsenic contamination exceeding the screening criteria in specific depositional areas (Areas 2 and 5) and in areas associated with slag (Figures 1-8 and 1-9).

Along the eastern 1,000 feet of the seawall, co-located lead and arsenic that exceed the screening criteria occur along the mean high tide line. Most of the contamination in this area is in the shallow soils and sediment. In Area 2, in the soils and near-shore sediments, lead and arsenic concentrations both exceed the screening criteria. Deeper soils in this area also exceeded both the lead and arsenic human health screening criteria. In Area 5, near the first jetty, co-located lead and arsenic in soil and sediment exceeded either the site-specific or the human health screening criteria. Deeper soil and sediment from this area did not exceed the lead or arsenic screening criteria.

Other site-related metals were detected at some locations where lead and arsenic contamination were not co-located. Copper (Figures 1-10 and 1-11) exceeded the site-specific screening criterion in most of the shallow soil samples in Areas 1, 2, and 5, and in shallow sediments in Area 1. Antimony exceeded the site-specific screening criterion in sediment and soil samples, especially in the eastern end of Area 1; in soils in Areas 2, 4, and 5; and in sediment in Area 2. Chromium exceeded the site-specific screening criterion in one shallow sediment sample collected in Area 6 on the north side of the third jetty.

In surface water, lead (Figure 1-12) was commonly detected above the site-specific screening criterion in surface water samples collected from the intertidal zone, between the eastern end of Area 1 and the western end of Area 6; the highest concentrations were in Areas 1 and 2. Arsenic (Figure 1-13) was detected above its site-specific screening criterion less frequently than lead. Copper (Figure 1-14) frequently exceeded its site-specific screening criterion in Areas 6, 5, and 2.

1.7.4 Summary of Jetty Sector

The western jetty and adjacent areas contain slag and some battery casings. The western side of the western jetty and the adjacent shoreline are comprised of 80 to 90 percent slag. The prevailing currents in the vicinity of the western jetty promote sediment deposition on the western side of the jetty and transport of sediment into Raritan Bay. The fine-grained organic rich sediments in this area tend to sorb metals.

The highest concentrations of lead, arsenic, antimony, copper, and chromium in the Jetty Sector sediments, soils, and surface water were located on and to the west of the western jetty. Sediment

contamination, as defined by the co-location of lead and arsenic that exceed site-specific screening criteria, included the area from the western jetty westward approximately 200 feet into Area 8, and seaward of the western jetty in Area 7 (Figures 1-15 and 1-16). Co-located soil and sediment lead and arsenic above the site-specific screening criteria extended 1,000 feet northwest of the western jetty and westward along the shore into Area 11. In Area 11, co-located lead and arsenic contamination was found along the mean high tide line and the intertidal zone. The vertical extent of sediment contamination along the entire length of the jetty has not been fully delineated, but the horizontal extent of deeper contamination is bounded to the west.

Concentrations of lead, arsenic, copper, antimony, and chromium in soils in the Jetty Sector exceeded site-specific soil screening criteria. The shallow soils most impacted by site-related metals were on and adjacent to the western jetty. In deep soils, lead and arsenic concentrations exceeding the site-specific screening criteria are limited to the western jetty and Area 8 beach. The contaminant distribution near the intersection of the jetty and the shoreline suggests the wave action has pushed the contaminated sediment deeper.

The majority of surface water samples collected from the Jetty Sector did not exceed screening criteria. However, two surface water samples in the Jetty Sector exceeded the site-specific screening criteria for lead (Figure 1-12), arsenic (Figure 1-13), and copper (Figures 1-14).

Cheesequake Creek Inlet Exchange Study Results

The exchange study was conducted to estimate the flux of contaminants through the Cheesequake Creek Inlet. Contaminant flux for neap ebb, neap flood, spring ebb, and spring flood tidal stages were estimated using Cheesequake Creek flow measurements and lead, arsenic, copper, antimony, and chromium data for surface water samples.

The net flux (mass per tidal cycle) during spring tides is toward Raritan Bay for all five metals. For lead, the spring tide (maximum) net flux out of Cheesequake Creek was 2.36 grams (g) per tidal cycle and the neap tide (minimum) net flux into the Creek was 1.17 g per tidal cycle. Therefore, the net flux for lead during a lunar tidal cycle ranges between 1.17 g into Cheesequake Creek and 2.36 g out of Cheesequake Creek. Arsenic net flux during a lunar tidal cycle ranges from 0.43 g in to less than 0.01 g out of Cheesequake Creek. Copper net flux is consistently out of Cheesequake Creek, ranging from 0.11 to 3.51 g per tidal cycle.

The concentrations of site-related metals in the Inlet surface water were much lower than other areas of the site. In terms of bulk sediment and water, Cheesequake Creek was determined to be a net exporter of both sediments and water into Raritan Bay.

1.7.5 Summary of Margaret's Creek Sector

Sediment samples with co-located lead and arsenic that exceeded the site-specific screening criterion were limited to the shallow wetland areas (Figures 1-17 and 1-18). The co-location of lead and arsenic in sediment that exceeded the human health screening criteria was limited to one location. In deep sediments, co-located arsenic and lead concentrations above the site-specific screening criteria were limited to two widely-separated locations. Both of the high-resolution contaminant analysis cores showed that, in the top eight inches of core, both arsenic and lead exceeded the human health

screening criteria. The site-specific screening criterion for copper was exceeded in most shallow sediment samples in the wetland, co-located with arsenic and lead (Figures 1-10 and 1-11). In the deep samples, the copper criterion was exceeded in three widely-separated locations and the chromium criterion was exceeded in two widely-separated, shallow sediment samples.

No primary sources (e.g., slag or battery casings) were observed in the wetland sediment, which suggests that the source of sediment contamination is weathering of slag and battery casings and storm water runoff from upland sources. Contaminants are dispersed widely across the wetlands, and contamination is generally present only in the top 24 inches.

Two surface water samples collected from inside the Margaret's Creek channel exceeded surface water criteria for lead (Figure 1-12), arsenic (Figure 1-13), and copper (Figure 1-14). In the western, open-water portion of the wetlands, two surface water samples exceeded the site-specific criteria for both copper and lead. No surface water samples in the eastern, open-water area exceeded any site-specific screening criteria. In Raritan Bay samples in the vicinity of Margaret's Creek, lead and copper in surface water samples were detected above the site-specific screening criteria.

In soils, co-located lead and arsenic that exceeded the site-specific screening criteria were identified in nine samples: one on the dunes, two adjacent to Area 1, and six in upland soils. Four shallow soil samples contained collocated arsenic and lead above the human health screening criteria. Two subsurface locations in the upland area exceeded the human health screening criteria for co-located lead and arsenic. The highest concentration of lead was located in the sample adjacent to Area 1. Antimony was above the human health screening criterion in five surface and two subsurface soil samples where elevated lead and arsenic were co-located.

The observed distribution of soil contamination is consistent with a model of non-contiguous "hot spots" rather than area-wide contamination. This finding is consistent with observations that sporadic dumping of waste on the ground surface occurred in the upland areas of Margaret's Creek.

Margaret's Creek Exchange Study Results

The Margaret's Creek exchange study evaluated the exchange of contaminants and sediment between the Margaret's Creek wetlands and Raritan Bay via Margaret's Creek (i.e., water and sediment flux). Water and sediment exchange in Margaret's Creek does not occur on a regular basis since the Margaret's Creek wetlands are at a higher elevation than mean high tide. Therefore, flux out of Margaret's Creek into Raritan Bay was measured. The average daily contaminant flux calculated from Margaret's Creek entering Raritan Bay was approximately 19.1 g of lead per day. The dissolved portion of the lead flux is estimated not to exceed 6.6 g per day.

High-Resolution Analysis in Sediment Cores

Two sediment cores were collected and sliced into thin sections (i.e., high resolution) for metals analysis and radionuclide dating. Concentrations of lead, arsenic, copper, and antimony at descending depths beneath the bed were plotted (Figures 1-19 and 1-20). From the deepest interval to the surface, concentrations rise gradually until a depth of approximately 15 inches, where concentrations increase substantially. Concentrations peak at about three inches depth, and then decrease approaching the surface. Both cores indicate that metals contamination is present in the subsurface at concentrations tens of times greater than were present in the distant past (deepest interval).

1.7.6 Groundwater Sampling Results

Groundwater samples were collected from 21 monitoring wells in January 2011, and in April 2011 from one well pair (MW-10S and MW-10D - to confirm lead results). MW-11S was installed at an upgradient location to monitor background conditions (Figure 1-21).

In background well MW-11S, aluminum, arsenic, iron, lead, manganese, and sodium exceeded their respective screening criteria, indicating that some of the concentrations above site-specific screening criteria in the other samples may not be related to site sources. Lead exceeded the site-specific screening criterion (5 micrograms per liter [µg/L]) in nine monitoring wells (excluding the background well). These wells are clustered around the three source areas: the western jetty, the seawall, and Margaret's Creek. Arsenic exceeded the site-specific screening criterion (3 µg/L) in six monitoring wells (in addition to the background well), with most of the wells clustered around the three source areas, similar to lead. Chromium exceeded the site-specific screening criterion (70 µg/L) in one well on the eastern end of the seawall.

1.8 Summary of Contaminant Fate &Transport

Contaminant fate and transport in the soil, groundwater, surface water, and sediment at the site were evaluated, with the primary focus on the site-related metals. The chemical and mineralogical composition of the slag and battery casing waste materials at the site and the related chemical dissolution processes resulting in aqueous phase (dissolved) metals were evaluated using various leaching tests.

1.8.1 Slag Source Material Composition

Seventeen slag samples were analyzed for metals to determine the composition of the slag. The site-related metals lead, arsenic, antimony, and copper were present at concentrations greater than 2,000 milligrams per kilogram (mg/kg). In fact, lead in slag exceeded 10,000 mg/kg in 15 of 17 samples and 100,000 mg/kg in 5 of 17 samples. Chromium and hexavalent chromium were less than 120 mg/kg. Iron and silicon were present at 4 to 50 percent by weight and aluminum and calcium were present at 2 to 4 percent by weight in composite samples. Concentrations of magnesium, manganese, sodium, tin, and zinc were less than 1 percent (10,000 mg/kg) by weight. The results show that the composition of individual slag samples is highly variable.

1.8.2 Battery Casings Source Material Composition

Samples of contaminated soils near battery casing disposal areas (mainly Area 9) were analyzed for lead and arsenic, relative bioavailability, and speciation. Lead was measured up to 34,697 mg/kg. Arsenic was lower (up to 39 mg/kg) in the bioavailability and speciation testing.

1.8.3 Slag Leaching Tests

Slag samples and slag cores were subjected to a variety of leaching tests (Schnabel 2011 provided in Appendix B), including synthetic precipitation leaching procedure (SPLP), TCLP, and de-ionized water (DIW) using the SPLP procedure. In addition, core samples were subjected to semi-dynamic leach (SDL) tests.

TCLP tests indicated that lead in slag samples exceeded the Resource Conservation and Recovery Act (RCRA) regulatory limit, making the slag a D008 waste. EPA conducted leachability tests using a simulated seawater solution. Up to 870 mg of lead per kilogram of dry slag was leached under these conditions. Selected TCLP arsenic values and all the TCLP lead values exceeded the criteria used to classify material as RCRA hazardous waste. The TCLP lead values and selected TCLP antimony and arsenic values also exceeded the universal treatment standards (UTS) for soil.

The SDL test used intact core samples and DIW as the leach solution. The leach solution was replaced 13 times, representing leaching periods ranging from 2 hours to 43 days (total leaching time of 90 days). The leaching solution was analyzed for metals in each of the 13 samples. The only metals that exceeded the primary maximum contaminant limit (MCL) or Action Level were antimony and lead.

Leachability from the slag was also examined in a neutral salt extraction procedure, used to simulate conditions in which slag is exposed to seawater. Under these conditions, lead was determined to be leachable while arsenic, copper, antimony, and tin did not leach. It was demonstrated that core samples had considerably higher levels of leachable lead than exterior slag samples but levels from both core and exterior samples were above the MCL.

These leaching tests show that if the slag comes into contact with fresh or salt water, it will leach lead. As a result, the slag must be chemically stabilized to minimize the leaching potential. The potential for the slag to contact water must be minimized, or leachate from the slag must be prevented from discharging into the environment.

1.8.4 Battery Casing Leaching Tests

TCLP tests were conducted on the battery casings by analyzing three composite samples from battery casing piles in the upland area of the Margaret's Creek Sector, the Area 2 beach, and the landward end of the western jetty. Lead was the only metal to leach in significant quantities. Samples from the Area 2 beach were below the 5.0 mg/L regulatory TCLP limit. Samples from the Margaret's Creek Sector and western jetty composite samples were both above the TCLP limit, making the battery casings a D008 waste.

1.9 Conceptual Site Model

The CSM integrates all the information collected during the RI to explain the observed distribution of contamination in site media. Figure 1-22 is a graphical representation of the CSM for the site.

The primary source material (slag) contains lead, arsenic, antimony, copper, and chromium, along with other metals. Weathering of the slag can release contaminants into the environment and create secondary sources (e.g., contaminated soils and sediment). Erosion of particulates and leaching of metals are two of the mechanisms for the release of metals into the environment.

Dissolved metals are washed into surface water via tidal flushing or storm water, or percolate into the subsurface. In the surface water, elevated dissolved-phase lead, arsenic, and copper were observed in all three sectors, and elevated lead was observed in Area 1. Dissolved-phase metals in groundwater travel with groundwater flow and discharge to Raritan Bay.

Eroded particulates from the seawall and re-suspended contaminated sediments are transported by an easterly current, and a portion is deposited in the shoal near the intersection of Area 1 and Area 9. Sediments on the western part of the seawall are entrained in the westerly along-shore current and are deposited on the eastern side of the first and second jetties. Sediment mixing by breaking waves in the surf zones tends to move contamination deeper into the sediment bed.

The complex currents in the Jetty Sector create a depositional area west of the western jetty, a shoal off the eastern jetty, and another shoal off the western jetty. Eroded slag particles and dissolved metals from the western side of the western jetty accumulate in the depositional area. Eddy currents keep the particles from migrating west.

Eroded material from the eastern side of the western jetty is entrained in the strong currents of Cheesequake Creek Inlet where the net sediment flux is toward Raritan Bay. Once in Raritan Bay, some sediments are transported far into Raritan Bay on strong ebb tide currents. Some deposit and accumulate on the ebb shoal just east of the Inlet, and some deposit slightly west of the Inlet in a dynamic area where mixing of Cheesequake Creek flow and Raritan Bay occurs. Sediments are regularly re-suspended and entrained in this mixing zone, settling to the Bay floor during slack tides. The result is no regular pattern of deposition.

Although groundwater in the Jetty Sector flows inland through primary source material during flood tides, no groundwater contamination was detected in the well in the Jetty Sector.

In the Margaret's Creek Sector, storm water runoff carries particles of eroded waste and dissolved metals from the upland areas to the ponded surface water. Storm water may flow overland along the drainage pathways or percolate into groundwater; however, elevated lead concentrations were not detected in groundwater. The net result of the hydraulic regime and sediment characteristics in Margaret's Creek is that contamination from the upland areas accumulates in sediments in the wetlands. The high-resolution core data show that higher metals concentrations occur beneath the sediment surface and are covered by cleaner sediments.

1.10 Risk Assessment Summaries

1.10.1 Human Health Risk Assessment

The primary source of contamination at this site is slag, which is comprised of mostly metals including aluminum, antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, vanadium, and zinc. For this HHRA, as required by the EPA Risk Assessment Guidance for Superfund (EPA 2001), other contaminants identified during the remedial investigation were also included in this baseline HHRA to provide a complete picture of the health risk posed at this site. For the HHRA, 25 chemicals, including the metals, are identified as chemicals of potential concern (COPCs) in soil, groundwater, surface water, sediment, and fish/shellfish. These COPCs include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, and metals. Non-site related contaminants that pose a risk will be referred to the appropriate regulatory agency.

Potential exposure pathways and potential receptors evaluated for the site in the HHRA are listed below.

- Current Land Use Scenario: Recreational users in Area 1, Areas 3 through 6, and Area 9; anglers throughout the site except Areas 3 and 4; pedestrians throughout the site except Areas 2, 8, and 11; trespassers in Areas 2, 8, and 11; outdoor workers in Areas 3 and 4; and construction/utility workers throughout the site (see Figure 1-23).

- Future Land Use Scenario: Recreational users in Areas 1 through 6, and Area 9; anglers throughout the site except Areas 3 and 4; pedestrians throughout the site except Areas 8 and 11; trespassers in Areas 8 and 11; outdoor workers in Areas 3 and 4; construction/utility workers throughout the site; and residents throughout the site.

Risks from lead, the cancer risks and noncancer health hazards for exposures to contaminants in various media at the site that were quantitatively evaluated for potential health threats are summarized in Tables 1-4 to 1-6. Total estimated cancer risks and noncancer health hazards were within EPA's target thresholds (10^{-4} to 10^{-6} for cancer risk and unity (1) for the noncancer health hazard) for all receptor scenarios except the following:

- Current/Future Scenario: Construction/utility workers; adult anglers consuming fish or hard clam; and children consuming fish or hard clam

- Future Scenario: Child recreational users in Area 2, and residents using groundwater as drinking water

In conclusion, lead in soil, arsenic in fish and hard clam, and iron and cobalt in groundwater are risk drivers at the site. Future child recreational users in Area 2 and current/future construction/utility workers at the site have potential lead risks above the threshold level of concern due to the presence of lead in soil. Adult anglers and children consuming self-caught fish and hard clam from the site have cancer risks or noncancer health hazards exceeding EPA's target threshold due to arsenic. Future residents using groundwater as drinking water have noncancer health hazards exceeding EPA's threshold due to iron and cobalt in groundwater. Although site-related slag material could have contributed some iron, several lines of evidence indicate that the elevated levels of iron in groundwater are likely natural occurring due to existing geochemical conditions in the area. Cobalt is a naturally occurring metal and is not a major component of the slag.

Groundwater is not currently used for drinking water at the site. Future potable use of groundwater is unlikely because of high salinity and a municipal water supply is readily available and serves the site and vicinity.

1.10.2 Ecological Risk Assessments

A Screening Level Ecological Risk Assessment (SLERA) and an ERA prepared by EPA/Environmental Response Team (ERT) (EPA/ERT 2010) evaluated the potential for risks to ecological receptors from exposure to site chemicals. The SLERA evaluated Areas 8 and 9. EPA/ERT's risk assessment evaluated Area 1 (Appendix C). A technical addendum to the SLERA was prepared to further evaluate potential for risks to ecological receptors from exposure to site chemicals at Areas 1, 8, and 9 using less conservative assumptions.

1.10.2.1 Screening Level Ecological Risk Assessment

The SLERA determined that chemicals present in site media may pose a risk to ecological receptors utilizing Areas 8 and 9. Areas 8 and 9 were selected for evaluation as the areas represent the worst case scenario in terms of exposure pathways for ecological receptors. Risk drivers included metals, PAHs, pesticides and a PCB, specifically Aroclor 1254.

Several metals were identified as risk drivers mostly through direct contact in both Areas 8 and 9 sediment, and Area 9 soil; fewer metals pose a risk via food chain exposure. Model results indicated that arsenic and lead are the primary risk drivers to terrestrial receptors. Risk drivers to modeled aquatic receptors via dietary exposure were arsenic, copper, lead, and selenium.

Risk from exposure to PAHs was mostly limited to receptors in contact with Area 9 sediments; PAHs posed little or no risk to upper trophic level receptors based on the food chain exposure models, or those organisms in contact with Area 8 sediment or Area 9 soil.

Pesticides as a group posed a risk to receptors in contact with Area 9 soil and Areas 8 and 9 sediment; however, risks were limited to a few compounds. Risk from dietary exposure to pesticides in Area 9 soil to insectivorous (feeds mainly on insects) birds and mammals, and carnivorous (flesh-eating) birds were also noted. Collectively speaking, the most prominent pesticide risk driver was 4, 4'-DDT, both from direct contact exposure in Area 8 sediment and Area 9 soil and from dietary exposure to insectivorous birds and mammals, and carnivorous birds utilizing Area 9. The same trend was noted for Aroclor 1254 where risks were from direct contact with Area 8 sediment and Area 9 soil, and from dietary exposure to insectivorous birds and mammals, and carnivorous birds utilizing Area 9.

1.10.2.2 EPA/ERT's Ecological Risk Assessment of Area 1

The Area 1 ERA determined that arsenic and lead in sediment; arsenic, manganese, and lead in pore water; and arsenic, copper, and lead in surface water posed potential risks to the intertidal invertebrate community, and the horseshoe crab (fecundity and early-life stage development).

Conservative food chain exposure models indicated risks to invertivorous and herbivorous birds from dietary exposure to arsenic and lead in sediment; risk to herbivorous (feeds mainly on grass or other plants) birds from dietary exposure to chromium was also noted. Finally, consumption of slag particles may also pose a risk to avian receptors, a result of ingestion of particles for use within bird crops. This exposure pathway was not quantified.

1.10.2.3 Addendum to Screening Level Ecological Risk Assessment

In the SLERA Report and EPA/ERT's investigation report, conservative assumptions were used to evaluate potential ecological risks to receptors exposed to contaminants in media at Areas 1, 8 and 9. Based on this conservative approach, both reports concluded that contaminants present in site media may pose risks to ecological receptors utilizing Areas 1, 8 and 9.

In this Addendum, less conservative assumptions and more representative input parameters in food chain exposure models were used to further evaluate the potential risks to ecological receptors exposed to contaminants in Area 1, 8, and 9. For instance, a 95 percent upper confidence limit of arithmetic mean for each chemical retained as a COPC was used as exposure point concentration, rather than maximum concentration used in the SLERA and in the EPA/ERT's investigation of surface

water data in Area 1. In addition, average reported body weights and food ingestion rates, as well as more realistic site foraging factor for model species that are not expected to reside at the site year long or utilize 100% for foraging were used. Furthermore, three additional model receptors, osprey (a piscivorous bird), Canada goose (an aquatic herbivorous bird) and semipalmated plover (an invertivorous bird) are evaluated in this Addendum.

Results of this Addendum concluded that there are fewer risks from exposure to chemicals in site media when compared to the SLERA. This is most prevalent for Area 9 where no risks are noted from either direct contact or through dietary exposure of sediments. Metals, pesticides, and Aroclor 1254 continue to drive risk in the following site media: Area 1 - sediment and surface water, Area 8 – sediment and surface water, and Area 9 – soil and surface water. However, only metals, specifically lead and arsenic, are considered site-related. Lead is the most prominent risk driver, not only from direct contact, but through dietary exposure in Area 9 soil and Areas 1 and 8 sediments.

Section 2
Development of Remedial Action Objectives and Screening of Technologies

The remedial investigation has characterized the site sufficiently for the completion of the FS. The data from the RI will be used for the screening, evaluation and selection of remedial technologies, development and screening of remedial alternatives, and the evaluation of remedial action alternatives in accordance with CERCLA.

Remedial Action Objectives (RAOs) are media-specific goals for protecting human health and the environment. They serve as the basis for the development of remedial action alternatives and specify what the cleanup action will accomplish. The process of identifying the RAOs follows the identification of affected media and contaminant characteristics; evaluation of exposure pathways, contaminant migration pathways, and exposure limits to receptors. The RAOs are based on regulatory requirements and risk based evaluation, which may apply to the various remedial activities being considered for the site. This section reviews the affected media and contaminant exposure pathways and identifies Federal, State, and local regulations that may affect remedial actions.

Preliminary remediation goals (PRGs) were developed based on Federal or State promulgated Applicable or Relevant and Appropriate Requirement (ARARs), risk-based levels (human health and ecological), and background concentrations, with consideration also given to other requirements such as analytical detection limits and guidance values. These PRGs were then used as benchmarks in the technology screening, alternative development and screening, and detailed evaluation of alternatives presented in the subsequent sections of the FS report.

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended, requires that, at a minimum, any remedial action must achieve overall protection of human health and the environment and comply with ARARs. Other criteria that do not meet the definition of an ARAR are known as to be considered (TBC) criteria, which may also be used to develop RAOs and be considered during evaluation of remedial alternatives.

The remedial action alternatives developed in subsequent sections of this FS are required to attain applicable Federal, State of New Jersey and local environmental requirements. Technical requirements of ARARs must be met by the remedial action alternatives. However, 40 CFR 121(d)(4) allows selection of remedies that will not attain all ARARs provided one of the following conditions is satisfied:

- The remedial action is an interim measure where the final remedy will attain the ARAR upon completion.
- Compliance with all ARARs will result in greater risk to human health and the environment than other options.
- Compliance is technically impracticable.
- The remedial action will attain the equivalent of the ARAR.
- For State requirements, the State has not consistently applied the requirement in similar circumstances.
- Compliance with the ARAR will not provide a balance between protecting public health, welfare, and the environment at the Site and the availability of funding for response at other facilities (fund balancing).

ARARs apply to actions or conditions located onsite and offsite. Onsite actions implemented under CERCLA are exempt from administrative requirements of Federal and State regulations (such as permits), as long as the substantive requirements of the ARARs are met. Offsite actions are subject to the full requirements of the applicable standards or regulations (including all administrative and procedural requirements).

Based on the CERCLA statutory requirements, the remedial actions developed in this FS would be analyzed for compliance with Federal and State environmental regulations. This process involves the initial identification of potential requirements, the evaluation of the potential requirements for applicability or relevance and appropriateness, and, finally, a determination of the ability of the remedial alternatives to achieve the ARARs.

2.1 Development of Remedial Action Objectives

RAOs for all impacted media, including the source media, soil, sediment, groundwater, and surface water, are developed in this section. The process for developing RAOs follows the identification of contaminants of concern (COCs) for each media, identification of potentially applicable or relevant and appropriate federal and state regulations and other guidance, development of human health and ecological risk-based cleanup levels, and finally, selection of the PRGs based on the ARARs, guidance values, risk-based values or background concentrations. Generally, where a chemical-specific ARAR exists, it provides the basis for the corresponding PRG; if more than one applicable chemical-specific ARAR exists, the most stringent applicable requirements are generally applied first. The selected PRGs are levels of COCs which will be protective of human health and the environment and provide the basis for the evaluation of remedial technologies. A detailed discussion of the contaminants and media of concern, principal threat wastes, and development of RAOs is provided below.

2.1.1 Contaminants and Media of Concern

2.1.1.1 Selection of Contaminants of Concern

The Raritan Bay Slag Site was listed on the NPL because of heavy metal contamination, which was a result of placement of secondary lead smelter slag, battery casings, and associated wastes in the

western jetty, seawall, and the Margaret's Creek upland area. Although several types of contaminants were identified in the large quantity of analytical data obtained during the RI, a few key heavy metals, including lead and arsenic, were selected as the contaminants of concern (COCs) for the site based on the RI data and the risk assessments. These metals are known to be associated with the source materials and were also detected frequently at the site in all media and often at elevated levels. The human health and ecologic risk assessments conducted for this site indicated that lead and arsenic contribute the majority of the potential risks in the media evaluated at the site. Therefore, lead and arsenic were identified as COCs and were used to define the areas that would require remediation at the site. Although other metals, including chromium, antimony, and iron, were found in varying proportions in the slag relative to the COCs, they were either detected less frequently, generally at lower levels, or are less toxic than the COCs and were not the primary drivers of the risks at the site.

The RI also identified elevated concentrations of PAHs and PCBs in onsite soil and sediment. The risk assessments performed for this site also identified minor risks posed by these two groups of compounds. Even though these two groups of compounds pose some degree of risks to human health and the environment, they are not related to the slag, battery casings or other associated wastes in the site areas. As a result, these two groups of compounds are not site-related and will not be addressed in this FS. Non site-related contaminants that pose a risk will be referred to the appropriate regulatory agency.

2.1.1.2 Media of Concern

The site consists of the following media that are impacted by the COCs:

- Source materials such as slag and battery casings/associated wastes
- Soil
- Sediment
- Biota
- Groundwater
- Surface water

The sources of contamination (also referred to as "source materials" throughout this document) at the site consist of slag materials and shredded battery casings that are located in all three sectors. Additionally, other industrial wastes are located only in the upland portion of the Margaret's Creek Sector. The other waste materials consist of brick (including refractory brick) and appear to be co-located with the battery casings in the Margaret's Creek Sector. Due to this co-location, the battery casings and the other industrial wastes are referred to as 'battery casings/associated waste' henceforth in this report. Although the source materials such as slag and battery casings/associated wastes are different in nature, the RAOs and the alternatives for these materials are conceptually similar. Hence, the RAOs and the alternatives for the source materials are provided together; however, where specific components of the alternatives for each of these source materials differ, they have been discussed separately.

In the Jetty Sector and the Seawall Sector, the term "soil" refers to all contaminated solids other than the slag and battery casings/associated wastes that lie upland of the mean high tide line. The term "sediment" in the Jetty Sector and the Seawall Sector refers to all contaminated solids other than slag and battery casings/associated wastes seaward of the mean high tide line. This definition is similar to the ecological risk assessment, which is one of the key drivers for establishing the PRGs. In the Margaret's Creek Sector, the term "sediments" refers to solids that are submerged in water, and the term "soils" refers to solids other than the slag and battery casings/associated wastes that are on dry land. The demarcation line of the area "submerged in water" and "dry land" was evaluated during the development of the FS and was also discussed with all stakeholders. Based on the evaluation, the demarcation line is shown in Figure 2-1c.

RAOs are developed for each of the media above and are discussed in Section 2.1.3.

2.1.2 Principal Threat Wastes

2.1.2.1 EPA Definition of Principle Threat Wastes

In the EPA guidance document on principal threat wastes (EPA 1991), the term 'source material' is defined as material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, to surface water, to air or acts as a source for direct exposure. According to the guidance document, principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. Although no "threshold level" of toxicity/risk has been established to equate to principal threat, the document recommends that when toxicity and mobility of source material combine to pose a potential risk of 10^{-3}, or greater, generally treatment alternatives should be evaluated.

2.1.2.2 Principle Threat Wastes at the Site

Principal threat wastes at the site include: (1) slag and battery casings/associated wastes, including particles of slag and battery casings/associated wastes identified in the soil and sediment media; (2) highly impacted soil in the Seawall Sector in portions of Areas 1 and 2, in the Jetty Sector in Area 8 and in the upland portion of the Margaret's Creek Sector; and (3) highly impacted sediment located in Area 8 in the Jetty Sector and Areas 1 and 2 in the Seawall Sector.

Much of the principal threat wastes at the site consist of slag materials, which are believed to have been deposited at the site in late 1960s and early 1970s. The slag materials are present on top of the western jetty and the seawall, mostly in the form of blast furnace pot bottoms that are boulder-sized. Smaller pieces of slag materials are also seen in areas of Margaret's Creek Sector in much lesser quantities compared to the seawall or western jetty.

Shredded battery casing materials are also observed throughout the site including the Jetty Sector, beach areas and selected areas of Margaret's Creek Sector. Leachate studies performed for the battery casing materials showed high levels of lead that exceeded the TCLP criterion. Hence, they are considered sources of contamination and will be addressed as principal threat wastes during this FS. Intermingled with the slag and battery casings, other waste materials such as brick materials

(including refractory brick) were also observed in the upland portion of the Margaret's Creek Sector, suggesting the possible disposal of industrial wastes in this area. As mentioned previously, the battery casings and other wastes are together referred to as 'battery casings/associated waste' in this report. The slag and battery casings/ associated wastes make up most of the principal threat wastes at the site.

Secondary sources of contamination may also be considered principle threat wastes at the site. The forces of erosion and wave actions in the Bay and jetty have caused the breaking up of the slag over time. This has resulted in the migration of significant amounts of particulates/fines from the source materials to the surrounding areas, leading to significant accumulation of COCs in the soil and sediment media at certain locations near the depositional areas in the western jetty and the seawall. Wave actions and currents subsequently spread the contaminants to the nearby areas. Specifically, intertidal zones of the Seawall Sector near the seawall in Area 1, near the first jetty in Area 2, and intertidal and sub-tidal zones in Area 8 contain soils and sediments that are impacted with high levels of COCs that pose unacceptable risks to receptors. Certain locations near the wastes piles in the Margaret's Creek Sector also contain soils that pose high risks. Hence, the soil and sediment at these locations are also considered principal threat wastes and a secondary source material. In accordance with the EPA guidance, treatment alternatives are considered for the principal threat wastes at the site. In instances where treatment is not sufficiently effective in reducing risks or not implementable, other methods such as removal or containment are considered that significantly reduce or eliminate the risks due to principal threat wastes.

2.1.3 Remedial Action Objectives

RAOs for the site are based on the results from the risk assessment and regulatory requirements and were developed in consultation with the EPA/USACE. According to the NCP and RI/FS Guidance, RAOs should include COCs, exposure routes and receptors.

The RI identified heavy metals contamination, in particular, lead and arsenic in the slag, battery casings/associated wastes, soil, sediment, surface water, and groundwater in various areas of the site. These heavy metals in various media contribute risks to human health and the environment. RAOs for each of the contaminated media at the site such as slag and battery casings/associated wastes, soil, sediment, and biota are provided in the below sections.

Surface water includes the waters of Raritan Bay, Cheesequake Creek and Margaret's Creek. Surface water at the site may potentially come into contact with impacted material such as slag, battery casings/associated wastes, soils, and sediments. Based on the RI results, surface water is contaminated with heavy metals from erosion and leaching of slag and battery casings/associated wastes, contaminated soil, and sediment. The contamination poses risk to human health and the environment. However, surface water continuously flows throughout the Bay and it is not a source of contamination. A practical approach for remediating surface water would be to minimize the principal threat wastes that act as sources of contamination, namely the slag and battery casings/associated wastes, contaminated soil, and sediment to contaminate the surface water. Once the migration of contamination from principal threat wastes to the surface water is removed or minimized, the contaminant concentrations in surface water are expected to decrease over time. Subsequently, the risk to human health and the environment would be reduced.

The RI results indicated that the groundwater at areas hydraulically downgradient of the seawall is contaminated with heavy metals. The groundwater upgradient of the seawall is not contaminated with heavy metals. The groundwater contamination could be caused by one or both of the following processes: erosion of slag and battery casings/associated wastes, leaching of heavy metals from the seawall or contaminated soil and sediment from above, and/or from hydraulically connecting to the contaminated surface water, as evidenced by similar sodium concentrations in the groundwater and the surface water. Therefore, direct remediation of the groundwater in those areas will not be effective, as the groundwater will be recontaminated by the source materials or surface water. Similar to the surface water, the approach for remediating the groundwater would be to control the principal threat wastes that act as sources of contamination, namely the slag and battery casings/associated wastes, contaminated soil, and sediment. Once the migration of contamination from principal threat wastes to groundwater and surface water are minimized, the contaminant concentrations in groundwater are expected to decrease over time.

2.1.3.1 Slag and Battery Casings/Associated Wastes

The slag and battery casings/associated wastes contain high concentrations of lead, arsenic, and other heavy metals which pose risks to human health and the environment, and act as the source of contamination for soil, sediment, groundwater, and surface water. Although the slag and battery casings/associated wastes are considered as separate media, the treatment objectives for these media are similar. Hence the RAOs for these media are provided together. However, the components of the alternatives for each of these media, whenever they are different, are listed and described separately. The RAOs for the slag and battery casings/associated wastes are listed below.

- Reduce to acceptable levels human health risks from exposure resulting from incidental ingestion of and dermal contact with slag and battery casings/associated wastes.
- Reduce to acceptable levels the risks to ecological receptors resulting from the ingestion of and direct contact with slag and battery casings/associated wastes.
- Reduce or eliminate migration of contamination from the slag and battery casings/associated wastes to surface water, groundwater, soil, and sediments.

2.1.3.2 Soil

Based on the RI results, the soil in Areas 2, 4, 5, and 9 have been impacted by the slag and battery casings/associated wastes. Some of the areas contain slag particles with high concentrations of heavy metals. The contaminated soil poses risks to human health and ecological receptors and also serves as a secondary source for sediment, surface water, and groundwater contamination. The RAOs for the contaminated soil are listed below.

- Reduce to acceptable levels human health risks from exposure resulting from inhalation (from dust), incidental ingestion of and dermal contact with contaminated soil.
- Reduce to acceptable levels the risks to ecological receptors resulting from the ingestion of and direct contact with contaminated soil and ingestion of contaminants via food chain exposure.

- Reduce or eliminate migration of contamination from the soil to surface water, groundwater, and sediments.

2.1.3.3 Sediment

Based on the RI results, heavy metal contamination in the sediment was identified in various areas in the Raritan Bay, in particular areas near the seawall, western jetty, and Area 2. Sediment contamination was also identified in the Margaret Creek Sector (Area 9). The contaminated sediment poses risks to human health and the ecological receptors and also serves as a secondary source for the surface water and groundwater contamination. The RAOs for the contaminated sediment are listed below.

- Reduce to acceptable levels human health risks from exposure resulting from incidental ingestion of and dermal contact with sediments.
- Reduce to acceptable levels the risks to ecological receptors resulting from the ingestion of and direct contact with contaminated sediments and ingestion of contaminants via food chain exposure.
- Reduce or eliminate migration of contamination from the sediments to surface water, groundwater, and soil.

2.1.3.4 Biota

Consumption of fish/hard clam posed an unacceptable human health risk. The RAO for biota is listed below.

- Reduce to an appropriate background concentration, total arsenic in site-related biota tissue currently resulting in an unacceptable risk to human health via consumption (fish, hard clam). Site-specific background data will be collected during the design phase prior to any remedial action.

2.2 Potential ARARs, Guidelines, and Other Criteria

CERCLA requires that on-site remedial actions attain or waive Federal environmental ARARs, or more stringent State environmental ARARs, upon completion of the remedial actions. Along with the protection of human health, attainment of ARARs is considered threshold criteria under CERCLA. The purpose of ARARs is to define the minimum level of protection that must be provided by a remedy selected and implemented. Additional protection may be required, if necessary, to protect human health and the environment.

2.2.1 Definition of ARARs

ARARs are designated as either “applicable” or “relevant and appropriate,” according to NCP. A requirement under CERCLA, as amended, may be either “applicable” or “relevant and appropriate” to a site-specific remedial action, but not both. The distinction is critical to understanding the constraints imposed on remedial alternatives by environmental regulations other than CERCLA.

If a state or federal environmental law is determined to be either applicable or relevant and appropriate, compliance with the substantive requirements of that ARAR are mandatory under

CERCLA and the NCP. Compliance with ARARs is a threshold criteria that any selected remedy must meet, unless a legal waiver as provided by CERCLA Section 121(d) (4) is invoked.

2.2.1.1 Applicable Requirements

Applicable requirements pertain to those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. Applicable requirements are defined in the NCP, at 40 CFR 300.5—Definitions.

2.2.1.2 Relevant and Appropriate Requirements

Relevant and appropriate requirements pertain to those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site per se, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate. Relevant and appropriate requirements are defined in the NCP, at 40 CFR 300.5—Definitions.

The determination that a requirement is relevant and appropriate is a two-step process that includes: (1) the determination if a requirement is relevant and (2) the determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including an examination of the purpose of the requirement and the purpose of the proposed CERCLA action, the medium and substances regulated by the requirement and the proposed requirement, the actions or activities regulated by the requirement and the remedial action, and the potential use of resources addressed in the requirement and the remedial action. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable (EPA 1988).

2.2.1.3 Other Requirements to Be Considered

These requirements pertain to federal and state criteria, advisories, guidelines, or proposed standards that are not generally enforceable but are advisory and that do not have the status of potential ARARs. Guidance documents or advisories "to be considered" (TBCs) in determining the necessary level of remediation for protection of human health or the environment may be used where no specific ARARs exist for a chemical or situation, or where such ARARs are not sufficient to be protective.

2.2.1.4 Classifications of ARARs

Three classifications of requirements are defined by EPA in the ARAR determination process. An ARAR can be one or a combination of all the following three types of ARARs:

- Chemical-specific ARARs

- Location-specific ARARs
- Action-specific ARARs

Chemical-specific ARARs include those laws and regulations governing the release of materials possessing certain chemical or physical characteristics, or containing specified chemical compounds. These ARARs and TBCs usually are numerical values that are health- or risk-based values or methodologies. They establish acceptable amounts or concentration of chemicals that may be found in, or discharged to, the ambient environment. They also may define acceptable exposure levels for a specific contaminant in an environmental medium. They may be actual concentration-based cleanup levels, or they may provide the basis for calculating such levels. Examples of chemical-specific ARARs are polychlorinated biphenyl (PCB) cleanup criteria for soils under the Toxic Substances and Control Act (TSCA) or MCLs specified for public drinking water that are applicable to groundwater aquifers used for drinking water.

Location-specific ARARs are design requirements or activity restrictions based on the geographical or physical positions of the site and its surrounding area. Location-specific requirements set restrictions on the types of remedial activities that can be performed based on site-specific characteristics or location. Examples include areas in a floodplain, a wetland, or a historic site. Location-specific criteria can generally be established early in the RI/FS process since they are not affected by the type of contaminant or the type of remedial action implemented.

Action-specific ARARs are technology-based, establishing performance, design, or other similar action-specific controls or regulations for the activities related to the management of hazardous substances or pollutants. Selection of a particular remedial action at a site will invoke the appropriate action-specific ARARs, which specify performance standards or technologies, as well as specific environmental levels for discharged or residual chemicals. An example includes transportation of hazardous waste regulations.

Additionally, TBC criteria are also evaluated. TBC criteria are not federally enforceable standards but may be technically or otherwise appropriate to consider in developing site- or media-specific PRGs.

Each of these groups of ARARs and TBCs is described below. Summaries of the potential ARARs and TBCs criteria are provided in Tables 2-1, 2-2, and 2-3.

2.2.2 Chemical-specific ARARs and TBCs

Chemical-specific ARARs are health-based or technology-based numerical values that establish concentration or discharge limits for specific chemicals or classes of chemicals. If more than one requirement applies to a contaminant, compliance with the more stringent applicable ARAR is required. In the absence of ARARs and TBC criteria, guidance values are considered. Table 2-1 outlines the chemical specific criteria applicable to the site.

2.2.2.1 Federal Standards and Guidelines

The federal standards that are considered as chemical-specific ARARs during the FS are listed below. A brief synopsis of the requirement that each ARAR entails, the status of each ARAR (i.e., whether the

ARAR is applicable, relevant, appropriate) or TBC and a brief discussion of the ARAR's consideration in this FS are provided in Table 2-1.

Federal Soil Guideline

- EPA Regional Screening Levels for residential soil

Federal Drinking Water Standards and Regulations

- National Primary Drinking Water Standards (40 CFR 141). Drinking water standards (maximum contaminant levels [MCLs] and non-zero maximum contaminant level goals [MCLGs]). Note that these MCLs are considered relevant and appropriate ARAR for groundwater which is listed as a source of drinking water (CERCLA Section 300.430[e][2][i][b]).
- National Secondary Drinking Water Regulations that set non-mandatory water quality standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels" or SMCLs. They are established only as guidance to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCLs.
- Clean Water Act, Ambient Water Quality Criteria (40 CFR 131)

2.2.2.2 New Jersey Standards and Guidelines

The state standards that are considered as chemical-specific ARARs during the FS are listed below. A brief synopsis of the requirement that each ARAR entails, the status of each ARAR (i.e., whether the ARAR is applicable, relevant, appropriate) or TBC and a brief discussion of the ARAR's consideration in this FS are provided in Table 2-1.

Soil Standards

Soil Remediation Standards (N.J.A.C. 7:26D). Residential direct contact and non-residential direct contact are applicable requirements in the development of cleanup levels. Impact to groundwater criteria are "to be considered" requirements.

Groundwater

- New Jersey Ground Water Quality Standards (NJGQS) Class IIA (NJAC 7:9C), July 22, 2010
- New Jersey Drinking Water Standards (NJ MCL), February 2005
- New Jersey Surface Water Quality Standards (N.J.A.C. 7:9B)

2.2.3 Location-Specific ARARs

Location-specific ARARs are those which are applicable or relevant and appropriate due to the location of the site or area to be remediated. Possible applicable regulations at the site are relevant to wetlands, flood plains, historical places, archaeological significance, endangered species, and wildlife habitats. Table 2-2 outlines the location-specific criteria applicable to the site.

2.2.3.1 Federal Standards and Guidelines

The federal standards that are considered as location-specific ARARs during the FS are listed below. A brief synopsis of the requirement that each ARAR entails, the status of each ARAR, i.e. whether the ARAR is applicable, relevant, appropriate or TBC and brief discussion of the ARAR's consideration in this FS are provided in Table 2-1.

- Rivers and Harbors Act (33 USC 403, 33 CFR 320-330)
- Coastal Zone Management Act (1972) and Coastal Zone Act Reauthorization Amendments (1990) (16 USC 1451 et seq; 16 USC 6217)

<u>Wetlands and Flood Plains Standards and Regulations</u>

- Statement of Procedures on Floodplain Management and Wetlands Protection (40 CFR 6 Appendix A)
- Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-12, 1985)
- Floodplain Management (EO11988)
- Wetlands Executive Order (EO 11990)
- National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321: 40 CFR 1500 to 1508)
- Clean Water Act (CWA) Section 404 (b)(1) Guidelines for Specification of Disposal sites for Dredge or Fill Material; Section 404(c) Procedures; 404 Program Definitions; 404 State Program Regulations

<u>Wildlife Habitat Protection Standards and Regulations</u>

- Endangered Species Act (16 USC 1531 et seq.; 40 CFR 400)
- Fish and Wildlife Conservation Act (16 USC 2901 et seq.)
- Fish and Wildlife Coordination Act (16 USC 661)
- Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703 *et seq.*)
- Magnuson-Stevens Fishery Conservation and Management Act

<u>Cultural Resources, Historic Preservation Standards and Regulations</u>

- National Historic Preservation Act (16 USC 470) Section 106 *et seq.* (36 CFR 800)

2.2.3.2 New Jersey Standards and Guidelines

The state standards that are considered as location-specific ARARs during the FS are listed below. A brief synopsis of the requirement that each ARAR entails, the status of each ARAR (i.e., whether the

ARAR is applicable, relevant, appropriate) or TBC and a brief discussion of the ARAR's consideration in this FS are provided in Table 2-1.

- Tidelands Conveyances
- Flood Hazard Control Act (N.JAC.7:13)
- Flood Control Facilities Act (N.J.S.A 58:16A-50 et seq.; N.J.A.C. 7:8-3.15)

Wetland Protection Regulations

- Freshwater Wetland Protection Act (N.J.A.C. 7:7A, N.J.S.A.13:98-1)
- Wetlands Permit (N.J.SA 13:9A-1)

Coastal Zone Regulations

- Coastal Zone Management Program (N.J.A.C. 7:7E)
- Coastal Permit Program Rules (N.J.A.C. 7:7)
- Coastal Area Facility Review Act Permit (N.J.S.A. 13:19-1 et seq.)
- Waterfront Development Upland Waterfront Permit (N.J.SA 12:5-3)

Wildlife Habitat Protection Standards and Regulations

- Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A-1 - 15)
- Endangered Plant Species List Act (N.J.A.C. 7:5B).

2.2.4 Action-specific ARARs and TBCs

Action-specific ARARs are requirements which set controls and restrictions to particular remedial actions, technologies, or process options. These regulations do not define site cleanup levels but do affect the implementation of specific remedial technologies. For example, although outdoor air has not been identified in the RI report as a contaminated medium of concern, air quality ARARs are listed below, because some potential remedial actions may result in temporary inhalation hazards due to toxic or hazardous substances caused by dust particles in air. Another example is that the treatment, storage and disposal of waste will need to meet the requirements of Land Disposal Restrictions (LDRs) under the Resource Conservation and Recovery Act (RCRA). These action-specific ARARs are considered in the screening and evaluation of various technologies and process options in subsequent sections of this report. Table 2-3 outlines the action-specific criteria applicable to the site.

2.2.4.1 Federal Standards and Guidelines

The federal standards that are considered as action-specific ARARs during the FS are listed below. A brief synopsis of the requirement that each ARAR entails, the status of each ARAR, i.e. whether the ARAR is applicable, relevant, appropriate or TBC and brief discussion of the ARAR's consideration in this FS are provided in Table 2-1.

Principal Threat Waste

- A Guide to Principal Threat and Low Level Threat Wastes (OSWER 9380.3-06FS)

General - Site Remediation

- Occupational Safety and Health Administration (OSHA) Worker Protection (29 CFR 1904, 1910, 1926)
- OSHA General Industry Standards (29 CFR 1910)
- OSHA Construction Industry standards (29 CFR 1926)
- RCRA: Identification and Listing of Hazardous Waste (40 CFR 261); Standards Applicable to Generators of Hazardous Waste (40 CFR 262); Standards for Owners/Operators of permitted hazardous waste facilities (40 CFR 264.10-164.18); Preparedness and prevention (40 CFR.30-264.31); Contingency Plan and Emergency procedures (40 CFR 264.50-264.56)

Transportation of Hazardous Waste

- Department of Transportation (DOT) Rules for Hazardous Materials Transportation Regulations (49 CFR 107, 171, 172, 177, and 179)
- RCRA Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)

Disposal of Hazardous Waste

- RCRA Land Disposal Restrictions (40 CFR 268)
- RCRA Hazardous Waste Permit Program (40 CFR 270)
- Area of Contamination (55FR 8758-8760, March 8, 1990
- Corrective Action Management Units (Subpart S of 40 CFR 264.552)

Discharge of Water

- Federal Clean Water Act - National Pollutant Discharge Elimination System (40 CFR 100 et seq.); Effluent Guidelines and Standards for the Point Source Category (40 CFR 414); Ambient Water Quality Criteria (40 CFR 131.36)
- Clean Water Act Section 404 (40 CFR Parts 230 to 233

Off-Gas Management

- Clean Air Act (CAA)—National Primary and Secondary Ambient Air Quality Standards (NAAQs) (40 CFR 50)
- Standards of Performance for New Stationary Sources (40 CFR 60)
- National Emission Standards for Hazardous Air Pollutants (40 CFR 61)

2.2.4.2 New Jersey Standards and Guidelines

The state standards that are considered as action-specific ARARs during the FS are listed below. A brief synopsis of the requirement that each ARAR entails, the status of each ARAR (i.e., whether the ARAR is applicable, relevant, appropriate) or TBC and a brief discussion of the ARAR's consideration in this FS are provided in Table 2-1.

General Site Remediation

- Technical Requirements for Site Remediation (N.J.A.C. 7:26E)
- Uniform Construction Code (N.J.A.C. 5:23)
- Hazardous Waste Regulations - Identification and Listing of Hazardous Waste (N.J.A.C. 7:26G-5)
- Soil Erosion and Sediment Control Act (N.J.A.C. 2:90)
- Freehold Soil Conservation District Soil Erosion and Sediment Control Plan Certification
- Bureau of Water Allocation Temporary Dewatering Permit Equivalency (N.J.A.C. 7:19)
- Noise Control (N.J.A.C. 7:29)

Transportation of Hazardous Waste

- Transportation of Hazardous Materials (N.J.A.C. 16:49)

Disposal of Hazardous Waste

- Land Disposal Restrictions (N.J.A.C. 7:26G-11)
- Hazardous Waste (N.J.A.C. 7:26C)

Discharge of Water

- New Jersey Pollutant Discharge Elimination System (N.J.A.C. 7:14A)

Off-Gas Management

- Air Pollution Control Act, Standards for Hazardous Air Pollutants (N.J.A.C. 7:27)
- Ambient Air Quality Standards (N.J.A.C. 7:27-13)

2.2.5 RCRA Land Disposal Restrictions Requirements, Area of Contamination, and Corrective Action Management Units

During the RI, composite samples of slag in the seawall and western jetty showed very high concentrations of lead (>4%). Prior to the RI, analysis of the slag performed by EPA showed that lead exceeded 1% in 15 of the 17 samples and exceeded 10% in 5 of the 17 samples. The other site COC arsenic was also present at high concentrations in the slag. TCLP tests of the slag showed that the RCRA regulatory limits for lead were exceeded.

Samples of contaminated soil in the areas where battery casings are disposed showed high concentrations of lead but relatively low concentrations of arsenic. TCLP tests of battery casings showed that lead exceeded the regulatory limit.

After reviewing the listings of F, K, P, and U wastes, none of the waste listings apply to the slag or battery casings/associated wastes. Currently there is no documentation (i.e., manifests) indicating the exact origins of the slag or battery casings/associated wastes. Therefore, it is not possible to definitively identify if these wastes are F-, K-, P-, or U-listed wastes. Since both the slag and the battery casings fail the TCLP regulatory limit for lead, both are classified as RCRA characteristic wastes (D-008). As a result, disposal of the slag and/or the battery casings off-site will need to comply with RCRA Land Disposal Restriction (LDR) requirements. The wastes will need to be treated such that:

- The wastes no longer show the RCRA characteristic (i.e., the leachate concentration for lead passes the TCLP regulatory limit) or
- The leachate concentration for lead and other metals meets the universal treatment standards (UTS)

However, consolidation of the slag materials and battery casings/associated wastes to locations with similar types of contamination on site will not trigger the RCRA LDR. According to the Area of Contamination (AOC) Policy (EPA 1998), EPA interprets RCRA to allow certain discrete areas of generally dispersed contamination to be considered RCRA units (usually landfills). Because an AOC is equated to a RCRA land-based unit, consolidation and in-situ treatment of hazardous waste within the AOC do not create a new point of hazardous waste generation for the purposes of RCRA. This RCRA AOC policy is also applicable to Superfund sites and is referred to as Superfund AOC policy or Superfund AOC rules in this report. This interpretation allows wastes to be consolidated or treated in-situ within an AOC without triggering land disposal restrictions or minimum technology requirements. The AOC interpretation may be applied to any hazardous remediation waste (including non-media wastes) that is in or on the land. Note that the AOC policy only covers consolidation and other in-situ waste management techniques carried out within an AOC. Therefore, treatment of slag and battery casings will not be necessary in order to comply with the RCRA LDR if the wastes are consolidated within an AOC.

EPA has also created a Corrective Action Management Unit (CAMU) rule, which is specially intended for treatment, storage and disposal of hazardous remediation waste. Under the CAMU rule, EPA and authorized states (e.g., NJ) may develop and impose site-specific design, operating, closure and post closure requirements for CAMUs in lieu of the minimum technology requirements (MTR) for land-based units. Although there is a strong preference for use of CAMUs to facilitate treatment, remediation waste placed in approved CAMUs does not have to meet LDR treatment standards. The main differences between CAMU and AOC policy are that, when a CAMU is used, waste may be treated ex-situ and then placed in a CAMU; CAMUs may be located in uncontaminated areas at a facility, and wastes may be consolidated into CAMUs from areas that are not contiguously contaminated. CAMUs must be approved by EPA as an applicable or relevant and appropriate requirement during a CERCLA cleanup using a record of decision.

2.3 Preliminary Remediation Goals

To meet the RAOs defined in Section 2.1.3, PRGs were developed to aid in defining the extent of contaminated media requiring remedial action and developing cost estimates in the FS. This section presents the site-specific PRGs that were developed during the FS. PRGs are chemical specific remediation goals for each media and/or exposure route that are expected to be protective of human health and the environment. They have been derived based on comparison to ARARs, risk-based levels (human health and ecological), and background concentrations, with consideration also given to other requirements such as analytical detection limits, guidance values and other pertinent information.

Slag and battery casings/associated wastes will be remediated based on visual observation (i.e., waste materials observed on site during remedial action will be removed or remediated). Slag materials that are not readily visible will be remediated as soil/sediment.

For the soil and sediment media, a two step process was used to derive the PRGs. In the first step, the PRGs were derived based on parameters that are specific to each medium. In the second step, a single set of PRGs (unified PRGs) was derived that can be applied site wide to both the soil and sediment cleanup. The technical basis of the site-specific PRGs developed for soil and sediment at the site is discussed in detail in Sections 2.3.1 through 2.3.4.

2.3.1 Preliminary Remediation Goals for Soils

Both the regulatory requirements and risk based values were considered in the development of the PRGs for soil. Site background metal concentrations were also taken into consideration in the development of the PRGs. Both Federal and State chemical-specific ARARs were identified. New Jersey State soil remediation standards for residential and non-residential direct contact values are considered applicable requirements in the remediation of soil at the site. New Jersey State impact to groundwater values are “to be considered” requirements. Risk based soil PRGs were also developed based on the potential exposure risks for human and ecological receptors. The human health exposure pathways were evaluated for both residential and non-residential exposures. Ecological risk based PRGs were calculated using food chain models by adjusting the concentration of lead in soil until a lowest-observed-adverse-effect-level (LOAEL)-based hazard quotient (HQ) of 1.0 was achieved. The resulting lead concentration was selected as the PRG. Food chain models were run using literature-based soil-to-food item bioaccumulation factors (BAFs).

For arsenic, a value of 19 mg/kg was selected as the PRG. This value is consistent with the NJDEP soil remediation standard and is also within EPA’s acceptable risk range for human health. For lead, PRGs for soil were selected in two steps:

1. The lowest of the three sets of values (ARAR, human health and ecological risk based values) were selected.
2. The selected results from step 1 were compared to the background concentrations. The higher values were selected as the soil PRGs.

The impact to groundwater value for lead was not selected even though it has a lower value. The reason is that the NJDEP guidance indicates that lead in soil is usually not mobile and will not impact the groundwater if the following conditions are met:

- Lead is not within a mixture that will increase its mobility.
- A co-solvent is not present.
- Soil mixture at the site is not coarser than a sandy loam.
- Soil pH has not been altered by the discharge of acids or bases.
- Lead is not present at levels associated with free or residual product after the slag has been removed.
- There is a clean zone (below default impact to groundwater value) of at least 2 feet between the soil contamination and the groundwater.

The above conditions were met at this site except the beach areas. The beach areas have sandy soil and no clean zones exist between the soil contamination and the groundwater. However, due to the influent from the surface water, the beach area groundwater has high concentrations of total dissolved solids (TDS) (greater than 10,000 mg/L). Based on Federal and State requirements, water with TDS greater than 10,000 mg/L is not considered potable. Therefore the impact to groundwater value is not considered. The soil PRGs for site wide areas are presented in Table 2-4a.

2.3.2 Preliminary Remediation Goals for Sediment

There is no applicable chemical-specific ARAR for remediating site sediment. The development of PRGs for sediment will be risk based values. Site background metal concentrations are also taken into consideration in the development of the PRGs.

For arsenic, the risk based values for human health are based on a carcinogenic risk of 1×10^{-6} or a noncancer hazard index of 1 for the most sensitive human receptor, whichever is lower or applicable. For lead, the human health risk based value is based on the OSWER screening level for residential soil. Ecological risk based PRGs were calculated using food chain models by adjusting the concentration of lead in sediment until a LOAEL-based HQ of 1.0 was achieved. The resulting lead concentration was selected as the PRG. Food chain models used in the derivation of PRGs utilized site-specific BSAFs. The PRGs for the sediment at the site were selected in two steps:

1. Selected from either the human health risk based values or the ecological risk based values, whichever is lower;
2. The selected value from Step 1 was compared to the background concentration. The higher value among the two is selected as the PRG.

The selected PRG for arsenic is 15 mg/kg, which is based on the site-specific background value for sediment. For lead, the human health risk based numbers was selected, because it was the lower of

the two when compared to the ecological risk based number and was higher than the background concentration. The PRGs for the sediment are presented in Table 2-4b.

2.3.3 Unified Preliminary Remediation Goals for Soil and Sediment for All Areas

Sections 2.3.1 and 2.3.2 discussed the development of the PRGs for soil and sediment, respectively. In this section, the soil PRGs and the sediment PRGs were compared and a single set of PRGs (the unified PRGs) was proposed which aimed to collectively address the entire site as a whole regardless of environmental media (e.g., soil and sediment). The reason a single set of unified PRGs was proposed for this site is because in this coastal environment along Raritan Bay and in the tidal zone areas, the chemical and physical characteristics of soil and sediment in most cases are indistinguishable. Additionally, due to the nature of the site (relationship between soil and sediment in the intertidal zone areas), there is significant potential for re-contaminating soil or sediment if the two were cleaned up to a different PRG. Therefore a set of unified PRGs is recommended. Table 2-4c presents the unified PRGs.

For arsenic, a unified PRG of 15 mg/kg was selected, which is the site specific background value and is the lowest among the soil and sediment PRGs developed in Sections 2.3.1 and 2.3.2.

For lead, the proposed site-wide soil PRG is 126 mg/kg and the proposed site-wide sediment PRG is 400 mg/kg. The ecological risk based PRG developed for soil at 126 mg/kg was calculated using a literature-based BAF. The proposed sediment PRG represents the human health PRG and is also in line with the ecological PRG of 401 mg/kg developed for sediment, which was calculated using a site-specific BSAF. Use of PRGs based on site-specific data is preferred because it is realistic and representative of site conditions. Therefore 400 mg/kg was selected as the unified PRG for lead for protection of human health and ecological receptors.

2.3.4 Preliminary Remediation Goals for Biota

The remediation goal is to prevent unacceptable risks to human health, resulting from consumption of biota. Site-specific background biota data will be collected during the design phase prior to any remedial action. Since only fish and hard clam tissue posed an unacceptable health risk in the human health risk assessment, only these species will be included in the baseline monitoring program. Institutional control measures may be implemented to reduce human health risks due to consumption that may remain after source materials are addressed. Monitoring requirements for biota will be developed during the design phase.

2.4 Identification of Remediation Target Areas

Remediation target areas include locations that are impacted with source materials, soil and sediment that exceed the PRGs in the Jetty Sector, Seawall Sector and Margaret's Creek Sector.

2.4.1 Slag and Battery Casings/Associated Wastes

Based on a visual survey (Appendix A), locations that contain slag and battery casings/associated wastes in the Jetty Sector, Seawall Sector and Margaret's Creek Sector are provided in Figures 2-1a, 2-1b, and 2-1c respectively. Slag is present mostly on top surface of the western jetty and in the

seawall. However, small amounts of slag material are also found scattered in areas of Margaret's Creek upland areas.

Based on the visual survey, battery casing materials are scattered throughout all sectors. In the Margaret's Creek Sector, battery casings are found intermingled in the same locations as where slag and other wastes are present. These areas are also shown in Figures 2-1a, 2-1b, and 2-1c. The dimensions and volume estimates for each area are presented in Table 2-5. The depth of these waste piles has not been defined. For volume estimation purposes, it is assumed that these areas will be excavated up to a depth of 2 feet below ground surface (bgs).

The remedial approach for the slag and battery casings/associated wastes involves removal to the maximum practicable extent through visual observation. Both large and small pieces of waste materials will be removed when found. Any smaller pieces of slag material, battery casings/associated wastes that are buried within or co-mingled with the soil or the sediment media would be treated as part of the alternatives that address the soil or sediment media. Post-excavation sampling would be conducted to determine whether soil or sediment surrounding the removal areas meet the selected PRGs.

2.4.2 Soil

Areas of the site with contaminated soil above the PRGs are shown in Figures 2-1a, 2-1b, 2-1c, 2-2a, 2-2b, and 2-2c. These areas were developed based on the analytical results of the collected soil samples. The results for each COC were compared to the PRG to delineate areas requiring remediation. Most of the contamination at the site occurred at depths shallower than two feet below ground surface or seabed surface. These areas were designated as contaminated 'surface' areas. All areas of the site that were contaminated at depths greater than two feet bgs were also delineated separately and designated as contaminated 'subsurface' areas. The soil surrounding a sample location was considered to require remediation if any COC concentrations exceeding the PRGs in the 'surface' or 'subsurface' depths. At many sample locations, more than one sample was collected within any two foot depth interval. For the delineation of zones, the maximum value of any of the samples collected within the two feet interval was considered representative of the 'surface' or the 'subsurface' depth interval.

For estimating the remediation volumes in these 'surface areas', a uniform remediation depth of two feet was assumed. For estimating the remediation volume in 'subsurface' areas, the depth of the "subsurface" contamination was set from two feet to the end depth of the deepest sample with COCs exceeding the PRG. The end depth was rounded up to the closest multiple of two feet to account for the assumed minimum cut interval.

To the extent possible, the remediation target areal limits were set through clean sample locations as long as the clean sample locations were within 30 feet of the adjacent contaminated sample. However, at several locations, the clean sample locations were greater than 30 feet to as much as 200 feet from the closest sample that was contaminated. In these cases, establishing the remediation target area limits at the clean sample locations would be too conservative and would result in unnecessary handling of a high volume of clean sediment. Instead, the remediation target area limits at these locations are set at the mid-point between the clean and contaminated samples. This was

accomplished by generating a set of polygons known as Thiessen polygons around the sample locations. The edges of these Thiessen polygons are perpendicular bisectors of the triangles generated by considering the sample locations as a triangulated irregular network of points. In the instances where the contaminated sample location does not have any clean sample location nearby for distances greater than 200 feet, the remediation target area limits were set at about 30 feet from the contaminated sample location or estimated by professional judgment based on factors such as nature of location, migration mechanism at the location etc. Detailed depiction of this procedure followed during the delineation of the remediation target areas is provided in Appendix C.

The definitions for soil and sediment provided in Section 2.1.1.2 was used to delineate the remediation target areas for soil and sediment. Otherwise, the same approach that was used to generate areas of remediation for soil was also used to generate the remediation target area limits for sediment. This is discussed in more detail in Section 2.4.3. The dimensions and volume estimates for soil in each area and sector are presented in Table 2-5. Due to the large area with a limited number of samples, there is high uncertainty in the volume estimate. The exact areas and volumes of contamination will be refined during the remedial design phase by conducting a pre-design investigation.

2.4.3 Sediment

Areas of the site with contaminated sediment above the PRGs are shown in Figures 2-1a, 2-1b, 2-1c, 2-2a, 2-2b, and 2-2c. Based on the definitions provided in Section 2.1.1.2, in the Jetty Sector and the Seawall Sector, the term 'soil' refers to all contaminated solids other than the slag and battery casings/associated wastes that lie upland of the mean high tide line and the term 'sediment' refers to all contaminated solids other than slag and battery casings/associated wastes seaward of the mean high tide line. In the Margaret's Creek Sector, the term 'sediment' refers to solids that are submerged in water, and the term 'soil' refers to solids other than the slag and battery casings/associated wastes that are on dry land. As mentioned previously, the remediation limits for sediment were generated using the same approach that was used to generate the remediation limits for soil. Following that, the remediation target areas for soil and sediment were estimated separately based on the above definitions. The dimensions and volume estimates for each area are presented in Table 2-5. Detailed depiction of this procedure followed during the delineation of the remediation target areas is provided in Appendix C. Due to the large area with limited number of samples, there is high uncertainty of the volume estimate. The exact areas and volumes of contamination will be refined during the remedial design phase by conducting a pre-design investigation.

2.5 General Response Actions

General response actions (GRAs) are broad remedial actions defined as actions which may satisfy the RAOs and which characterize the range of remedial responses appropriate to the media of concern at the site. Following the development of GRAs, one or more remedial technologies and process options would be identified for each GRA category. Although an individual response action may be capable of satisfying the RAOs alone, combinations of GRAs are usually required to adequately address site contamination. The following sections present the GRAs that may be applicable to each media type at the site and detail the subsequent technology screening process. The technologies and process

options remaining after screening have been assembled into alternatives that are discussed in Section 3.

2.5.1 No Action

The National Contingency Plan (NCP) and CERCLA require the evaluation of a No Action alternative as a basis for comparison with other remedial alternatives. Under the No Action response, no remedial actions are implemented, the current status of the site remains unchanged, and no action would be taken to reduce the potential for exposure to contamination. While the No Action response action may include environmental monitoring to track the contamination, it does not include any actions (e.g., institutional controls) to protect human health or the environment.

2.5.2 Institutional/Engineering Controls

Institutional Controls typically are restrictions placed to minimize future use of the site (e.g., deed notices for groundwater use restrictions and/or land use restrictions, and public education). Engineering controls are restrictions placed to minimize access (e.g., fencing) or other measures to reduce exposures (e.g., alternate drinking water sources) or to track the fate and transport of the contaminants (e.g., long-term monitoring). These limited measures are implemented to provide some protection of human health and the environment from exposure to site contaminants. They are also used to continue monitoring contaminant migration (e.g., long-term monitoring). Institutional/ Engineering Controls are generally used in conjunction with other remedial technologies; alone, they are not effective in preventing contaminant migration or reducing contamination.

2.5.3 Monitoring

Monitoring activities include activities such as sampling and analysis in order to track the fate and transport of the contaminants (e.g., long-term monitoring) and inspections performed to assess the risks of exposure. These measures do not decrease the toxicity/mobility/volume (T/M/V) of the COCs but do assist in delineating the nature and extent of contamination over time. Hence, they are generally used in conjunction with other remedial technologies and are not effective in achieving the PRGs for the COCs by themselves.

2.5.4 Monitored Natural Attenuation/Monitored Natural Recovery

Monitored natural attenuation (MNA) is a response action by which the volume and toxicity of contaminants are reduced by naturally occurring processes. Extensive modeling and monitoring are performed as part of the MNA response action to demonstrate that contaminants do not represent significant risk and that attenuation is occurring. In general, processes which reduce contamination levels include dilution, dispersion, volatilization, adsorption, biodegradation, and chemical reactions with other subsurface constituents. Although volatilization or biodegradation of site COCs, which are metals, do not occur, other mechanisms such as dilution, dispersion, adsorption and chemical reactions can promote attenuation of COC concentrations at the site. However, MNA alone would not be sufficient to treat all areas of the site. This process option could be used in conjunction with other GRAs as part of an alternative.

Monitored natural recovery (MNR) is the response action by which the risk of existing contamination in sediments is being reduced over time by natural burial through sedimentation. The elevated COC

concentrations in sediment must be at a depth, either currently or at a point in time in the foreseeable future, such that the risk for both human and ecological receptors is at acceptable levels. Due to the potential for significant scouring in the Jetty Sector and the Seawall Sector, this response action is expected to be applicable only for the sediment in the wetland areas of the Margaret's Creek Sector and in select areas of the Jetty Sector. Additional evaluation of each area is required in order to determine the applicability of MNR to each area prior to inclusion as part of an alternative. This evaluation is performed in Section 3.

2.5.5 Containment

Containment actions use physical or low permeability barriers to minimize or eliminate contaminant migration and to eliminate the exposure pathways to the human health and the ecologic system. It is typically used at the source areas.

Containment technologies do not involve treatment to reduce the toxicity or volume of contaminants. The response actions require long-term monitoring to determine whether containment actions are performing successfully. The NCP does not prefer containment response actions since they do not provide permanent remedies and do not use treatment. Hence, this GRA is typically combined with other response actions in order to enhance the effectiveness.

2.5.6 Removal

Removal response actions refer to methods typically used to excavate and handle soil, sediment, waste, and/or solid materials. Excavation technologies provide no treatment of wastes, but may be used prior to treatment or disposal to remove wastes from designated areas. It merely transfers the contaminants to be managed under another response action. Hence, removal technologies would be considered in conjunction with technologies for treatment and disposal response actions.

2.5.7 Treatment

Treatment involves the destruction of contaminants in the affected media, transfer of contaminants from one media to another, or alteration of the contaminants, thereby resulting in the reduction of T/M/V of the contaminants and a higher degree of protection to public health and the environment. Treatment technologies vary among environmental media and can consist of chemical, physical, thermal, and biological processes. Treatment can be implemented either in-situ or ex-situ. This GRA is usually preferred unless site or contaminant-specific characteristics make it infeasible from an implementability perspective, or if it is cost prohibitive. The use of treatment technologies to achieve RAOs is favored by CERCLA, unless site conditions limit their application.

2.5.8 Disposal

Disposal response actions for solid phase contamination involve the disposal of excavated soil, sediments, and/or source materials in an offsite facility permitted for the specific waste type, or consolidate onsite in accordance with RCRA regulations.

2.6 Identification and Screening of Remedial Technologies and Process Options

Initial Screening Based on Technical Implementability

Several technologies and process options within each GRA were evaluated based on technical implementability and all process options that were not technically implementable were screened out and all process options within each GRA that are technically implementable were retained. All the technologies and the process options that were considered under each GRA described in Sections 2.5.1 through 2.5.8 are listed in Table 2-6. The results of this screening process, wherein the remedial technologies and the process options were screened out based on technical implementability, are also summarized in Table 2-6. Details regarding individual GRAs, the applicable technologies, process option, a brief description of the action and comments regarding the technical implementability of each option are also included in Table 2-6.

The following potentially applicable technologies and process options were retained under each GRA category (other than No Action) based on their technical implementability:

Institutional/Engineering Controls

- Land Use Restrictions
- Groundwater Use Controls
- Recreational Use Restrictions by Fencing and Signage
- Community Awareness Programs

Monitoring

- Sampling and Analysis
- Site Inspection

Monitored Natural Attenuation/Monitored Natural Recovery

- Monitored Natural Attenuation
- Monitored Natural Recovery
- Enhanced Monitored Natural Recovery

Containment

- Engineered Containment Structure
- In-situ Capping

Removal

- Excavation
- Dredging

Treatment

- Ex -situ Chemical Treatment by S/S
- In-situ Chemical Treatment by S/S

Disposal

- Off-Site Disposal of Hazardous Wastes
- Off-Site Disposal of Non-hazardous Wastes

2.7 Evaluation and Screening of Implementable Technologies

Potential remedial technologies and process options associated with each GRA that are technically implementable in addressing contamination are identified and further screened based on three factors – effectiveness, implementability, and relative cost. Representative remedial technologies and process options that have been retained from this second screening step are used to develop remedial action alternatives.

These representative remedial technologies and process options are retained to simplify the development and analysis of alternatives and to provide greater flexibility in the final design. Table 2-7 provides screening information based on implementability, effectiveness, and relative cost.

The technology screening approach is based upon the procedures outlined in *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 1988). Among the three criteria used in the evaluation process described in the guidance, the effectiveness criterion outweighs the implementability and relative cost criteria. These criteria are described below:

Effectiveness: This evaluation criterion focuses on the effectiveness of process options to reduce the T/M/V of contamination for long term protection, comply with ARARs, achieve protection in a timely manner, and meet the RAOs. It also evaluates the potential impacts to human health and the environment during construction and implementation, and how proven and reliable the process is with respect to site-specific conditions.

Implementability: This evaluation criterion encompasses both the technical and administrative feasibility of the technology or process option. It includes an evaluation of pretreatment requirements, residuals management, and the relative ease or difficulty in performing the operation and maintenance (O&M) requirements. Process options that are technically or administratively unworkable at the site are eliminated by this criterion.

Relative Cost: Cost plays a limited role in the screening process. Both capital and O&M costs are considered. The cost analysis is based on engineering judgment, and each process is evaluated as to whether costs are low, medium, or high relative to the other options within the same technology type.

Remedial technologies and process options that could achieve the RAOs, either alone or in combination with other technologies and process options were used to develop alternatives in Section 3.

2.7.1 No Action

The No Action alternative is not a technology. The NCP requires that a No Action alternative be considered as a basis for comparison.

Effectiveness: The No Action alternative is used as a baseline against which other technologies may be compared. It generally does not provide measures that would comply with ARARs, or otherwise meet RAOs. This alternative has been retained as required by the NCP.

Implementability: The No Action alternative is implementable given that no action would be required.

Relative Cost: The No Action alternative involves no capital, O&M or administrative cost.

Conclusion: The NCP requires that the No Action be retained as an alternative for further consideration.

2.7.2 Institutional/Engineering Controls

Institutional/engineering controls do not reduce the T/M/V of contamination, but can be implemented to reduce the probability of exposure to contaminants. Institutional/engineering controls typically are restrictions placed to minimize access or future use of the site. These limited measures are implemented to provide some protection of human health and the environment from exposure to site contaminants. They are also used to continue monitoring contaminant migration and are generally used in conjunction with other remedial technologies; alone they are not effective in preventing contaminant migration or reducing contamination. Some degree of institutional/ engineering control measures will need to be taken at the site as a component of the remedy to be selected, unless the active treatment can remediate the entire site below all applicable cleanup criteria.

As will be discussed in Section 3, Institutional/Engineering Controls will be a common component of the remedial alternatives that are under consideration in this FS except the No Action alternative.

2.7.2.1 Land Use Controls

Land use controls are government and proprietary controls that include restriction of future site construction, well drilling activities, or any other activities that will result in the disturbance of soils or sediment in site areas.

Effectiveness: These controls may be effective from a human health standpoint through restriction of future site uses or activities which may result in direct contact with contamination. These measures, however, will not reduce the migration or the extent of environmental impacts and will not reduce COC concentrations to protective levels.

Implementability: Implementation may be difficult in some cases if there are objections from property owners. These restrictions will have to be approved by the local municipalities and may be difficult to enforce due to the constraints that will limit future land use options. However, deed restrictions may be implemented, in addition to remediation activities, as a protective measure to prevent exposure to contaminants. It should be noted that most areas of the site are municipal properties; however, portions of the site include beach areas. Hence, although land use controls may be easily implementable in other areas of the site, they may not be easily implementable in the beach areas.

Relative Cost: The implementation cost is low. Some administrative, long-term monitoring and periodic assessment costs would be required.

Conclusion: Land use controls will be retained for further evaluation in all areas at the site.

2.7.2.2 Groundwater Use Controls

Groundwater use controls are government and proprietary controls that would limit use of groundwater in the zone of contamination. The groundwater use near the site is expected to be minimal due to the high salinity and the residences are connected to the public supply system. However, this option is considered because the site area is listed as a possible future source of potable water.

Effectiveness: Groundwater use controls may effectively protect against adverse human impacts from contaminated groundwater. They will not reduce migration or environmental impacts of the contamination or reduce COC concentrations to protective levels.

Implementability: Groundwater at the site is saline and the use is already expected to be low. Hence, groundwater use controls are expected to be easily implementable.

Relative Cost: Low capital costs. Low O & M costs.

Conclusion: Groundwater use controls will be retained for further evaluation in all areas at the site.

2.7.2.3 Fencing and Recreational Use Controls

Fencing would limit access to contaminated areas and warning signs posted that consumption of marine invertebrates as harmful can deter fishing activities at the site. This would significantly reduce the risks of exposure for human receptors, especially from fishing. At present, fencing and signs are in place to restrict access to certain areas of the site.

Effectiveness: Fencing and signs can reduce site access but do not reduce the T/M/V of the contaminated media, which will continue to pose risks to human health and the environment. These measures would also not reduce COC concentrations to protective levels.

Implementability: This process option is easily implemented for the site.

Relative Cost: This process option has low capital and O&M costs.

Conclusion: Fencing and use controls will be retained for further evaluation in all areas at the site.

2.7.2.4 Community Awareness

Community awareness would involve information and education programs to enhance awareness of potential hazards and remedies.

Effectiveness: Educational programs may protect human health by creating awareness and may enhance the benefits of deed restrictions or proprietary controls in limiting human exposures. However, these programs alone would not reduce COC concentrations to protective levels.

Implementability: This option is easily implementable.

Relative Cost: Low capital costs. The maintenance costs depend on duration of educational programs.

Conclusion: Community awareness will be retained for further evaluation for all areas at the site.

2.7.3 Long-Term Monitoring

Long-term monitoring includes periodic sampling and analysis of soil, sediment, biota, groundwater, and surface water samples; and toxicity studies and/or caged bivalve studies at site locations. This program would provide an indication of the movement of the contaminants and the effectiveness of any remedial action that is implemented at the site.

2.7.3.1 Sampling and Analysis

Monitoring of soil, sediment, biota, groundwater and surface water impacts may be achieved by periodically sampling and analyzing samples to determine the extent and concentrations of the COCs in site areas.

Effectiveness: Long-term monitoring alone would not alter the effects of the contamination on human health and the environment. Monitoring is a proven and reliable process for tracking the migration of contaminants during and following treatment. However, sampling alone would not reduce COC concentrations to protective levels.

Implementability: This process option is easily implementable. A long-term commitment would be required to implement a long-term monitoring program. All monitoring locations are accessible for sample collection.

Relative Cost: Low capital costs and medium operation and maintenance costs. Some long-term costs for periodic reassessment would be required.

Conclusion: Sampling and analysis will be retained for further evaluation in all areas at the site. It can be coupled with other technologies and process options that can effectively address the COCs.

2.7.3.2 Site Inspection

A Five-Year Site Review is generally required by CERCLA or program policy when hazardous substances remain on site above levels which permit unrestricted use and unlimited exposure.

Effectiveness: Site inspection is effective for long-term success. However, inspection alone would not reduce COC concentrations to protective levels.

Implementability: This option is easily implementable and is required per CERCLA.

Relative Cost: Low capital cost.

Conclusion: Site inspections will be retained for further evaluation in all areas at the site as required by CERCLA.

2.7.4 Monitored Natural Attenuation (MNA)/Monitored Natural Recovery (MNR)

The MNA response action applies to contaminated groundwater and surface water and relies on natural processes such as sorption, dilution and dispersion, and chemical speciation processes to immobilize the metal COCs. The MNR response action applies to contaminated sediment and relies primarily on natural sedimentation processes that physically isolate the sediment contamination and reduce the potential for exposure.

2.7.4.1 Monitored Natural Attenuation

MNA refers to the remedial action that relies on naturally occurring attenuation processes to achieve site-specific RAOs within a reasonable time frame. Natural attenuation processes that reduce contaminant concentrations in groundwater and surface water include destructive (biodegradation and chemical reactions with other subsurface constituents) and nondestructive mechanisms (dilution, dispersion, volatilization, and adsorption).

Dilution reduces contaminant concentrations through mixing of the contaminated surface water or groundwater with non-contaminated surface water or groundwater. Dispersion is the process by which a pollutant is spread over a wider area due to local variations in surface water or groundwater velocity and flow paths. Molecular diffusion describes contaminant migration due to concentration gradients. Both dispersion and diffusion reduce contaminant concentrations. Volatilization is the process by which contaminants in the liquid phase convert to the gaseous phase, reducing contaminant concentrations in the liquid phase. As the metal COCs do not volatilize, this process will not be applicable for this site. Adsorption occurs when contaminants adhere to the surface of soil particles. Adsorption would reduce the migration of contaminants. Biodegradation transforms contaminants to different species by naturally occurring bacteria. The biodegradation intermediates and end products can be either non-toxic or more toxic than the original contaminants.

Effectiveness: The effectiveness of MNA depends highly on the ability to remove the source materials at the site. Residual contamination would limit the effectiveness of this technology. This process option can be effective when combined with removal and off-site disposal of source materials. In conjunction with source removal contaminant concentrations in surface water and groundwater would be reduced in the long-term.

Implementability: MNA is implementable at sites with a clear understanding of the CSM and multiple years of data to demonstrate that the contaminant concentrations are being reduced. For this site, MNA has not been demonstrated as data are lacking.

Relative Cost: MNA and associated modeling involve low capital costs and medium O&M costs for long-term monitoring, and periodic reassessment costs.

Conclusion: MNA will not be retained for further evaluation in this FS.

2.7.4.2 Monitored Natural Recovery

An MNR response action consists of demonstrating that the exposure to contamination is limited due to burial mechanisms that reasonably isolate the contaminated sediments and that the risks to

potential receptors are significantly reduced due to this natural recovery of sediment. Since significant scouring occurs in most areas of the site, this response action is likely applicable only to the sediment in the wetland areas of the Margaret's Creek Sector (Area 9) and to certain other areas where erosional forces are limited. Further evaluation is performed in Section 4 to determine the applicability of MNR to each area. There are two process options under the MNR response action: 1) Natural Recovery and 2) Enhanced Natural Recovery.

Multiple lines of evidence will be evaluated to show natural recovery including:

- Identification of upland sources
- Evaluation of active sedimentation
- Rate of burial
- Concentration trends in surface sediments
- Evaluation of sediment stability

Effectiveness: Investigative activities performed by CDM Smith during the RI along with some preliminary evaluation have shown that this approach may have a reasonable likelihood to be effective. However, additional evaluation is required in order to assess effectiveness for each area. Details of the additional evaluation are provided in Section 3 and Section 4.

Implementability: MNR is considered easily implementable. Materials and services necessary to model and monitor the contaminant dynamics are readily available. Site restrictions and/or institutional controls may be required as long-term control measures as part of the MNR alternatives. With additional investigation, decision points and contingency plans can be prepared so that any unexpected increase in contaminant concentrations could be quickly addressed.

Relative Cost: MNR and associated modeling involve low capital costs and medium O&M costs for long-term monitoring and periodic reassessment costs.

Conclusion: MNR will be retained for further evaluation for sediments pending additional area-specific evaluation that is performed in Section 4.

2.7.4.3 Enhanced Monitored Natural Recovery

If evidence suggests that sedimentation and burial rate are not sufficiently fast to implement natural recovery as a viable alternative, then the natural recovery can be enhanced through certain measures such as spreading a thin layer of clean material on top of sediments, which is the same as thin layer capping, or installation of an engineered structure that will promote rapid sedimentation and burial.

Effectiveness: Enhanced MNR is more likely to be effective than the process option without enhancement. Similar to MNR, additional area-specific evaluation is required in order to assess effectiveness; the details are provided in Section 4. MNR alone is unlikely to achieve the PRGs for the COCs.

Implementability: Enhanced MNR is considered easily implementable.

Relative Cost: Enhanced MNR and associated modeling involve low to medium capital costs and medium O&M costs for long-term monitoring, and periodic reassessment costs.

Conclusion: Enhanced MNR will be retained for further evaluation for sediments pending additional area-specific evaluation that is performed in Section 4.

2.7.5 Containment

Containment technologies are implemented to reduce contaminant mobility but do not directly impact contaminant toxicity or volume. However, by reducing contaminant mobility, exposures are significantly reduced or eliminated. Containment technologies are typically accompanied by long-term monitoring at locations in the vicinity of containment to verify that the containment measures continue to be effective. The commonly used containment technologies include capping, slurry walls, or engineered barriers. Slurry walls are used to contain contamination below the water table. Since most of the contamination exists between the water table and the surface, slurry walls are not discussed.

2.7.5.1 Engineered Containment Structure

An engineered structure would be constructed within the site, inside which contaminated material will be placed to isolate and contain the contaminated material. This structure will consist of bottom liners, sidewalls, and a low-permeable cover on top to prevent direct contact by receptors with the contamination, contact with surface runoff, infiltration of precipitation, as well as prevent any leaching of contamination into the groundwater. This structure may be located either within the upland areas of the Margaret's Creek Sector or in the Jetty Sector. Due to wetland areas in the Seawall Sector, location of the containment structures within this sector is unlikely.

Effectiveness: The engineered structure would be effective in preventing direct contact with contaminated slag, battery casings/associated waste, soil, and sediment. When properly designed and installed, it could also prevent infiltration that would cause leaching of contaminants into groundwater. However, long-term maintenance and monitoring may be required to ensure that the structure is functioning effectively. Containment within the structure would not achieve the PRGs for the COCs but would rather contain them from exposure.

Implementability: This process option is technically implementable with some degree of difficulty. Anticipated difficulties involve construction of the structure in the Jetty Sector or upland areas of the Margaret's Creek Sector, transportation of treated contaminated material from all areas of the site to the location of the structure for placement, and potential settlement of the structure due to the geologic nature of the surface/subsurface material.

Most of the available space in the upland areas of the Margaret's Creek Sector are near wetland areas as classified by the NJDEP. This restricts the areas where the engineered structure can be constructed. A wetland transition zone would be included when determining the location of the containment cells. The presence of a sanitary force main in the potential areas for the engineered cells also poses additional constraints to the location of the engineered structure. Due to these restrictions, multiple structures may be necessary in order to accommodate the volume of contaminated materials that need to be contained. The only access road from the beach areas of the Margaret's Creek Sector to the upland areas of the Margaret's Creek Sector where the engineered structures will likely be located occurs very close to the sanitary force main lines. Hence any construction to improve this access road to facilitate transportation of contaminated materials to these structures would have to take into

account the location of the force main lines. Additionally, ground improvement techniques may have to be used prior to construction of the structure in order to mitigate any settlement that would likely occur subsequent to the construction. Treatment to meet RCRA LDRs is not required as discussed in Section 2.2.5.

Relative Cost: This option involves moderate to high capital costs and low to medium O&M costs.

Conclusion: The engineered containment structure will be retained for further consideration.

2.7.5.2 In-situ Capping

This process option can be categorized in two types – physical capping and reactive capping. Physical capping consists of the installation of a subaqueous covering on top of the sediments that will physically isolate the contaminated sediments from contact with surface water and prevent exposure to aquatic organisms. The cap will need to be engineered to withstand the hydrodynamic forces such as waves, currents, storm events, ice scour, and groundwater flow. This consists of installation of additional armoring layers that withstand erosive forces on habitat layers to encourage benthic recolonization. Reactive caps involve the installation of a reactive layer to a standard cap that enhances the physical isolation process by further reducing contaminant mobility. Additional evaluation may be required to confirm the effectiveness of both physical and reactive caps.

Effectiveness: In-situ capping options (both physical and reactive) are likely to be effective initially in isolating the sediments from contact with surface water. However, long-term effectiveness needs further evaluation. Additional maintenance and monitoring may be required to ensure that the cap continues to function effectively.

Implementability: Both standard and reactive capping process options are technically implementable with reasonable ease and are expected to be much easier to implement than the options that involve dredging of the sediments. Issues that may be encountered due to handling, processing, and transportation of sediments may be avoided if these options are implemented.

Relative Cost: This option involves moderate costs and low to medium O&M costs.

Conclusion: In-situ capping will be retained for further evaluation for sediments at the site.

2.7.6 Removal

Removal response actions refer to methods typically used to excavate and handle soil, sediment, waste, and/or solid materials. Excavation technologies provide no treatment of wastes, but may be used prior to treatment or disposal to remove wastes from designated areas.

2.7.6.1 Excavation

Excavation technologies use standard earthwork equipment to excavate contaminated materials for consolidation, treatment, and/or disposal. These contaminated materials include slag, battery casings/ associated wastes, and soil. Special equipment will likely be required to excavate, segregate, handle, and/or crush the slag materials prior to treatment or disposal. In general, heavy machinery can be utilized to remove large quantities of soil. A variety of equipment (e.g., backhoes, bulldozers,

end-loaders) can be used for excavation. Manual excavation is useful for removal of small amounts of soil or when heavy machinery cannot be used in certain hard to access areas.

Effectiveness: Excavation is effective in removing contaminated materials from the designated area. However, excavation alone would not reduce T/M/V of the contamination. Excavation is a common construction technique and does not require long-term maintenance or monitoring.

Implementability: Excavation is technically and administratively feasible. The process uses commercially available equipment. Deep excavation would require sheet pile to provide structural support for excavating large quantities of material.

Relative Cost: Excavation has high capital costs, but it does not have O&M costs.

Conclusion: Excavation will be retained for further consideration in all areas of the site.

2.7.6.2 Dredging

Dredging is a process option that is applicable only for sediments and uses equipment similar to that for excavation. Similar to excavation, the excavated contaminated materials are designated for consolidation, treatment, and/or disposal. There are two types of dredging technologies – mechanical and hydraulic dredging. Mechanical dredging consists of dredging by mechanical means such as the use of a clam-shell bucket or a barge-mounted excavator. Hydraulic dredging uses suction pumps or other types of pumps in conjunction with a cutter head to remove sediment hydraulically. They require different management approaches, are affected by site conditions such as size and amount of debris, and may result in different levels of residuals, resuspension and release. Additional health and safety measures are also necessary during dredging as it is performed well into the bay.

Effectiveness: Dredging is effective in removing contaminated sediments from the designated areas. However, dredging alone would not reduce T/M/V of the contaminated sediments. Dredging also temporarily causes significant adverse effects to the benthic ecosystem in the vicinity of the areas dredged. Both mechanical and hydraulic dredging are effective at the site. However, dredging residuals that remain in place following dredging activities may need to be covered with a clean layer of sand to ensure that the RAOs are achieved.

Implementability: Dredging is technically and administratively implementable. Similar to excavation, the process uses commercially available equipment. Select areas in the Jetty Sector may require construction of support platforms or bases in order to perform dredging. Additionally, dewatering may also need to be performed and the dewatering area maintained temporarily, depending on the location with respect to the mean tide line. Dredging is implementable at the site. The technology is commonly used at several sites and vendors are readily available to perform dredging.

Relative Cost: Dredging has high capital costs and no O&M costs.

Conclusion: Dredging will be retained for further consideration in all areas of the site.

2.7.6.3 Dewatering

Mechanical or hydraulic dredging would require the use of ancillary technologies to dewater the dredged materials. Ancillary technologies are not stand-alone technologies that can help achieve the

RAOs by themselves; however, they are used in conjunction with a primary technology or a process option that helps meet the RAOs. Because hydraulically dredged sediments are pumped as a sediment/water slurry, the dewatering of hydraulically dredged sediments will required specialized equipment such as a filter press. Mechanically dredged sediments may be dewatered passively or through application of a drying agent. Dewatering should be combined with treatment technologies in order to treat the water that is generated from the process prior to discharge.

Effectiveness: Dewatering is effective in removal of excess water from the sediment. The technology selected will depend on the dredging technology and sediment disposal approach selected. A combination of process options may be utilized to achieve the best results.

Implementability: Dewatering is technically implementable. However, water generated during the dewatering process must be managed appropriately and will likely require treatment prior to discharge back to surface water.

Relative Cost: Dewatering of mechanically dredged sediments has low capital and O&M cost. The construction of a specialized facility to dewater hydraulically dredged sediments may increase capital costs.

Conclusion: Dewatering will be retained for further consideration.

2.7.7 Treatment

Treatment of the contaminated materials at the site may successfully reduce the toxicity and/or mobility to acceptable levels. Based on literature review and discussion with vendors, stabilization with phosphate based reagents appears to be the best approach to reduce the toxicity of the contaminated materials such as soil and sediment. Stabilization results in the chemical binding of the site COCs (which are metals), thus reducing the toxicity of the materials. If necessary, this stabilization may be followed by the addition of solidifying agents such as portland cement or cement/bentonite grout to immobilize the stabilized waste. The treatment may be performed either in-situ or ex-situ.

Chemical stabilization is utilized to decrease the aqueous solubility or mobility of materials contaminated with heavy metals. Chemical stabilization usually involves the addition of a material that adsorbs, chelates, precipitates, or coprecipitates with a waste constituent and renders it less soluble. Phosphate-based heavy metal stabilization has been used successfully for decades in the terrestrial and aquatic environments to stabilize many types of metal contaminated wastes prior to disposal. With the addition of certain phosphate-based stabilization agents, the solubility of heavy metals is highly reduced with the formation of new mineral phases with reduced solubilities and increased geochemical stability in a leaching environment. These new mineral phases include the apatite family of minerals (e.g., pyromorphite) that are highly resistant to oxidation and pH shifts.

2.7.7.1 Ex-situ Chemical Treatment

Under this process option, contaminated materials from all areas of the site will be excavated/dredged and treated in designated remediation target areas and then either disposed of at off-site facilities, placed into the containment structures on site or consolidated and placed back in the excavated/dredged areas. Logistical challenges such as transportation from the Jetty Sector, handling the boulder-size slag material, and dredging well inside the Bay are expected to be encountered.

Effectiveness: The success of treatment generally depends on the ability to produce sufficient mixing between the contaminated materials and the stabilizing agents. For slag materials, the success of treatment additionally depends on the ability to reduce the particle size. Assuming good mixing, the S/S process is expected to be effective in reducing the toxicity and mobility of the contaminated materials and could potentially help achieve PRGs for the COCs. However, due to the addition of s/s agents, the volume of the treated material to be disposed will increase.

Implementability: This option has a high degree of difficulty in terms of implementation for most areas of the site.

Relative Cost: Moderate to high capital costs. O & M costs will depend on whether the treated material is disposed of at off-site facilities or contained within the site.

Conclusion: This process option will be retained for further evaluation for all site areas.

2.7.7.2 In-situ Chemical Treatment

This process option is primarily applicable for the soil and sediment media. Application of this process to slag and the battery casings is technically implementable but any treatment and solidification will only be surficial and would require significance maintenance to ensure reduced mobility of contamination. The chemistry of the process is similar to ex-situ treatment. The soil and/or sediments in the contaminated areas are treated using specialized mixing equipment that is capable of mixing the S/S agents with the contaminated soil/sediments in-situ.

Effectiveness: The effectiveness of this process depends mainly on the ability of the mixing equipment to ensure complete mixing. Depending on local conditions, there may be zones of insufficient mixing. Some monitoring will have to be performed to ensure effectiveness. Beach areas that are poorly treated may lead to high risks for human exposure to contaminants.

Implementability: This option is difficult to implement for the sediments; it may not even be feasible to implement in-situ mixing in areas well into the bay. Even if adequate mixing is achieved in the upland areas, constant variations in tide levels and scouring forces will contribute to significant difficulty in implementation.

Relative Cost: Medium to high capital costs and low O&M costs.

Conclusion: This process option will be retained for further evaluation.

2.7.8 Disposal

Disposal response actions for slag, battery casings/ associated wastes, soil, and sediments involve the disposal of excavated materials to an offsite facility permitted for the specific waste type, or backfill on site if treated to regulatory limits. Pre-processing of the boulder-size slag materials may be necessary prior to offsite disposal. Based on the disposal facility, pre-treatment may also be required prior to disposal.

2.7.8.1 Offsite Disposal of Non-Hazardous Waste (RCRA Subtitle D) Landfill

This option involves disposing the contaminated material that is non-hazardous at an offsite non-hazardous waste (RCRA Subtitle D) disposal facility. Offsite landfills are commercially owned,

permitted facilities that minimize potential environmental impacts of disposal waste. Landfilling is considered a non-treatment alternative and is considered less acceptable than treatment alternatives by CERCLA. The final determination on whether the excavated material is hazardous or non-hazardous will be based on TCLP testing of the material disposed of.

Effectiveness: Landfill disposal is effective in preventing direct contact and in reducing the mobility of contaminants. The volume and toxicity of the waste is not reduced.

Implementability: This technology is implementable.

Relative Cost: This process involves moderate to high capital and no O&M costs.

Conclusion: Offsite non-hazardous waste landfill will be retained for further consideration.

2.7.8.2 Offsite Disposal of Hazardous Waste (RCRA Subtitle C) Landfill

If the contaminated waste material is TCLP hazardous, it must be disposed in a RCRA Subtitle C landfill, or will require treatment to meet the UTS for the slag, battery casing/associated wastes, or LDR treatment standards for contaminated soil and sediment at a hazardous treatment facility prior to disposal.

Effectiveness: Landfill disposal is effective in preventing direct contact and in reducing the mobility of contaminants. The volume and toxicity of the waste is not reduced. If treatment is conducted, toxicity and mobility of the treated material would be reduced.

Implementability: RCRA Subtitle C landfills that accept metal-contaminated materials are available.

Relative Cost: This process involves high capital and no O&M costs.

Conclusion: Off-site hazardous waste landfill will be retained for further consideration.

Section 3
Development of Remedial Action Alternatives

In Section 2, screening of available remedial action technologies and process options was performed. In this section, remedial action alternatives (herein referred to as remedial alternatives) are assembled by combining the retained remedial technologies and process options presented in Section 2. Remedial alternatives are developed from either stand-alone process options or combinations of the retained process options.

3.1 Assumptions Affecting Development of Remedial Alternatives

Several fundamental assumptions affect the development of remedial alternatives evaluated in this FS (other than the "no action alternative"). These assumptions are driven by requirements of the RAOs and site limitations and constraints that cannot be overcome by using one or more remedial technology/process options as described in Section 2. These fundamental assumptions were taken into consideration during development of remedial alternatives for this FS and include the items listed in Exhibit 3-1. Note that changes to site conditions or the current understanding of site conditions may affect these fundamental assumptions, which in turn, may impact the remedial alternatives developed for the site.

Exhibit 3-1. Assumptions

Fundamental Assumption	Rationale
30-Year Period of Evaluation for Long-Term Monitoring, Maintenance and Institutional Controls.	Alternatives that may require long-term monitoring, maintenance or institutional controls would be evaluated for a default 30-year period. Evaluation of longer durations is not considered necessary for comparative analysis of alternatives due to cost discounting under present value analysis. Alternatives that are able to meet RAOs in a shorter time frame would have a shorter period of evaluation. However, due to the uncertainty in remediation times for surface water and groundwater media, a 30-year monitoring period is assumed for all alternatives that address surface water and groundwater media (except the no action alternatives) and select alternatives for other media such as source materials, sediment and soil.

Fundamental Assumption	Rationale
The FS assumes that alternatives developed for the different media at the Raritan Bay Slag Superfund site would be coordinated with each other.	Efficiency in terms of cost and implementation would be increased if the remedial alternatives for different media at the site are coordinated with each other.
Institutional Controls are essential General Response Action (GRA) components of all alternatives and monitoring is an essential component of alternatives that address surface water and groundwater.	After implementing a remedial alternative, there may potentially be unidentified portion(s) of the site outside the remediated areas containing contaminants which could pose a risk to human health. Thus, it is assumed that institutional controls are essential GRA components of all remedial alternatives (accept the "no action" alternatives) and monitoring is an essential component of alternatives that address surface water and groundwater. These components would be implemented while contaminant levels remain at concentrations that could pose a risk to human health.
Monitoring would be implemented to determine the protectiveness of the selected remedy and to assess the need for any additional remedial measures	It is assumed that monitoring would be performed to determine the protectiveness of the remedy and the need for any additional remedial measures. Such additional measures are excluded from the screening and evaluation of remedial alternatives since they are considered contingency measures.

3.2 Development of Remedial Action Alternatives

Several technologies and process options were retained following the screening and evaluation process described in Section 2. The GRAs, technologies, and the process options that were retained in Section 2 are listed below.

- No action
- Institutional/engineering controls
  - Includes measures such as land use controls, groundwater use controls, recreational use restrictions and community awareness programs
- Long-term monitoring (LTM)
  - Includes groundwater and surface water sampling and site inspections

- Monitored Natural Recovery (MNR)
  - Includes MNR or enhanced MNR
- Containment – including on-site containment in an engineered structure or "cell" (applicable for all media) and an in-situ barrier cap for sediment
  - Includes barrier technologies such as a containment cell, standard or reactive in-situ caps for sediment
- Removal
  - Includes excavation and dredging; it should be noted that dredging includes ancillary technologies for dewatering
- Treatment
  - Includes ex-situ or in-situ treatment via stabilization and/or solidification
- Disposal
  - Includes off-site disposal of hazardous and non-hazardous waste

Using one or more of the process options listed above, several alternatives are developed for each of the media at the site that are contaminated or act as source of contamination. For instance, soil contamination can be addressed by a combination of removal by excavation and off-site disposal or a combination of in-situ treatment, LTM and Institutional controls (ICs). There may be several combinations of the applicable process options that could achieve the RAOs. Each of these combinations constitutes an alternative and this process of assembling is known as the development of alternatives. The alternatives developed in this section are categorized based on the media. The remedial alternatives have been categorized as follows:

- Remedial Alternatives for Slag and Battery Casings/Associated Wastes
- Remedial Alternatives for Soil
- Remedial Alternatives for Sediment

The alternatives developed for each media are evaluated and screened based on effectiveness, implementability and cost. In this FS, the selected alternatives for several media are then consolidated into site-wide alternatives based on conceptual similarities, as described in Section 3.6. The remedial alternatives in each of the above categories are listed below.

Remedial Alternatives for Slag and Battery Casings/Associated Wastes

- Alternative SL-1 - No Action
- Alternative SL-2 - Removal and Off-site Disposal/ IC
- Alternative SL-3 - Removal /On-site Containment/ LTM/IC

- Alternative SL-4 - In-situ Stabilization, Solidification and Encapsulation/LTM/IC

Remedial Alternatives for Soil

- Alternative SO-1 - No Action
- Alternative SO-2 - Excavation and Off-site Disposal/IC
- Alternative SO-3 - Excavation and On-site Containment/LTM/IC
- Alternative SO-4 - Consolidation and In-situ Stabilization/LTM/IC

Remedial Alternatives for Sediments

- Alternative SED-1 - No Action
- Alternative SED-2 - Dredging/Excavation and Off-site Disposal/IC
- Alternative SED-3 - Dredging/Excavation and On-site Containment/LTM/IC
- Alternative SED-4 - Capping/LTM/IC
- Alternative SED-5 - In-situ Stabilization/LTM/IC
- Alternative SED-M6 - Monitored Natural Recovery/LTM/IC

Critical factors considered in the development and screening of remedial alternatives includes:

- Source Removal: One of the key features of the approach in this FS is that the groundwater and surface water at the site are not treated separately. Removal of principal threat wastes that include slag materials and battery casings/associated wastes that act as sources of contamination are expected to bring the contaminant levels in the groundwater and surface water media down with time. SL-4 is the only alternative that leaves the source materials in place and would be screened to evaluate the feasibility of the approach.
- Direct-contact risks in beach areas: Due to direct contact risks in the beach areas, alternatives that include in-situ treatment in these areas would be screened to evaluate the feasibility of the alternatives. These risks are further increased if there are untreated zones in the treated soil or sediment that occurs due to insufficient mixing of the stabilization agent with the contaminated soil/sediment.
- Forces of Erosion: The erosional forces in the Bay affect the effectiveness and implementability of several process options that would otherwise be applicable. For example, in-situ stabilization of sediment is considered as a potential alternative only in areas with low erosion. In addition, due to the high erosion that occurs near the seawall, the location of the on-site containment cell near the seawall is not considered. Areas with reasonably low erosion include select areas of the western jetty and most areas of Margaret's Creek.
- Space availability in Margaret's Creek: The on-site containment approach requires significant space to provide the necessary volume for the contaminated materials. Due to the availability

of land space in the Margaret's Creek area, this location could potentially be used to install a structure capable of containing the contaminated materials. Additional advantages include the accessibility of the Margaret's Creek area by vehicles and its proximity to the seawall. However, it should be noted that there are permitting restrictions due to the presence of wetlands in the area. These restrictions have been taken into consideration in the conceptual design of applicable alternatives.

The development of alternatives is described in detail in the following sections.

3.3 Description of Remedial Action Alternatives

Certain components and sub-components of the remedial alternatives such as ICs, five year site reviews, LTM, dewatering and construction of engineered containment structures are common to several or all the alternatives developed in this FS (except the "No action" alternatives). Hence, these components are discussed globally under Section 3.3.1 and are also described in more detail in Section 4.3.1.

3.3.1 Common Elements

Institutional Controls

ICs are included as part of all the proposed alternatives (other than the "No Action" alternatives). The objective of institutional controls is to control, limit, and monitor activities and conditions at the site, thus reducing potential exposures of receptors to contamination.

As part of the ICs, some or all of the following measures would be considered for implementation at the site:

- Restrictions on fishing or other recreational activities in select areas
- Restrictions on drilling wells in contaminated areas
- Restrictions on groundwater use in contaminated areas
- Programs to increase community awareness of potential hazards of exposure to contaminant compounds, ways to prevent exposure, and information on the remedial measures that would be implemented as part of the selected alternative.

Deed restrictions were not considered as part of institutional controls as there are no private properties at the site.

Site Reviews

Five-year reviews would also be performed as part of all alternatives as required by CERCLA. As part of the five-year reviews, public health evaluations would be conducted and would allow EPA to assess the ongoing risks to human health and the environment posed by the site. The evaluations would be based on the data collected during long-term monitoring. Decisions regarding the continuation of institutional control measures would be made during the site reviews.

Long Term Monitoring

LTM is implemented as part of all, except the No Action, remedial alternatives. LTM would include periodic surface water and groundwater sampling and analysis, so as to monitor reduction of contaminant concentrations in surface water and groundwater over time. LTM might also include the collection of biota tissue/toxicity studies/caged bivalve studies dependent upon the remedy selected. Two sampling events would be recommended to support the first five year review. Details of the long term biota monitoring plan will be developed during the design phase.

For alternatives that include installation of engineered containment structure(s) or installation of a cap or for alternatives that involve passive measures such as MNR or enhanced MNR, additional monitoring would be performed to assess effectiveness or track progress. For alternatives that involve in-situ remediation of sediments such as capping, LTM would not include sediment sampling beneath the capped interval as the introduction of the sediment sampling device beneath the cap may cause cap failure or rupture, thus nullifying the isolating action of the barrier cap. However, samples of fresh sediments deposited above the cap may be collected to confirm that the cap is effective. Pore water monitoring for the freshly deposited sediment may also be performed.

The primary parameters to be monitored would be the COCs – arsenic and lead, along with geochemical indicators (e.g., oxidation-reduction potential, dissolved oxygen, pH) and hydrogeologic parameters (e.g., elevation of groundwater in monitoring wells). Increases and decreases in monitoring frequency may occur over the life of the remedy in response to changes in site conditions and monitoring needs.

For cost estimating purposes, monitoring for COCs, geochemical indicators, and hydrogeologic parameters for a period of 30 years is assumed with the following monitoring frequency: quarterly for the first two years, semi-annual for the next three years and annual thereafter. A network of sample locations would be monitored in each of the three sectors of the site along with existing monitoring wells or any additional monitoring wells that may be installed as part of the remedial action.

Engineered Containment Structures or "Cells"

This component is applicable for all remedial alternatives that involve on-site containment as an approach to address the COCs. Specifically, remedial alternatives SL-3, SO-3, and SED-3 involve the construction of the engineered containment structures or "cells" to isolate the contaminated material from exposure and reduce or eliminate any current or future risks due to the contamination at the site. The engineered containment cells would consist of the following features that isolate the contaminants within their structure and prevent migration of contamination from inside the cells.

- Bottom liners made of low-permeability material
- Containment walls or berms at the sides
- Low permeability cover on top

Factors that affect the size and location of containment cells include the volume of materials to be contained, availability of space and permit restrictions. The source materials would be placed within the cells and covered on top by contaminated soil and sediment in order to achieve maximum

isolation of the most contaminated source materials. The soil and sediment may be blended with drying agents for improving the handling characteristics of the materials.

Frequent maintenance and/or monitoring are necessary to ensure that the cells are effective in preventing contaminant migration and to assess if repairs are necessary to maintain effectiveness. For cost estimating purposes, monitoring for COCs, geochemical indicators, and hydrogeologic parameters for a period of 30 years is assumed. Additional details regarding the engineered containment structure are provided in Section 4.3.1.3.

Dewatering

This component is applicable for all remedial alternatives for soil and sediment (other than 'No Action' alternatives) that do not involve leaving the contaminated material in place. Specifically, remedial alternatives SO-2, SO-3, SED-2, and SED-3 would involve dewatering at least to some extent. Since a large portion of the treatment area is within the intertidal zone or seaward of the mean high tide line, including areas that are up to approximately 1,500 feet into the Bay from the mean low tide line, a significant amount of dredged sediment material would need to be dewatered prior to disposal, containment or treatment. For soil, dewatering requirements may be minimal and are expected only in near-shore Bay areas where some of the soil may be saturated. Most of the dewatering would be expected to be performed by implementing best management practices such as allowing reasonable time for most of the liquid to be released back into the water during dredging, decantation on a barge or an appropriate on-shore location. For sediment with high organic content, drying agents may be added as part of dewatering.

Additionally, in order to implement certain alternatives such as installation of the sediment cap or for certain locations to be accessible during excavation or dredging, continuous maintenance of dewatered conditions for a temporary period from a few hours to a few days may be required. The water collected during dewatering operations would be treated using treatment systems that would include sedimentation basins and treatment tanks. The treated water would be discharged into Raritan Bay. Dewatering activities are described in detail in Section 4.3.1.4.

3.3.2 Remedial Alternatives for Slag and Battery Casings/Associated Wastes

In this section, remedial alternatives developed for treating the slag and battery casings/associated wastes at the site are described briefly. Based on the evaluation and screening process described in Section 2 and presented in Table 2-6, the following alternatives have been developed for the treatment of slag and battery casings/associated wastes at the site.

- Alternative SL-1 - No Action
- Alternative SL-2 - Removal and Off-site Disposal/IC
- Alternative SL-3 – Removal/Disposal/On-site Containment/LTM/IC
- Alternative SL-4 – In-situ Stabilization, Solidification and Encapsulation/LTM/IC

3.3.2.1 Remedial Alternative SL-1 – No Action

The No Action alternative is retained in accordance with the NCP requirement to serve as a baseline for comparison with the other alternatives that address the slag and battery casings/associated wastes. No action would be taken under this alternative and additional contamination would

continue to migrate from the slag into the surface water and subsequently into other media such as soil, sediment, and groundwater. Potential receptors would continue to be exposed to the contamination at the site. This alternative does not include any institutional control measures or monitoring.

3.3.2.2 Remedial Alternative SL-2 – Removal and Off-site Disposal/IC

This alternative addresses the slag and battery casings/associated wastes and consists of the following major components

- Removal of slag and battery casings/associated wastes
- Disposal of the removed slag and battery casings/associated wastes to an approved off-site facility
- Restoration of western jetty, seawall and upland areas of Margaret's Creek
- Institutional Controls

The slag on the western jetty and the seawall are boulder-sized, 1 to 3 feet in diameter and are present on the surface of the western jetty and the seawall (Figure 2-1a, 2-1b). Smaller pieces of slag, battery casings/ associated wastes are also present in the upland areas of Margaret's Creek Sector (Figure 2-1c).

The slag on the western jetty is found on the surface (top and sides) of the jetty as an armored layer. Since the slag is confined to the surface of the jetty, complete removal of the jetty itself is not warranted. The slag can be removed from the jetty by building an access path from the existing asphalt pavement located at the south end of the jetty progressing northward along the length of the jetty. Equipment with special clamp-type attachments and large wheel dump trucks, loaders and excavators may be used in removing the large boulder sized slag materials. After removal of the slag, the jetty would then be rebuilt to its existing height by placing clean rocks onto the jetty to its current elevations.

At the Seawall Sector, equipment with special attachments would be used to segregate the co-mingled slag and clean rock, and then temporarily placed in separate areas near the seawall. The removal of slag within the Seawall Sector can be accomplished from the land side. Additionally, slag material identified in other areas of the Seawall Sector will be addressed with either the soil or sediment media. Once all the slag material is removed from the seawall, clean rocks would be placed back in the seawall along with other clean fill as required for the other areas.

The source materials in the Margaret's Creek Sector consist mostly of smaller pieces of slag and crushed battery casings/associated wastes in the upland portions of the sector. These materials would be removed using standard excavation equipment. The areas impacted by the remediation will be restored to existing conditions.

Additional soil and sediment at the bottom of the western jetty and the seawall would also be removed. This is discussed as part of the alternatives that address the soil and sediment. Health and safety precautions including dust monitoring in air for lead and other metals would be performed

during the removal and transport of all slag and battery casings/associated wastes and during restoration operations. Dust suppression measures would also be implemented during these operations.

Any smaller pieces of slag material, battery casings/associated wastes that are buried within or co-mingled with the soil or the sediment media would be treated as part of the alternatives that address the soil or sediment media. Following the removal of the slag, battery casings and associated wastes, these source materials would be disposed of at off-site facilities. Based upon the results from prior testing of the source materials, they would be disposed of as hazardous wastes at off-site facilities. Additional processing of the slag material such as crushing, consolidation, and treatment may be required depending on the disposal facility. If necessary, these operations would be performed at the facility prior to disposal.

IC measures such as fishing restrictions and community awareness activities, discussed briefly in 3.3.1.1, would also be implemented as part of this alternative, along with five-year site reviews to evaluate the progress of the effectiveness of remedial alternatives.

3.3.2.3 Remedial Alternative SL-3 – Removal, Disposal and On-site Containment/LTM/IC

This alternative addresses the slag and battery casings/associated wastes. The major components under this alternative include:

- Removal of slag and battery casings/associated wastes
- Consolidation and on-site containment of slag and battery casings/associated wastes
- Restoration of western jetty and seawall
- Institutional Controls
- Long-Term Monitoring and Maintenance

As part of this alternative, the slag material and battery casings/associated wastes from the site areas would be removed and placed in an engineered containment structures or “cells” consisting of bottom liners, lined containment walls or berms and a low permeability cover. These cells would be constructed within the site in the upland area of Margaret’s Creek Sector and in the asphalt area near the western jetty. As discussed in Section 2.2.5, treatment of slag to meet land disposal requirements prior to placement in the containment cell would not be required, as this operation is consolidation of waste materials within an Area of Contamination, which exempts waste consolidation from meeting LDR requirements.

The slag and battery casings removed from the Jetty Sector would be placed within the cell that would be constructed near the western jetty. Slag and battery casings/associated wastes removed from all other areas of the site would be placed within the cells located in the upland area of Margaret’s Creek. The seawall would be rebuilt with segregated clean rocks or other clean fill/rocks as required and the western jetty would also be restored to its original elevation with clean rocks. Dust monitoring and dust suppression measures would be implemented during all activities at the site involving removal and handling of slag and battery casings/associated wastes.

Maintenance of the cells and IC measures such as land use and groundwater use restrictions would be required in the vicinity of the containment cells to ensure that the cells are effective in isolating the contaminated material. LTM program is also required to confirm that contamination is not migrating from within the cells. These LTM and IC measures would be implemented in addition to the LTM/IC measures discussed under the common elements in Section 3.3.1. Five-year site reviews would also be performed to evaluate the success of implemented alternatives.

3.3.2.4 Remedial Alternative SL-4 - In-situ Stabilization, Solidification & Encapsulation/LTM/IC

This alternative addresses the slag and battery casings/associated wastes and consists of the following major components:

- In-situ stabilization and encapsulation of slag in the western jetty and Seawall Sectors
- ICs
- LTM and maintenance of encapsulated areas

As part of this alternative, the slag material and battery casings/associated wastes at the site would be consolidated, stabilized and/or solidified in-situ at the western Jetty and Seawall. Additional encapsulation with cement or concrete may be performed in order to reduce the permeability of the stabilized material and physically separate the stabilized material from potential receptors. Sheet piling might need to be installed around the jetty and seawall for the encapsulation process. A complete stabilization, solidification and encapsulation cannot be achieved with this in-situ application as the underside of either the western jetty or seawall would be difficult to reach. In addition to stabilization/solidification and encapsulation, IC measures, LTM and five-year site reviews discussed in Section 3.3.1 would also be implemented as part of this alternative.

3.3.3 Remedial Alternatives for Soil

The following alternatives address the soil contamination at the site:

- Alternative SO-1 - No Action
- Alternative SO-2 - Excavation and Off-site Disposal/IC
- Alternative SO-3 - Excavation and On-site Containment/LTM/IC
- Alternative SO-4 - In-situ Stabilization/LTM/IC

3.3.3.1 Alternative SO-1 - No Action

The No Action alternative is considered in accordance with NCP requirements. This alternative provides a baseline for comparison with the other alternatives. No further action would be implemented under this alternative, and the current status of the site would remain unchanged. Additional contamination would continue to migrate from contaminated soils into the sediments and

also into the surface water and groundwater. No institutional controls or monitoring would be performed under this alternative.

3.3.3.2 Alternative SO -2 –Excavation and Off-site Disposal/IC

This alternative consists of the following major components:

- Excavation of contaminated soil
- Disposal of the excavated soil to an approved off-site facility
- Restoration of excavated areas
- ICs

Under this alternative, impacted soils would be excavated and disposed of at off-site facilities. The disposal requirements would depend on the metal concentrations and results of required regulatory tests on the soil. Contaminated soil that fails TCLP would require treatment to meet Universal Treatment Standards prior to disposal in a Subtitle C landfill. Contaminated soil that passes TCLP can be disposed of in a Subtitle D landfill without treatment.

Certified clean material/fill/sands would be placed as appropriate at the excavated areas. These areas would be restored to existing conditions, when determined necessary, following the implementation of the remedy. These operations would be coordinated and performed in conjunction with the slag and sediment removal operations in order to increase cost-effectiveness during the remedial implementation. Health and safety measures including air monitoring for lead and other metals and dust suppression would be followed during the soil removal operations. A pre-design investigation (PDI) would be conducted in order to determine the final areas and depths of excavation. Post excavation samples would be collected to verify that the PRGs are achieved. Groundwater at the site ranges from a few feet bgs near the Bay to 30 feet bgs inland (at well MW11S) and excavation would be scheduled for periods of low tide so major dewatering operations could be avoided. However, because some excavation may be required in areas of saturated soil, some dewatering as described in Section 3.3.1 may be required. As mentioned previously in Section 3.3.1, dewatering is performed by decantation or using drying agents.

3.3.3.3 Alternative SO-3 – Excavation and On-site Containment/LTM/IC

The major components of this alternative are:

- Excavation of contaminated soil
- Consolidation and on-site containment of excavated soil
- Restoration of excavated areas
- ICs
- LTM and maintenance

This alternative would be implemented in conjunction with other alternatives in which impacted material is contained on-site. Impacted soil would be excavated, dewatered, and disposed of in the same engineered containment structure built in the upland area within the Margaret's Creek Sector and Jetty Sector for the disposal of the slag material and described under Section 3.3.1.

Drying agents such as fly ash if required would be added to the impacted soil prior to the containment of the impacted soils for the following reasons:

- Minimize leachate generation.
- Improve handling for the transportation from the respective areas to the containment cells.

PDI, excavation, backfilling, site restoration, health and safety measures, and post excavation sampling are similar to Alternative SO-2 and described under Section 3.3.3.2. LTM and maintenance of the cells would also be performed as part of this alternative in order to ensure effectiveness of containment. IC measures to ensure land use controls and groundwater use controls in the vicinity of the cells would also be performed to prevent potential exposure of receptors to contamination. In addition, five-year site reviews would be performed to evaluate the success of this alternative.

3.3.3.4 Alternative SO-4 – Consolidation and In-situ Stabilization/LTM/IC

The components of this alternative include:

- Consolidation of soil from beach areas (Areas 2, 4, 5 and 6)
- In-situ stabilization of contaminated soil for all areas
- Restoration of beach areas
- ICs
- LTM and maintenance of encapsulated areas

Under this alternative, soil would be treated in-situ with appropriate phosphate-based stabilization agents and/or solidifying agents such as Portland cement and left in place within the Jetty Sector, Seawall Sector and Margaret's Creek Sector. Although no impact is anticipated to the adjacent wetlands during the implementation of this remedy at the upland Margaret's Creek Sector, best management practices such as silt fence and controlled in-situ application would be instituted. Soil in certain beach areas may be consolidated prior to stabilization/solidification based on exposure risks. Specifically, the impacted soils in the beach areas (Areas 2, 4, 5 and 6) that involve high risk of direct-contact exposure would be consolidated into the seawall area and then treated with S/S agents. These beach areas would be replenished with clean sand. The treated soils from other areas would be left in place. Long term monitoring and maintenance of the soil that were consolidated or treated in-situ would also be performed as part of this alternative. IC measures and five-year site reviews would also be performed as part of this alternative.

3.3.4 Remedial Alternatives for Sediment

The following alternatives address the sediment contamination at the site:

- Alternative SED-1 - No Action
- Alternative SED-2 – Dredging/Excavation and Off-site Disposal/IC
- Alternative SED-3 – Dredging/Excavation and On-site Containment/LTM/IC
- Alternative SED-4 – Capping/LTM/IC
- Alternative SED-5 - In-situ Stabilization/LTM/IC
- Alternative SED-M6 – Monitored Natural Recovery/LTM/IC

3.3.4.1 Remedial Alternative SED-1 – No Action

The No Action alternative is retained in accordance with the NCP requirement to serve as a baseline for comparison with the other alternatives that address the sediment at the site. No action would be taken under this alternative and additional contamination would continue to migrate from the sediment into the surface water and groundwater. Potential receptors would continue to be exposed to the sediment contamination at the site. This alternative does not include any IC measures or monitoring.

3.3.4.2 Remedial Alternative SED-2 – Dredging/Excavation and Off-site Disposal/IC

The major components of this alternative are:

- Dredging of the contaminated sediment
- Disposal of the dredged sediment to an approved off-site facility
- Restoration of the dredged areas (if necessary)
- ICs

Under this alternative, all the impacted sediment would be dredged or excavated, dewatered, and disposed of at off-site facilities. As mentioned previously in Section 3.3.1, to the maximum possible extent, sediment in intertidal areas in the Jetty Sector and the Seawall Sector would be removed by excavation during periods of low tide in order to minimize dewatering. Removal of all other sediment in all three sectors would be performed via dredging. Dewatering activities are discussed in Section 3.3.1. In addition, silt curtains would be installed prior to dredging to minimize the impacts on the marine ecosystem near areas that would be dredged. Silt curtains are devices that control suspended solids and turbidity in the water column, thus protecting sensitive habitat from suspended sediment and particle-associated contamination.

The disposal requirements would be similar to Alternative SO-2 as described in Section 3.3.3.2. It may not be necessary to backfill excavated areas in the Jetty Sector. If it is necessary, certified clean material/fill would be placed as appropriate at the excavated/dredged areas. The need for placement of clean fill in areas of the Jetty Sector and the Margaret's Creek Sector would be considered in the wetland restoration plan developed for each sector. The operations under this alternative would be coordinated and performed in conjunction with the slag and soil removal operations in order to

increase cost effectiveness during the remedial implementation. ICs and site reviews discussed under Section 3.3.1 would also be performed as part of this alternative.

3.3.4.3 Remedial Alternative SED-3 – Dredging/Excavation and On-site Containment/LTM/IC

Under this alternative, the major components include:

- Dredging/excavation of the contaminated sediment
- On-site containment of the dredged/excavated sediment within cells
- Restoration of the dredged areas (if necessary)
- LTM and maintenance of containment cells
- ICs

This alternative would be implemented in conjunction with Alternative SL-3 that addresses source materials and Alternative SO-3 that addresses soil. The impacted sediment would be dredged or excavated, dewatered, and disposed of in the same engineered containment structure built for the slag and/or soil. The sediment dredged from the Seawall and Margaret's Creek Sectors would be contained within the structure in the Margaret's Creek upland area and the sediment dredged from the Jetty Sector would be disposed of in the containment cell located in the Jetty Sector. Drying agents such as flyash would be added to the impacted sediment prior to the containment of the impacted sediment for the following reasons:

- Minimize leachate generation.
- Improve material handling for transportation from the respective areas to the containment cells.

A certified clean material/fill would be placed as appropriate at the excavated/dredged areas as necessary. The need for placement of clean fill in areas of the Jetty Sector and the Margaret's Creek Sector would be considered in the wetland restoration plan developed for this area. LTM and maintenance of the cells would also be performed as part of this alternative in order to ensure effectiveness of containment. In addition, ICs and site reviews discussed under Section 3.3.1 would be performed as part of this alternative.

3.3.4.4 Remedial Alternative SED-4 – Capping/LTM/IC

The major components of this alternative include:

- Capping of the contaminated sediment in-situ
- LTM and maintenance of capped areas
- ICs

Under this alternative, contaminated sediments would be left in place, and an engineered subaqueous covering of gravel, sand, or other media or materials (including reactive materials) would be installed over the sediments. Capping can reduce risk in three ways:

1) Physical Isolation: Burying the contamination to such a depth that ecological and human receptors no longer come into contact with the contamination

2) Stabilization: Preventing erosion and resuspension of the contaminated sediments (and the subsequent contamination of other areas)

3) Reduce Contaminant Flux: Controlling flux of dissolved contamination by removal using a cap that contains reactive materials

A cap would need to be specifically engineered to address the fate and transport characteristics of the contaminants left in place (i.e., potential for dissolved phase transport), as well as the expected hydrodynamic conditions at the capped location (i.e., waves, currents, storm events, ice scour, and groundwater flow). This alternative would be potentially applicable to areas with low energy wave and current action, mainly the Margaret's Creek wetland and Area 8. However, all sediment areas would be evaluated for applicability of capping, and capping would be considered in conjunction with other sediment remedies. Once the cap is installed, monitoring and maintenance of the cap would be performed to confirm effectiveness. In addition, LTM and IC measures discussed under Section 3.3.1 would be performed as part of this alternative.

3.3.4.5 Remedial Alternative SED-5 – In-situ Stabilization/LTM/IC

The components of this alternative are:

- In-situ stabilization contaminated sediment
- ICs
- LTM of stabilized areas

Under this alternative, contaminated sediments would be stabilized in-situ using phosphate-based stabilization agents. Additional solidification may be performed using concrete or cement mixtures in order to increase the stability of the stabilized sediment. In-situ stabilization does not achieve complete destruction of the COCs; however, detoxification and immobilization would be achieved by converting the COCs to a chemically less mobile and less bioavailable forms, thus reducing the risks of exposure significantly. The reduced bioavailability would be achieved because the COCs, once converted, would be chemically bound to the solid matrix. However, this binding would likely have limited unacceptable impact on the benthic habitat.

Issues such as insufficient mixing and leaching due to erosion may reduce the effectiveness of this approach. During stabilization, maintenance of dewatered conditions would be required. LTM would also be performed as part of this alternative in order to ensure effectiveness. In addition, ICs and site reviews discussed under Section 3.3.1 would be performed to limit exposure and to assess the success of the alternative.

3.3.4.6 Remedial Alternative SED-M6 – Monitored Natural Recovery/LTM/IC

Alternative SED- M6a – Monitored Natural Recovery

Under this alternative, the major components are as follows:

- MNR of contaminated sediment
- Long-term monitoring
- Institutional controls

MNR relies on natural processes to meet the sediment PRGs within an acceptable time frame. It is important to first control releases of contaminants from the primary sources, thus allowing natural recovery to occur without recontamination. Since the contaminants would not be permanently removed, it would be necessary to put institutional and engineering controls in place that restrict access to the area. The ability to put these controls in place is the first "filter" for identifying feasible areas for MNR.

The next filters utilize the hierarchy of preferred natural recovery processes at a site presented by EPA in the 2005 contaminated sediments guidance. The hierarchy, in order from most preferred processes to less preferred, is as follows:

1) Processes in the sediment transform the contaminants to less toxic forms
2) The mobility and bioavailability of the contaminants are reduced due to sorption or binding to the sediments
3) Concentrations in the depth interval near the surface are reduced due to burial by natural sedimentation, or by the mixing in of cleaner sediments depositing on the sediment bed
4) A decrease in contamination in the surface depth interval through dispersion of the contaminants via surface water currents, or advective or diffusive transport

This hierarchy implies three ways for risk to be reduced during MNR: physical isolation of the contamination through burial, a reduction in bioavailability, or dispersion. Additional area-specific evaluation based on these three mechanisms would be required in order to determine the applicability of MNR.

Alternative SED- M6b – Enhanced Monitored Natural Recovery

Under this alternative, the major components are as follows:

- Enhanced MNR of contaminated sediment
- Long-term monitoring
- Institutional controls

If the rate of sedimentation in the areas of concern is not adequate to ensure risk reduction by natural burial of contamination in an acceptable period of time, then natural recovery can be enhanced in two ways. The first is by spreading a layer of clean material over the contaminated sediments. The cleaner material would cover or mix with the contaminated sediment (through bioturbation or hydrodynamic forces), thus reducing the risks to potential receptors due to sediment contamination. The second enhancement method would be to manage the flow and sediment transport in the area of

concern with engineered structures in order to promote more rapid sedimentation and natural burial. Similar to MNR, area-specific evaluation of this alternative based on physical isolation, reduction in bioavailability, or dispersion would be required to determine applicability of enhanced MNR.

3.4 Screening of Remedial Alternatives

All the alternatives described briefly in Section 3.3 are screened based on factors such as effectiveness, implementability, and cost. In Section 2, the individual technologies or process options involved in the alternatives were evaluated in order to develop the alternatives. In this section, each alternative is evaluated in its entirety based on the same factors to determine the ability of the alternative to meet RAOs, its short-term impacts, ease of implementation, and the overall cost.

Effectiveness: This evaluation criterion focuses on the effectiveness of the alternative to protect human health and the environment by achieving the remedial action objectives and reduce toxicity, mobility, and volume. It also evaluates the potential impacts to human health and the environment during construction and implementation, and how reliable and proven the components of the alternative are with respect to site-specific conditions. Alternatives that involve components which are not extensively field tested or in the early stages of development whose effectiveness are in doubt are screened out due to uncertainty.

Implementability: This evaluation criterion encompasses both the technical and administrative feasibility of all the components involved in the alternative. It includes an evaluation of pretreatment requirements, residuals management, and the relative ease or difficulty in performing the operation and maintenance (O&M) requirements. Alternatives that are technically or administratively unworkable at the site or those with unknowns are eliminated by this criterion.

Cost: Cost plays a limited role in the screening process. Both capital and O&M costs are considered. The cost analysis is based on engineering judgment, and each process is evaluated as to whether costs are low, medium, or high relative to the other alternatives.

3.4.1 Remedial Alternatives for Slag and Battery Casings/Associated Wastes

3.4.1.1 Alternative SL-1 - No Action

Effectiveness

The no action alternative is required by the NCP to be carried through the screening process, as it serves as a baseline for comparison of the site remedial action alternatives for slag and battery casings/associated wastes. This alternative does not reduce the exposure of receptors to COCs in the slag and battery casings/ associated wastes. Continued migration of contaminants and the resulting exposure of receptors would occur. As a result, this alternative is not effective in protecting human health or reducing mobility/toxicity/volume of contaminants at the site.

Implementability

This alternative could be easily implemented since no action would be undertaken.

Cost

No costs would be associated with this alternative.

3.4.1.2 Alternative SL-2 – Removal and Off-site Disposal/IC

Effectiveness

Removal of the contaminated slag and battery casings/associated wastes to an off-site secure RCRA-permitted landfill virtually eliminates the on-site risks associated with exposure pathways. All RAOs would be met under this alternative. This alternative does not permanently and/or significantly reducing the T/M/V through treatment; however, mobility is reduced via off-site disposal within a landfill. Long-term monitoring would not be needed under this alternative.

Implementability

Several factors impact the implementability of this alternative. Annual landfill capacity may be limited and more than one RCRA landfill may have to be used depending on the volume to be shipped from the site. Additional pre-processing may need to be performed by the disposal facility in order to meet its permit requirements. At the site, factors which can impact the implementability of this alternative include identification and segregation of the slag from clean rock, handling of the large boulder-sized slag, and the availability of access routes for removal and transportation of the slag.

Cost

The costs associated with this alternative would be volume and transportation dependent. High capital costs would be incurred; transportation and disposal are the bulk of the costs. There would be minimal O&M cost.

3.4.1.3 Alternative SL-3 – Removal and On-site Containment/LTM/IC

Effectiveness

The removal of the contaminated slag and battery casings followed by disposal in an on-site containment structure would virtually eliminate exposure to contaminants and greatly reduce the risk to human health. Removal of the sources of contamination would ensure that contamination concentrations in other media such as surface water and groundwater would reduce over time. A liner along the sidewalls and bottom of the cell would contain contaminated materials within a specific area and minimize leaching of contaminants from the material into the underlying soil and groundwater. Finally, long-term monitoring would be required to assess any potential impacts of this alternative. Some maintenance may be required in the long term.

Implementability

Implementation of this alternative is considered technically feasible and could be accomplished through conventional construction methods. However, the presence of a shallow water table and location in a tidal area suggests that a significant effort and cost would be needed to de-water the work zone (if necessary) for excavation. Segregation of slag from the clean rock and handling of boulder-sized slag may pose additional problems during implementation.

Equipment, services, and personnel would be readily available from many vendors. Routine and periodic cap inspection and a maintenance program would be necessary to seal cracks and ensure that vegetation remains established and flood control measures remain in place.

Long-term monitoring would be required to ensure liners remain intact and leaching of contaminants from the containment cell does not occur.

Cost

Moderate costs would be associated with this alternative relative to other remedial alternatives. Expenditures would include capital costs for equipment, materials, labor for the construction of the containment cells and removal and handling of the wastes, as well as fencing upgrades and institutional control measures. Annual and periodic O&M costs would include such items as media monitoring and periodic mowing and maintenance of the containment structure.

3.4.1.4 Alternative SL-4 – In-situ Stabilization, Solidification and Encapsulation/LTM/IC

Effectiveness

The particle size reduction of the boulder-sized slag or other contaminated materials such as battery casings/associated wastes would not be performed. Hence, any stabilization of slag and battery casings with phosphate-based or other reagents would be only surficial and majority of the slag materials would remain unstabilized but isolated by a layer of stabilization agent and another layer of solidification agent. Over time, these layers may be eroded away by wave action and weathering and the contaminated materials would eventually be subject to the risk of potential exposure. Hence, this alternative may not be effective in providing long term protectiveness to potential receptors.

In the beach areas of the Seawall Sector and Margaret's Creek Sector, where there are continued risks of direct contact exposure of human receptors to the contaminated materials, implementation of this alternative may result in unacceptably high risk levels. Even in other areas of the Jetty Sector and Seawall Sector, the effectiveness of this approach would likely be low due to the low life expectancy of the encapsulation mechanism. Permit-related issues would be expected prior to the implementation of such a remedy at the western jetty.

The Western Jetty at Cheesequake Creek is part of a federally authorized navigational project. As such the Corps of Engineers is responsible for reviewing and approving all proposed changes to the Western Jetty. The encapsulation requires placement of sheetpile along the footprint of the jetty to allow for the placement of concrete/grout. It is estimated that the life expectancy for steel sheetpiling is approximately 25 years. The concrete encasement would create a monolithic structure that will be subjected to the fluctuating weather in the northeast thus creating structural cracks. As the sheetpiling loses its strength due to corrosion the fractured concrete will erode.

It should be noted that impermeable structures, such as the encapsulation of the western jetty or the seawall, are discouraged by permitting and coastal zone management agencies since they imply removal of sand from the system. As a result, the proposed project would present a challenging permitting process. In a memo from the New York District (NYD), the frequency of maintenance between a stone jetty and an encapsulated jetty can be as much as 40 and 25 years respectively. Furthermore, NYD has indicated that they would not approve a jetty alternative that leaves slag in place with encapsulation. Since the slag and battery casing/associated wastes are considered principal threat wastes, NJDEP has indicated that they prefer the slag and battery casing/associated wastes be removed from the current locations to locations that can provide better long term containment of the waste materials.

This alternative would be unlikely to be effective in addressing the COCs as significant contact between the principal threat wastes and the surface water or groundwater would continue to occur

even after stabilization/encapsulation. Additionally, the stabilization/encapsulation would be prone to failure and may require frequent maintenance to remain functional.

Implementability
Significant efforts towards maintenance of the stabilization/encapsulation would be required. Additionally, administrative issues with regards to obtaining a permit for in-situ encapsulation would be anticipated.

Cost
Comparatively lower capital costs but O & M costs could be significantly higher to ensure effectiveness of the alternative.

3.4.2 Soil Alternatives

Screening of remedial action alternatives that address soil using the criteria of effectiveness, implementability and cost is performed below.

3.4.2.1 Alternative SO-1 - No Action

Effectiveness
The no action alternative is required by the NCP to be carried through the screening process, as it serves as a baseline for comparison of the site remedial action alternatives. This alternative does not reduce the exposure of receptors to site contaminants. Continued migration of contaminants and the resulting exposure of receptors would occur. As a result, this alternative would not be effective in protecting human health or reducing mobility/toxicity/volume of contaminants at the site.

Implementability
This alternative could be easily implemented since no action would be undertaken.

Cost
No costs would be associated with this alternative.

3.4.2.2 Alternative SO-2 – Excavation and Off-site Disposal/IC

Effectiveness
Removal of the contaminated soil to an off-site secure RCRA-permitted landfill virtually would eliminate the on-site risks associated with exposure pathways. This alternative would meet the RAOs. This alternative would not reduce the toxicity or volume. However, mobility would be reduced via off-site disposal and on-site risks would be reduced.

Implementability
Several factors impact the implementability of this alternative. Annual landfill capacity may be limited and more than one RCRA landfill may have to be used depending on volume that would be shipped from the site. In addition, the location of contaminated areas in tidal areas would suggest that some effort may be needed to either dewater the work zone and/or plan excavation work during periods of low tide to the extent practicable to minimize the need to dewater. The other factor which can impact the implementability of this alternative would be the availability of enough trucks to make the loading and transportation operation efficient.

Cost

The costs associated with this alternative would be volume and transportation dependent. High capital costs would be associated with this alternative. Transportation and disposal would be the bulk of the capital costs. There would be minimal O&M cost with this alternative.

3.4.2.3 Alternative SO-3 – Excavation and On-site Containment/LTM/IC

Effectiveness

Removal of the contaminated soil to an on-site containment cell would virtually eliminate exposure to contaminants and greatly reduce risk to human health. A liner along the sidewalls and bottom of the cell would contain contaminated materials within a specific area and minimize leaching of contaminants from the material into the underlying soil and groundwater. Finally, long-term monitoring would be required to assess any potential impacts of this alternative.

Implementability

Implementation of this alternative would be considered technically feasible and would be accomplished through conventional construction methods; however, the presence of a shallow water table and location in a tidal area would suggest that a significant effort and cost would be needed to dewater the work zone, excavate deeper materials, and install the liner.

Equipment, services, and personnel would be readily available from many vendors. Routine and periodic cell inspection and a maintenance program would be necessary to seal cracks and ensure that vegetation remains established and flood control measures remain in place.

Long-term monitoring would be required to ensure liners remain intact and leaching of contaminants from the containment cell does not occur.

Cost

Moderate costs would be associated with this alternative relative to other remedial alternatives. Expenditures would include capital costs for equipment, materials, labor for the construction of the containment cells and removal and handling of the soil, as well as fencing upgrades and deed restrictions. Annual and periodic O&M costs would include such items as media monitoring and periodic mowing and maintenance of the cap and site.

3.4.2.4 Alternative SO-4 – Consolidation and In-situ Stabilization/LTM/IC

Effectiveness

Due to elevated direct contact risks in beach areas and Margaret's Creek Sector, this alternative would likely require additional components such as implementation of ICs, engineering controls and/or construction of a cap to reduce the risks in these areas to acceptable levels. However, these measures would restrict access to the subject areas and would likely not be acceptable to the community. Long-term effectiveness of this remedial alternative in the Jetty and Seawall Sectors may not be viable as the consolidated treated material would be subject to forces of erosion from the bay. This erosion may result in potential leaching of contaminants from the portion of the consolidated material that would be either untreated or insufficiently treated due to poor mixing. Treatability studies would be needed to confirm the effectiveness and implementability.

Implementability
In-situ treatment within the Jetty Sector would necessitate the maintenance of dewatered conditions for extended periods during the mixing process in order to allow stabilization/solidification to occur. Previous studies had used roto-tilling to apply the reagent during the low tide period only (so that it was not under the water) to avoid generation of suspended solids and spreading of the contaminants if they were under the water. The implementation of this methodology would require the removal of all vegetation including its root systems to achieve its end objectives including extensive logistical support for the equipment and personnel and therefore, achieving complete solidification/ stabilization of the contaminated material would be challenging.

Cost
Moderate costs would be associated with this alternative relative to other remedial alternatives. Expenditures would include capital costs for equipment, materials, labor for the stabilization/ solidification of the soil, as well as fencing upgrades and deed restrictions. Annual and periodic O&M costs would include such items as media monitoring.

3.4.3 Sediment Alternatives

3.4.3.1 Remedial Alternative SED-1 – No Action

Effectiveness
The no action alternative is required by the NCP to be carried through the screening process, as it serves as a baseline for comparison of the site remedial action alternatives. This alternative would not reduce the exposure of potential receptors to COCs. Continued migration of contaminants and the resulting exposure of receptors would occur due to impacted sediment. As a result, this alternative would not be effective in protecting human health or reducing mobility/toxicity/volume of contaminants at the site.

Implementability
This alternative could be easily implemented since no action would be undertaken.

Cost
No costs would be associated with this alternative.

3.4.3.2 Remedial Alternative SED-2 – Dredging/Excavation and Off-site Disposal/IC

Effectiveness
Dredging and disposal of the contaminated sediment to an off-site secure RCRA-permitted landfill virtually would eliminate the on-site risks associated with exposure pathways. This alternative would meet the RAOs. Short term releases during dredging would be possible and must be controlled through engineering controls. This alternative would not reduce the toxicity or volume. However, mobility would be reduced via off-site disposal and on-site risks would be reduced.

Implementability
Factors that impact the implementability of this alternative would include limited annual landfill capacity. More than one RCRA landfill may have to be used depending on volume that would be shipped from the site. In addition, significant effort may be needed to either dewater the work zone and/or plan dredging/excavation work during periods of low tide to the extent practicable to minimize the need to dewater. Transportation of contaminated sediments from areas that are farther into the

Bay may also pose significant challenges. The other factor which can impact the implementability of this alternative would be the availability of enough trucks to make the loading and transportation operation efficient.

Cost
The costs associated with this alternative would be volume and transportation dependent. High capital costs would be associated with this alternative. Transportation and disposal account for the bulk of the capital costs. There would be minimal O&M cost under this alternative.

3.4.3.3 Remedial Alternative SED-3 – Dredging/Excavation and On-site Containment/LTM/IC

Effectiveness
Similar to Alternatives SL-3 and SO-3, this alternative would virtually eliminate the risks associated with the exposure pathways. Short term releases during dredging would be possible and would be controlled through engineering controls. Since the containment structure would eliminate exposure to contaminants, risk to human health would be greatly reduced. Additionally, removal of the sources of contamination would ensure that residual contamination in other media such as surface water and groundwater would reduce over time. A liner along the sidewalls and bottom of the cell would contain contaminated materials within a specific area and minimize leaching of contaminants from the material into the underlying soil and groundwater. LTM would be required to assess any potential impacts of this alternative.

Implementability
Implementation of this alternative would be considered technically feasible and could be accomplished through conventional construction methods. However, working in a tidal area would suggest that significant effort and cost would be needed to de-water the work zone to excavate materials.

Equipment, services, and personnel would be readily available from many vendors. Routine and periodic cap inspection and a maintenance program would be necessary to seal cracks and ensure that vegetation remains established and flood control measures remain in place. Transportation of contaminated sediments from areas that are farther into the Bay may also pose significant challenges.

LTM would be required to ensure liners remain intact and leaching of contaminants from the containment cell does not occur.

Cost
Moderate costs would be associated with this alternative relative to other remedial alternatives. Expenditures would include capital costs for equipment, materials, and labor for the construction of the containment cells and removal and handling of the wastes, as well as fencing upgrades and deed restrictions. Annual and periodic O&M costs would include such items as media monitoring, periodic mowing, and maintenance of the cap and site.

3.4.3.4 Remedial Alternative SED-4 – Capping/LTM/IC

Table 3-1 summarizes the key effectiveness and implementability issues for the three sectors at the site. A detailed evaluation of site conditions affecting effectiveness, implementability, and cost of capping are discussed below. The evaluation shows that capping would be most effective and

implementable in the subtidal portion of Area 8, an area protected from waves by the nearby jetty, and where groundwater flux up through the cap would be negligible.

Effectiveness

The following four items contributing to cap effectiveness are considered in the detailed discussion below:

1. Protection from erosion
2. Presence of silt and clay sediments that will help retain lead and arsenic in the capped sediments
3. Lack of groundwater upwelling that can transport contaminants
4. Potential for hardening of sediments over time

The cap must be able to withstand the forces of erosion in order to be effective over the long term. For example, the waves and currents present at the site would induce a shear stress that can cause erosion. Margaret's Creek wetlands are protected from waves and have low shear stresses. In the Jetty Sector, the area directly adjacent to the western jetty (Area 8) is relatively protected because of the existence of the jetty. The Seawall Sector is unprotected and very exposed to high-energy events such as hurricanes and nor'easters. Shear stresses would be more manageable in the Margaret's Creek and Jetty Sectors.

In addition to erosion, long-term effectiveness must also consider the potential for contaminants to migrate up from the contaminated sediment to the cap surface and/or to surface water at concentrations that pose a risk to human health or the environment such that RAOs are not achieved. The potential migration of dissolved contaminants in the pore water of the sediments is the key concern. This migration can occur in three ways: (1) as the weight of the cap material compresses the contaminated sediments, the pore water is squeezed out of the sediments and up into the cap material, (2) groundwater seepage up through the sediments carries contaminants via dissolution/desorption and advection into the cap, and (3) molecular diffusion of the dissolved contaminants into the pore water of the cap. These geotechnical, hydrogeological, and geochemical aspects must be considered during design of the cap.

The potential for contaminant migration along all three of the pathways is influenced by the chemistry of the contaminants and the sediments. The principle contaminants in the sediments are arsenic and lead in Area 8 and Area 9. Contaminant migration can be inhibited by sorption or binding of the metals to the sediment, or by the formation of low-solubility metal complexes. The fine particles in Area 8 sediments are primarily silt with little clay (<5%), whereas the fines in Margaret's Creek have high fractions of both silt and clay. The distribution of fine particles is important for metals for two reasons: (1) arsenic and lead exist as charged ions in the dissolved phase. Clay has negatively charged binding sites that can bind positively charged metals, and organic matter (silt) has both positively and negatively charged binding sites. In contrast, binding is minimal to relatively inert sand. (2) In low-energy areas (e.g., with minimal currents and waves), the cohesion and compaction of fine particles can restrict the movement of pore water, resulting in anaerobic redox conditions in the sediment.

Redox conditions are especially important for arsenic geochemistry, and must be considered carefully before constructing a sediment cap. Arsenic can be adsorbed to iron minerals in the sediment and the concentration of arsenic in the aqueous phase is reduced. The adsorption is greatest for arsenic in the oxidized state (arsenate anion) compared to the reduced state (arsenite anion). Under sulfate reducing conditions, arsenic sulfide minerals can form that are also less soluble. Iron and sulfate are generally plentiful in marine waters. However, these reactions are reversible for both adsorption and precipitation as sulfides. If redox conditions change to more oxidizing, the sulfide minerals can dissolve and re-release dissolved arsenic. If the conditions are slightly reducing, the iron can dissolve and release the adsorbed arsenic or arsenic can become reduced (arsenite anion), resulting in increased dissolved arsenic concentrations. The potential changes in solubility of arsenic present a major argument for incorporating reactive materials into the cap that can remove arsenic and other metals from the dissolved phase. An inert cap (for example, a sand cap), would be far less protective.

Lead is less sensitive to changes in redox conditions. In the environment, lead exists as positively charged cations (such as Pb^{2+} or $PbCl^{+}$). The positively-charged metal can be adsorbed under varying conditions to materials with negatively charged surfaces, with clay being the most abundant such material. It must be noted that pH is also an important indicator of metals solubility. However, pH is not expected to vary substantially in the capped sediments.

Another important feasibility consideration is the potential flux of groundwater that would carry contamination up from the deeper layers of contaminated sediments. Groundwater discharges through sediments only in the intertidal zone, because the groundwater coming from upland areas is fresher and less dense than the Raritan Bay saltwater. In the subtidal zone, the continual presence of seawater above and below the sediment bed means no fresh groundwater is found in the sediment pore spaces. Contaminant transport through advection would be limited in the subtidal areas. Within the intertidal zone, sediment caps must be designed to account for groundwater transport through the cap material. This may necessitate the use of reactive materials such as apatite and organoclay to reduce the potential for contaminant transport through the cap resulting from groundwater flux. At the site, the most effective cap locations would be in areas that are continuously inundated with salt water due to lower groundwater flux rates and less wave action. These areas are in the Jetty Sector. Contaminated areas in the Seawall Sector are predominantly in the intertidal zone. Continuously inundated areas are present in the Margaret's Creek Sector, although the water here is brackish rather than saline, the groundwater discharge pattern discussed above would not be as prevalent.

Other considerations include the buildup of gases such as methane (known as "ebullition") that can deform the cap overtime or create preferential contaminant migration pathways and the incorporation of a habitat layer into the cap design to encourage benthic colonization.

In the long-term, the contaminated sediments under the cap would be compressed. Pore water would be expelled and the density would increase. With very little pore water, there would be very slow dissolved phase migration. Increased density leaves the sediment more resistant to erosion. Hard, low-permeability material that contains the metals is the ultimate goal of capping, and would lead to a permanent reduction in risk.

Table 3-1 presents a summary of the overall effectiveness of capping in each site area.

Implementability

Human uses of the areas narrow the list of feasible cap locations at the site. Boat anchors and clamming, for example, could disturb the cap. Institutional controls such as signs and fences could be installed around a cap in the Margaret's Creek Sector. The Jetty Sector is not a popular place for beach or other coastal activities and institutional controls could be effectively implemented. In contrast, the Seawall Sector is important for recreation, and controls would not be implementable.

Another consideration in Margaret's Creek would be the presence of *Phragmites* in contaminated areas. A cap would not be implementable without removing the heavy vegetation. Considering that the contamination is shallow, removing the heavy vegetation would effectively mean removing the contamination, negating the need for a cap.

Caps would be implementable from a construction and O&M perspective in all sectors.

Cost

Low costs would be associated with this alternative relative to other remedial alternatives. The major cost drivers for capping would be the design and installation, the materials in the cap, and long-term monitoring. While long-term monitoring costs can be significant, caps would be considered cost-effective options since the contaminants would be left in place and there would be no costs associated with removal of the sediments and disposal in a landfill.

3.4.3.5 Remedial Alternative SED-5 – In-situ Stabilization/LTM/IC

Effectiveness

Similar to Alternative SO-4, this is still a technology in development and information on full scale application of the technology is limited. Hence the degree of effectiveness of this alternative would be uncertain. Due to erosion in most areas of the bay, this alternative may not be effective or may require significant armoring. The presence of heavy *Phragmites* vegetation in Margaret's Creek would make it difficult for contaminants coming into contact with the stabilizing agent. In areas that are exposed during low tides, this alternative may present elevated direct contact risks. Treatability studies would be needed to confirm the effectiveness and implementability of this alternative.

Implementability

This alternative would require the application of roto-tilling or similar technologies to achieve good mixing. In order to avoid generation of suspended solids and spreading of the contaminants, this mixing would have to be performed during low tide period only (so that it was not under the water). However, this methodology would be difficult to implement for the Margaret's Creek wetland area due to the heavy *Phragmites* vegetation. Implementability in the Bay area will be challenging to keep off wave action from damaging the stabilized area. It should also be noted that these mixing technologies for sediment are still in development and are yet to gain widespread acceptance. In the beach areas that are exposed during low tides, this alternative would not be acceptable to the community. Additional challenges for in-situ treatment within the intertidal zone and areas seaward of the intertidal zone would necessitate the maintenance of dewatered conditions for extended periods during the mixing process in order to allow for stabilization/solidification to occur. Areas of Margaret's Creek may also require maintenance of dewatered conditions.

Cost

Moderate costs would be associated with this alternative relative to other remedial alternatives. Expenditures would include capital costs for equipment, materials, and labor for the stabilization/ solidification of the contaminated sediment. Annual and periodic O&M costs would include media monitoring.

3.4.3.6 Remedial Alternative SED-M6 – Monitored Natural Recovery/LTM/IC

Alternative SED-M6a – Monitored Natural Recovery

Table 3-2 summarizes the key effectiveness and implementability issues for MNR in the three sectors at the site. A detailed evaluation of site conditions affecting effectiveness, implementability, and cost of MNR are discussed below. The evaluation shows that MNR will be most effective and implementable in the Margaret's Creek wetlands, where natural sedimentation will bury contamination over time, and in select parts of Area 7 and Area 11, where existing surface water currents will disperse contamination over time into the wider Raritan Bay.

Effectiveness

The EPA contaminated sediments guidance (2005) presents a hierarchy of preferred natural recovery processes. In this section, this hierarchy of processes (Section 3.3.4.6) is used as a guide to evaluate the effectiveness of MNR at the site.

In the rest of this section, the processes presented above are used to evaluate the effectiveness and implementability of MNR at the site. This MNR evaluation assumes that contaminant releases from primary sources would be controlled.

Processes in the sediment transform the contaminants to less toxic forms

In general, the metals and arsenic contamination is more toxic if the elements are in the dissolved phase, rather than solid precipitates. Under sulfate reducing conditions, metal ions can be drawn out of the dissolved phase and form metal sulfide precipitates. However, this is not an irreversible reaction. If redox conditions change (such as during a high-energy storm event where erosion and resuspension of the sediments occurs) the metal and arsenic ions can be remobilized into the dissolved phase. Therefore, the higher probability that sediments would remain undisturbed, the higher the probability that MNR would be effective.

The mobility and bioavailability of the contaminants are reduced due to sorption or binding to the sediments

The principle contaminants at the site are arsenic and lead. The fine particles are silt and clay (in various proportions depending on the location). The distribution of fine particles is important because arsenic exists as an anion, and lead exists as cation in the dissolved phase. Clay has negatively charged binding sites that can bind cations, and organic matter (silt) has both positively and negatively charged binding sites that can bind both cations and anions. Binding is minimal to relatively inert sand.

Redox conditions are also important for sorption and binding. Arsenic can be adsorbed to iron minerals in the sediment and the concentrations of arsenic in the aqueous phase would decrease. The adsorption is greatest for arsenic in the oxidized state (arsenate anion) compared to the reduced state (arsenite anion). Iron is plentiful in marine waters. However, if the conditions are slightly reducing,

the iron can dissolve and release the adsorbed arsenic or arsenic can become reduced (arsenite anion) resulting in increased dissolved arsenic concentrations.

Lead is less sensitive to changes in redox conditions. In the environment, lead exists as positively charged cations (such as Pb^{2+} or $PbCl^{+}$). These positively-charged metals can adsorb under varying conditions to materials with negatively charged surfaces, with clay being the most abundant such material.

Concentrations in the depth interval near the surface are reduced due to burial by natural sedimentation, or by the mixing in of cleaner sediments depositing on the sediment bed

In the Margaret's Creek Sector, three lines of evidence were collected during the RI to evaluate the rates of sedimentation and indications of mixing: geochronology, high-resolution core contaminant analysis, and bulk density. For the high-resolution cores, one core was sliced into thin intervals to determine the concentration gradient through the core. Two cores were taken. Both cores indicated regular deposition over time, without significant erosion events. There were limited contaminant concentration gradients in the deeper intervals (Figures 1-25 and 1-26). However, starting at approximately 10 inches depth, contaminant concentrations started to spike. The gradient reversed at around 3 inches depth. The similarities of the two cores indicate that the sediment dynamics in these two areas in the Margaret's Creek Sector have been fairly similar. Another important conclusion is that concentrations at the surface appear to be decreasing with time.

The geochronology data was used to determine the rate of sedimentation and where active sedimentation is occurring. The two measured rates were 0.1 inch per year and 0.3 inch per year. The geochronology data showed that this type of deposition would likely occur across the majority of the wetland.

Similar data were not collected in the Jetty Sector. An evaluation of the erosional forces and currents in Area 8, the most contaminated area, showed that the sediments in this area appear to be consistently resuspended and reworked, resulting in contamination at depth (at least six feet below the seabed). These sediment dynamics do not indicate that natural burial by sedimentation would be an effective natural recovery mechanism for this area. The evidence in Areas 7 and 11 also does not indicate that natural burial by sedimentation is regular and reliable. However, a portion of the sediment load discharging from Cheesequake Creek deposits in Area 7 (Cheesequake Creek was determined to be a net exporter of sediments). These cleaner sediments are potentially mixing in with the contaminated sediments in this area.

A decrease in contamination in the surface depth interval through dispersion of the contaminants via surface water currents, or advective or diffusive transport

In Areas 11 and 7 of the Jetty Sector, the hydrodynamic study conducted during the RI showed that regular surface water currents are transporting and dispersing sediments. Area 7 is a zone where Cheesequake Creek mixes with Raritan Bay. Tidal currents shift back and forth depending on the tide. The result is no regular pattern of deposition, but rather regular dispersion of contaminants. In Area 11, an alongshore current is continually dispersing sediments westward along the coast. This current is also responsible for bringing contamination into Area 11 from slag on the western jetty; however,

primary sources must first be controlled for MNR to be effective. Furthermore, both of these areas are "open systems", meaning that there are no physical boundaries between the areas and the greater Raritan Bay. The sediments can thus be dispersed over a wide area, especially during strong storms.

In contrast, the Margaret's Creek wetlands are much less open. While the contaminant data indicates that dispersion has occurred across the wetland, the contaminants are trapped to an extent in the wetlands. The entire wetlands drains through a narrow creek and the currents are almost negligible. These hydraulics result in the slow transport of sediments out of Margaret's Creek into the open system of Raritan Bay (where they can be dispersed over a wide area).

Implementability

Since the contaminants would not be permanently removed, it would be necessary to establish institutional and engineering controls that restrict access to the area until such time that MNR achieves the RAOs. The waters and beaches of the Seawall Sector are important coastal recreation resources for the surrounding communities; controls would not be implementable in this sector. The contaminated areas of the Jetty sector and Margaret's Creek are much less important for recreation. MNR would therefore only be considered in these latter two sectors.

Cost

Low costs would be associated with this alternative relative to other remedial alternatives. The major costs for MNR would include modeling, SEDFLUME analysis for sediment stability, and a pilot study. Institutional and engineering controls would need to be implemented, and a long term monitoring program carried out.

Alternative SED-M6b – Enhanced Monitored Natural Recovery

The effectiveness, implementability, and cost of enhanced monitored natural recovery are discussed below. Table 3-3 summarizes the key effectiveness and implementability issues for the three sectors at the site. The evaluation shows that enhanced monitored natural recovery is not considered effective and implementable at any areas of the site.

Effectiveness

The purpose of enhanced MNR would be to speed up the natural recovery processes discussed in Alternative SED-M6a. The primary mechanism to be enhanced would be burial by natural sedimentation. The most common enhanced MNR remedial action would be to add a thin layer of clean material over the contaminated sediments.

The newly placed material could become contaminated by release of metals and arsenic from the deeper sediments as a result of dissolution into pore water and subsequent transport upward into the newly placed materials. Both advective and diffusive transport can occur. Advective transport would be strongest in areas with significant groundwater upwelling. If upward migration is significant, the long-term effectiveness of the enhanced MNR remedy would be in doubt. The component of the groundwater gradient in the Margaret's Creek area is toward the wetlands, indicating that there is likely some discharge of groundwater into the wetlands. In the coastal areas, the groundwater

discharge is in the intertidal zone, since the less dense fresh groundwater is pushed to the surface by the denser salt water.

An additional enhancement would be to alter the contaminant chemistry in situ. Risk would be reduced by both natural sedimentation and also the reduction of mobility and bioavailability. One way would be for the new material to be more resistant to erosion than the native material, thus better maintaining the redox conditions in the contaminated sediments (assuming conditions were such that the contaminants of concern formed low-solubility complexes). Reactive amendments could also be mixed in with the new material. Phosphate-rich apatite is one such amendment that can potentially bind lead into low-solubility complexes that would then remain in situ. Organoclays or manufactured granular hydrous ferric oxides could be used to adsorb arsenic ions. These amendments have been used at other sites and are commercially available.

Lastly, the naturally occurring physical processes of either burial or dispersion could be enhanced. With knowledge of the hydrodynamics and sediment dynamics (including sediment loading), the existing hydraulics could be altered using engineered structures to either promote sedimentation over the contaminated area, or alternatively to promote dispersion. Under the former, deposition could be enhanced by engineering low-energy conditions with minimal currents and waves. In the latter, high-energy conditions with strong currents could be engineered to enhance dispersion.

With the right design, enhanced MNR can reduce the timeframe (compared to MNR) to achieve the RAOs.

Implementability

Since the contaminants would not be permanently removed, it would be necessary to put institutional and engineering controls in place that restrict access to the area until RAOs are achieved. These controls would likely include fences and signs to impede access to the area, as well as restrictions on the future development of the treatment zone. The waters and beaches of the Seawall Sector are important coastal recreational resources for the surrounding communities; controls would not be implementable in this sector. The contaminated areas of the Jetty Sector and Margaret's Creek are much less important for recreation. Enhanced MNR should only be considered in these latter two sectors.

A thin layer placement of clean sediment with or without amendments would be implementable given that clean material (such as coarse sand) is available, and machines and techniques would be available to mix the amendments and spread the material across the treatment zone. Amendments would be commercially available.

Enhanced MNR would be implementable in heavily vegetated areas, such as the *Phragmites* areas in the Margaret's Creek Sector. The material would settle into the root zones of the vegetation.

In Margaret's Creek, a thin layer placement of clean sediment would likely be considered "fill" under Section 404 of the Clean Water Act, and would require permitting that takes into account the nature and function of the wetlands.

Cost

Low costs would be associated with this alternative relative to other remedial alternatives. Costs for enhanced MNR would include modeling, treatability studies to find an effective amendment, SEDFLUME analysis for sediments stability, and a pilot study. Institutional and engineering controls would need to be implemented, and a long term monitoring program carried out.

3.5. Selection of Alternatives for Further Evaluation

3.5.1 Alternatives for Slag and Battery Casings/Associated Wastes

Alternative SL-1 (No Action) is retained for detailed analysis as required by the NCP. This alternative serves as a baseline for decision makers to evaluate the other alternatives.

Alternatives SL -2 (Excavation and Off-site Disposal) and SL-3 (Excavation and On-site Containment) are effective and implementable. Hence, they are retained as remedial alternatives for further analysis.

Alternative SL-4 (In-situ Solidification/Stabilization/Encapsulation) is eliminated from further consideration since this technology is unlikely to be effective in achieving acceptable levels of risk in the areas of the site that may involve increased direct-contact risks (e.g., beach areas and Margaret's creek areas). Additionally, this alternative may not be administratively implementable in the western jetty as permit-related issues would be anticipated.

3.5.2 Soil Alternatives

Alternative SO-1 (No Action) is retained for detailed analysis as required by the NCP. This alternative serves as a baseline for decision makers to evaluate the other alternatives.

Alternatives SO-2 (Excavation and Off-site Disposal) and SO-3 (Excavation and On-site Containment) are retained for further consideration primarily as effective and expedient remedial alternatives for soils.

Alternative SO-4 (Consolidation and In-situ Stabilization) is eliminated from further consideration since this technology is still in development with limited information regarding full scale application.

3.5.3 Sediment Alternatives

Alternative SED-1 (No Action) is retained for detailed analysis as required by the NCP. This alternative serves as a baseline for decision makers to evaluate the other alternatives.

Alternatives SED-2 (Dredging/Excavation and Off-site Disposal) and SED-3 (Excavation and On-site Containment) are retained for further consideration as effective and implementable remedial alternatives.

Alternative SED-4 (Capping) is retained for Area 8 in the Jetty Sector. It is the most implementable location for a cap because it is protected from the erosional forces of strong waves and currents, and is not a recreational or navigational area where implementing institutional and engineering controls would be disruptive. A pre-design investigation, treatability study, and pilot study may be required prior to implementation. A robust monitoring plan would be needed to support the effectiveness of a capping remedy.

Alternative SED-5 (In-situ Treatment) is not considered feasible due to low effectiveness, high monitoring and maintenance requirements and potential non-acceptance of the local community. This alternative is eliminated from further consideration in this FS.

Alternative SED-M6a (MNR) is applicable for Area 7 and Area 11 in the Jetty Sector because currents here can disperse the contamination into the greater Raritan Bay. MNR is also applicable in the wetland areas of the Margaret's Creek Sector (Area 9) because the area is protected from erosion, and natural sedimentation will continue to bury contamination over time. A robust monitoring plan would be needed to support the effectives of a MNR remedy. MNR is retained for further consideration as effective and implementable alternative in these areas.

Alternative SED-M6b (Enhanced MNR) would not be effective in many site areas due to the potential for erosion. The degree of difficulty in the effectiveness and implementability of enhanced MNR is unknown due to the uncertainty regarding how well the thin layer of clean material can be distributed uniformly over the sediment areas. It should be noted that a large portion of these areas need to be dewatered prior to implementation and their ability to support any equipment is also unknown.

3.6. Consolidation of Alternatives for Further Evaluation

The alternatives selected for further evaluation following the screening process are listed below.

Remedial Alternatives for Slag and Battery Casings/Associated Wastes

- Alternative SL-1 - No Action
- Alternative SL-2 - Removal and Off-site Disposal/ IC
- Alternative SL-3 - Removal /On-site Containment/ LTM/IC

Remedial Alternatives for Soil

- Alternative SO-1 - No Action
- Alternative SO-2 - Excavation and Off-site Disposal/IC
- Alternative SO-3 - Excavation and On-site Containment/LTM/IC

Remedial Alternatives for Sediments

- Alternative SED-1 - No Action
- Alternative SED-2 - Dredging/Excavation and Off-site Disposal/IC
- Alternative SED-3 - Dredging/Excavation and On-site Containment/LTM/IC
- Alternative SED-4 - Capping/LTM/IC
- Alternative Sed-M6 - Monitored Natural Recovery /LTM/IC

Even though the media are different for Alternatives SL-2, SO-2, and SED-2, many components of these alternatives are similar. The underlying concept behind these three alternatives is removal of

the contaminated materials, disposal to an off-site facility and restoring the areas from which contaminated materials were removed. Similarly, the basic principle behind Alternatives SL-3, SO-3, and SED-3 is to remove the contaminated materials and contain them on-site. Hence, several components of these three alternatives are also similar even though the media are different. Due to their similarities, consolidation of the alternatives is based on the basic principles behind the alternatives.

The components of sediment Alternatives SED-M6 (MNR) and SED-4 (capping) are unique to the sediment medium and there are no components in the alternatives for source materials and soil that are equivalent. In fact, for MNR to be effective in sediment, active remediation of source materials will likely be required. Combination of these components for sediment only (i.e., MNR and capping) that are applicable only to specific areas of the site, with components that are applicable site-wide to all solid media (i.e. off-site disposal and on-site containment) yields a consolidated set of site-wide alternatives (Alternatives 5 and 6 in the list below) that are applicable to all solid media. In addition, due to the high volume of soil and sediment that need to be addressed, the limited availability of on-site land space for containment and the likely possibility that most of the soil and sediment may be non-hazardous wastes based on TCLP, a separate alternative is proposed wherein only the source materials are contained on-site and the soil and sediment are disposed of at off-site facilities (Alternative 4 in the list below). Based on these considerations, the consolidated set of site-wide alternatives is presented below.

- Alternative 1 - No Action
- Alternative 2 - Excavation/Dredging, Off-site Disposal, Institutional Controls and Long-Term Monitoring
- Alternative 3 – Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
- Alternative 4 – Excavation/Dredging, On-site Containment of Source Materials, Off-site Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
- Alternative 5 – Excavation/Dredging, On-site Containment, Off-site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring
- Alternative 6 – Excavation/Dredging, On-site Containment, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

The six site-wide alternatives will be developed and evaluated in detail in Section 4. A brief summary of the components of the Alternatives 2 through 6 are provided below.

Alternative 2 – Excavation/Dredging, Off-site Disposal, Institutional Controls and Long-Term Monitoring: Under this alternative, slag, battery casing/associated wastes, contaminated soils and sediment above the PRGs would be excavated and/or dredged and disposed of at off-site facilities. The disposal requirements would depend on the metal concentrations and results of required regulatory tests on the wastes. Contaminated wastes that fail TCLP would require treatment to meet

Universal Treatment Standards prior to disposal in a Subtitle C landfill. Contaminated wastes that pass TCLP can be disposed of in a Subtitle D landfill without treatment. Certified clean material/fill/sands would be placed as appropriate at the excavated/dredged areas. The Margaret's Creek wetland would be impacted due to dredging and would require restoration. ICs will be performed along with long-term monitoring of surface water and groundwater.

Alternative 3 – Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring: Under this alternative, MNR would be implemented for selected remediation target areas in Areas 7 and 11, and the Margaret's Creek wetland. The slag, battery casings/associated wastes, contaminated soil and sediment above the PRGs in other areas would be removed and disposed of at off-site facilities as described under Alternative 2. The Margaret's Creek wetland would not require restoration. ICs will be performed along with long-term monitoring of surface water, groundwater and MNR.

Alternative 4 – Excavation/Dredging, On-site Containment of Source Materials, Off-site Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring: Under this alternative MNR would be implemented for selected remediation target areas for Areas 7 and 11, and the Margaret's Creek wetland, and contaminated soil and sediment in other areas would be removed and disposed of at off-site facilities as discussed under Alternative 2. The slag and battery casing/associated wastes would be placed in the on-site containment cells consisting of bottom liners, lined containment walls, berms and a low permeability cover. These cells would be constructed within the site in the upland area of Margaret's Creek and in the asphalt area near the western jetty. Treatment of slag to meet land disposal requirements prior to placement in the containment cell would not be required, as this operation is consolidation of waste materials within an Area of Contamination, which exempts waste consolidation from meeting Land Disposal Restriction (LDR) requirements. The Margaret's Creek wetland would not require restoration. ICs will be performed along with long-term monitoring of surface water, groundwater and MNR.

Alternative 5 – Excavation/Dredging, On-site Containment, Off-site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring: Under this alternative, MNR would be implemented for selected remediation target zones in Areas 7 and 11 and the Margaret's Creek wetland. Additionally, a selected remediation target area in Area 8 would be capped. This alternative would also include on-site containment of slag, battery casings/associated wastes, and contaminated soil and sediment excavated or dredged from other Site areas. However, the on-site containment cells would not have the capacity to contain all the contaminated soil and sediment from other Site areas. Therefore, a portion of the excavated soil and dredged sediment would be disposed of at off-site facilities. The Margaret's Creek wetland would not require restoration. ICs will be performed along with long-term monitoring of surface water, groundwater and MNR.

Alternative 6 – Excavation/Dredging, On-site Containment, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring: This alternative would be similar to Alternative 5 except capping of Area 8 would not be implemented. Instead, the contaminated sediment would be dredged and disposed of at off-site facilities.

It should be noted that in all the alternatives described above, the dredged sediment and the excavated soil would be dewatered (if necessary) prior to containment or disposal. The detailed descriptions, detailed analysis and comparative analysis of the six site-wide alternatives are provided in Section 4. In addition, a sensitivity cost analysis for each alternative is provided.

Section 4
Detailed Analysis of Alternatives

This section provides a detailed analysis description of each alternative developed in Section 3. Conceptual descriptions outline potential and relevant technologies and processes that could be involved in each alternative. The green remediation practices that can be implemented under each alternative are also discussed. The six remedial action alternatives developed in Section 3 are listed below.

Alternative 1 - No Action

Alternative 2 – Excavation/Dredging, Off-site Disposal, Institutional Controls and Long-Term Monitoring

Alternative 3 – Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Alternative 4 – Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Alternative 5 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

Alternative 6 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

As discussed in Section 2.4 and as presented in Table 2-5, the total remediation volume includes approximately 11,100 CY of source materials, about 62,000 CY of contaminated soil and sediment in the jetty sector and about 185,200 CY of contaminated soil and sediment in the seawall and Margaret's Creek sectors. The individual volumes of contaminated materials addressed by each remedial component such as off-site disposal, on-site containment, MNR, or capping are different for each alternative. The summary breakdown of the volumes for soil, sediment and source materials addressed by each remedial measure is provided in Table 4-1.

Green Remediation

In April 2008, EPA issued "Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites" (EPA 2008). In August 2009, EPA issued "Principles for Greener Cleanups" (EPA 2009a) and "Superfund Green Remediation Strategy" (EPA 2009b). In these documents, green remediation is defined as "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions" or as seeking maximum

environmental benefits, while effectively protecting human health and the environment.

To achieve green remediation, it is important to assess the environmental footprint, identify and implement sustainable practices, or develop innovative approaches that would reduce the environmental footprint of the cleanup. For this section, sustainable practices for each alternative are identified in accordance with the core elements of green remediation. These core elements are summarized below (EPA 2008).

- Energy Efficiency – Reduce or minimize energy use through treatment system optimization, use of energy efficient equipment, and use of renewable energy resources.
- Air Emissions – Reduce or minimize air emissions through minimizing fuel use, use of cleaner fuels, engine retrofits to minimize release of toxic or priority pollutants.
- Water Use/Impact on Water Resources – Reduce or minimize water consumption and maximize water reuse, reclaim water for beneficial uses, limit impacts on nearby water bodies.
- Land/Ecosystem Impacts – Minimize soil and habitat disturbance, use passive technologies where possible and effective.
- Material Consumption/Waste Generation – Re-use and recycle materials, minimize waste generation, use materials that minimize resource extraction and disposal.

More specifically, EPA Region 2 issued its "Clean & Green" Policy on March 17, 2009 (EPA 2009c). In this policy, EPA Region 2 established a preference for the use of:

- 100 percent of electricity from renewable energy, and energy conservation and efficiency approaches including Energy Star equipment
- Cleaner fuels and clean diesel technologies and strategies
- Water conservation and efficiency approaches including WaterSense products
- Sustainable site design
- Industrial material reuse or recycling within regulatory requirements
- Recycling applications for materials generated at or removed from the site
- Environmentally preferable purchasing
- Greenhouse gas emission reduction technologies

Potential applicable green remediation technologies for each alternative are considered under the evaluation of one of the EPA criteria, short-term effectiveness. The potential is also considered for implementing best management practices (BMPs) for green remediation and for employing sustainable practices that work to minimize the environmental and energy footprints of actions taken during the life of a project. This list would be re-evaluated during the remedial design and remedial

action so that the sustainable practices can be incorporated into design documents and implemented during the remedial action.

4.1 Evaluation Criteria for Detailed Analysis

EPA's nine evaluation criteria address statutory requirements and considerations for remedial actions in accordance with the NCP and additional technical and policy considerations that have proven to be important for selecting among remedial alternatives (EPA 1988). The following subsections describe the nine evaluation criteria used in the detailed analysis of remedial alternatives.

4.1.1 Overall Protection of Human Health and the Environment

Each alternative is assessed to determine whether it can provide adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site. Evaluation of this criterion focuses on how site risks are eliminated, reduced, or controlled through treatment, engineered controls, or institutional controls and whether an alternative poses any unacceptable cross-media impacts. This is a threshold criterion that must be met.

4.1.2 Compliance with ARARs

Each alternative is assessed to determine whether it would attain ARARs under federal and state environmental or facility siting laws, and non-promulgated advisories and guidance, or whether it would provide grounds for invoking one of the waivers. This is a threshold criterion that must be met.

Superfund specifies situations under which the ARARs may be waived (40 CFR 300.430: Remedial Investigation/Feasibility Study (f) Selection of Remedy). The situations eligible for waivers are shown in Exhibit 4-1 below.

Where remedial actions are selected that do not attain ARARs, the lead agency must publish an explanation in terms of these waivers. It should be noted that the "fund balancing waiver" only applies to Superfund-financed remedial actions.

ARARs apply to actions or conditions located on-site and off-site. On-site actions implemented under CERCLA are exempt from administrative requirements of Federal and State regulations, such as permits, as long as the substantive requirements of the ARARs are met. Off-site actions are subject to the full requirements of the applicable standards or regulations, including all administrative and procedural requirements.

Based on the CERCLA statutory requirements, the remedial actions developed in the FS will be analyzed for compliance with federal and state environmental regulations. This process involves the initial identification of potential requirements, the evaluation of the potential requirements for applicability or relevance and appropriateness, and finally a determination of the ability of the remedial alternatives to achieve the ARARs. This FS provides a preliminary discussion of the regulations that are applicable or relevant and appropriate to the remediation of the contaminated media at the site. Both Federal and State environmental regulations and public health requirements are evaluated. In addition, this FS identifies Federal and State criteria, advisories, and guidance as TBCs.

Exhibit 4-1. ARAR Waivers

Waiver	Description
Interim Measures	The remedial action selected is only part of a total remedial action that will attain such level or standard of control when completed (CERCLA §121(d)(4)(A)).
Greater Risk to Health and the Environment	Compliance with such requirement at the facility will result in greater risk to human health and the environment than alternative options (CERCLA §121(d)(4)(B)).
Technical Impracticability	Compliance with such requirement is technically impracticable from an engineering perspective (CERCLA §121(d)(4)(C)).
Equivalent Standard of Performance	The remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation through use of another method or approach (CERCLA §121(d)(4)(D)).
Inconsistent Application of State Requirements	With respect to a State standard, requirement, criteria, or limitation, the State has not consistently applied (or demonstrated the intention to consistently apply) the standard, requirement, criteria, or limitation in similar circumstances at other remedial actions (CERCLA §121(d)(4)(E)).
Fund Balancing	In the case of a remedial action to be undertaken solely under section 104 using the fund, selection of a remedial action that attains such level or standard of control will not provide a balance between the need for protection of public health and welfare and the environment at the facility under consideration, and the availability of amounts from the fund to respond to other sites which present or may present a threat to public health or welfare or the environment, taking into consideration the relative immediacy of such threats (CERCLA §121(d)(4)(F)).

4.1.3 Long-Term Effectiveness and Permanence

Long-term effectiveness evaluates the likelihood that the remedy will be successful and the permanence that it affords. Factors to be considered, as appropriate, are summarized below.

- Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities. The characteristics of the residuals are considered to the degree that they remain hazardous, taking into account their T/M/V, and propensity to bioaccumulate.
- Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site. This factor includes an assessment of containment systems and institutional controls to determine if they are sufficient to ensure that any exposure to human and ecological receptors is within protective levels. This factor also addresses the long-term reliability of management controls for providing continued protection from residuals, the

assessment of the potential need to replace technical components of the alternative, and the potential exposure pathways and risks posed should the remedial action need replacement.

4.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Each alternative is assessed for the degree to which it employs technology to permanently and significantly reduce toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the Site. Factors to be considered, as appropriate, provided below.

- The treatment processes the alternatives use and materials they will treat
- The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed
- The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment
- The degree to which the treatment is irreversible
- The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents
- Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action

4.1.5 Short-Term Effectiveness

This criterion reviews the effects of each alternative during the construction and implementation phase of the remedial action until remedial response objectives are met. The short-term impacts of each alternative are assessed, considering the factors summarized below.

- Short-term risks that might be posed to the community during implementation of an alternative
- Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures
- Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts
- Time until protection is achieved

4.1.6 Implementability

The technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation is evaluated under this criterion. The ease or difficulty of implementing each alternative is assessed by considering the following factors detailed in Exhibit 4.2.

Exhibit 4-2. Implementability Factors to be Considered during Alternative Evaluation

Criterion	Factors to be Considered
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology Reliability of the technology, focusing on technical problems that will lead to schedule delays Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure
Administrative Feasibility	Activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies
Availability of Services and Materials	Availability of adequate off-site treatment, storage capacity, and disposal capacity and services Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies Availability of prospective technologies

4.1.7 Cost

Detailed cost estimates for each alternative were developed for the FS according to *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA 2000a). Detailed cost estimates for each alternative are included in Appendix D and include the following:

- Capital costs
- Annual O&M costs
- Periodic costs
- Present value of capital and annual O&M costs

4.1.8 State (Support Agency) Acceptance

State (support agency) acceptance is a modifying criterion under the NCP. Assessment of State acceptance will not be completed until comments on the Final FS Report are submitted to EPA. Thus, State acceptance is not considered in the detailed analysis of alternatives presented in the FS.

4.1.9 Community Acceptance

Community acceptance is also a modifying criterion under the NCP. Assessment of community acceptance will include responses to questions that any interested person in the community may have regarding any component of the remedial alternatives presented in the Final FS Report. This assessment will be completed after EPA receives public comments on the Proposed Plan during the public commenting period. Thus, community acceptance is not considered in the detailed analysis of alternatives presented in the FS.

4.1.10 Potential for Green Remediation

Even though it does not fall under the NCP criteria evaluated during the FS, this criterion is evaluated for all the alternatives in this FS. BMPs for green remediation emphasize a "whole-site" approach that closely evaluates core elements of a cleanup project, as summarized below.

- Energy requirements
- Air emissions
- Water requirements and associated impacts on water resources
- Impacts on land and ecosystems
- Material consumption and waste generation
- Impacts on long-term stewardship of a site

4.2 Secondary Assumptions Affecting Detailed Analysis of Remedial Alternatives

Fundamental assumptions for all remedial alternatives used during alternative development and screening were presented in Section 3. However, numerous secondary assumptions affect the detailed analysis of alternatives but are not fundamental controlling considerations. These assumptions are driven mainly by site limitations and constraints that cannot be overcome by using one or more retained remedial technology/process options as described in Section 2 and Section 3. Some of these secondary assumptions are grouped into distinct categories and include the items listed in Exhibit 4-3.

Exhibit 4-3. Secondary Assumptions Affecting Refinement and Detailed Analysis of Remedial Alternatives

Secondary Assumption Category	Secondary Assumption Description	Rationale	Impact if Assumption Not Met
Land Use Control Assumptions	Drilling Restrictions and Groundwater Use Controls Site areas are Primarily Institutional Controls and Community Awareness Activities	The degree of difficulty in the establishment of drilling controls and groundwater controls is uncertain. However, legal authority exists to implement certain types of institutional controls (e.g., informational devices) as well as community awareness activities and is expected to be easily implementable. Drilling restrictions and groundwater use controls are assumed to be primarily institutional controls and community awareness activities.	If institutional controls cannot be used to effectively control access, engineering controls may be required which may cause significant impact to remedial costs and schedule (relative to other components).
Site Setting and Conditions	Impact on Remedy Implementation	Location of existing buildings, site features and local subsurface conditions may preclude or limit the use of certain technologies.	Limitations due to site setting and/or local geological and hydrogeological properties may require the elimination or re-design of remedy components causing delay to project schedule and increase in costs.
Community and Stakeholders	Community and Stakeholders Acceptance	It is assumed that the community and stakeholders would approve remedial activities proposed for the site.	Project schedule would be delayed if proposed activities are not approved and must be replaced or approval process is slow.

Secondary Assumption Category	Secondary Assumption Description	Rationale	Impact if Assumption Not Met
Technology Vendors	Vendor/Contract or Availability and Experience	Qualified, experienced vendors are available for each of the technologies that would be employed to remediate the Site.	Project schedule would be delayed as additional time would be required to find and procure qualified vendors and contractors. Project costs may increase significantly if work completed by a vendor/contractor is substandard and has to be re-done.
Pilot Studies	Technology Applicability	Some of the alternatives include the completion of site-specific pilot studies in each area of the site to confirm that selected technologies would adequately address contamination.	Project schedule and cost impact if pilot studies indicate that selected technologies do not sufficiently address contamination. The selected remedy may need to be re-designed or contingency remedy may need to be employed.
Energy Costs	Unit energy costs (electricity, fuel, etc) needed to complete remedial activities	No rapid, substantial increase in energy costs is anticipated as project progresses from FS to remedy implementation.	Rapid, sustained increases in energy costs would increase overall project costs. Energy-intensive alternatives would be most affected and may require reconsideration if energy cost increases are substantial.
Institutional Controls and Monitoring	Institutional Controls and Monitoring are easily implementable	It is assumed that certain institutional control measures are an integral part of all alternatives (other than no action alternatives) and would be implemented. It is also assumed that monitoring would be	If institutional controls are not employed, remedial alternatives may not be fully protective of human health during the time needed to

Secondary Assumption Category	Secondary Assumption Description	Rationale	Impact if Assumption Not Met
		implemented for the groundwater and surface water media.	implement and complete the remedial alternative.
Green Remediation	Alternatives Would Incorporate Relevant Elements of EPA Region 2's Clean and Green Policy Except Where Protectiveness is Affected	It is assumed that all alternatives would address relevant elements of EPA Region 2's Clean and Green Policy (EPA 2010) to the extent possible. Alternatives would consider incorporation of the EPA Region 2 Touchstone Practices to the extent practicable. Touchstone Practices are required unless a site-specific evaluation demonstrates impracticability or favors an alternative green approach.	The environmental footprint of the alternatives would likely be larger than necessary if Touchstone Practices are not implemented.

4.3 Detailed Description of Remedial Alternatives

4.3.1 Common Elements

4.3.1.1 Institutional Controls

Institutional controls are implemented as part of all the proposed alternatives (other than the No Action alternative). Implementation of institutional controls would be performed to control, limit, and monitor activities and conditions at the site, thus reducing exposures of potential receptors to contamination. The objectives of institutional controls are to prevent exposure to contaminant concentrations, control future development that could result in increased risk of exposure and prevent the installation of new drinking water wells within contaminated areas. The effectiveness of selected institutional controls depends on their continued implementation and their reliability depends on future compliance with the restrictions and inspections that are enforced. The continued need for Institutional Controls would be evaluated during five year reviews.

The types of institutional controls employed at the source areas would include activity and use restrictions enacted through proprietary (e.g., easements, covenants) and /or governmental (e.g., zoning requirements) controls to prevent use of Site Areas that would pose an unacceptable risk to receptors. Other controls could include restrictions on any fishing or other recreational activities in certain areas of the site, restrictions on installation of drinking water wells and restrictions on groundwater use at locations within the contaminated areas. Information device controls (e.g., warning signs, advisories, additional public education, Notices of Environmental Contamination) would also be employed to limit exposures to contamination. As part of the selected alternative, some or all of the following measures would be implemented in areas of the site.

- Restrictions on fishing or other recreational activities in select areas
- Restrictions on drilling wells in contaminated areas
- Restrictions on groundwater use in contaminated areas
- Programs to increase community awareness of potential hazards of exposure to contaminant compounds, ways to prevent exposure, and information on the remedial measures that would be implemented as part of the selected alternative

Since ingestion of bioaccumulated contaminants, specifically arsenic, was found to be one of the major exposure pathways that presented significant risk, fishing restrictions would be instituted as part of the IC measures.

Alternate drinking water supply to all affected residents was also considered; however, since all properties in the nearby areas are already connected to the public water supply, this measure would be deemed unnecessary. Most areas of the site are municipal properties where deed restrictions are not necessary; however, at private properties, they would be considered as part of institutional controls.

Groundwater in some areas of the site is not potable due to high TDS. However, the site groundwater is classified as potable water. Therefore, groundwater use restrictions and well drilling permit restrictions would be implemented in coordination with the townships and the county to prevent future use of contaminated groundwater.

Other measures such as increasing the awareness of the local community on ways to minimize potential exposure to contaminants during and after the implementation of the remedial action would also be instituted as part of the alternatives.

In addition, five year reviews would also be performed as required by CERCLA. All IC measures would be re-evaluated as part of five year reviews and decisions regarding the continuation, revisions to the ICs or inclusion of additional ICs would be made based on available data. Entities responsible to carry out the ICs and ensure that they are functioning as intended would be identified during the design.

4.3.1.2 Long-Term Monitoring

Long-term monitoring would include periodic surface water, groundwater, biota, soil, and/or sediment sampling and analysis, in order to monitor contaminant concentrations and migration over time. The objectives of the long-term monitoring program are outlined below.

- Identify any potentially toxic and/or mobile transformation products
- Assess the effectiveness of remedial action implemented
- Verify that the extent of contamination is not expanding downgradient, laterally or vertically
- Verify no unacceptable impact to potential receptors

- Detect new releases of contaminants to the environment or migration of existing contamination that could impact potential receptors
- Demonstrate the efficacy of institutional controls that were put into place to protect potential receptors
- Verify attainment of RAOs

Monitoring data would be evaluated and used to make decisions regarding the adequacy and continuation of the monitoring program. Decisions resulting from the evaluation of the data may include:

- Continue monitoring program without change
- Modify the monitoring program
- Modify institutional controls
- Implement a contingency or alternative remedy
- Verify remedial goals have been met and terminate performance monitoring

While lead and arsenic did not pose an unacceptable health risk, concentrations in groundwater did exceed acceptable levels near the jetty and seawall but also in the background well. As a result, monitoring of lead and arsenic in groundwater as an indication of reduced contamination from source removal is not a reliable metric. Groundwater will be monitored solely to assess impacts from remedial activities.

While exposure to surface water do not pose any unacceptable human health risks, proposed long term monitoring would assess impacts from remedial activities and confirm that surface water concentrations decrease below acceptable levels once source materials are removed.

The primary parameters to be monitored would be the COCs arsenic, lead, and other TAL metals, geochemical indicators (e.g., oxidation-reduction potential, dissolved oxygen, pH), and hydrogeologic parameters (e.g., elevation of ground water in monitoring wells). Increases and decreases in monitoring frequency may occur over the life of the remedy in response to changes in site conditions and monitoring needs. Monitoring requirements for groundwater and surface water would be finalized during the design phase.

For cost estimating purposes, quarterly monitoring for the first two years, semi-annual monitoring for the next three years, and annual monitoring thereafter for TAL metals (including the COCs), geochemical indicators, and hydrogeologic parameters for a period of 30 years is assumed. Groundwater and surface water would be monitored at a network of sample locations in each of the three sectors of the site along with existing monitoring wells or any additional monitoring wells that may be installed as part of the remedial action. These locations would be finalized as part of remedial design. In addition, biota monitoring and toxicity studies or caged bivalve studies may also be performed as part of a biomonitoring program to assess and confirm the beneficial effects of remedial

activities on ecological receptors. The number of samples and the collection frequency during the biomonitoring program would depend on the remedial alternative implemented and the details of the program would be provided as part of a biomonitoring plan prior to the commencement of the program. For purposes of cost estimation, two sampling events (one biota sample from each sector per event) and a toxicity study prior to the first five-year review were assumed as part of the biomonitoring program.

In addition to the long-term monitoring activities specified in this section, additional monitoring and maintenance activities would be performed depending on the remedial alternative. These activities include monitoring that would be performed as part of the MNR evaluation, as part of the capping remedy, wetlands restoration or activities to maintain/monitor the on-site containment cells. The post-removal sampling of soil/sediment would also be performed as part of the alternatives that include excavation/dredging. These additional monitoring activities are discussed under the individual alternatives or associated remedial components.

As part of the five year reviews required by CERCLA, public health evaluations would be conducted and would allow EPA to assess the ongoing risks to human health and the environment posed by the site. The evaluations would be based on the data collected during long-term monitoring.

4.3.1.3 Engineered Containment Structures or Cells

This component would be applicable to Alternatives 4, 5, and 6, which would involve the construction of above-ground engineered containment structures or containment cells to isolate the contaminated material from exposure to the environment and receptors. Under the Superfund AOC rules, wastes consolidated within an AOC are not required to meet the RCRA LDR requirements. Hence, no additional treatment would be required if contaminated materials are consolidated within an AOC. This approach would result in significant reductions in the volumes that would otherwise be disposed of at off-site facilities, resulting in several benefits, such as reduced transportation and disposal costs, reduced energy consumption requirements, reduced carbon footprint, and the cost savings associated with all these benefits.

The containment cells for Alternatives 4 though 6 would be located in the Margaret's Creek upland area and western jetty as shown in Figures 4-3, 4-4, and 4-5, respectively. The general considerations during the construction, maintenance and monitoring of the containment cells and placement of contaminated materials within the cells are discussed in this section. Considerations such as dimensions, volume of materials placed, and the locations of the cells that are specific to each alternative are discussed under each alternative in Section 4.3.

The engineered containment structures or cells would consist of features that isolate the contaminants within these structures and prevent migration of contamination. The exterior of the cells would consist of berms constructed of soil or fill material and lined inside with impermeable material. The construction of these cells may occur concurrently during removal, excavation, or dredging operations at the site. The layers of materials that the inside of the containment cells would be constructed with are listed below from bottom to top.

- Bottom liners made of impermeable material

- Drainage pipes for leachate collection
- One-foot layer of sand for bottom drainageContaminated material
- Six inches of sand at the top for gas venting layer
- Top liner made of impermeable material
- Twenty-four inches of sandy loamy material at top
- Six inches of topsoil
- Seeding

The leachate from the drainage pipes would be collected in a tank and disposed of periodically.

Once the construction of the outside berm and the bottom liner of the cells is completed, slag and battery casings/associated wastes would be placed inside the cells first. Following this, if the approach taken by the alternative includes placement of the contaminated soil/sediment, then the contaminated soil/ sediment would be mixed with drying agents as discussed later under Section 4.3.1.4. Even though the addition of these agents would not be required under the Superfund AOC rules, the drying agents would improve the ability to handle any wet material and would minimize leachate generation after placement of the materials in the containment cells.

The surficial geologic map of the Site Areas (Figure 1-5), where containment cells would potentially be located, shows that the material is mostly silt or clay that is partially organic. This could potentially result in settlement issues following the construction of containment cells. Hence, prior to construction, vibro-flotation or equivalent techniques would be utilized in order to minimize the occurrence of future settlement. If the containment cell locations fall within the 100-year flood zones based on the Federal Emergency Management Agency (FEMA) floodplain maps, then additional engineering controls would be required to avoid the impacts of floods on the cells. During the remedial design when the exact locations of these cells would be finalized, it would be verified whether they comply with the zoning regulations. Additionally, the impact of the cells in the Margaret's Creek wetlands would also be evaluated in detail during the remedial design stage.

Periodic inspections of containment structures and monitoring of surrounding groundwater conditions around the containment structures would be performed to:

- Ensure that the cell is successfully mitigating contaminant migration
- Confirm that the cell is effective in reducing any current or future risks of exposure to acceptable levels
- Assess if repairs or additional remedies are necessary

These monitoring events and inspections would be implemented in addition to the IC and LTM measures that are discussed in Sections 4.3.1.1 and 4.3.1.2, respectively, and would be applicable to all the alternatives that involve on-site containment. The long-term maintenance and monitoring

program would be developed at the time of preparing the remedial work plan and the deed notice. For cost estimating purposes, it is assumed that the long-term maintenance and monitoring program period is 30 years. The monitoring activities would involve periodic inspections of the area to assess erosion and to confirm the structural integrity of the containment cell, checking for proper drainage post storm events, and periodic groundwater monitoring in the downgradient vicinity of the containment cell in order to ensure effectiveness of containment. Maintenance would include activities such as mowing the grass and re-seeding, as necessary. The cells would be monitored quarterly for the first two years, semi-annually for the next three years, and annually thereafter. A biennial certificate form would be filed with NJDEP every two years to demonstrate that the cells are properly maintained and continuously providing protection to human health and the environment.

Permitting

The permits that would need to be obtained prior to general construction activities related to remediation are discussed in detail under Alternative 2. Refer to Section 4.3.3 for additional information on these permits. The permits specific to Superfund AOC rules that govern the placement of contaminated materials within the cell are discussed under Alternative 4. Additionally, when the cell location is evaluated during the remedial design stage for zoning compliance and the impacts on the Margaret's Creek wetlands, the need for any additional permits would be determined.

4.3.1.4 Dewatering

This component would be applicable for Alternatives 2 through 6 for soil and sediment. Since a large portion of the remediation target area would be within the intertidal zone or seaward of the mean high tide line, including areas that are up to approximately 1,700 feet into Raritan Bay from the mean low tide line, a significant amount of excavated soil or dredged sediment material would need to be dewatered prior to disposal, containment, or treatment. Depending on tide conditions, soil in areas upland of the mean high tide line may need some dewatering. To the maximum extent possible, excavation would be performed during periods of low tides in order to reduce the need for dewatering. However, since more than 70% of the volume of contaminated material is made up of sediment, dewatering operations are expected to be significant. The degree of sediment dewatering would depend on the dredging method. Due to the potential presence of debris in the soil and sediment in the Bay areas, it was assumed during the preparation of cost estimates that mechanical dredging would be performed. However, the final decision on the dredging method during implementation would be made during the remedial design. Additionally, in order to implement certain alternatives such as installation of the sediment cap or for certain locations to be accessible during removal of source materials, soil excavation or sediment dredging, continuous maintenance of dewatered conditions for a temporary period from a few hours to a few days may be required.

Dewatering of excavated/dredged material would be performed on site either on the barge during the dredging and/or in a staging area at a convenient location that is upland of the mean high tide line and unaffected by tides. For ease of access to off-site transportation and to minimize human exposure, most of these on-shore dewatering areas would likely be located near the beach areas or upland areas of the Margaret's Creek Sector or near the western jetty. Dewatering of excavated material in on-shore areas would be accomplished using an aboveground bermed area constructed of clean soil and

lined with an impermeable membrane. Following initial decantation, the partially dewatered material may be mixed with drying agents to reduce the time required for dewatering. The purpose of the addition of drying agents is to remove free water and to improve handling characteristics of the soil and sediment following removal. However, the addition of drying agents would increase the volume of the material. During the preparation of cost estimates, it was assumed that the volume would increase due to the addition of drying agents by 4%.

Water in the vicinity of active excavation areas or construction areas where dewatered conditions need to be maintained would be collected and pumped. A temporary berm or sheet pile wall would be constructed around this area to control tidal intrusion during excavation or cap installation.

The water generated from the decantation of the dredged/excavated material or from the pumping would be routed to temporary lined sedimentation basins or frac tanks to achieve solids removal. The decanted water would be treated using appropriate technologies to comply with permit requirements prior to discharge into Raritan Bay. The accumulated sediments would be included with the excavated materials for disposal, containment or treatment.

4.3.2 Alternative 1 - No Action

The No Action alternative, as required by the NCP, was retained for comparison purposes and provides a baseline for comparison with the other site-wide alternatives. Under this alternative, no action would be implemented to restore the contaminated soil or sediment or to remove the source materials. Contamination would continue to migrate from the slag to other media such as sediment and soil, and subsequently to surface water and groundwater. Additionally, COCs would continue to migrate from the slag and battery casings/associated wastes through the following migration mechanisms:

- Weathering of the source resulting in migration to soil/sediment media
- Leaching resulting in migration of contamination to surface water in the jetty and seawall sectors

Once the surface water is contaminated, currents driven by waves, winds, and tides transport contamination away from the slag and battery casings in the Jetty and Seawall Sectors. In the Margaret's Creek Sector, the transport of contamination from the principal threat wastes (slag, battery casings, and highly contaminated soil) occurs primarily through storm water runoff. Potential human and ecological receptors would continue to be exposed to contamination at the site.

Alternative 1 does not include any institutional control or other measures that would be likely to reduce any of the exposures to human and ecological receptors. This alternative also would not include any long term monitoring activities that may assess the nature and extent of contamination. Implementation of green remediation and sustainable practices would not be considered for this alternative as no action would be taken. Five year reviews would generally be conducted by EPA to assess site conditions. No costs would be included in the FS for five year reviews since it would be performed by EPA.

4.3.3 Alternative 2 – Excavation/Dredging, Off-Site Disposal, Institutional Controls, and Long-Term Monitoring

This alternative addresses the slag and battery casings/associated wastes, and contaminated soil and sediment and consists of the following major components and subcomponents.

- Pre-design Investigation
- Removal of Contaminated Materials including:
  - Segregation and removal of slag
  - Removal of battery casings/associated wastes
  - Excavation of contaminated soils and dewatering if necessary
  - Dredging and dewatering of contaminated sediment
- Post-removal inspection and sampling
- Transport and off-site disposal of excavated/dredged/removed materials
- Restoration of areas impacted by slag and battery casings/associated wastes, excavated areas and dredged areas (if necessary)
- Wetlands Restoration and Monitoring in Margaret's Creek and Bay area wetlands
- LTM
- ICs
  - Community awareness
  - Site restrictions

In addition, five year site reviews would be conducted to evaluate effectiveness of the remedy and to determine if additional contingency remedial measures are required.

Health and safety precautions and protocols, including establishment of exclusion and contaminant reduction zones, dust suppression, use of personnel protective equipment (PPE), and monitoring would be followed during all stages of removal, handling, and disposal of contaminated source materials and during restoration activities to reduce risks to workers. Prior to the implementation of the remedy, a health and safety plan including an air monitoring plan would be developed to address the health risks to workers and other receptors during remedial activities and the mitigation activities that would address those risks. Either water or chemical-based dust suppression would be used to prevent contaminated dust particles from becoming airborne and potentially posing an inhalation exposure risk. Temporary gravel access roads would be constructed as necessary to limit disturbance of contaminated materials during the implementation of these components of the alternative. The location of the existing 30-inch diameter ductile iron sewer line in the Margret's Creek Sector and the

force main connecting the sewage treatment plant in Old Bridge with the pump station in Sayreville would be taken into consideration during the construction of these access roads. Additional details of each of the components are provided below.

Pre-Design Investigation

The proposed remediation areas for sediment, soil, slag, and battery casings/associated wastes are shown on Figure 4-1. During the remedial design, a pre-design investigation would be performed to refine the remediation areas and to obtain any additional parameters, which may include analytical, hydro-geological or geochemical parameters. The locations and parameters for the pre-design investigation would be determined prior to the remedial design. Results from the pre-design investigation would be used to estimate the area and volume of excavation during remedial design. Similarly, the vertical extent of slag and battery casings/associated wastes to be remediated needs to be further delineated through test pits or other methods.

Waste characterization sampling would be performed to determine the appropriate disposal options of the removed material. Samples would be collected separately for slag and battery casings/associated wastes. Samples would be collected from the most contaminated soil and sediment areas as well as areas with less contamination as indicated by the RI data. Additional geotechnical investigations may be conducted to determine the ability of the soil to withstand the loads during construction activities. Soil cores near the seawall and the western jetty would be collected and analyzed for geotechnical parameters such as Uniaxial Compressive Strength.

Removal of Contaminated Material

Segregation and Removal of Slag

All of the following slag materials that act as sources of contamination and are located in different sectors of the site would be removed as part of this alternative.

- Slag materials in the western jetty
- Slag materials in the seawall
- Pieces of slag co-mingled with crushed battery casing materials and associated wastes in the Margaret's Creek Sector

Equipment capable of handling the boulder-sized slag such as an excavator or a crane equipped with a boulder-clamp attachment would be used during removal and loading/unloading operations involving the slag materials in the western jetty and the seawall. In addition, standard excavation equipment may be used for handling smaller pieces of slag in the Margaret's Creek Sector and in the jetty/seawall sectors. The removed slag materials would be placed in appropriate staging areas within each sector prior to further transportation.

For the western jetty, the slag material would be removed from the surface (top and sides) of the jetty without removing the boulders at the bottom half of the jetty. For the Seawall Sector, all the slag material present in the entire seawall would be removed. In order to accomplish this, the existing clean rock material that is co-mingled with slag material would be segregated and placed temporarily in the seawall area. Following the removal of all slag from the seawall, the clean rock would be placed

back in the seawall as appropriate and may be supplemented with imported clean rocks as necessary. Segregation and removal of slag from the clean rocks would be based on visual determination.

The slag materials in the Margaret's Creek Sector are co-mingled with battery casings/associated wastes and occur in smaller pieces. Standard equipment for excavation would be sufficient to remove the slag materials in this area.

Removal of Battery Casings/Associated Wastes
In the Jetty Sector and the Seawall Sector, the battery casing materials are present in a crushed state and are co-mingled or buried in the soil. Hence, they would be addressed as part of the alternatives for soil. The battery casings/associated wastes in Margaret's Creek Sector are co-mingled with small pieces of slag. They would be removed together with the slag using standard excavation equipment and placed in the appropriate staging area within the Margaret's Creek Sector prior to transportation.

Source materials that are buried in the soil or sediment in any area of the site would be addressed as part of the removal of soil or sediment, respectively. The estimated quantity of slag and battery casings/associated waste to be removed is summarized in Table 2-5. A total volume of approximately 11,100 CY of slag and battery casings/associated wastes was estimated based on the visual survey. For cost estimating purposes, it was assumed that additional soil/sediment of up to two feet depth below the seawall slag would be removed as part of the soil/sediment removal. This additional volume was included as part of the soil/sediment volumes in Table 2-5.

Excavation of Contaminated Soils
Contaminated soils would be excavated using standard construction equipment. Excavated soil would be stockpiled in separated areas based on the estimated level of contamination. For areas where the the surface soils are clean but subsurface soils are contaminated, the clean surface soils would be stockpiled separately from the contaminated soils during excavation and placed back appropriately during restoration and backfilling activities. For this FS, the volumes of soils to be remediated were estimated based on existing soil sampling data. The depth of excavation is assumed to be two feet bgs for soil in most locations at the site. In certain locations in Area 2, the maximum depth of excavation is assumed to be 10 feet bgs based on the data. Excavated areas would be backfilled with clean fill material. During the remedial design, the area and volume of contaminated soil exceeding the PRGs of COCs would be more accurately determined based on the pre-design investigation data. The estimated quantity of contaminated soil to be excavated is summarized in Table 2-5. A total volume of approximately 58,000 CY of contaminated soil was estimated. This volume includes contaminated soil below the seawall for up to a depth of two feet.

Groundwater at the site ranges from a few feet bgs near the Bay to 30 feet bgs inland (at well MW11S) and excavation would be scheduled for periods of low tide so major dewatering operations could be avoided. However, soil excavated from areas nearest the mean high tide line may require dewatering as described in Section 4.3.1.4. The wastewater generated during the dewatering operations would be treated with appropriate technologies if required and the soil generated from the dewatering operations would be combined with the contaminated soil for off-site disposal. For areas with deeper excavations, sloping or benching would be used, as needed. Storm water run on and runoff would be controlled at excavation areas during remedial construction by installing

temporary storm water/erosion control features, such as berms and silt fencing to divert storm water away from excavation areas and to minimize storm water runoff from excavation areas. Soil stock piles would be covered by tarps to serve as dust control and to prevent erosion and transport of contaminated soils during storm events.

To minimize airborne contamination from excavation and handling of COC-contaminated soil and to protect on-site workers, dust would be controlled through the use of water or commercial dust suppressants during excavation.

Removal of Contaminated Sediment by Dredging
In the subtidal areas, contaminated sediment above PRGs would be removed by dredging. For cost estimating purposes, mechanical dredging using a crane with a clam shell bucket mounted on a barge was assumed for transportation of the sediment to the staging area. Dewatering of the sediment would either be performed on the barge or onshore in the staging area. One on-shore docking location would be set up in the seawall sector for unloading the dredged sediment from the barge. Access ramps may be constructed from the beach areas or other on-shore areas to the dock to facilitate transport of sediment. From the dock, sediment would be moved using standard excavation equipment or vacuum trucks. Dewatering the sediment would be performed by decantation with some additional mixing with a drying agent if required, as discussed under Section 4.3.14. The wastewater generated during the dewatering operations would be treated with appropriate technologies if required and the sediment generated from the dewatering operations would be combined with the contaminated sediment for off-site disposal.

In the intertidal beach areas in the Seawall Sector and in Areas 8 and 11 of the Jetty Sector where the contaminated sediment is reasonably sandy, excavation of sediment during periods of low tides may be performed using standard excavation equipment in areas that are accessible.

Based on the PRGs, the thickness of the removed sediment is between two to four feet bgs in most areas of the site and deeper in select portions of Areas 2 and 8. The estimated quantity of contaminated sediment to be dredged/excavated is summarized in Table 2-5. A total volume of approximately 190,000 CY of contaminated sediment is estimated. To minimize rejection of waste at the disposal facility, approximately 20 percent by weight of additional drying agent would need to be added to the dewatered sediment to absorb any remaining moisture prior to transportation for off-site disposal. Additionally, pads can be placed on top of the contaminated material during transportation to absorb any liquid developed during transportation.

Post-removal Inspection and Sampling
Inspections would be performed during and after the removal operations to ensure that no visually observed slag materials or battery casings/associated wastes remain on site. If the inspections show that residual contaminated source material exists in the areas from which source materials were removed, then additional removal operations would be conducted until the inspections confirm the absence of source materials in these areas.

For soils, post-excavation sampling would be conducted prior to backfill at the excavated areas to verify achievement of the PRGs. NJDEP Technical Rules require one soil sample per every 900 square feet of excavation floor, and one soil sample per 30 linear feet of each excavation sidewall.

For sediment, core sampling and bathymetric surveys would be performed before and after performance of the remedial activities to confirm dredge depth, to document depth profile and to verify the achievement of PRGs. For cost estimating purpose, one core sample would be collected for every 900 square feet of dredged area. A similar bathymetric survey and core sampling program would be implemented to monitor sediment recovery and redistribution following the completion of remedial activities. Monitoring would be performed on an annual basis for the first 5 years, then once every 5 years for the next 25 years.

Off-site Disposal

The total volume of contaminated materials under each medium that is designated for off-site disposal are presented as part of Table 4-1. Under this alternative, all the contaminated materials at the site are addressed by off-site disposal.

Slag and Battery Casings/Associated Wastes

The removed contaminated materials would be transported off-site and placed within one or more permitted off-site disposal facilities specifically authorized by EPA and State regulatory agencies. Since the slag materials and battery casings/associated wastes are RCRA hazardous waste, they would likely require disposal at a Subtitle C landfill. Depending on the requirements of the disposal facility, additional processing of the boulder-sized slag such as crushing may be required to reduce the particle size. Stabilization and/or solidification of the source materials may also be performed to satisfy facility disposal requirements.

Excavated Soil

The excavated soil would be disposed of at permitted off-site disposal facilities. During the RI, samples were collected from the investigation derived waste (IDW) containers and tested using TCLP. The test results indicated that the IDW was non hazardous waste. However, due to the high concentrations of lead in some areas, for FS cost estimating purposes, it is assumed that up to approximately 20% of the total volume of soil to be excavated would be classified as RCRA hazardous waste (D008) and would be disposed of at a Subtitle C landfill. The hazardous soil would require treatment at the disposal facility to meet the land disposal requirements prior to landfilling. The remaining soil would be non-hazardous and would be disposed of at a Subtitle D landfill without treatment.

Dredged Sediment

Contaminated sediment would be transported to the staging areas. Dewatering of dredged sediment could be accomplished as described in Section 4.3.1.4. The dewatered sediment would be disposed of at one or more approved off-site facilities. Similar to contaminated soil, sediment wastes that are classified as hazardous based on the TCLP tests (assume 20%) would be disposed of at one or more off-site Subtitle C disposal facilities and the wastes that are classified as non-hazardous (assume 80%) would be disposed of at off-site Subtitle D disposal facilities.

Site Restoration

Slag Areas

Subsequent to the confirmation of the absence of source materials in the western jetty, seawall and source areas of Margaret's Creek, the western jetty and seawall would be restored to their original conditions by placement of clean rocks to match the conditions that existed prior to removal operations. In the source areas of Margaret's Creek Sector, backfilling the locations from which slag and battery casings/associated wastes are removed would not be considered necessary but may be performed if deemed appropriate. If backfilling is performed in the Margaret's Creek areas, the clean soil used for backfilling is assumed to be transported from off-site areas tested to ensure that contamination is not present. The backfill would be covered with topsoil and revegetated, or otherwise restored to match the surface conditions that existed prior to removal/excavation operations in Margaret's Creek areas.

Soil Excavation Areas

Areas where contaminated soils were excavated would be backfilled with imported clean common fill or sand as applicable and be properly compacted. Analysis would be conducted for representative samples of the fill material to demonstrate that the fill meets applicable remediation standards and State and local requirements. After backfilling, the permeability of the excavated areas should be equal to or less permeable than adjacent areas.

Dredged Sediment Areas

All dredged areas would not necessarily require backfilling or restoration to elevations prior to dredging. However, intertidal zones in select beach areas may be backfilled with clean, imported beach-quality sand along the perimeter or as necessary based on aesthetic requirements or to match the elevations of soil backfilling. Proposed areas that would be backfilled after dredging would be finalized during remedial design. For cost estimating purposes, it was assumed that all dredged and excavated areas would be backfilled with appropriate certified clean fill material.

Wetlands Restoration and Monitoring

Restoration and monitoring of the Margaret's Creek and Bay area wetlands would also be performed along with the other site restoration activities described above. These wetlands restoration and monitoring activities would be implemented over several years. Depending on the conditions of the substrate, backfilling with clean sand or other appropriate materials may be necessary. Vegetation would need to be planted to restore the functionality of the wetland. The restoration process would take several years. Since a depth-based approach would be adopted for dredging, placement of clean material would be relied upon for the following reasons:

- To prevent exposure to contaminated residuals
- To maintain long-term protection given the expected wave and current generated shear forces
- To provide a clean layer for restoration of the benthic habitat.

If deemed appropriate, other wetland restoration measures would potentially be considered during remedial design. These measures may include development of compensatory wetlands in the upland areas of the Margaret's Creek Sector or other areas of the site or site improvements that would improve the drainage characteristics, thus promoting the restoration of wetland areas. In accordance with Clean Water Act Section 404, Protection of Wetlands E.O. 11990, 40 CFR 6 App A, all activities that would be proposed as part of wetlands restoration would be summarized in a "Wetlands Assessment and Restoration Plan" that would be prepared prior to the implementation of remedial activities described under this alternative. This plan would discuss the potential impacts or disturbances on the wetlands due to the remedial activities. Additionally, whenever possible, Management Practices (according to Federal Register Vol. 51, No. 219, Part 330.6) would be followed during the design/implementation of the remedy to minimize unavoidable impacts (e.g., spread of contaminants, roadways) to wetlands to the maximum extent practicable.

In addition to LTM activities discussed under Section 4.3.2.1, monitoring activities specific to wetlands restoration in the Margaret's Creek Sector and Bay areas would be performed in order to assess the impacts to the wetlands during the implementation of the remedy and to track and confirm the progress of wetland re-establishment following the restoration activities. These monitoring activities would involve periodic inspections of the conditions of the vegetation and core sampling of sediment in the wetland areas of the Margaret's Creek Sector and Bay areas. Additional restoration activities may be performed based on periodic review of the data obtained during the wetlands monitoring.

Institutional Controls

ICs include measures such as restrictions on fishing or other recreational activities in select areas, restrictions on groundwater use or drilling wells in contaminated areas and implementing programs to increase community awareness of potential hazards, ways to prevent exposure, and information on the remedial alternatives. These measures are described in detail in Section 4.3.2.1.

Five year site reviews would be conducted during which the need for these controls would be re-evaluated. If increased risks of exposure remain even after removal operations, contingency remedial measures may be required.

Long-Term Monitoring

Long-term monitoring would be performed as described in Section 4.3.2.1.

Green Remediation Considerations

Under this alternative, green remediation objectives would be implemented by planning the field activities to minimize fuel usage and impact to the environment. Planning practices that would minimize environmental impact include, but would not be limited to:

- Minimize number of field mobilizations
- Use local labor to reduce fuel consumption associated with driving to the site
- Schedule sampling to minimize shipping
- Sequencing the removal and restoration activities to minimize on-site handling of materials and fuel consumption

- Schedule transportation for off-site disposal or import of clean rocks to minimize the number of trips and fuel consumption
- Coordinate the activities that address the different media such as source materials, soil and sediment with each other
- Use ultra low sulfur diesel or fuel-grade biodiesel as fuel
- Use non-phosphate detergents for decontamination
- Purchase locally supplied materials
- Avoid or reduce engine idle time

Permitting

Dredged material from New Jersey's coastal or tidal waters is regulated under the provisions of the following statutes: New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.), Waterfront Development Law (N.J.S.A. 12:5-3 et seq.), Riparian Interests (N.J.S.A. 12:3-1 et seq. and 18:56-1 et seq.), Federal Water Pollution Control Act of 1972 as amended by the Clean Water Act of 1977 (33 U.S.C. § 1251), and Federal Coastal Zone Management Act (16 U.S.C. §§ 1451 et seq.) and/or other relevant statutes and implementing regulations.

The proposed dredging of sediment and disposal would require State permit equivalencies and local permits prior to construction, which would include, but not necessarily be limited to, the list below.

Waterfront Development Law (N.J.S.A. 12:5-3 et seq.) and Federal Coastal Zone Management Act (16 U.S.C. §§ 1451 et seq.)

- NJDEP Division of Land Use Regulation (DLUR) Waterfront Development or Coastal General Permit-Equivalency (N.J.A.C. 7:7 and N.J.A.C. 7:7E) – A Waterfront Development permit-equivalency would be necessary for developments proposed within any tidal waterway of the State and lands lying there under up to and including the mean high water line. The removal or deposition of sub-aqueous materials (for example, excavation, dredging or filling) in that portion of the waterfront area at or below (outshore of) the mean high water line requires this permit-equivalency. Additionally, for any coastal wetlands impacts, this permit-equivalency would also be necessary to address coastal wetlands impacts. Finally, since a portion of the study area is located in NJ's Coastal Area Facility Review Act (CAFRA) zone, any regulated construction activities such as excavation, grading, or filling would require review under CAFRA. As a federal lead project this DLUR permit review covers regulated activities conducted in a tidal water location as noted above and would result in a Federal Coastal Zone Management Act (CZMA) consistency determination review. In addition to consistency with the CZMA, this application would also require that impacts to cultural and/or archeological resources (coordination with the NJ State Historic Preservation Office) and threatened and/or endangered species and their habitats (coordination with state and federal fish and wildlife service, NOAA National Marine Fisheries Service) be assessed and addressed, and appropriate storm water management (N.J.A.C. 7:8) must also be addressed in the application.

- NJDEP DLUR Flood Hazard Area Permit-Equivalency (N.J.A.C. 7:13) – A Flood Hazard Area permit-equivalency would be necessary for work in flood hazard areas and riparian zones to protect the loss of life and property during flood events, preserve riverine habitat, and to insure the quality and integrity of the State's surface waters. A separate FHA permit would not be required if a Waterfront Development or other DLUR coastal permit is necessary. In this situation, since the project site would be located in a tidal water location, the DLUR coastal permit (see above) would take precedence. However, since the regulated activities would be conducted in the regulated flood hazard area and potentially riparian zones, the Flood Hazard Area (FHA) Control Act design and construction requirements will need to be reviewed, and the proposed activities will need to be designed and performed in accordance with the applicable portions of the FHA Control Act rules.

- NJDEP DLUR Freshwater Wetlands Permit-Equivalency (N.J.A.C. 7:7A) – A Freshwater Wetlands General Permit No. 4: Hazardous Site Investigation and Cleanup equivalency and Water Quality Certification is necessary for remediation and dredging activities conducted in freshwater wetlands, freshwater wetlands transition areas, and State open waters. Using the NJDEP's iMAP database, images showing general locations of potential freshwater wetlands areas are shown at the end of this section; this is for general information purposes only and does not substitute as an actual field delineation of regulated wetlands. Wetlands field delineation by a qualified biologist is necessary to delineate the wetlands in the project location inclusive of 150 feet (which is the maximum wetlands transition area width) around the project area, followed by land surveying to locate and map the wetland delineation boundaries. The wetland field delineation showing the wetland boundaries, transition areas, and State open waters would form the basis for this permit equivalency application.

Riparian Interests (N.J.S.A. 12:3-1 et seq. and 18:56-1 et seq.)

- NJDEP Bureau of Tidelands (N.J.S.A. 12:3) – Evidence of tidelands instruments for this project location, as shown on the NJDEP's Tidelands mapping, would be required. This may be in the form of a grant, license or lease. If no tidelands instruments currently exist, an application for one of these (grant, license or lease) would be required. A copy of NJDEP's Tidelands mapping covering the project area has been requested. When received, the mapping would be reviewed for relevancy to the project work area and the application for the appropriate tidelands instrument would be made.

New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and Federal Water Pollution Control Act of 1972 as amended by the Clean Water Act of 1977 (33 U.S.C. § 1251)

- NJDEP NJPDES Discharge to Surface Water (DSW) or Discharge to Groundwater (DGW) Permit-Equivalency (N.J.A.C. 7:14A) – A NJPDES DSW or DGW permit-equivalency for treated wastewater discharges, potentially from dewatering of sediments or as a result of wastewater treatment, if this is included as a project activity, would be required. The type of permit would depend on where the treated wastewater would be discharged (i.e., to surface water or groundwater). If wastewater or treated wastewater would be discharged to a local publicly-

owned treatment works (POTW), depending on which facility, a state permit or a local permit to discharge directly to a POTW would be required.

On a long-term basis, the placement of the dredged material on land would likely require a NJPDES DGW permit-equivalency, mostly for longer-term monitoring of impacts from the containment cells on groundwater quality.

- NJDEP NJPDES Treatment Works Approval (TWA) Equivalency (N.J.A.C. 7:14A) – A TWA is required for wastewater treatment systems, if such a system would be needed for this project. TWAs are a type of construction permit where the proposed treatment plant's design and its ability to meet the effluent standards specified in the NJPDES permit would be evaluated. An NJDEP TWA equivalency would be required for an industrial wastewater treatment system and residuals management system related to a wastewater treatment system, if there would be wastewater treatment.

- NJDEP NJPDES RFA for Stormwater Discharge During Construction (N.J.A.C. 7:14A) – In conjunction with the SESC Plan certification for one acre or more of disturbance during construction, an application for a NJDEP NJPDES Request for Authorization (RFA) for storm water discharge during construction would be necessary and would be processed following receipt of SESC plan certification. This is an on-line application. Since more than one acre of disturbance would be occurring, this approval would be required.

Others

- NJDEP Site Remediation Program – Approval by NJDEP of the Record of Decision.

- Freehold Soil Conservation District – Soil Erosion and Sediment Control (SESC) Plan Certification (Soil Erosion and Sediment Control Act Chapter 251, P.L. 1975) – A SESC plan certification would be required by the local soil conservation office for any project that disturbs more than 5,000 square feet of surface area of land. The proposed activities would result in disturbance of more than 5,000 square feet of surface area of land; a SESC plan application would be required to be submitted for certification.

- NJDEP Water Supply, Bureau of Water Allocation- Temporary Dewatering Permit-Equivalency (N.J.A.C. 7: 19) – A temporary dewatering permit for containment cell construction would be required for the withdrawal of ground and/or surface water in excess of 100,000 gallons of water per day for a period of more than 30 days in a consecutive 365 day period, for purposes other than agriculture, aquaculture or horticulture. For dewatering in excess of 100,000 gallons of water per day, the project owner must obtain a Temporary Dewatering Allocation Permit, or Dewatering Permit-by-Rule or Short Term Permit-by-Rule depending on the duration of construction and the method employed. If this dewatering threshold is anticipated, a permit-equivalency application to allow for temporary dewatering would be required.

- Cheesequake Creek near the western jetty is part of a federally authorized navigational project under the USACE. Hence, any remedial activities at the western jetty that affect its basic functionality would have to be permitted and approved by the USACE in accordance

with Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects dated 17 November 2008. Approval of Section 10 and 404 permits under the above Guidance would need to be obtained prior to implementation. The permit would be approved by the USACE after a review of the technical analysis of the final design that would need to be submitted as part of the permit.

Other local approvals or access agreements may also be necessary based on site conditions and the specific nature of activities. Prior to implementation, a meeting with the state approval agency would be required to finalize the list of permits that may be necessary.

4.3.4 Alternative 3 - Excavation/Dredging, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls, Long-Term Monitoring

The components and sub-components of this alternative are depicted conceptually in Figure 4-2 and are summarized below.

- Pre-design Investigation
- MNR in selected remediation target areas in Areas 7 and 11, and the Margaret's Creek wetlands
- Removal of all source materials and contaminated soil in all areas and contaminated sediment outside of MNR areas. Including:
    - Segregation and removal of slag
    - Removal of battery casings/associated wastes
    - Excavation of contaminated soils and dewatering if necessary
    - Dredging and dewatering of contaminated sediment outside of MNR areas
- Post-removal inspection and sampling
- Transport and off-site disposal of the removed contaminated materials
- Restoration of areas impacted by slag and battery casings/associated wastes, excavated areas and dredged areas (if necessary)
- ICs
    - Community awareness
    - Site restrictions
- LTM

In addition, five year reviews would be conducted by EPA to re-evaluate ICs and to determine the need for additional contingency measures.

Components of this alternative such as pre-design investigation, removal of contaminated materials, post-removal Inspection and sampling, and restoration of contaminated areas, ICs and LTM would be similar to those in Alternative 2, although the total quantities of contaminated materials handled and disposed of at off-site facilities would be lower. A summary of the volumes addressed by individual remedial components such as off-site disposal and MNR are presented in Table 4-1. Under this alternative, about 11,100 CY of source materials and 134,300 CY of soil/sediment are addressed by off-site disposal and about 112,900 CY of contaminated soil/sediment are addressed by MNR. Since all remedial components under this alternative except MNR are conceptually similar to those in Alternative 2, refer to the detailed descriptions of these components under Section 4.3.3. The detailed description of the MNR component is provided below.

Monitored Natural Recovery

As the source of contamination would be remediated as part of this alternative, MNR is proposed for two selected remediation target areas in Area 7 and one selected remediation target area in Area 11, as shown on Figure 4-2. The principal natural recovery processes for these areas are contaminant transport that are driven by dispersion and advection, processes listed in the hierarchy of natural recovery processes in the EPA contaminated sediments guidance (2005). The rationale rests on the existence of currents that can transport the contamination (and lack of down-current areas where the dispersed contaminants would accumulate, such as sediment-trapping jetties), thus causing a net reduction in contaminant concentrations in the target remediation area and would eventually meet the RAOs. Sample data (shown in Figure 4-5) indicate that concentrations are either not far in excess of the PRGs (Area 11) or are not widespread (Area 7) in those selected remediation target areas. Tidal and wave-driven currents were identified in these two areas during the hydrodynamic study in the RI. These currents have the capacity to disperse the contaminants further into the open water of Raritan Bay. No depositional zones or entrapment areas (such as the types of jetties seen in Area 2 and 5) are present down-current where the contaminants would accumulate over time. Over time, the concentrations in the sediments in these areas would decrease. Regular monitoring would be required for confirmation. The contamination in the remaining areas in Area 7 and Area 11 would be remediated through dredging and off-site disposal.

Additional areas within Raritan Bay where arsenic sediment concentrations are above site background (>15 mg/kg) but below state background (<19 mg/kg) and lead sediment concentrations are less than the PRG may also be considered candidates for MNR. These areas would be identified and confirmed during pre-design sampling. Similar to the proposed MNR areas in Area 7 and 11, the principal natural recovery process for these additional target remediation areas is contaminant transport driven by dispersion and advection.

MNR would also be proposed for the Margaret's Creek wetlands (Figure 4-2) after the upland sources of contamination are remediated. Based on the data show in Figure 4-5, areas exceeding the PRGs for lead are not widespread, whereas arsenic contamination is widespread. However, the arsenic concentrations are on average less than twice the PRG. The wetlands are protected from the storms, high waves and currents present in Raritan Bay, resulting in minimal erosional forces. The lack of significant erosion was recorded in the high-resolution cores during the RI. The geochronology study showed that active sediment deposition is occurring across the majority of the wetland, and that sediments can be expected to accumulate on the surface at the rate of between 0.1 and 0.3 inch per

year. It is reasonable to assume that any additional sediment accumulated would be clean following the remediation of upland areas. This evidence indicates that the natural recovery mechanism of burial by natural sedimentation would decrease the net contaminant concentrations in the top interval of the sediment bed over time. In other words, the net influx of uncontaminated sediments would result in a decrease in the average concentration in the top six inches even with the occurrence of bioturbation, and deeper layers would continue to be isolated from ecological and human receptors. Monitoring would determine if such a decrease occurs over time or not. It should be noted that the accumulation rates stated above are based on sampling data from only two locations and may not be sufficiently representative of the deposition rates over the entire area. The need for additional sedimentation mass balance modeling would be considered during the remedial design to more accurately estimate the timeframe by which PRGs can be achieved.

In the Margaret's Creek wetlands, MNR would rely on geochemical changes and natural burial via sedimentation (after upland sources had been remediated). Changes in pH and redox conditions can change the toxicity, mobility, and bioavailability of the metals and arsenic contamination at the site. If anoxic sediments are present with the correct reducing conditions to form low-solubility minerals and sorption (e.g. the first two processes in the hierarchy discussed above), storm events that erode and resuspend contaminated sediments can change redox conditions such that the minerals dissolve, desorption occurs, and the contaminants are re-released into the dissolved phase. Although the high-resolution cores collected during the RI do not indicate that significant erosional events have occurred in the past, there is still the potential for erosion of contaminated sediments in the Margaret's Creek wetlands during large storms such as hurricanes or nor'easters. Therefore resistance to erosion is important for the above geochemical reactions to occur.

Newly deposited sediments can become contaminated by release of metals and arsenic from the deeper sediments as a result of dissolution into pore water and subsequent transport into the newly placed cover materials. Both advective and diffusive transport can occur. Advective transport would be strongest in areas with significant groundwater upwelling. If upward migration is significant, the long-term effectiveness of MNR would be in doubt. Since upland sources of contamination will be controlled, the new sediments depositing on the wetland will not contain site-related contaminants over the PRGs.

Sample location A9-97 shows higher lead and arsenic results when compared to the other sample locations in the Margaret's Creek wetland. This area may require additional action such as removal or capping, which would be determined during the remedial design. The impact of any additional activities in the upland areas on the sediment deposition rates would also be evaluated during the remedial design.

MNR would include the following major components:

- Institutional and engineering controls
- Modeling, pilot study, and sediment erodibility measurements (Area 9 only)
- LTM

- Five year review

Institutional and Engineering Controls
Institutional and engineering controls would be needed to curtail access to the areas where the MNR alternative would be implemented, until that time that MNR achieves the RAOs. These would include signs, fences, and deed restrictions as discussed in detail in Section 4.1.3.1.

Modeling, Pilot Study, and Sediment Erodibility Measurements
The suggested pre-design work to evaluate the long-term effectiveness of MNR in the Margaret's Creek wetland (Area 9) would include a groundwater seepage study, sediment erodibility measurements with associated hydrodynamic modeling, and fate and transport modeling to evaluate contaminant solubility under various redox conditions in the sediments. A pilot study would also be conducted to collect in-situ data on rates of leaching, erosion, and sedimentation. Based on the results from the pilot study, the need to develop a sedimentation mass balance model for Area 9 would be considered to gain a better understanding of the effectiveness of MNR.

No modeling or pilot study would be proposed for Areas 7 or 11.

Long-Term Monitoring
Long-term monitoring of all the areas where natural recovery processes are allowed to occur would be implemented under this alternative. This monitoring plan would not only track and confirm the progress of the MNR remedy, but would also assist in a more accurate estimation of the remediation timeframe. In the short term, the monitoring would seek to develop statistical evidence that the trajectory of natural recovery was such that the RAOs and PRGs are going to be met in the accepted timeframe.

For cost estimating purposes, one sediment sample and one surface water sample would be collected for every 20,000 square feet of MNR area. Sampling would be conducted semi-annually for the first five years, and annually after that until the 30 year monitoring period has been completed or RAOs and PRGs have been consistently met. The MNR area would be visually inspected during each monitoring event for areas of recent erosion. Furthermore, the MNR area would be visually inspected after high-energy storms such as nor'easters or hurricanes (approximately six times in 30 years).

Five Year Review
It is assumed that Five Year Reviews would be conducted six times for the duration of the 30 years FS evaluation period.

Green Remediation Considerations
The considerations of this sub-component would be similar to those under Alternative 2. Due to off-site disposal, there would be significant fuel consumption; however, since the volume of material for off-site disposal would be considerably lower than Alternative 2, the fuel consumption would also be lower compared to Alternative 2. Hence, the carbon footprint due to this alternative would be expected to be much lower compared to Alternative 2.

Permitting

All the permits discussed under Alternative 2 would also apply to Alternative 3, except for the permits related to wetland restoration activities. Since the Margaret's Creek wetlands would be addressed by MNR, wetland restoration would not be required under this alternative.

4.3.5 Alternative 4 – Excavation/Dredging, On-Site Containment of Source Materials, Off-Site Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls, and Long-Term Monitoring

This alternative includes the following remedial components and sub-components:

- Pre-design Investigation
- MNR in selected remediation target areas in Areas 7, 11 and the Margaret's Creek wetlands
- Removal of all source materials and contaminated soil in all areas and contaminated sediment outside of MNR areas, including:
    - Segregation and removal of slag
    - Removal of battery casings/associated wastes
    - Excavation of contaminated soils and dewatering if necessary
    - Dredging and dewatering of contaminated sediment outside of MNR areas
- Post-removal inspection and sampling
- On-site containment within engineered containment cells of all source materials
    - Construction of engineered containment cells
    - Transportation and placement of source materials within containment cells
- Transport and off-site disposal of the removed contaminated soil and sediment
- Restoration of areas impacted by slag and battery casings/associated wastes, excavated areas and dredged areas (if necessary)
- ICs
    - Community awareness
    - Site restrictions
    - Certification of cell maintenance
- LTM

In addition, five-year reviews would be conducted by EPA to re-evaluate ICs and to determine the need for additional contingency measures.

All the remedial components under this alternative except on-site containment are conceptually similar in nature to Alternative 3. The conceptual design for this alternative is shown under Figure 4-3. As summarized in Table 4-1, 11,100 CY of source materials would be contained on-site within engineered cells (shown in Figure 4-3) as part of this alternative. The volumes of soil and sediment addressed by remedial components under this alternative are the same as in Alternative 3 and 134,300 CY of soil and sediment would be addressed by off-site disposal and 112,900 CY of contaminated soil/sediment would be addressed by MNR.

Both the generic IC/LTM measures discussed in Section 4.3.1.1 and the IC/LTM measures specific to containment cells discussed under Section 4.3.1.3 would be performed under this alternative. All remedial components under this alternative except on-site containment are conceptually similar to those described in detail under Alternative 2 and Alternative 3 and are not discussed separately in this section. Specific considerations related to the design and implementation of on-site containment cells under this alternative are discussed below. It should be noted that during the pre-design investigation under this alternative, geotechnical parameters including the potential for settlement would be investigated at proposed containment cell location B in addition to the pre-design investigation activities discussed under Alternative 2.

On-Site Containment within Engineered Structures

Conceptual Design of Engineered Containment Cells

General considerations with regards to construction of containment cells, placement of contaminated materials within the cells and LTM and maintenance of the cells are described in Section 4.3.1.3. Additional factors specific to this alternative that were considered in the conceptual design of the containment cells include:

- Volume of contaminated materials that require containment
- Availability of land space - this along with the volume determines the dimensions of the cells
- Presence of utility lines in the available areas
- Occurrence of wetland in the available areas – New Jersey Freshwater Wetland Protection Act and Wetlands Permit requirements stipulate a buffer zone of 150 feet between the wetland areas and the location of any proposed containment cell
- Load bearing capacity of the soil and potential settlement

Based on the volume estimates and above design considerations, Cell A (as shown in Figure 4-3) would be located near the western jetty and would be deemed sufficient to contain the source materials from the Jetty Sector. Cell B (also shown in Figure 4-3) would be located in the upland areas of the Margaret's Creek Sector and would be sufficient to contain the source materials from the Seawall Sector and Margaret's Creek Sector. Approximately 5,000 CY of source materials from the western jetty would be contained in Cell A and approximately 6,100 CY of source materials from the Seawall Sector and the Margaret's Creek Sector would be contained within Cell B. The wetland areas, along with the buffer zone as well as the existing 30-inch diameter ductile iron sewer line in the area, are also shown in Figure 4-3. Based on the volumes and the dimensions of the cells shown in Figure 4-3,

the maximum height of the containment cells is assumed to be approximately nine feet for Cell A near the western jetty and approximately eight feet for Cell B in the Margaret's Creek Sector during the preparation of cost estimates. The actual heights of the cells would be finalized during the remedial design stage.

The surficial geologic map of the site areas near containment cell locations shows that the material is mostly silt or clay and is also partially organic (Figure 1-5). This material could potentially result in settlement issues following the construction of the containment cells. The pre-design investigation would determine the load bearing capacity of the soil in the potential containment cell areas and develop engineering measures to improve the load bearing capacity of the soil to minimize settlement. Prior to construction, vibro-flotation or equivalent techniques would be utilized to minimize the occurrence of future settlement. Cell A in the Jetty Sector lie within the 100-year flood zone based on the FEMA floodplain maps. Additional engineering controls such as revetments or increasing the elevations at these cell locations would be performed to mitigate the flood hazards. The details of these mitigation measures would be finalized as part of the remedial design.

Permitting

In addition to the permits discussed under Alternative 2, EPA approval for the application of Superfund AOC rules would be required prior to placement of the source materials within containment cells. During the RI, the slag and battery casings were found to exceed TCLP limits for lead and were classified as hazardous. Any consolidation or movement of the material would require meeting the LDR requirements, unless this consolidation is performed within the same AOC where the contamination is contiguous. Under Alternative 4, the source materials from the Jetty Sector would be placed within the containment cell in the same sector and the source materials from Seawall and Margaret's Creek Sectors would be placed within the cells in the contiguous upland area of the Margaret's Creek Sector. In accordance with Superfund AOC Policy (EPA 1998), the source materials do not have to be treated.

4.3.6 Alternative 5 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

Alternative 5 includes the major components detailed below.

- Removal of slag from the western jetty and containment in an on-site cell located in the western Jetty Sector
- Capping of a selected remediation target area in Area 8
- MNR in selected remediation target areas in Areas 7, 11 and the Margaret's Creek wetlands
- Removal and on-site containment of contaminated soil and sediment from Areas 7, 8 and 11 outside of the MNR and capping remediation target areas until capacity in Cell A near the western jetty; off-site disposal of remainder of the contaminated soil and sediment in Jetty Sector

- Removal of slag and battery casings/associated wastes and contaminated soil and sediment from the Seawall Sector and Margaret's Creek sector (outside of the MNR zone) and placement in on-site containment cells in the Margaret's Creek upland area until capacity is reached; off-site disposal of remainder of the contaminated soil and sediment in the Seawall Sector and Margaret's Creek Sector
- ICs
- LTM
- Five year reviews

The conceptual design for Jetty Sector and Margaret's Creek Sector under Alternative 5 is provided in Figure 4-4. The major conceptual difference between this alternative and Alternative 4 apart from the capping component is how the contaminated soil and sediment are handled. Under Alternative 4, all removed contaminated soil and sediment from all three sectors would be disposed of at off-site facilities. Under this alternative, removed contaminated soil and sediment would also be contained within these cells until the cell capacity is reached. This cell capacity would be determined based on available land space for construction of the cells and a maximum assumed height of 15 feet for the containment cells. This assumption is made for cost estimating purposes and the actual heights of the cells would be finalized during the remedial design stage. The contaminated soil and sediment would be placed within the cells only after all the source materials are placed within the cells (i.e., none of the source materials would be disposed of at off-site facilities under this alternative). The removed contaminated soil and sediment that could not be accommodated in the containment cells would be disposed of at off-site facilities.

Since a significant amount of contaminated soil and sediment would be contained on-site, the volume for off-site disposal under this alternative would be much lower than in Alternative 4. As presented in Table 4-1, under this alternative, 11,100 CY of source materials and 86,700 CY of contaminated soil/sediment would be contained on-site; 37,200 CY of contaminated soil/sediment would be disposed of at off-site facilities, 112,900 CY of sediment would be addressed by MNR and 10,400 CY of sediment would be addressed by capping. All major components under this alternative except capping have been described in detail previously as part of other alternatives. Capping and a discussion of the specific conceptual design considerations toward the determination of dimensions of the on-site containment are provided below.

Sediment Cap

A sediment cap would be proposed for selected remediation target area in Area 8, as shown on Figure 4-4. Two items would be paramount for the long-term effectiveness of a cap: (1) removal or control of the contaminant sources on the western jetty and (2) the continued presence of a coastal structure where the western jetty is now in order to maintain the existing conditions in Area 8. The subtidal section of Area 8 would likely be the most effective section for placing a cap. The intertidal zone would be considered for capping during the design phase. However, for this alternative, contaminated sediments in the intertidal zone are assumed to be dredged and disposed of at off-site facilities. The subtidal section of Area 8 would be approximately two acres and is shown in Figure 4-4.

Likely the most effective cap would incorporate reactive media into the cap to remove dissolved metals leaching from the sediments. A conceptual design of a reactive cap is depicted in Figure 4-4a. In this case, a geotextile mat containing reactive materials would be placed directly over the sediments. There would be no need to dewater the area since the cap could be installed using a barge and crane. An armoring layer would be installed over the reactive geotextile mat in order to withstand the currents and waves expected over time, and to physically isolate the contaminated sediments. This configuration is costed as part of this alternative; however, different designs and materials would be considered during the remedial design.

Given the RAOs, PRGs, and characteristics of the site and contaminants, a generic design was created for the purposes of this FS. The goals of the cap would be as follows:

- Slow the movement of water through the capped material
- Promote the removal of metal ions from the dissolved phase
- Promote the compaction and hardening of the contaminated sediments

Despite the adsorption of metals to clay or other materials and the potential formation of low-solubility minerals, it would be assumed for the sake of design that some fraction of the metals in the capped sediments would be dissolved in the pore water and thus prone to upward migration into the cap.

Capping in Area 8 would include the following major components.

- Pre-design investigation, fate and transport modeling, treatability study and pilot study
- Permitting
- Design and Installation
- Institutional and Engineering Controls
- Long-term maintenance and monitoring

Pre-design Investigation, Fate and Transport Modeling, Treatability Study and Pilot Study
The pre-design investigation would include a geotechnical evaluation, determination of expected shear stresses from currents and waves, and evaluation of groundwater seepage rates. A bench-scale treatability study would be needed to identify the appropriate reactive materials, which would include a fate and transport model for the contaminants in the cap. A pilot study would be conducted to field-test the conclusions of the treatability study, as well as to test different configurations for the management of ebullition and groundwater flux.

Permitting
The proposed project would require state and local permits equivalencies prior to construction which would include, but not necessarily be limited to, the following:

- NJDEP Division of Land Use Regulation (DLUR) Waterfront Development or Coastal General Permit-Equivalency (N.J.A.C. 7:7 and N.J.A.C. 7:7E) and a Federal Coastal Zone Management Act (CZMA) consistency determination review
- NJDEP Bureau of Tidelands (N.J.S.A. 12:3)
- NJDEP Site Remediation Program – Approval by NJDEP of the Record of Decision.

The above permits have been discussed under the permitting section for Alternative 2.

Design and Installation
For costing and evaluation purposes, a preliminary design of the cap was developed (Figure 4-4a). The two principle layers include:

- Heavier materials such as cobbles or recycled construction debris for armoring and benthic habitat. Since this would be the layer at the sediment bed surface, it is the layer subject to PRGs and monitoring. For costing purposes, a rock-filled marine mattress was chosen for the armoring.
- Reactive core mat containing apatite to remove dissolved lead and iron-containing adsorptive media to remove dissolved arsenic.

Over time, suspended sediment from the overlying water would settle onto the armoring layer and fill in the interstitial spaces. The silted-in mattress would serve to reduce the flow of seawater downward into the cap and contaminated sediments, and also provide habitat for benthic organisms. The reactive materials may lose their reactivity if they become saturated with contaminants. The cap would be reinforced when this occurs by installing a new mattress plus reactive mat system over the existing one.

The cap would be constructed by anchoring a barge near the cap area, and then hoisting the cap into place with a crane mounted on the barge. Divers and sonar would be used to guide the cap into place. Since this process could be done slowly and carefully, protective measures such as silt curtains would not be necessary.

Institutional and Engineering Controls
To protect the integrity of the cap for the long term, institutional and engineering controls would be needed to curtail access to the capped zone. These may include signs, fences, and deed restrictions as discussed in detail in Section 4.1.3.1.

Long-term Maintenance and Monitoring
The structural integrity of the cap would be maintained in order for it to be effective. Over time as the sediments are compacted and expel pore water, the potential for the migration of contamination out of the sediments would diminish. Likewise, the generation of gas in the sediments would diminish over time as the volume of pore water decreases and organic matter is degraded. Long term monitoring would be important to ensure that the risk from the contamination has been reduced. A monitoring period of 30 years is assumed for costing purposes.

Visual inspections of the cap would be conducted twice per year for the first five years, and then annually after that for 30 years or until RAOs and PRGs have been consistently met. The cap would be inspected after high-energy storms such as nor'easters or hurricanes (assume approximately six times in 30 years). Surface water and sediment samples would be collected during each inspection (one sample per 10,000 square feet of cap surface). No sediment from underneath the cap would be sampled to reduce risk of damaging the cap. It would likely be difficult to collect sufficient volume of overlying sediment considering that the top layer of the cap is proposed to be rock armoring. However, for cost estimating purposes, it is assumed that sediment would be available to collect. Sampling would be conducted concurrently with visual inspection.

On-Site Containment Cells

General considerations with respect to the construction of containment cells and placement of contaminated materials within the cells are described in detail under Section 4.3.1.3. The specific factors that drive the conceptual design of the containment cells under this alternative are the same as in Alternative 4. They are as follows:

- Volume of contaminated materials that require containment
- Availability of land space - this along with the volume determines the dimensions of the cells
- Presence of utility lines in the available areas
- Occurrence of wetland in the available areas – New Jersey Freshwater Wetland Protection Act and Wetlands Permit requirements stipulate a buffer zone of 150 feet between the wetland areas and location of any proposed containment cell
- Load bearing capacity of the soil and potential settlement

Based on the above factors, two containment cells in the upland areas of Margaret's Creek Sector and one containment cell near the western jetty would be constructed as shown in Figure 4-4. The wetland areas, along with the buffer zone as well as the existing 30-inch diameter ductile iron sewer line in the area, are also shown in Figure 4-4. The requirements of wetland areas and the limitations imposed by the existing sewer line in determining the location of the cells is evident from the figure. Since a higher volume is designated for on-site containment, the concerns due to space constraints under this alternative are exacerbated. Similarly, the concerns due to the potential for settlement are also higher due to the increased containment volume as seen from the surficial geologic map (Figure 1-5) which shows that the cells in the Margaret's Creek Sector are at locations that are partially organic silt or clay. Similar to Alternative 4, the pre-design investigation would determine the load bearing capacity of the soil in the potential containment cell areas and develop engineering measures to improve the load bearing capacity of the soil to minimize settlement. Engineering techniques such as vibro-flotation or equivalent measures would be utilized prior to construction to minimize the occurrence of future settlement.

During the remedial design when the exact locations and the dimensions of these cells are finalized, it would be verified whether they comply with the zoning regulations. Additionally, the impact of the cells in the Margaret's Creek wetlands would be evaluated in detail during the remedial design stage.

Cell 1 in the Jetty Sector and part of Cell 2 in the Margaret's Creek Sector lie within the 100-year flood zone based on the FEMA floodplain maps. Additional engineering controls such as revetments or increasing the elevations at these cell locations would be performed to mitigate the flood hazards. The details of these mitigation measures would be finalized as part of the remedial design.

Under this alternative, the slag and battery casings/associated wastes, contaminated soil and contaminated sediment from the Seawall Sector and Margaret's Creek Sector would be consolidated and contained within the cells shown in the Margaret's Creek sector until the containment cells are filled up to capacity based on a maximum assumed cell height of 15 feet. The source materials from the western jetty would be consolidated and contained within Cell 1 (Figure 4-4) near the western jetty. The contaminated soil and sediment from the Jetty Sector would then be placed within Cell 1 until the cell is filled to capacity. The remainder of the excavated/dredged contaminated soil and sediment material would be disposed of at an approved off-site Subtitle C or Subtitle D landfill similar to Alternative 2. Based on volume estimates, approximately 5,000 CY of source materials and 5,700 CY of contaminated soil and sediment would be contained in Cell 1 near the western jetty. The remainder of the soil/sediment from the Jetty Sector (about 28,400 CY) would be disposed of at an off-site Subtitle C or Subtitle D landfill based on TCLP results. Similarly, approximately 6,100 CY of source materials and 81,000 CY of contaminated soil/sediment from the Seawall and Margaret's Creek Sectors would be contained within Cells 2 and 3 in the upland areas of the Margaret's Creek Sector. The remainder of the soil/sediment from the Seawall Sector and Margaret's Creek Sector (about 8,800 CY) would be disposed of at an off-site Subtitle C or Subtitle D landfill based on TCLP results. For cost estimating purposes, it is assumed that 20 percent of the soil and sediment for off-site disposal would be hazardous and 80 percent would be non-hazardous. The crushed battery casings that are intermingled with the soil or sediment of the Seawall Sector would also be addressed along with the soil or sediment.

Permitting

The permits discussed under Alternative 4 would also apply to this alternative. In accordance with Superfund AOC Policy (EPA 1998), the source materials and contaminated soil and sediment would not have to be treated when consolidated and placed in the on-site containment cells.

4.3.7 Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Alternative 6 combines MNR with removal, containment, and disposal to present a comprehensive alternative for the source materials and contaminated media at all the areas of the site. Alternative 6 is conceptually similar to Alternative 5 except for one change: instead of capping, sediments in the subtidal portion of Area 8 would be removed and disposed of at off-site facilities. Alternative 6 could also be considered conceptually similar to Alternative 4 except that contaminated soil/sediment would be contained on-site in addition to source materials. The conceptual design for this alternative for Jetty Sector and Margaret's Creek Sector is provided in Figure 4-5. Alternative 6 includes the major components listed below.

- Removal of slag from the western jetty and containment in an on-site cell located in the western Jetty Sector
- MNR in selected remediation target areas in Areas 7 and 11 and the Margaret's Creek wetland in Area 9
- Removal and on-site containment of contaminated soil and sediment from Areas 7, 8 and 11 outside of the MNR remediation target areas until capacity is reached in Cell 1 near the western jetty; off-site disposal of remainder of the contaminated soil and sediment in Jetty Sector
- Removal of slag and battery casings / associated wastes and contaminated soil and sediment from the Seawall Sector and Margaret's Creek Sector (outside of the MNR remediation target area) and placement in on-site containment cells in the Margaret's Creek upland area until capacity is reached; off-site disposal of remainder of the contaminated soil and sediment in the Seawall Sector and Margaret's Creek Sector
- ICs
- LTM
- Five Year Reviews

Except where MNR is proposed in selected remediation target areas in Areas 7, 11, and the Margaret's Creek wetlands, on-site containment and off-site disposal would be proposed for the remaining contaminated areas, in the same manner as described in Alternative 2 for removal and off-site disposal, and Alternative 5 for on-site containment. Refer to these two alternatives for detailed description of these activities. As presented in Table 4-1, MNR addresses about 17,500 CY of contaminated sediment in the Jetty Sector and 95,400 CY of contaminated sediment in the Seawall and Margaret's Creek Sectors. On-site containment addresses about 5,000 CY of source materials and 5,700 CY of contaminated soil/sediment in the Jetty Sector and 6,100 CY of source materials and 81,000 CY of contaminated soil/sediment in the Seawall and Margaret's Creek Sectors. Off-Site disposal accounts for 38,800 CY of soil/sediment in the Jetty Sector and 8,800 CY of contaminated soil/sediment in the Seawall and Margaret's Creek Sectors.

As the source of contamination would be remediated as part of this alternative, MNR is proposed for two selected remediation target areas in Area 7, one selected remediation target area in Area 11, and the wetlands in Area 9 (Figure 4-5). For a full description of MNR in these areas, refer to Alternative 3.

4.4 Detailed Analysis of Retained Alternatives

Table 4-2 provides a summary of the evaluation of the remedial alternatives against EPA's evaluation criteria.

4.4.1 Detailed Analysis of Alternative 1 - No Action

Alternative 1 is described in detail in Section 4.3.2.

4.4.1.1 Overall Protection of Human Health and the Environment

The No Action Alternative would not be protective of human health and the environment. Contamination due to the COCs would remain at the site. This alternative would not include the implementation of any ICs such as fishing restrictions or future surface water or groundwater monitoring. The No Action Alternative would fail to meet the RAOs.

4.4.1.2 Compliance with ARARs

The No Action Alternative would not comply with the chemical-specific ARARs and would not meet the PRGs, which are ARAR and risk-based values. There are no location-specific and action-specific ARAR requirements as there would be no action under this alternative.

4.4.1.3 Long-Term Effectiveness and Permanence

The No Action Alternative does not address contamination due to sediment, soil, slag or battery casings/associated wastes. Hence, this alternative has no long-term effectiveness and permanence.

4.4.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

There would be no reduction in toxicity, mobility, or volume of contaminated soil, sediment, slag or battery casings/associated wastes as no remedial action would be taken under the No Action Alternative.

4.4.1.5 Short-Term Effectiveness

No construction activities would be required for the No Action Alternative, thus there would be no short-term impacts to workers and the community from implementation.

4.4.1.6 Implementability

No remedial action would be taken under this alternative, thus nothing would be implemented.

4.4.1.7 Cost

There are no costs associated with the no action alternative since no remedial activities would be performed.

4.4.1.8 Green Remediation

This alternative minimizes greenhouse gas emissions, air pollutants, energy consumption, and water use since no action would be taken.

4.4.2 Detailed Analysis of Alternative 2: Excavation/Dredging and Off-site Disposal, Institutional Controls and Long-Term Monitoring

Alternative 2 is described in detail in Section 4.3.3.

4.4.2.1 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment. Risks to human health due to direct contact, ingestion, and inhalation would be eliminated since contaminated sediment, soil, slag and battery casings/associated wastes would be removed from the site, resulting in COC concentrations below the PRGs. Since PRGs are selected considering the human health and ecological risks, the concentrations following remedial action would be protective of human health and environment. However, during the dredging operations, risks to ecological receptors may temporarily

increase due to the disruption caused to the aquatic habitat, especially in the Margaret's Creek Sector. In the long term, this alternative would achieve the RAOs.

Potential risks to wildlife and other ecological receptors would be eliminated or greatly reduced since clean fill would be used after removing contaminated soil and sediment and clean rocks would be used after removing the slag and battery casings/associated wastes. Sources for future contamination would be eliminated or greatly reduced. Visual inspections would be performed after implementation to confirm the removal of the slag and battery casings/associated waste. Post-excavation confirmation sampling would be completed after excavation and dredging of soil and sediment that would confirm that the concentrations after removal are below the PRGs. Backfilling as part of site restoration activities would provide additional protection from any residual contamination and in sediment areas would provide a clean layer for restoration of benthic habitats. This alternative would achieve the RAOs.

4.4.2.2 Compliance with ARARs

This alternative would meet the chemical-specific ARARs since contaminated sediment, soil, slag and battery casings/associated wastes would be removed and disposed of at off-site facilities. This alternative would follow health and safety requirements, hazardous and non-hazardous transportation and disposal requirements to meet the action-specific ARARs. This alternative would meet location-specific ARARs including coastal zone regulations, wetlands and floodplains regulations including restoration of wetlands, which would take years, wildlife habitat protection regulations and cultural historic preservation regulations. Tables 2-2 and 2-3 summarize the location- and action-specific ARARs and their FS considerations.

4.4.2.3 Long Term Effectiveness and Permanence

Magnitude of Residual Risk - This alternative would provide long-term effectiveness and permanence since the contaminated materials would be removed and disposed of at off-site facilities, and would no longer pose human health or ecological risk. Removal of the sources of contamination would ensure that residual contamination in other media such as surface water and groundwater decreases over time.

Adequacy of Controls – Removal and off-site disposal would be effective in removing site risk. The process is not reversible.

Reliability of Controls – Off-site disposal would be an irreversible process. Visual inspections would be performed after remedial actions to confirm that the source materials have been removed. Post excavation/dredging sampling would confirm attainment of the PRGs. In addition, long-term monitoring would be performed to confirm the contaminant concentrations in groundwater and surface water would decrease overtime.

4.4.2.4 Reduction of T/M/V through Treatment

This alternative would provide no reduction of T/M/V through treatment at the site. It moves the contaminated materials from the site to a different location where it can be better contained. For the slag materials and battery casings/associated wastes, dredged sediment and excavated soils that

would be hazardous, reduction of toxicity and mobility would occur through treatment at a RCRA-permitted treatment/disposal facility to meet the LDR Treatment Standards for Contaminated Soil.

4.4.2.5 Short Term Effectiveness

This alternative would include a significant amount of conventional construction work during removal and transport of contaminated materials. These construction activities would have some significant short-term impact to the communities and workers. Heavy-load trucks would be driving back and forth daily in the community to transport contaminated materials and import clean rocks and other fill materials to the site for approximately two years. Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily. This would be more pronounced in the Margaret's Creek Sector, the vegetation in the wetland would be completely removed and the habitat destroyed. The wetland would need to be restored after the remediation. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

The fire access road in upland areas of the Margaret's creek sector would be heavily utilized for transportation during the off-site disposal. In order to minimize impacts due to truck traffic, all disposal activities would be coordinated with the Old Bridge Fire District and performed in accordance with the township fire regulations. Emergency plans would be followed in order to allow easy, unhindered access for fire trucks to the fire access road during fire events. If necessary, a second access road may be constructed or the existing access road would be widened.

Due to off-site disposal, there would be an increased possibility of a trucking accident leading to release of materials during transport. The heavy construction equipment would generate noise. Increased particulate emissions may occur during the removal operations. Working hours would be coordinated with Old Bridge Township and the Borough of Sayreville and dust control would be implemented through the use of dust suppression techniques (e.g., water or foam sprays) to minimize impact to the local community. Stormwater runoff would be controlled through the use of conventional, temporary storm water/erosion control features (e.g., berms, ditches, or silt fences). It would take approximately two years to complete the removal, disposal and restoration activities under this alternative. Restoration of the wetland would take several more years. Health and safety measures would be implemented to prevent incidents and to protect the construction workers, such as using PPE to minimize exposure to contaminated materials or hazardous chemicals during remedial activities.

4.4.2.6 Implementability

Removal and off-site disposal is a conventional remediation technology and is widely implemented. Equipment, supplies, and services would be readily obtainable. There would be no administrative difficulties associated with implementing this technology, however, some of the technical difficulties may include:

- Dewatering the sediment, especially in areas near the western jetty that consist of sediment with high organic content

- Maintaining dewatered conditions during sediment dredging operations in areas that are submerged in water
- Accessibility of select areas in the jetty sector that are nearly 1,500 feet from the shore
- Logistical issues related to transport of dredged material from the Bay to the staging area
- Difficulty in segregation of slag material from clean rocks
- Constraints to vehicular movement in the western jetty and in portions of the seawall
- Handling boulder-sized slag and rocks may require special attachments to standard equipment and may slow down the removal operations
- Lack of open space available for the remedial operations

4.4.2.7 Cost

A summary of the capital, O & M and present worth costs for all alternatives are provided in Table 4-3 and a detailed summary of the costs of each alternative are provided in Table 4-4. Detailed costs including the backups and quotations from vendors are provided in Appendix D. The total present worth for this alternative is approximately $217.4 million, including $216.0 million in capital costs and $1.5 million in O&M costs.

4.4.2.8 Green Remediation

The major energy consumption for Alternative 2 would be fuel used by construction equipment and vehicles, commute to the site by workers, and transportation for importing clean rocks/fill and for off-site disposal of contaminated sediment, soil, slag, and battery casings/associated wastes. Fuel efficient vehicles and equipment would be used to the extent possible. Biodiesel could be used as much as possible. Work sequence and trip planning would be implemented to minimize the work duration and number of trips. Water use under this alternative would be minimal, primarily for dust control and decontamination. Remediation would restore the contaminated land to beneficial use.

4.4.3 Detailed Analysis of Alternative 3 - Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Alternative 3 is described in details in Section 4.3.4.

4.4.3.1 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment. In areas where removal and off-site disposal are implemented, the risks to human health due to direct contact, ingestion, and inhalation would be eliminated since contaminated sediment, soil, slag, and battery casings/ associated wastes would be removed from the site. In areas where MNR is implemented, the risks due to the contaminated materials would reduce gradually over time due to natural recovery processes. During the dredging operations, risks to ecological receptors may temporarily increase due to the disruption caused to the aquatic habitat. Under this alternative, dredging operations would not

be performed in the sensitive wetland areas of the Margaret's Creek Sector. In the long term, this alternative would achieve the RAOs.

Potential risks to wildlife and other ecological receptors would be eliminated or greatly reduced since clean fill would be used after removing contaminated soil and sediment and clean rocks would be used to rebuild the seawall and jetty after removing the slag and battery casings/associated wastes. Source for future contamination would be eliminated or greatly reduced. Visual inspections would be performed after implementation to confirm the removal of the slag and battery casings/associated waste. Post-excavation confirmation sampling would be completed after excavation and dredging of soil and sediment that would confirm that the COC concentrations are below the PRGs and hence, protective of human health and environment.

MNR in Areas 7, 9, and 11 would gradually provide increasing protection of human health and the environment. In Areas 7 and 11, human health and biota risk associated with the contaminated sediment would decrease over time as the existing contaminants would be dispersed by currents. It is important to note that sources of contamination (e.g. slag and battery casings) must be remediated first, so no new contamination would migrate into the MNR areas. The point in time when this migration from the sources is stopped would mark the highest concentrations in the MNR areas. Afterwards, concentrations would decrease as natural recovery processes act on the areas. These processes would include geochemical changes that reduce contaminant bioavailability, burial by natural sedimentation to a depth below the biologically active zone of the sediments, and contaminant transport. In Areas 7 and 11, the natural process would be contaminant transport driven by advection and dispersion, so the mass of contaminants would be reduced in these areas over time. In Area 9, the natural process would be burial by sedimentation. In this case, the contamination would remain in the deeper sediment layers, but the top layer where human and ecological receptors would be exposed would have a decrease in concentration over time. MNR in Area 9 would provide protection of human health and the environment. If institutional controls are unsuccessful and activities in Area 9 disturb the sediments, the buried contamination could be revealed, potentially exposing receptors. However, periodic monitoring and sampling would be performed as part of this alternative to ensure that institutional control measures are implemented and that the risks due to contaminated sediment are decreasing over time. This alternative would meet the RAOs.

4.4.3.2 Compliance with ARARs

This alternative would meet the chemical-specific ARARs since contaminated sediment, soil, slag, and battery casings/associated wastes above the PRGs would either be removed and disposed of at off-site facilities, or in areas where MNR is implemented, natural recovery processes would meet the chemical specific ARARs over time.

This alternative would meet the action-specific ARARs by following health and safety requirements during implementation. LDR requirements would be met for materials that are disposed of at off-site facilities. This alternative would meet all the location-specific ARARs. Tables 2-2 and 2-3 summarize the location- and action-specific ARARs and their FS considerations.

4.4.3.3 Long Term Effectiveness and Permanence

Each component of the alternative is evaluated separately below.

Removal and Off-site Disposal

Magnitude of Residual Risk – This alternative would provide long-term effectiveness and permanence since the contaminated materials above the PRGs would be removed and disposed of at off-site facilities and would no longer pose human health or ecological risk. Removal of the sources of contamination would ensure that residual contamination in other media such as surface water and groundwater decreases over time.

Adequacy of Controls – Removal and off-site disposal would be effective in removing site risk. The process is not reversible.

Reliability of Controls – Visual inspections would be performed after remedial actions to confirm that the source materials have been removed. Post excavation/dredging sampling would confirm attainment of the PRGs. In addition, long-term monitoring would be performed to confirm the contaminant concentrations in groundwater and surface water would decrease overtime.

MNR in Areas 7 and 11

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in these areas because contaminants would be transported into the greater Raritan Bay. Transport would happen during average conditions, but would be accelerated greatly during storms since currents are stronger during storms. The absence of structures that would entrap sediments down-current means that the risk would not just be transferred from Areas 7 and 11 to another area, but would in fact be a permanent risk reduction.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place until contaminant transport has caused PRGs and RAOs to be met. However, routine monitoring could be difficult to enforce over the long-term, which might result in inadequate control of site contamination.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, implemented, and monitored. If bathymetry or hydrodynamics change over time, the contaminant transport patterns may change and risk reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place.

MNR in Area 9

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in Area 9 as the existing contamination is buried by natural sedimentation. The timeframe for risk reduction would depend on the initial concentration in the sediment: the lower the initial concentration, the faster the location would meet the PRGs and RAOs. MNR would provide conditional long-term effectiveness and permanence. Contaminants would be left in place and potentially pose risks to human health and the environment if the sediments are disturbed. Due to the large quantity of contaminants left in place, the land use would be limited. Any redevelopment would require additional remediation to be performed.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place. These controls would need to be permanent. Given that Margaret's Creek wetlands are not a popular recreational area and, since the area is wetlands, development would be unlikely; the institutional controls should be adequate. However, enforcement of the controls could be difficult to enforce over the long-term.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, implemented, and monitored. However, if bathymetry or hydrodynamics change over time, the accumulated clean sediment may be eroded, thereby exposing the contamination. The patterns of natural sedimentation that are burying the existing contamination may change and risk reduction may slow. These pattern changes would be unlikely if the coastline and the wetlands are left undisturbed. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place. It should be noted that the current understanding of the remediation timeframe is based on the sediment deposition rates from only two locations. Additional data from the pilot studies would determine the need to refine the estimates of these timeframes. If simple concentration averages do not provide a good understanding of the remediation timeframes over the entire area, then additional sedimentation mass balance models may need to be developed during the remedial design. The impact due to other remedial activities in the upland areas on the drainage characteristics and hence the sediment deposition rates and residual risks in Area 9 would also be evaluated during the remedial design. Pre-design activities including a pilot study to evaluate leaching and sedimentation and site-specific erodibility measurements would provide a better understanding of the reliability of the controls.

4.4.3.4 Reduction of T/M/V through Treatment

Each component of the alternative is evaluated separately below.

Removal and Off-site Disposal

This component of the alternative would provide no reduction of T/M/V through treatment at the site. The alternative would provide removal of slag, battery casing/associated wastes, contaminated soil and sediment from their currently unprotected locations to a controlled environment off-site. The mobility of the contained wastes would be reduced. For the dredged sediment and excavated soils that are hazardous, reduction of toxicity and mobility would occur through treatment at a RCRA-permitted treatment/disposal facility to meet the LDR Treatment Standards for Contaminated Soil.

MNR in Areas 7 and 11

In Areas 7 and 11, contaminant transport would reduce the toxicity of contamination in these areas over time as the concentrations of metals are reduced. Bioavailability and mobility would not be reduced. If bathymetry or hydrodynamics change over time, the contaminant transport patterns may change and the rate of concentration reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met.

MNR in Area 9

In Area 9, the volume of contaminants would not change since they would be left in place. Natural sedimentation would bury the existing contamination, restricting the mobility of both dissolved and sorbed contaminants. Ultimately, bioavailability would be eliminated as contaminants are buried to a depth below the biologically active zone where organisms reside.

4.4.3.5 Short Term Effectiveness

This alternative would include a significant amount of conventional construction work during removal and transport of contaminated materials. These construction activities would have some significant short-term impact to the communities and workers. Heavy-load trucks would be driving back and forth daily in the community to transport contaminated materials and import clean rocks and other fill materials to the site for approximately two years. Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily, although it should be noted that since no dredging or removal is performed in the sensitive wetland areas of the Margaret's Creek Sector, the impacts on these wetlands would be minimal. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

The fire access road in upland areas of the Margaret's Creek Sector would be heavily utilized for transportation during the off-site disposal. In order to minimize impacts, all disposal activities would be coordinated with the Old Bridge Fire District and performed in accordance with the township fire regulations. Emergency plans would be followed in order to allow easy, unhindered access for fire trucks to the fire access road during fire events. If necessary, a second access road may be constructed or the existing access road would be widened.

Due to off-site disposal, there would be an increased possibility of a trucking accident leading to release of materials during transport. The heavy construction equipment would generate noise. Increased particulate emissions may occur during the removal operations and construction of the on-site containment cells. Working hours would be coordinated with Old Bridge Township and Borough of Sayreville and dust control would be implemented through the use of dust suppression techniques (e.g., water or foam sprays) to minimize impact to the local community. Storm water runoff would be controlled through the use of conventional, temporary storm water/erosion control features (e.g., berms, ditches, or silt fences). It would take approximately two years to complete the removal and off-site disposal. Health and safety measures would be implemented to prevent incident and protect the construction workers, such as using PPE to minimize exposure to contaminated materials or hazardous chemicals during remedial activities.

Although MNR activities would be continued for longer than two years the impacts to the environment and the local community due to MNR activities is minimal.

4.4.3.6 Implementability

Removal and off-site disposal and on-site containment are conventional remedial technologies and are widely implemented. Equipment, supplies and services would be readily obtainable. There would be no administrative difficulties associated with implementing this technology; however, some of the technical difficulties may include:

- Dewatering the sediment, especially in areas near the western jetty that consist of sediment with high organic content
- Maintaining dewatered conditions during sediment dredging operations in areas that are submerged in water
- Accessibility of select areas in the jetty sector that are nearly 1,500 feet from the shore
- Logistical issues related to transport of dredged material from the Bay to the staging area
- Difficulty in segregation of slag material from clean rocks
- Constraints to vehicular movement in the western jetty and in portions of the seawall
- Handling boulder-sized slag and rocks may require special attachments to standard equipment and may slow down the removal operations
- Lack of open space available for the remedial operations

MNR would be implementable in three areas (Areas 7, 9 and 11). The natural recovery processes that would be relied upon to achieve the RAOs are already occurring. It is important to note that MNR would only be implementable if the contaminant sources have been controlled, and there would no longer be significant loading of new contamination. There would be no anticipated administrative difficulty associated with implementing MNR. Services and materials for implementation would be readily available, including institutional controls like signs and fences, and environmental monitoring.

4.4.3.7 Cost

A summary of the capital, O & M and present worth costs for all alternatives are provided in Table 4-3 and a detailed summary of the costs of each alternative are provided in Table 4-4. Detailed costs including the backups and quotations from vendors are provided in Appendix D. The total present worth for this alternative is approximately $122.6 million. The capital costs are estimated to be $117.8 million; the long-term maintenance and monitoring cost is estimated to be $5.9 million for 30 years. It should be noted that the maintenance and monitoring program should be carried out as long as the contaminants are in place.

4.4.3.8 Green Remediation

The major energy consumption for Alternative 3 would be fuel use by construction equipment and vehicles and transportation for off-site disposal of contaminated materials. Fuel efficient vehicles and equipment and use of biodiesel could be implemented as much as possible. Work sequencing and trip planning would be implemented to minimize the work duration and number of trips. Water use under this alternative would be minimal, primarily for dust control and decontamination. Remediation would restore most of the contaminated areas to beneficial use. Implementation of MNR would avoid additional energy use due to construction and transportation by reducing the removal/disposal volumes.

4.4.4 Detailed Analysis of Alternative 4 - Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Alternative 4 is described in details in Section 4.3.5.

4.4.4.1 Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment. Risks to human health due to direct contact, ingestion, and inhalation due to source materials would be eliminated since they would be contained on site within engineered cells. However, long term maintenance and monitoring of these cells and proper implementation of ICs is necessary to ensure protection. For contaminated sediment in areas 7, 9 and 11 where MNR is implemented, the risks due to contamination would reduce over the long term due to natural recovery processes. In other areas where removal and off-site disposal are implemented, the risks at the site are eliminated as the contaminated sediment and soil would be removed from the site; although, during the dredging operations, risks to ecological receptors may temporarily increase due to the disruption caused to the aquatic habitat. Under this alternative, dredging operations would not be performed in the sensitive wetland areas of the Margaret's Creek Sector. In the long term, this alternative would achieve the RAOs.

For the slag materials contained on-site, this alternative would provide protection of human health and the environment, if the containment cell is properly maintained and the institutional control measures are enforced. The primary exposure risks from source materials, soil and sediment would be ingestion, dermal contact, and dust inhalation. Implementation of this alternative would eliminate these risks. The slag would be placed in the containment cells which would restrict contaminant mobilization or migration. The top liners made of impermeable material would prevent infiltration of precipitation from the surface, thus preventing potential leaching of contaminants from the slag. The impermeable liner along the side wall and bottom of the cell would also prevent potential release of contaminants into groundwater. However, if the cap, liner or cell walls or floor are damaged by natural force or due to improper enforcement of ICs or a lack of maintenance, this alternative may no longer provide protection of human health and the environment. Clean rocks would be used to rebuild the seawall and jetty after removing the slag and battery casings/associated wastes. This would eliminate the risks in these areas and be protective of human health and environment. Visual inspections would be performed after implementation to confirm the removal of the slag and battery casings/associated waste. This alternative would achieve the RAOs if the containment cells are maintained and the ICs enforced.

MNR in Areas 7, 9, and 11 would gradually provide increasing protection of human health and the environment. In Areas 7 and 11, human health and biota risk associated with the contaminated sediment would decrease over time as the existing contaminants would be dispersed by currents. It is important to note that sources of contamination (e.g. slag and battery casings), must be remediated first, so no new contamination would migrate into the MNR areas. The point in time when this migration from the sources is stopped would mark the highest concentrations in the MNR areas. Afterwards, concentrations would decrease as natural recovery processes act on the areas. These processes would include geochemical changes that reduce contaminant bioavailability, burial by

natural sedimentation to a depth below the biologically active zone of the sediments, and contaminant transport driven by dispersion and advection. In Areas 7 and 11, the natural process would be contaminant transport, so the mass of contaminants would be reduced in these areas over time. In Area 9, the natural process would be burial by sedimentation. In this case, the contamination would remain in the deeper sediment layers, but the top layer where human and ecological receptors would be exposed would have a decrease in concentration over time. MNR in Area 9 would provide protection of human health and the environment. If institutional controls are unsuccessful and activities in Area 9 disturb the sediments, the buried contamination could be revealed, potentially exposing receptors. However, periodic monitoring and sampling would be performed as part of this alternative to ensure that institutional control measures are implemented and that the risks due to contaminated sediment are decreasing over time.

In areas where dredging/excavation and off-site disposal are implemented, potential risks to wildlife and other ecological receptors would be eliminated or greatly reduced since clean fill would be used after removing contaminated soil and sediment. Sources for future contamination would be eliminated or greatly reduced. Post-excavation confirmation sampling would be completed after excavation and dredging of soils and sediments to confirm that the contaminant levels in soil and sediment are below the PRGs.

Overall, this alternative would be protective of human health and environment as long as the ICs, maintenance and monitoring activities are properly implemented. This alternative would achieve the RAOs.

4.4.4.2 Compliance with ARARs

This alternative would meet the chemical-specific ARARs since contaminated sediment, soil, slag, and battery casings/associated wastes above the PRGs would either be removed and disposed of at off-site facilities, or contained on-site, or meet chemical specific ARARs over time through natural recovery processes.

For the slag contained on-site, this alternative would meet chemical-specific ARARs by:

- Preventing direct contact risks via isolation of contaminants in the containment cell
- Preventing migration of contamination from infiltration of rainwater via top liners
- Preventing migration of contamination to groundwater via liners at the side and bottom of containment cell
- Additional reduction in leachate generation from use of drying agents

This alternative would meet the action-specific ARARs by following health and safety requirements during implementation and by meeting the Superfund AOC requirements for on-site containment. LDR requirements would be met for materials that are disposed of at off-site facilities. This alternative would meet location-specific ARARs by complying with permit requirements for the wetland and coastal zones. The location- and action-specific ARARs and their FS considerations are summarized in Tables 2-2 and 2-3.

4.4.4.3 Long Term Effectiveness and Permanence

Each component of the alternative is evaluated separately below:

Removal and Off-site Disposal or On-site Containment

Magnitude of Residual Risk – This alternative would provide long-term effectiveness and permanence since the contaminated materials above the PRGs would either be removed and disposed of at off-site facilities, or contained on-site, and would no longer pose human health or ecological risk. Removal of the sources of contamination would ensure that residual contamination in other media such as surface water and groundwater decreases over time.

Adequacy of Controls – Removal and off-site disposal and on-site containment would be effective in removing site risk. The process is not reversible. The containment cell and deed notice/biennial certification would provide adequate control of contained material if they are well maintained and monitored. However, routine inspection, groundwater monitoring and filing of biennial certificate would need to be enforced over the long-term.

Reliability of Controls – Off-site disposal is an irreversible process. Visual inspections would be performed after remedial actions to confirm that the source materials have been removed. Post excavation/dredging sampling would confirm attainment of the PRGs. In addition, long-term monitoring would be performed to confirm the contaminant concentrations in groundwater and surface water would decrease overtime.

The containment cell and deed notice would provide reliable control of the contamination if properly designed, constructed, maintained, and monitored over the long term.

MNR in Areas 7 and 11

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in these areas because contaminants would be transported into the greater Raritan Bay. Contaminant transport would happen during average conditions, but would be accelerated greatly during storms since currents are stronger during storms. The absence of structures that would entrap sediments down-current means that the risk would not just be transferred from Areas 7 and 11 to another area, but would in fact be a permanent risk reduction. Given the regular occurrence of storms (including very strong nor'easters), sediment concentrations in these areas would be expected to decline.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place until contaminant transport has caused PRGs and RAOs to be met. However, routine monitoring could be difficult to enforce over the long-term, which might result in inadequate control of site contamination.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, implemented, and monitored. If bathymetry or hydrodynamics change over time, the contaminant transport patterns may change and risk reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met. It may also be difficult for the maintenance and

monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place.

MNR in Area 9

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in Area 9 as the existing contamination is buried by natural sedimentation. The timeframe for risk reduction would depend on the initial concentration in the sediment: the lower the initial concentration, the faster the location would meet the PRGs and RAOs. MNR would provide conditional long-term effectiveness and permanence. Contaminants would be left in place and potentially pose risks to human health and the environment if the sediments are disturbed. Due to the large quantity of contaminants left in place, the land use would be limited. Any redevelopment would require additional remediation to be performed.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place. These controls would need to be permanent. Given that Margaret's Creek wetlands are not a popular recreational area and, since the area is wetlands, development would be unlikely; the institutional controls should be adequate. However, enforcement of the controls could be difficult to enforce over the long-term.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, implemented, and monitored. However, if bathymetry or hydrodynamics change over time, the accumulated clean sediment may be eroded, thereby exposing the contamination. The patterns of natural sedimentation that are burying the existing contamination may change and risk reduction may slow. These pattern changes would be unlikely if the coastline and the wetlands are left undisturbed. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place. It should be noted that the current understanding of the remediation timeframe is based on the sediment deposition rates from only two locations. Additional data from the pilot studies would determine the need to refine the estimates of these timeframes. If simple concentration averages do not provide a good understanding of the remediation timeframes over the entire area, then additional sedimentation mass balance models may need to be developed during the remedial design. The impact due to other remedial activities (such as the construction of on-site containment cells) in the upland areas on the drainage characteristics and hence the sediment deposition rates and residual risks in Area 9 would also be evaluated during the remedial design. Pre-design activities including a pilot study to evaluate leaching and sedimentation and site-specific erodibility measurements would provide a better understanding of the reliability of the controls.

4.4.4.4 Reduction of T/M/V through Treatment

Each component of the alternative is evaluated for this criterion separately below.

Removal and Off-site Disposal or On-site Containment

This alternative would provide no reduction of T/M/V through treatment at the site. The alternative would provide removal of slag, battery casing/associated wastes, contaminated soil and sediment from their currently unprotected locations to a controlled environment either on-site or off-site. The mobility of the contained wastes, either on-site or off-site, would be reduced. For the dredged

sediment and excavated soils that are disposed of at off-site facilities and are hazardous, reduction of toxicity and mobility would occur through treatment at a RCRA-permitted treatment/disposal facility to meet the LDR Treatment Standards for Contaminated Soil.

MNR in Areas 7 and 11

In Areas 7 and 11, contaminant transport driven by advection and dispersion would reduce the toxicity of contamination in these areas over time as the metal concentrations are reduced. Bioavailability and mobility would not be reduced. If bathymetry or hydrodynamics change over time, the contaminant transport patterns may change and the rate of concentration reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met.

MNR in Area 9

In Area 9, the volume of contaminants would not change since they would be left in place. Natural sedimentation would bury the existing contamination, restricting the mobility of both dissolved and sorbed contaminants. The resuspension of contaminated sediments and transport in currents would be reduced, and reduced contact with surface water would mean less opportunity for the transfer of contaminant mass into surface water. The result would be reduced mobility of the contaminants. Ultimately, bioavailability would be eliminated as contaminants are buried to a depth below the biologically active zone where organisms reside.

4.4.4.5 Short-Term Effectiveness

This alternative would include a significant amount of conventional construction work during removal and transport of contaminated materials and construction of the on-site containment cells. These construction activities would have some significant short-term impact to the communities and workers. Heavy-load trucks would be driving back and forth daily in the community to transport contaminated materials and import clean rocks and other fill materials to the site for approximately two years. Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily, although this would not affect the sensitive wetland areas in the Margaret's Creek Sector as MNR would be implemented in these wetlands. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

The fire access road in upland areas of the Margaret's Creek Sector would be heavily utilized for transportation during the off-site disposal and construction of the on-site containment cells. In order to minimize impacts due to this, all disposal activities would be coordinated with the Old Bridge Fire District and performed in accordance with the township fire regulations. Emergency plans would be followed in order to allow easy, unhindered access for fire trucks to the fire access road during fire events. If necessary, a second access road may be constructed or the existing access road would be widened.

Due to off-site disposal, there would be an increased possibility of a trucking accident leading to release of materials during transport. The heavy construction equipment would generate noise. Increased particulate emissions may occur during the removal operations and construction of the on-site containment cells. Working hours would be coordinated with Old Bridge Township and Borough

of Sayreville and dust control would be implemented through the use of dust suppression techniques (e.g., water or foam sprays) to minimize impact to the local community. Storm water runoff would be controlled through the use of conventional, temporary storm water/erosion control features (e.g., berms, ditches, or silt fences). It would take approximately two years to complete the removal, disposal, on-site containment, and restoration activities under this alternative. Health and safety measures would be implemented to prevent incident and protect the construction workers, such as using PPE to minimize exposure to contaminated materials or hazardous chemicals during remedial activities.

Although MNR activities would be continued for longer than two years the impacts to the environment and the local community due to MNR activities is minimal.

4.4.4.6 Implementability

Removal and off-site disposal and on-site containment are conventional remedial technologies and are widely implemented. Equipment, supplies, and services would be readily obtainable. There would be no administrative difficulties associated with implementing this technology; however, some of the technical difficulties include:

- Dewatering the sediment, especially in areas near the western jetty that consist of sediment with high organic content
- Maintaining dewatered conditions during sediment dredging operations in areas that are submerged in water
- Accessibility of select areas in the jetty sector that are nearly 1,500 feet from the shore
- Logistical issues related to transport of dredged material from the Bay to the staging area
- Difficulty in segregation of slag material from clean rocks
- Constraints to vehicular movement in the western jetty and in portions of the seawall
- Handling boulder-sized slag and rocks may require special attachments to standard equipment and may slow down the removal operations
- Lack of open space available for the remedial operations

Additional implementability issues specific to on-site containment cells would include potential settlement of the ground following construction of the cells and presence of wetland areas at the site. The former would be addressed by employing well established techniques such as vibro-flotation or equivalent to minimize future settlement of the ground. With regards to the latter issue, NJDEP wetland rules allow the construction of a cell with a buffer zone of 150 feet between the cell and wetland areas. As illustrated in Figure 4-3, land space would be available in order to meet these requirements. However, these constraints would limit the flexibility for modifications during the implementation.

Removal operations, placement of contaminated materials in the containment cells, and implementation of a deed notice are well established practices for metal contamination. Equipment, supplies and services would be readily available for construction activities. However, maintenance of the containment cell and enforcement of deed notice over long term may not be reliable and would require proper and continued enforcement by the State and/or township authorities.

MNR would be implementable in all three areas (Areas 7, 9, and 11). The natural processes that would be relied upon to achieve the RAOs are already occurring. It is important to note that MNR would only be implementable if the contaminant sources have been controlled, and there would no longer be significant loading of new contamination. There would be no anticipated administrative difficulty associated with implementing MNR. Services and materials for implementation would be readily available, including institutional controls like signs and fences, and environmental monitoring.

4.4.4.7 Cost

A summary of the capital, O & M and present worth costs for all alternatives are provided in Table 4-3 and a detailed summary of the costs of each alternative are provided in Table 4-4. Detailed costs including the backups and quotations from vendors are provided in Appendix D. The total present worth for this alternative is approximately $119.1 million. The capital costs are estimated to be $111.9 million; the long-term maintenance and monitoring cost is estimated to be $9.2 million for 30 years. It should be noted that the maintenance and monitoring program should be carried out as long as the contaminants are in place.

4.4.4.8 Green Remediation

The major energy consumption of Alternative 4 would be fuel use by construction equipment and vehicles, commute to the site by workers, transportation for importing clean rocks/fill, and for off-site disposal of contaminated sediment and soil and fuel use during construction of on-site containment cells. Fuel efficient vehicles and equipment would be used to the extent possible. Biodiesel would be used as much as possible. Work sequencing and trip planning would be implemented to minimize the work duration and number of trips. Water use under this alternative would be minimal, for dust control and decontamination. Remediation would restore most of the contaminated areas to beneficial use. Implementation of MNR would avoid additional energy use due to construction and transportation by reducing the removal/disposal volumes.

4.4.5 Detailed Analysis of Alternative 5 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

4.4.5.1 Overall Protection of Human Health and the Environment

Removal and containment or disposal of source materials, soils, and sediments would be protective of human health. Although there may be temporary risks to the environment, removal would be protective in the long term. Risks to human health would be eliminated or greatly reduced since contaminated media would be removed from the site. Furthermore, the contaminated media would no longer be a potential source for surface water and groundwater contamination. During dredging operations, risks to ecological receptors may temporarily increase due to the disruption caused to the aquatic habitat. Once these temporary impacts abated, this alternative would achieve the RAOs.

The cap in Area 8 would provide protection of human health and the environment if the cap is properly maintained and the deed notice enforced. The cap would prevent significant flux of contamination into the top layers of sediment and the overlying surface water where human and ecological receptors would be exposed. However, if the cap is damaged by natural forces or due to improper enforcement of deed notice, contamination could be uncovered, potentially exposing receptors. This alternative would achieve the RAOs if the cap is properly maintained.

MNR in Areas 7, 9, and 11 would gradually provide increasing protection of human health and the environment. In Areas 7 and 11, human health and biota risk associated with the contaminated sediment would decrease over time as the existing contaminants would be dispersed by currents. It is important to note that sources of contamination (e.g. slag and battery casings), must be remediated first, so no new contamination would migrate into the MNR areas. The point in time when this migration from the sources is stopped would mark the highest concentrations in the MNR areas. Afterwards, concentrations would decrease as natural processes act on the areas. These processes would include geochemical changes that reduce contaminant bioavailability, burial by natural sedimentation to a depth below the biologically active zone of the sediments, and contaminant transport driven by advection and dispersion. In Areas 7 and 11, the natural process would be contaminant transport, so the mass of contaminants would be reduced in these areas over time. In Area 9, the natural process would be burial by sedimentation. In this case, the contamination would remain in the deeper sediment layers, but the top layer where human and ecological receptors would be exposed would have a decrease in concentration over time. MNR in Area 9 would provide protection of human health and the environment. If institutional controls are unsuccessful and activities in Area 9 disturb the sediments, the buried contamination could be revealed, potentially exposing receptors. However, periodic monitoring and sampling would be performed as part of this alternative to ensure that institutional control measures are implemented and that the risks due to contaminated sediment are decreasing over time. This alternative would meet the RAOs.

4.4.5.2 Compliance with ARARs

Chemical-specific ARARs would be complied with since the PRGs would be met either immediately (for areas where contaminated media is removed and for capped areas), or over time (for MNR areas). This alternative would follow health and safety requirements, hazardous and non-hazardous transportation and disposal requirements to meet the action-specific ARARs. In addition, this alternative would meet the transportation and disposal for hazardous waste criteria, thereby meeting the action-specific ARARs. Permits would be required for the construction of this alternative. This alternative would meet location-specific ARARs by complying with permit requirements for the wetland and coastal zones. Tables 2-2 and 2-3 summarize the location- and action-specific ARARs and their FS considerations.

4.4.5.3 Long Term Effectiveness and Permanence

Each component of the alternative is evaluated separately below.

Removal and Disposal or On-site Containment

Magnitude of Residual Risk - This alternative would provide long-term effectiveness and permanence since the contaminated media above the PRGs would be removed and disposed of or contained, and would no longer pose risks to human health or the environment.

Adequacy of Controls – Removal and disposal or on-site containment would be effective in removing site risk. The process would not be reversible. Long-term maintenance would be required to ensure the integrity of the containment cells.

Reliability of Controls – Confirmation samples would be collected and analyzed to confirm that the contaminant levels are below PRGs.

Capping in Area 8

Magnitude of Residual Risk – Risk would be immediately reduced once installation of the cap was complete. However, capping would provide only conditional long-term effectiveness and permanence. Contaminants would be left in place that could potentially pose risks to human health and the environment if the cap was not properly maintained or if the deed notice has not been properly enforced and intrusive construction is conducted on site that damages the cap and exposes the contaminated sediment. Furthermore, if bathymetry or hydrodynamics change over time, the cap may be eroded and expose the contamination. These changes would likely only occur if the entire western jetty (or its replacement) was removed. Due to the large quantity of contaminants left in place, the land use would be limited. Any redevelopment would require additional remediation to be performed. Assuming the cap integrity is maintained over the long-term, the contaminated sediments under the cap would be compressed. Increased density leaves the sediment more resistant to erosion, with very slow dissolved phase contaminant migration from the sediment. This compression and consolidation would be expected to occur within the 30 year monitoring period.

Adequacy of Controls – Capping and deed notices would provide adequate control of the contaminants left in place if they are well maintained and monitored. However, routine cap inspection and monitoring could be difficult to enforce over the long-term, which might result in inadequate control of site contamination.

Reliability of Controls – Capping and deed notice can provide reliable control of the contamination if properly designed, constructed, maintained, and monitored over the short term.

MNR in Areas 7 and 11

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in these areas because contaminants would be dispersing into the greater Raritan Bay. Contaminant transport would happen during average conditions, but would be accelerated greatly during storms since currents are stronger during storms. The absence of structures that would entrap sediments down-current means that the risk would not just be transferred from Areas 7 and 11 to another area, but would in fact be a permanent risk reduction. Given the regular occurrence of storms (including very strong nor'easters), sediment concentrations in these areas would be expected to decline.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place until contaminant transport has caused PRGs and RAOs to be met. However, routine monitoring could be difficult to enforce over the long-term, which might result in inadequate control of site contamination.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, constructed, maintained, and monitored. If bathymetry or hydrodynamics change over time, the contaminant transport patterns may change and risk reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place.

MNR in Area 9

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in Area 9 as the existing contamination is buried by natural sedimentation. The timeframe for risk reduction would depend on the initial concentration in the sediment: the lower the initial concentration, the faster the location would meet the PRGs and RAOs. MNR would provide conditional long-term effectiveness and permanence. Contaminants would be left in place and potentially pose risks to human health and the environment if the sediments are disturbed. Due to the large quantity of contaminants left in place, the land use would be limited. Any redevelopment would require additional remediation to be performed.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place. These controls would need to be permanent. Given that Margaret's Creek wetlands are not a popular recreational area and, since the area is wetlands, development would be unlikely; the institutional controls should be adequate. However, enforcement of the controls could be difficult to enforce over the long-term.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, constructed, maintained, and monitored. However, if bathymetry or hydrodynamics change over time, the accumulated clean sediment may be eroded, thereby exposing the contamination. The patterns of natural sedimentation that are burying the existing contamination may change and risk reduction may slow. These pattern changes would be unlikely if the coastline and the wetlands are left undisturbed. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place. It should be noted that the current understanding of the remediation timeframe is based on the sediment deposition rates from only two locations. Additional data from the pilot studies would determine the need to refine the estimates of these timeframes. If simple concentration averages do not provide a good understanding of the remediation timeframes over the entire area, then additional sedimentation mass balance models may need to be developed during the remedial design. The impact due to other remedial activities, such as the construction of on-site containment cells) in the upland areas on the drainage characteristics and hence the sediment deposition rates and residual risks in Area 9, would also be evaluated during the remedial design. Pre-design activities including a pilot study to evaluate leaching and sedimentation and site-specific erodibility measurements would provide a better understanding of the reliability of the controls.

4.4.5.4 Reduction of T/M/V through Treatment

Removal and disposal would provide no reduction of T/M/V through treatment at the site. The alternative would provide removal of slag, battery casing/associated wastes, contaminated soil and

sediment from their currently unprotected locations to a controlled environment either on-site or off-site. The mobility of the contained wastes, either on-site or off-site, would be reduced. For the removed media that is hazardous, reduction of toxicity and mobility would occur through treatment at a RCRA-permitted treatment/disposal facility to meet the LDR Treatment Standards for Contaminated Soil.

Capping would not reduce the volume of contaminants since they would be left in place. Since toxicity for metals would depend greatly on the oxidation state of the metal, a net reduction in toxicity would be uncertain. More importantly, bioavailability would be reduced since the reactive materials in the cap would remove contaminants from the dissolved phase (thus making any changes in toxicity irrelevant). The mobility of the contaminants would be reduced by preventing erosion and resuspension of the contaminated sediments, and controlling flux of dissolved contaminants using reactive materials in the cap.

In Areas 7 and 11, contaminant transport would reduce the toxicity of contamination in these areas over time as the metal concentrations are reduced. Bioavailability and mobility would not be reduced. If bathymetry or hydrodynamics change over time, the transport patterns may change and the rate of concentration reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met.

In Area 9, the volume of contaminants would not change since they would be left in place. Natural sedimentation would bury the existing contamination, restricting the mobility of both dissolved and sorbed contaminants. The resuspension of contaminated sediments and transport in currents would be reduced, and reduced contact with surface water would mean less opportunity for the transfer of contaminant mass into surface water. The result would be reduced mobility of the contaminants. Ultimately, bioavailability would be eliminated as contaminants are buried to a depth below the biologically active zone where organisms reside.

4.4.5.5 Short Term Effectiveness

This alternative would include dredging, excavation, and on-site containment construction and would have some significant short-term impacts to the communities, workers, and the ecological habitat. Heavy-load trucks would be driving back and forth daily in the community to transport contaminated media off-site and import clean fill to the site for approximately two years. During off-site disposal, there would be an increased possibility of a trucking accident leading to release of materials during transport. The heavy construction equipment would generate noise. Particulate emissions may increase during vehicular movement and other operations at the site. Working hours would be coordinated with Old Bridge Township and Borough of Sayreville and dust control would be implemented through the use of dust suppression techniques (e.g., water or foam sprays) to minimize impact to the local community. Storm water runoff would be controlled through the use of conventional, temporary storm water/erosion control features (e.g., berms, ditches, or silt fences). Health and safety measures would be implemented to prevent incidents and to protect the construction works, such as using PPE to minimize exposure to contaminated soil or hazardous chemicals during remedial activities.

Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily in the Jetty and Seawall Sectors. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

Capping would include conventional construction work and would have some short-term impact to the communities and workers. The heavy construction equipment would generate noise. Working hours would be coordinated with the local community and police department. Installation of the cap may temporarily increase emissions of dissolved and particulate contaminants, though such emissions would be expected to be minimal. It would take approximately one month to install the cap. Health and safety measures would be implemented to prevent incidents and to protect the construction works, such as using PPE to minimize exposure to contamination during remedial activities.

MNR in Areas 7 and 11 and in the Margaret's Creek Sector wetland would entail no construction activities and thus no short-term impacts.

4.4.5.6 Implementability

Dredging, excavation, disposal, and containment are all conventional remediation technologies and are widely implemented. Equipment, supplies and services would be readily obtainable. There would be no administrative difficulties associated with implementing this technology. Some of the technical difficulties include:

- Dewatering the sediment, especially in areas near the western jetty that consist of sediment with high organic content
- Maintaining dewatered conditions during sediment dredging operations in areas that are submerged in water
- Accessibility of select areas in the Jetty Sector that are nearly 1,500 feet from the shore
- Logistical issues related to transport of dredged material from the Bay to the staging area
- Difficulty in segregation of slag material from clean rocks
- Constraints to vehicular movement in the western jetty and in portions of the seawall
- Handling boulder-sized slag and rocks may require special attachments to standard equipment and may slow down the removal operations
- Lack of open space available for the remedial operations

Capping and institutional controls are established practices for sediment contamination. Equipment, supplies and services would be readily available. However, it may be difficult to implement a long-term maintenance and monitoring program and to enforce the institutional controls over the long term.

MNR would be implementable in all three areas (Areas 7, 9 and 11). The natural processes that would be relied upon to achieve the RAOs are already occurring. It is important to note that MNR would only

be implementable if the contaminant sources have been controlled, and there would no longer be significant loading of new contamination. There would be no anticipated administrative difficulty associated with implementing MNR. Services and materials for implementation would be readily available, including institutional controls like signs and fences, and environmental monitoring.

Additional implementability issues specific to on-site containment cells would include potential settlement of the ground following construction of the cells and lack of space due to presence of wetland areas at the site. The former would be addressed by employing well established techniques such as vibro-flotation or equivalent to minimize future settlement of the ground. With regards to the latter issue, NJDEP wetland rules would allow the construction of a cell with a buffer zone of 150 feet between the cell and wetland areas. As illustrated in Figure 4-4, land space would be available to meet these requirements. However, these constraints would limit the flexibility for modifications during the implementation.

4.4.5.7 Cost

A summary of the capital, O & M and present worth costs for all alternatives are provided in Table 4-3 and a detailed summary of the costs of each alternative are provided in Table 4-4. Detailed costs including the backups and quotations from vendors are provided in Appendix D. The total present worth for this alternative is approximately $80.0 million. The capital costs are estimated to be $71.2 million; the long-term maintenance and monitoring cost is estimated to be $11.3 million for 30 years. It should be noted that the maintenance and monitoring program would be carried out as long as the contaminants are in place.

4.4.5.8 Green Remediation

The major energy consumption of this alternative would be fuel use by equipment and vehicles, commute to the site by workers, and transportation for importing clean fill and for off-site disposal of removed contaminated media. The movement of fill and contaminated media would be temporary (until construction was completed); fuel use for trips to the site for monitoring and cap maintenance would continue for many years. Water use under this alternative would be minimal, primarily for dust control and decontamination. The capped zone would require comparatively less energy than dredging since the construction duration would be shorter, and there would be no transport of dredged sediment (only transport of the cap materials). MNR would require even less energy, since no construction or dredging is involved (only monitoring).

4.4.6 Detailed Analysis of Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

4.4.6.1 Overall Protection of Human Health and the Environment

Removal and containment or disposal of source materials, soils, and sediments would be protective of human health. Although there may be temporary risks to the environment, removal would be protective in the long term. Risks to human health and the ecological receptors would be eliminated or greatly reduced since contaminated media above the PRGs would be removed from the site. The contaminated media would no longer be a potential source for surface water and groundwater contamination. During dredging operations, risks to ecological receptors may temporarily increase

due to the disruption caused to the aquatic habitat. Once these temporary impacts abated, this alternative would achieve the RAOs.

MNR in Areas 7, 11, and the Margaret's Creek wetland would gradually provide increasing protection of human health and the environment. In Areas 7 and 11, human health and biota risk associated with the contaminated sediment would decrease over time as the existing contaminants were dispersed by currents. It is important to note that sources of contamination (e.g. slag and battery casings) must be remediated first, so no new contamination would migrate into the MNR areas. The point in time when migration from the sources is stopped would mark the highest concentrations in the MNR areas. Concentrations would then decrease as natural processes act on the areas. These processes would include geochemical changes that reduce contaminant bioavailability, burial by natural sedimentation to a depth below the biologically active zone of the sediments, and contaminant transport. In Areas 7 and 11, the natural process would be contaminant transport, so the mass of contaminants would be reduced in these areas over time. In the Margaret's Creek wetland, the natural process would be burial by sedimentation. In this case, the contamination would remain in the deeper sediment layers although the top layer where human and ecological receptors would be exposed would have a decrease in concentration over time. MNR in the Margaret's Creek wetland would only conditionally provide protection of human health and the environment. If institutional controls fail and activities in the Margaret's Creek wetland disturb the sediments, the buried contamination could be revealed, potentially exposing receptors. If properly implemented, this alternative would meet the RAOs.

4.4.6.2 Compliance with ARARs

Chemical-specific ARARs would be complied with since the PRGs would be met either immediately (for areas where contaminated media would be removed), or over time (for MNR areas). This alternative would follow health and safety requirements, hazardous and non-hazardous transportation and disposal requirements to meet the action-specific ARARs. In addition, this alternative would meet the transportation and disposal for hazardous waste criteria, thereby meeting the action-specific ARARs. Permits would be required for the construction of this alternative. This alternative would meet location-specific ARARs by complying with the permit requirements for wetlands and coastal zones. Tables 2-2 and 2-3 summarize the location- and action-specific ARARs and their FS considerations.

4.4.6.3 Long Term Effectiveness and Permanence

Each component of the alternative is evaluated separately below.

<u>Removal and Disposal or On-site Containment</u>

Magnitude of Residual Risk - This alternative would provide long-term effectiveness and permanence since the contaminated media above the PRGs would be removed and disposed of or contained, and would no longer pose risks to human health or the environment.

Adequacy of Controls – Removal and disposal or on-site containment would be effective in removing site risks. The process would not be reversible. Long-term maintenance would be required to ensure the integrity of the containment cells.

Reliability of Controls – Confirmation samples would be collected and analyzed to confirm and prove that the contaminant levels are below PRGs.

MNR in Areas 7 and 11

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in these areas because contaminants would be dispersing into the greater Raritan Bay. Contaminant transport would happen during average conditions, but would be accelerated greatly during storms since currents are stronger during storms. The absence of structures that would entrap sediments down-current would mean that the risk would not just be transferred from Areas 7 and 11 to another area, but would in fact be a permanent risk reduction. Given the regular occurrence of storms (including very strong nor'easters), sediment concentrations in these areas would be expected to decline.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place until contaminant transport has caused PRGs and RAOs to be met. However, routine monitoring could be difficult to enforce over the long-term, which might result in inadequate control of site contamination.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, constructed, maintained, and monitored. If bathymetry or hydrodynamics change over time, the transport patterns may change and risk reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place.

MNR in Margaret's Creek Wetland

Magnitude of Residual Risk – Once sources are controlled and no further input of contaminants into the recovering areas occurs, the risk would start to decrease in the Margaret's Creek wetland as the existing contamination is buried by natural sedimentation. The timeframe for risk reduction would depend on the initial concentration in the sediment: the lower the initial concentration, the faster the location would meet the PRGs and RAOs. MNR would provide conditional long-term effectiveness and permanence. Contaminants would be left in place and potentially pose risks to human health and the environment if the sediments are disturbed. Due to the large quantity of contaminants left in place, the land use would be limited. Any redevelopment would require additional remediation to be performed.

Adequacy of Controls – Institutional controls would be needed to provide adequate control of the contaminants left in place. These controls would need to be permanent. Given that Margaret's Creek wetlands are not a popular recreational area and, since the area is wetlands, development is unlikely. The institutional controls should be adequate. However, enforcement of the controls could be difficult to enforce over the long-term.

Reliability of Controls – Institutional controls can provide reliable control if properly designed, constructed, maintained, and monitored. However, if bathymetry or hydrodynamics change over time, the accumulated clean sediment may be eroded, thereby exposing the contamination. The patterns of natural sedimentation that are burying the existing contamination may change and risk reduction may slow. These pattern changes would be unlikely if the coastline and the wetlands are

left undisturbed. It may also be difficult for the maintenance and monitoring program to be carried out consistently over the long term, resulting in unreliable control of the contamination left in place. It should be noted that the current understanding of the remediation timeframe is based on the sediment deposition rates from only two locations. Additional data from the pilot studies would determine the need to refine the estimates of these timeframes. If simple concentration averages do not provide a good understanding of the remediation timeframes over the entire area, then additional sedimentation mass balance models may need to be developed during the remedial design. The impact due to other remedial activities (such as the construction of on-site containment cells) in the upland areas on the drainage characteristics and hence the sediment deposition rates and residual risks in Area 9, would also be evaluated during the remedial design. Pre-design activities including a pilot study to evaluate leaching and sedimentation and site-specific erodibility measurements would provide a better understanding of the reliability of the controls.

4.4.6.4 Reduction of T/M/V through Treatment

Removal and disposal or on-site containment would provide no reduction of T/M/V through treatment at the site. It moves the contaminated media from the site to a different location where it can be better contained. For the removed media that is hazardous, reduction of toxicity and mobility would occur through treatment at a RCRA-permitted treatment/disposal facility to meet the LDR Treatment Standards for Contaminated Soil.

In Areas 7 and 11, contaminant transport would reduce the toxicity of contamination in these areas over time as the metal concentrations are reduced. Bioavailability and mobility would not be reduced. If bathymetry or hydrodynamics change over time, the transport patterns may change and the rate of concentration reduction may slow. These pattern changes would be unlikely if the coastal structures, the Cheesequake Creek Inlet, and the shape of the coastline are left unchanged until the PRGs and RAOs are met.

In the Margaret's Creek wetland, the volume of contaminants would not change since they would be left in place. Natural sedimentation would bury the existing contamination, restricting the mobility of both dissolved and sorbed contaminants. The resuspension of contaminated sediments and transport in currents would be reduced, and reduced contact with surface water would mean less opportunity for the transfer of contaminant mass into surface water. The result would be reduced mobility of the contaminants. Ultimately, bioavailability would be eliminated as contaminants would be buried to a depth below the biologically active zone where organisms reside.

4.4.6.5 Short Term Effectiveness

This alternative would include dredging, excavation, and on-site containment construction and would have some significant short-term impact to the communities, workers and the ecological habitats. Heavy-load trucks would be driving back and forth daily in the community to transport contaminated media to the on-site containment cells or off-site and import clean fill to the site for approximately two years. During off-site disposal, there would be an increased possibility of a trucking accident leading to release of materials during transport. The heavy construction equipment would generate noise. Particulate emissions may increase during vehicular movement and other operations at the site. Working hours would be coordinated with Old Bridge Township and Borough of Sayreville and dust control would be implemented through the use of dust suppression techniques (e.g., water or

foam sprays) to minimize impact to the local community. Storm water runoff would be controlled through the use of conventional, temporary storm water/erosion control features (e.g., berms, ditches, or silt fences). Health and safety measures would be implemented to prevent incidents and protect the construction workers, such as using PPE to minimize exposure to contaminated soil or hazardous chemicals during remedial activities.

Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

For selected remediation target areas in Areas 7, 11 and the Margaret's Creek wetland, MNR would entail no construction activities and thus no short-term impacts.

4.4.6.6 Implementability

Dredging, excavation, disposal, and containment are all conventional remediation technologies and are widely implemented. Equipment, supplies and services would be readily obtainable. There would be no administrative difficulties associated with implementing this technology. Some of the technical difficulties include:

- Dewatering the sediment, especially in areas near the western jetty that consist of sediment with high organic content
- Maintaining dewatered conditions during sediment dredging operations in areas that are submerged in water
- Accessibility of select areas in the Jetty Sector that are nearly 1,500 feet from the shore
- Logistical issues related to transport of dredged material from the Bay to the staging area
- Difficulty in segregation of slag material from clean rocks
- Constraints to vehicular movement in the western jetty and in portions of the seawall
- Handling boulder-sized slag and rocks may require special attachments to standard equipment and may slow down the removal operations
- Lack of open space available for the remedial operations

MNR would be implementable in all three areas (Areas 7, 9 and 11). The natural processes that would be relied upon to achieve the RAOs are already occurring. It is important to note that MNR would only be implementable if the contaminant sources have been controlled, and there is no longer significant loading of new contamination. There would be no administrative difficulties associated with implementing MNR. Services and materials for implementation would be readily available, including institutional controls like signs and fences, and environmental monitoring.

Additional implementability issues specific to on-site containment cells would include potential settlement of the ground following construction of the cells and lack of space due to presence of wetland areas at the site. The former would be addressed by employing well established techniques

such as vibro-flotation or equivalent to minimize future settlement of the ground. With regards to the latter issue, NJDEP wetland rules allow the construction of a cell with a buffer zone of 150 feet between the cell and wetland areas. As illustrated in Figure 4-4, land space would be available in order to meet these requirements. However, these constraints would limit the flexibility for modifications during the implementation.

4.4.6.7 Cost

A summary of the capital, O & M and present worth costs for all alternatives are provided in Table 4-3 and a detailed summary of the costs of each alternative are provided in Table 4-4. Detailed costs including the backups and quotations from vendors are provided in Appendix D. The total present worth for this alternative is approximately $82.6 million. The capital costs are estimated to be $74.6 million; the long-term maintenance and monitoring cost is estimated to be $10.2 million for 30 years. It should be noted that the maintenance and monitoring program should be carried out as long as the contaminants are in place.

4.4.6.8 Green Remediation

The major energy consumption of this alternative would be fuel use by equipment and vehicles, commuting to the site by workers, and transportation to import clean fill and for off-site disposal of contaminated media. The movement of fill and contaminated media would be temporary (until construction was completed); fuel use for trips to the site for monitoring and cap maintenance would continue for many years. Water use under this alternative would be minimal, primarily for dust control and decontamination. MNR would require relatively minimal energy since no construction or dredging is involved (only monitoring).

4.5 Comparative Analysis of Retained Alternatives

The following sections provide a comparison among the six site-wide alternatives using the seven evaluation criteria. Table 4-2 summarizes the comparison of the six site-wide alternatives against the seven criteria, including the cost of each alternative.

4.5.1 Overall Protection of Human Health and the Environment

Alternative 1 would not protect human health and the environment. Alternatives 2 through 6 would provide protection to human health and the environment. However, during dredging operations under Alternatives 2, risks to ecological receptors would temporarily increase due to the disruption caused to the aquatic habitat from the dredging operation, especially in the Margaret's Creek wetland, where the wetland would be excavated/dredged and would need to be restored. Conversely, Alternatives 3 through 6 would have less impact to the environment as fewer areas would be dredged and the Margaret's Creek wetland would not be disturbed. However, the time to achieve protectiveness would be longer for Alternatives 3 through 6 than for Alternatives 2. For Alternatives 2 and 3, human health risk would be eliminated or greatly reduced through removal of contaminated materials and MNR. For Alternatives 4 through 6, human health risk would be eliminated or greatly reduced through removal and containment of contaminated materials; however, long-term maintenance of the containment cells would be required for these alternatives. The contaminated land would be restored to beneficial use with Alternatives 2 through 6.

Alternative 1 would not meet the RAOs. Alternatives 2 and 3 would meet the RAOs. Alternatives 4 through 6 would meet the RAOs provided that on-site containment is properly maintained.

4.5.2 Compliance with ARARs

Alternative 1 would not comply with chemical-specific ARARs because no action would be taken. Alternative 2 would comply with chemical-specific ARARs through removal and off-site disposal. Alternatives 3 through 6 would take longer (because of MNR) to comply with chemical-specific ARARs through various remedial activities. Action-specific and location-specific ARARs are not applicable to Alternative 1 since no action would be taken. Alternatives 2 through 6 would comply with action-specific ARARs by implementing health and safety measures during the remedial action, and by meeting regulatory requirements necessary for remedy implementation. Alternatives 2 through 6 would also comply with location-specific ARARs by meeting wetland, coastal zone, and siting requirements. Coastal wetland restoration would be required for Alternatives 2 through 6. Wetland restoration for the Margaret's Creek wetland would not be required for Alternatives 3 through 6 because the wetland would not be disturbed during remedy implementation.

4.5.3 Long Term Effectiveness and Permanence

Alternative 1 would not be considered a permanent remedy and does not achieve long-term effectiveness since no action would be taken. Alternative 2 would remove the contaminated materials from the current unprotected locations and would achieve long-term effectiveness and permanence. Alternatives 3 through 6 would achieve long-term effectiveness through a combination of removal, off-site disposal, on-site containment, capping, and MNR and would be permanent if long-term site controls are maintained.

4.5.4 Reduction of T/M/V through Treatment

Alternative 1 would not reduce Toxicity/Mobility/Volume (T/M/V) through treatment since no treatment would be implemented. Alternatives 2 through 6 would not reduce T/V through treatment on-site; however, off-site disposal, on-site containment, and capping under Alternatives 2 through 6 would reduce the mobility of the contaminants. The use of reactive capping technologies for Alternative 5 would further reduce contaminant mobility. The toxicity of site related metals in contaminated materials would be reduced if treatment is conducted at the off-site treatment and disposal facility.

4.5.5 Short Term Effectiveness

Alternative 1 would not have any short-term impact since no action would be taken. Alternatives 2 through 6 would have impacts to the community during pre-design investigations, source removal, soil excavation, sediment dredging, material handling, on-site containment, capping, and transportation and disposal operations.

Alternative 2 would have the biggest impact to the community since it would involve major construction operations on-site, and heavy traffic on local roads during the transportation and disposal of contaminated materials off-site. Due to re-suspension of sediment during dredging operations, significant adverse impact to the aquatic habitat would be expected to occur temporarily. This would be more pronounced in the Margaret's Creek wetland, where the habitat would be

impacted and would need to be restored. To the extent practicable, areas designated for dredging would be dewatered prior to operations to avoid re-suspension.

Alternatives 3 through 6 would have less short-term impact when compared to Alternative 2 because dredging would not be performed in selected remediation target zones in Areas 7, 8, 9, and 11. Instead, capping would be performed in Area 8 under Alternative 5, and MNR would be implemented for Areas 7, 9, and 11 under Alternatives 3 through 6.

4.5.6 Implementability

Alternative 1 would be the easiest to implement since it involves no action. Alternatives 2 through 6 would be technically implementable and would use conventional construction equipment, although there would be several technical challenges related to dredging and dewatering the sediment, segregating the slag, accessing work areas, siting of on-site containment cells, capping under water, and transportation logistics. Alternative 2 would also encounter some technical challenges with regards to wetland restoration. Additionally, Alternatives 4 through 6 also could face potential issues due to settlement of the ground following placement of contaminated material in the containment cells. Alternative 3 would be the easiest to implement among the action alternatives, as it would involve the least disturbance to the site and would not require restoration of the wetland. Alternatives 4, 5, and 6 would be the second easiest to implement, as it also would involve lesser disturbance to the site and would not require restoration of the wetland. Alternative 2 would be the most difficult to implement.

4.5.7 Costs

Alternative 1 would not involve any costs. Alternative 2 would have the highest capital cost due to transportation and disposal of the contaminated materials. Alternative 5 would have the lowest cost because of the use of MNR and capping. Table 4-3 summarizes the capital, O & M and present worth costs for each alternative.

4.5.8 Green Remediation

Alternative 2 has the highest estimated greenhouse gas emissions due to high fuel consumptions, followed by Alternative 3, 4, 6, 5, and 1, in that sequence.

4.6 Sensitivity Analysis of Retained Alternatives

A sensitivity analysis was performed to study the change in the capital costs with respect to remediation volumes. The capital costs with the remediation volumes increased or decreased by 20% were determined for each of the Alternatives 2, 3, 4, 5 and 6 and the variation in capital costs for these alternatives were compared with each other. The summary of this analysis is provided in Table 4-5. All alternatives have similar sensitivity to the change in volume – the capital cost for the alternatives varied between 10.9% and 11.7% for a 20% change in the remediation volumes. The capital cost for Alternative 5 was the most sensitive and the capital cost for Alternative 2 was the least sensitive to variation in the remediation volumes.

Section 5
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Tables

Table 1-1
Bay Sediment Background
Raritan Bay Slag Superfund Site
Old Bridge / Sayreville, NJ

Chemical	Unit	Minimum Concentration	Maximum Concentration	95% UPL*
Aluminum	mg/kg	423	5040	4125
Antimony	mg/kg	ND	ND	NC**
Arsenic	mg/kg	0.88	15.9	15.0
Barium	mg/kg	10.3	44.2	28.2
Beryllium	mg/kg	0.27	0.61	0.50
Cadmium	mg/kg	0.2	0.6	0.5
Calcium	mg/kg	338	8020	8020
Chromium	mg/kg	3.7	26.5	24.7
Chromium (hexavalent)	mg/kg	0.41	2.2	1.7
Cobalt	mg/kg	0.36	13.9	8.6
Copper	mg/kg	2.4	29	28.0
Iron	mg/kg	1850	25200	22996
Lead	mg/kg	2.7	21.1	20.5
Magnesium	mg/kg	325	2780	2445
Manganese	mg/kg	12.7	771	517
Mercury	mg/kg	0.03	0.33	0.25
Nickel	mg/kg	1.9	16.1	14.8
Potassium	mg/kg	283	1260	854
Selenium	mg/kg	ND	ND	NC**
Silver	mg/kg	ND	ND	NC**
Sodium	mg/kg	603	4540	4540
Thallium	mg/kg	ND	ND	NC**
Vanadium	mg/kg	4.4	35.7	34.6
Zinc	mg/kg	9.2	87	72

Note:
mg/kg = milligram per kilogram
ND = not detected
* 95% Upper Prediction Limit (UPL) is calculated using ProUCL version 4.01.00.
For 95% UPL greater than maximum concentration, the maximum concentration is listed.
** UPL was not calculated (NC) due to less than two detected samples.

Table 1-2
Wetlands Sediment Background
Raritan Bay Slag Superfund Site
Old Bridge / Sayreville, NJ

Chemical	Minimum Concentration	Maximum Concentration	95% UPL*
Aluminum	3650	11700	11700
Antimony	0.79	2	2
Arsenic	13.7	49.5	45.86
Barium	16.3	36.4	36.4
Beryllium	0.37	1.1	1.1
Cadmium	0.14	0.69	0.69
Calcium	716	2880	2880
Chromium	30.1	84.2	84.2
Chromium (Hexavalent)	0.56	2.8	2.625
Cobalt	3	13.3	11.0
Copper	42.5	176	176
Iron	15900	41100	41100
Lead	71.6	193	193
Magnesium	1610	5670	5670
Manganese	54.8	207	207
Mercury	0.17	0.99	0.99
Nickel	7.3	23.8	23.8
Potassium	711	2420	2420
Selenium	1.2	1.9	1.9
Silver	0.68	1.5	1.5
Sodium	4140	26000	26000
Thallium	0.31	0.31	NA**
Vanadium	29.3	74.3	74.3
Zinc	56.3	184	179.1

Note:
Unit is milligram per kilogram (mg/kg).
* 95% Upper Prediction Limit (UPL) is calculated using ProUCL version 4.1.
For 95% UPL greater than maximum concentration, the maximum concentration is listed.
** only one sample was collected. NA - not available

Table 1-3
Soil Background
Raritan Bay Slag Superfund Site
Old Bridge / Sayreville, NJ

Chemical	Unit	Minimum Concentration	Maximum Concentration	95% UPL*
Aluminum	mg/kg	89.6	972	882
Antimony	mg/kg	0.2	0.2	NC**
Arsenic	mg/kg	0.34	3.1	3.1
Barium	mg/kg	0.79	8.5	8.20
Beryllium	mg/kg	ND	ND	NC**
Cadmium	mg/kg	0.026	0.026	NC**
Calcium	mg/kg	217	1100	846
Chromium	mg/kg	1.1	7.8	7.8
Chromium (hexavalent)	mg/kg	0.42	0.54	0.54
Cobalt	mg/kg	0.3	0.93	0.50
Copper	mg/kg	0.44	2.4	2.21
Iron	mg/kg	1010	1010	NC**
Lead	mg/kg	1.1	6.9	5.7
Magnesium	mg/kg	225	336	336
Manganese	mg/kg	1.6	26.5	20.9
Mercury	mg/kg	ND	ND	NC**
Nickel	mg/kg	0.26	2.8	2.25
Potassium	mg/kg	ND	ND	NC**
Selenium	mg/kg	0.087	0.099	0.095
Silver	mg/kg	ND	ND	NC**
Sodium	mg/kg	515	1650	1650
Thallium	mg/kg	ND	ND	NC**
Vanadium	mg/kg	1.7	12.9	10.5
Zinc	mg/kg	1.2	16	15

Note:
mg/kg = milligram per kilogram
ND = not detected
* 95% Upper Prediction Limit (UPL) is calculated using ProUCL version 4.01.00.
For 95% UPL greater than maximum concentration, the maximum concentration is listed.
** UPL was not calculated (NC) due to less than two detected samples.

TABLE 1-4
SUMMARY OF CANCER RISKS AND NONCANCER HEALTH HAZARDS
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Scenario Time Frame	Receptor Population	Exposure Area	Receptor	Cancer Risk			Noncancer Hazard Index (HI)		
				RME	CTE	Risk Driver	RME	CTE	HI for Target Organ/Effect/Risk Driver
Current	Recreational User	Area 1	Adult	6×10^{-6}	--	--	0.3	--	--
			Adolescent	9×10^{-6}	--	--	0.4	--	--
		Areas 3 and 4	Adult	2×10^{-6}	--	--	0.06	--	--
			Adolescent	3×10^{-7}	--	--	0.009	--	--
			Child	9×10^{-6}	--	--	0.6	--	--
		Areas 5, 6 and Beach Area of Area 9	Adult	7×10^{-6}	--	--	0.09	--	--
			Child	9×10^{-6}	--	--	0.6	--	--
		Upland Area of Area 9	Adult	7×10^{-6}	--	--	0.3	--	--
			Adolescent	9×10^{-6}	--	--	0.4	--	--
	Pedestrian	All Areas (except Areas 2, 8 and 11)	Adult	6×10^{-6}	--	--	0.4	--	--
			Adolescent	8×10^{-6}	--	--	0.5	--	--
	Angler (Fish)	All Areas (except Areas 3 and 4)	Adult	**2×10^{-4}**	4×10^{-5}	Arsenic	1	--	--
			Child*	6×10^{-5}	--	--	**2**	0.6	HI due to arsenic: - skin: RME (2), CTE (0.6)
	Angler (Hard Clam)		Adult	**2×10^{-4}**	3×10^{-5}	Arsenic	1	--	--
			Child*	7×10^{-5}	--	--	**2**	0.9	HI due to arsenic: - skin: RME (2), CTE (0.9)
	Angler (Ribbed Mussel)		Adult	1×10^{-4}	--	--	0.7	--	--
			Child*	4×10^{-5}	--	--	1	--	--
	Angler (Blue Crab Muscle)		Adult	3×10^{-5}	--	--	0.2	--	--
			Child*	1×10^{-5}	--	--	0.3	--	--
	Angler (Blue Crab Muscle and Hepatopancreas)		Adult	4×10^{-5}	--	--	0.6	--	--
			Child*	2×10^{-5}	--	--	1	--	--
	Trespasser	Area 2	Adult	1×10^{-6}	--	--	0.05	--	--
			Adolescent	2×10^{-6}	--	--	0.07	--	--
		Areas 8 and 11	Adult	6×10^{-6}	--	--	0.2	--	--
			Adolescent	8×10^{-6}	--	--	0.3	--	--
	Outdoor Worker	Areas 3 and 4	Adult	6×10^{-6}	--	--	0.08	--	--
	Construction/Utility Worker	All Upland Areas	Adult	2×10^{-6}	--	--	**1**	--	--

TABLE 1-4
SUMMARY OF CANCER RISKS AND NONCANCER HEALTH HAZARDS
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Scenario Time Frame	Receptor Population	Exposure Area	Receptor	Cancer Risk			Noncancer Hazard Index (HI)		
				RME	CTE	Risk Driver	RME	CTE	HI for Target Organ/Effect/Risk Driver
Future	Recreational User	Area 1	Adult	6×10^{-6}	--	--	0.3	--	--
			Adolescent	9×10^{-6}	--	--	0.4	--	--
		Area 2	Adult	1×10^{-5}	--	--	0.2	--	--
			Child	2×10^{-5}	--	--	1	--	--
		Areas 3 and 4	Adult	2×10^{-6}	--	--	0.06	--	--
			Adolescent	3×10^{-7}	--	--	0.009	--	--
			Child	9×10^{-6}	--	--	0.6	--	--
		Areas 5, 6 and Beach Area of Area 9	Adult	7×10^{-6}	--	--	0.09	--	--
			Child	9×10^{-6}	--	--	0.6	--	--
		Upland Area of Area 9	Adult	7×10^{-6}	--	--	0.3	--	--
			Adolescent	9×10^{-6}	--	--	0.4	--	--
	Pedestrian	All Areas (except Areas 8 and 11)	Adult	6×10^{-6}	--	--	0.4	--	--
			Adolescent	8×10^{-6}	--	--	0.5	--	--
	Angler (Fish)	All Areas (except Areas 3 and 4)	Adult	**2×10^{-4}**	4×10^{-5}	Arsenic	1	--	--
			Child*	6×10^{-5}	--	--	**2**	0.6	HI due to arsenic: - skin: RME (2), CTE (0.6)
	Angler (Hard Clam)		Adult	**2×10^{-4}**	3×10^{-5}	Arsenic	1	--	--
			Child*	7×10^{-5}	--	--	**2**	0.9	HI due to arsenic: - skin: RME (2), CTE (0.9)
	Angler (Ribbed Mussel)		Adult	1×10^{-4}	--	--	0.7	--	--
			Child*	4×10^{-5}	--	--	1	--	--
	Angler (Blue Crab Muscle)		Adult	3×10^{-5}	--	--	0.2	--	--
			Child*	1×10^{-5}	--	--	0.3	--	--
	Angler (Blue Crab Muscle and Hepatopancreas)		Adult	4×10^{-5}	--	--	0.6	--	--
			Child*	2×10^{-5}	--	--	1	--	--
	Trespasser	Areas 8 and 11	Adult	6×10^{-6}	--	--	0.2	--	--
			Adolescent	8×10^{-6}	--	--	0.3	--	--
	Outdoor Worker	Areas 3 and 4	Adult	6×10^{-6}	--	--	0.08	--	--
	Construction/Utility Worker	All Upland Areas	Adult	2×10^{-6}	--	--	**1**	--	--
	Resident	All Areas	Adult/Child**	9×10^{-5}	--	--	**15**	**5**	HI due to cobalt: - respiratory system: RME (5), CTE (2) - thyroid gland: RME (5), CTE (2) HI due to iron: - GI system: RME (7), CTE (3)

RME = reasonable maximum exposure CTE = central tendency exposure GI = gastrointestinal

Bold indicates cancer risk is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} or noncancer HI is above EPA's threshold of unity (1)

*The angler scenario for children (0 to 6 years old) assumes children will consume fish and shellfish caught at the site by anglers

**For resident, cancer risk is based on age-adjusted exposure scenario and noncancer HI is based on the more sensitive child (0 to 6 years old) receptor.

Table 1-5
Summary of Inte grated Exposure Uptake Biokinetic Model Results
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Scenario Time Frame	Receptor Population	Exposure Area	Model Output Categories	Lead Concentration			Geomean Blood Lead Concentration (µg/dL)	Percentage of Children with Blood Lead Concentrations Above 10 µg/dL [1]
				Soil (mg/kg)	Groundwater (µg/L)	Tissue (mg/kg)		
Current	Recreational User	Areas 5, 6, and Beach Area of Area 9	Incidental Ingestion of Soil	68	--	--	1.6	0.004%
	Angler	All Areas (except Areas 3 and 4)	Ingestion of Shellfish, Hard Clam	--	--	1.696	3.8	1.85%
			Ingestion of Shellfish, Blue Crab Muscle	--	--	0.111	2.9	0.44%
			Ingestion of Shellfish, Blue Crab Muscle Plus Hepatopancreas	--	--	0.102	2.9	0.44%
			Ingestion of Shellfish, Ribbed Mussel	--	--	0.361	3.1	0.58%
Future	Recreational User	Area 2	Incidental Ingestion of Soil	485 (total lead)	--	--	5.4	9.86%
			Incidental Ingestion of Soil	685 (fine fraction, bioavailability 42%)	--	--	9.1	42.16%
		Areas 5, 6, and Beach Area of Area 9	Incidental Ingestion of Soil	68	--	--	1.6	0.004%
	Resident	All Areas	Ingestion of Groundwater as Drinking Water Source	--	11	--	3.4	1.007%
	Angler	All Areas (except Areas 3 and 4)	Ingestion of Shellfish, Hard Clam	--	--	1.696	3.8	1.85%
			Ingestion of Shellfish, Blue Crab Muscle	--	--	0.111	2.9	0.44%
			Ingestion of Shellfish, Blue Crab Muscle Plus Hepatopancreas	--	--	0.102	2.9	0.44%
			Ingestion of Shellfish, Ribbed Mussel	--	--	0.361	3.1	0.58%

mg/kg = milligram per kilogram
µg/dL = microgram per deciliter
µg/L = micrograms per liter
-- = not applicable
[1] Target blood lead level of concern = 10 µg/dL
Bold indicates value exceeds the 5% probability threshold of concern

Table 1-6
Summary of Predicted Fetal and Adult/Adolescent Blood Lead Concenrations Using the Adult Lead Model
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Scenario Time Frame	Receptor Population	Exposure Area	Receptor	Model Output Categories	Lead Concentration		Estimated Adult/ Adolescent Blood Lead Concentrations	Estimated Fetal Blood Concentrations (µg/dL)	Probability of Fetal Blood Lead Concentrations Exceeding 10 µg/dL [1]
					Soil (mg/kg)	Tissue (mg/kg)			
Current	Recreational User	Area 1	Adult	Incidental Ingestion of Soil	557	--	1.7	4.1	0.08%
			Adolescent	Incidental Ingestion of Soil	557	--	1.7	4.1	0.08%
		Area 5, Area 6, and Beach Area of Area 9	Adult	Incidental Ingestion of Soil	68	--	1.1	2.6	0.004%
		Upland Area of Area 9	Adult	Incidental Ingestion of Soil	251	--	1.3	3.1	0.02%
			Adolescent	Incidental Ingestion of Soil	251	--	1.3	3.1	0.02%
		Wetlands of Area 9	Adult	Incidental Ingestion of Sediment	117	--	1.2	2.7	0.01%
			Adolescent	Incidental Ingestion of Sediment	117	--	1.2	2.7	0.01%
	Pedestrian	All Areas (except Areas 2, 8 and 11)	Adult	Incidental Ingestion of Soil	215	--	1.5	3.5	0.03%
			Adolescent	Incidental Ingestion of Soil	215	--	2.0	4.7	0.17%
	Construction/ Utility Worker	All Upland Areas	Adult	Incidental Ingestion of Soil (Surface and Subsurface)	408	--	5.4	12.8	11.14%
	Angler	All Areas (except Areas 3 and 4)	Adult	Ingestion of Shellfish, Hard Clam	--	1.7	2.5	5.8	0.52%
				Ingestion of Shellfish, Blue Crab Muscle	--	0.11	1.1	2.6	0.004%
				Ingestion of Shellfish, Blue Crab Muscle Plus Hepatopancreas	--	0.10	1.1	2.6	0.004%
				Ingestion of Shellfish, Ribbed Mussel	--	0.36	1.3	3.1	0.01%

Table 1-6
Summary of Predicted Fetal and Adult/Adolescent Blood Lead Concenrations Using the Adult Lead Model
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Scenario Time Frame	Receptor Population	Exposure Area	Receptor	Model Output Categories	Lead Concentration		Estimated Adult/ Adolescent Blood Lead Concentrations	Estimated Fetal Blood Concentrations (µg/dL)	Probability of Fetal Blood Lead Concentrations Exceeding 10 µg/dL [1]
					Soil (mg/kg)	Tissue (mg/kg)			
Future	Recreational User	Area 1	Adult	Incidental Ingestion of Soil	557	--	1.7	4.1	0.08%
			Adolescent	Incidental Ingestion of Soil	557	--	1.7	4.1	0.08%
		Area 2	Adult	Incidental Ingestion of Soil, total lead	485	--	1.6	3.9	0.06%
				Incidental Ingestion of Soil, fine fraction	685	--	2.3	5.4	0.35%
		Area 5, Area 6, and Beach Area of Area 9	Adult	Incidental Ingestion of Soil	68	--	1.1	2.6	0.004%
		Upland Area of Area 9	Adult	Incidental Ingestion of Soil	251	--	1.3	3.1	0.02%
			Adolescent	Incidental Ingestion of Soil	251	--	1.3	3.1	0.02%
		Wetlands of Area 9	Adult	Incidental Ingestion of Sediment	117	--	1.2	2.7	0.01%
			Adolescent	Incidental Ingestion of Sediment	117	--	1.2	2.7	0.01%
	Pedestrian	All Areas (except Areas 8 and 11)	Adult	Incidental Ingestion of Soil	234	--	1.5	3.6	0.04%
			Adolescent	Incidental Ingestion of Soil	234	--	2.1	4.9	0.22%
	Construction/ Utility Worker	All Upland Areas	Adult	Incidental Ingestion of Soil (Surface and Subsurface)	408	--	5.4	12.8	11.14%
	Angler	All Areas (except Areas 3 and 4)	Adult	Ingestion of Shellfish, Hard Clam	--	1.7	2.5	5.8	0.52%
				Ingestion of Shellfish, Blue Crab Muscle	--	0.11	1.1	2.6	0.004%
				Ingestion of Shellfish, Blue Crab Muscle Plus Hepatopancreas	--	0.10	1.1	2.6	0.004%
				Ingestion of Shellfish, Ribbed Mussel	--	0.36	1.3	3.1	0.01%

Notes:
mg/kg = milligram per kilogram µg/dL = microgram per deciliter -- = not applicable
[1] Target blood lead level of concern = 10 µg/dL
Bold indicates value exceeds the 5% probability threshold of concern
Adult exposure to groundwater is covered under Integrated Exposure Uptake Biokinetic Model for Lead in Children

Table 2-1
Chemical-Specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Regulatory Level	ARAR	Status	Requirement Synopsis	Feasibility Study Consideration
Federal	EPA Regional Screening Level (RSL) for residential soil	To Be Considered	Establishes health-based levels for soil cleanups.	The RSL will be considered in the development of the PRGs if there are no applicable standards.
Federal	National Primary Drinking Water Standards (40 CFR 141)	Relevant and Appropriate	Establishes drinking water standards (maximum contaminant levels [MCLs]).	The standards will be used as guides to assess the effect of source removal on groundwater and surface water quality.
Federal	National Secondary Drinking Water Regulations	To Be Considered	set non-mandatory water quality standards for 15 contaminants. established only as guidance to assist public water systems in managing their drinking water for aesthetic	The RSL will be considered in the development of the PRGs.
Federal	Clean Water Act, Ambient Water Quality Criteria (40 CFR 131)	Relevant and Appropriate	Sets criteria for water quality based on protection of human health and protection of aquatic life.	The standards will be used as guides to assess the effect of source removal on groundwater and surface water quality.
State	NJDEP Residential Direct Contact and Non-residential Direct Contact Soil Remediation Standards (N.J.A.C. 7:26D)	Applicable	Establishes standards for soil cleanups.	The standards will be used to develop the PRGs.
State	NJDEP Impact to Groundewater Soil Remediation Criteria (N.J.A.C.	To Be Considered	Establishes criteria for soil cleanups.	The criteria will be considered in developing the PRGs.
State	New Jersey Ground Water Quality Standards (NJGQS) Class IIA (NJAC 7:9C)	Applicable	Establish the water quality standards for State's ground waters based on the type of groundwater use.	The standards will be used to develop the PRGs.
State	New Jersey MCLs, February 2005	Relevant and Appropriate	Establish the drinking water standards for the State.	The standards will be used to develop the PRGs.
State	New Jersey Surface Water Quality Standards (N.J.A.C. 7:9B)	Applicable	Establishes classification of surface waters of the state, procedures for establishing water quality-based effluent limitations, and modification of water quality-based effluent limitations.	The standards will be used to develop the PRGs.

Table 2-2
Location-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Coastal Zone Regulations				
Federal	Rivers and Harbors Act (33 USC 403, 33 CFR 320-330)	Applicable	This act specifies regulations for filling, altering or modifying the course, location, condition, or capacity of a navigable waterway.	This requirement will be considered during the development of alternatives.
Federal	Coastal Zone Management Act (1972) and Coastal Zone Act Reauthorization Amendments (1990) (16 USC 1451 et seq; 16 USC 6217)	Applicable	This act encourages states to develop coastal management plans to manage competing uses of and impacts to coastal resources, and to manage sources of non point pollution in coastal waters.	This requirement will be considered during the development of alternatives.
State	Tidelands Conveyances	Applicable	Tidelands grants, leases, and/or licenses are required for the use of state-owned riparian lands. These conveyances are granted by the Tidelands Resources Council.	This requirement will be considered during the development of alternatives.
State	Coastal Zone Management Program (N.J.A.C. 7:7E)	Applicable	This program establishes standards for use and development of coastal resources in coastal waters to the limit of tidal influence.	This requirement will be considered during the screening, evaluation and development of alternatives.
State	Coastal Permit Program Rules (N.J.A.C. 7:7)	Applicable	These rules govern the permit requirements for activities in coastal areas in the state of New Jersey.	This requirement will be considered during the screening, evaluation and development of alternatives.
State	Coastal Area Facility Review Act Permit (N.J.S.A. 13:19-1 et seq.)	Applicable	This requirement establishes that coastal areas should be dedicated to land uses that protect public health and are consistent with laws governing the environment.	This requirement will be considered during the development of alternatives.

Table 2-2
Location-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
State	Waterfront Development Upland Waterfront Permit (N.J.SA 12:5-3)	Applicable	This requirement establishes the need for permitting when constructing or developing in coastal area between mean high tide. Waterfront development activities include, but are not limited to, the construction or addition of docks, wharves, piers, bridges, pipelines, dolphins, permanent buildings, and removal or deposition of subaqueous materials (dredging or	This requirement will be considered during the development of alternatives.
Wetlands and Flood Plains Standards and Regulations				
Federal	Statement on Procedures on Floodplain Management and Wetlands protection (40 CFR 6 Appendix A)	Applicable	This Statement of Procedures sets forth Agency policy and guidance for carrying out the provisions of Executive Orders 11988 and 11990.	Alternatives will take into consideration for floodplain management and wetland protection.
Federal (Non-Regulatory)	Floodplain Management (EO 11988)	Applicable	Federal agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial values of floodplains.	The potential effects of any action will be evaluated to ensure that the planning and decision making reflect consideration of flood hazards and floodplains management, including restoration and preservation of natural undeveloped floodplains.
Federal	Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-12, 1985)	To Be Considered	Superfund actions must meet the substantive requirements of E.O. 11988, E.O. 11990, and 40 CFR part 6, Appendix A.	Alternatives will take into consideration floodplain management and wetland protection.

Table 2-2
Location-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Federal (Non-Regulatory)	Wetlands Executive Order (EO 11990)	Applicable	Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance natural and beneficial values of wetlands.	Remedial alternatives that involve construction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision making of remedial alternatives.
Federal	National Environmental Policy Act (NEPA) (42 USC 4321; 40 CFR 1500 to 1508)	To Be Considered	This requirement sets forth EPA policy for carrying out the provisions of the Wetlands Executive Order (EO 11990) and Floodplain Executive Order (EO 11988).	This requirement will be considered during the development of alternatives.
Federal	Clean Water Act (CWA) Section 404 (40 CFR parts 230 to 233)	Applicable	Under this requirement, no activity that adversely affects a wetland is permitted if a practicable alternative that does not affect wetlands is available. If no other practicable alternative exists, impacts on wetlands must be mitigated.	The effects on wetlands will be evaluated during the identification, screening, and evaluation of alternatives. Permits may be required for some alternatives.
State	Freshwater Wetland Protection Act (N.J.A.C. 7:7A, N.J.S.A.13:98-1)	Applicable	This act establishes permitting requirements for regulated activity disturbing wetlands.	This requirement will be considered during the screening, evaluation and development of alternatives.
State	Wetlands Permit (N.J.SA 13:9A-1)	Applicable	This act restricts work type and mitigative measures necessary within a wetland.	This requirement will be considered during the screening, evaluation and development of alternatives.
State	Flood Hazard Control Act (N.JAC.7:13)	Applicable	This act establishes state standards for activities within floodplains.	This requirement will be considered during the development of alternatives.
State	Flood Control Facilities Act (N.J.S.A 58:16A-50 et seq.; N.J.A.C. 7:8-3.15)	Applicable	This requirement sets standards to construct, operate, or acquire a flood control device.	This requirement will be considered during the development of alternatives.

Table 2-2
Location-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Wildlife Habitat Protection Standards and Regulations				
Federal	Endangered Species Act (16 USC 1531 et seq.; 40 CFR 400)	Applicable	This requirement establishes standards for the protection of threatened and endangered species.	This requirement will be considered during the development of alternatives.
Federal	Fish and Wildlife Conservation Act (16 USC 2901 et seq.)	To Be Considered	This act protects and conserves nongame fish and wildlife.	This requirement will be considered during the development of alternatives.
Federal	Fish and Wildlife Coordination Act (16 USC 661)	To Be Considered	This act maintain and coordinate wildlife conservation.	This requirement will be considered during the development of alternatives.
Federal	Migrator Bird Treat Act (MBTA, 1 U.S.C. 03 *et seq* .)	Applicable	The selected remedial action(s) must be carried out in a manner that avoids the taking or killing of protected migratory bird species, including individual birds or their nests or eggs.	This requirement will be considered during the development of alternatives.
Federal	Magnuson-Stevens Fishery Conservation and Management Act	Applicable	Raritan Bay is a designated Essential Fish Habitat (EFH) for one or more species, which may require an EFH assessment.	If there are no substantial impacts to EFH from any future proposed remedy, the site contractor may only need to complete and submit an EFH worksheet. However, if there are potential significant impacts to the EFH from project activities, the site contractor will have to prepare an EFH assessment.

Table 2-2
Location-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
State	New Jersey Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A-1 - 15)	Applicable	This act protects and conserves endangered and nongame species.	No threatened or endangered species were observed onsite during site ecological reconnaissance.
State	New Jersey Endangered Plant Species List Act (N.J.A.C. 7:5B)	Applicable	This act protects endangered plant species.	The effects on endangered plant species will be evaluated during the identification, screening, and evaluation of alternatives.
Cultural Resources, Historic Preservation Standards and Regulations				
Federal	National Historic Preservation Act (40 CFR 6.301)	Applicable	This requirement establishes procedures to provide for preservation of historical and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	The effects on historical and archeological data will be evaluated during the identification, screening, and evaluation of alternatives.

Table 2-3
Action-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Principal Threat Waste			
A Guide to Principal Threat and Low Level Threat Wastes (OSWER 9380.3-06FS)	To be Considered	This guidance outlines considerations for Sites that involve significant amount of hazardous wastes that act as source of contamination for other media such as surface water and groundwater	The guidance recommends treatment of principal threat wastes. However, since treatment may not be entirely effective at the Site, any source material at the Site will be removed from existing locations.
General Site Remediation			
National Contingency Plan (40 CFR300, Subpart E)	Applicable	This regulation outlines procedures for remedial actions and for planning and implementing off-site removal actions	This standard will be applied to any investigative, planning or other remediation activities performed at the site.
OSHA Recording and Reporting Occupational Injuries and Illnesses (29 CFR 1904)	Applicable	This regulation outlines the record keeping and reporting requirements for an employer under OSHA.	These regulations apply to the companies contracted to implement the remedy. All applicable requirements will be met.
OSHA Occupational Safety and Health Standards (29 CFR 1910)	Applicable	These regulations specify an 8-hour time-weighted average concentration for worker exposure to various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below the 8-hour time-weighted average at these specified concentrations.
OSHA Safety and Health Regulations for Construction (29 CFR 1926)	Applicable	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on site, and appropriate procedures will be followed during remediation activities.
RCRA Identification and Listing of Hazardous Wastes (40 CFR 261)	Applicable	This regulation describes methods for identifying hazardous wastes and lists known hazardous wastes.	This regulation is applicable to the identification of hazardous wastes that are generated, treated, stored, or disposed during remedial activities.
RCRA Standards Applicable to Generators of Hazardous Wastes (40 CFR 262)	Applicable	Describes standards applicable to generators of hazardous wastes.	Standards will be followed if any hazardous wastes are generated onsite.
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – General Facility Standards (40 CFR 264.10–264.19)	Relevant and Appropriate	This regulation lists general facility requirements including general waste analysis, security measures, inspections, and training requirements.	Facility will be designed, constructed, and operated in accordance with this requirement. All workers will be properly trained.
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Preparedness and Prevention (40 CFR 264.30–264.37)	Relevant and Appropriate	This regulation outlines the requirements for safety equipment and spill control.	Safety and communication equipment will be installed at the site. Local authorities will be familiarized with the site.

Table 2-3
Action-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Contingency Plan and Emergency Procedures (40 CFR 264.50–264.56)	Relevant and Appropriate	This regulation outlines the requirements for emergency procedures to be used following explosions, fires, etc.	Emergency Procedure Plans will be developed and implemented during remedial action. Copies of the plans will be kept on site.
New Jersey Technical Requirements for Site Remediation (N.J.A.C. 7:26E)	Applicable	This regulation provides the minimal technical requirements to investigate and remediate contamination at the site.	The regulation will be applied to any hazardous waste operation during remediation of the site.
New Jersey Uniform Construction Code (N.J.A.C. 5:23)	Applicable	This code provides the requirement for construction performed during remediation of the site.	This code will be applied to any construction performed during remediation of the site.
New Jersey Hazardous Waste Regulations - Identification and Listing of Hazardous Waste (N.J.A.C. 7:26G-5)	Applicable	This regulation describes methods for identifying hazardous wastes and lists known hazardous wastes.	This regulation will be applicable to the identification of hazardous wastes that are generated, treated, stored, or disposed during remedial activities.
New Jersey Soil Erosion and Sediment Control Act (N.J.A.C. 2:90)	Applicable	This act outlines the requirements for soil erosion and sediment control measures.	This act will be considered during the development of alternatives.
Freehold Soil Conservation District Soil Erosion and Sediment Control (SESC) Plan Certification	Applicable	A SESC plan certificaton is required by the local soil conservation office for any project that disturbs more than 5,000 square feet of surface area of land.	The requirement will be considered during the development of the alternatives.
New Jersey Bureau of Water Allocation Temporary Dewatering Permit equivalency (N.J.A.C. 7:19)	Applicable	A temporary dewatering permit for containment cell construction will be required for the withdrawal of ground and/or surface water in excess of 100,000 gallons of water per day for a period of more than 30 days in a consecutive 365 day period, for purposes other than agriculture, aquaculture or horticulture. For dewatering in excess of 100,000 gallons of water per day, the project owner must obtain a Temporary Dewatering Allocation Permit, or Dewatering Permit-by-Rule or Short Term Permit-by-Rule depending on the duration of construction and the method employed.	The requirement will be considered during the development of the alternatives.
New Jersey Noise Control (N.J.A.C. 7:29)	Applicable	This standard provides the requirement for noise control.	This standard will be applied to any remediation activities performed at the site.
Waste Transportation			
Department of Transportation (DOT) Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171, 172, 177 to 179)	Applicable	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting hazardous materials.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.

Table 2-3
Action-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
RCRA Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)	Applicable	Establishes standards for hazardous waste transporters.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.
New Jersey Transportation of Hazardous Materials (N.J.A.C. 16:49)	Applicable	Establishes record keeping requirements and standards related to the manifest system for hazardous wastes.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.
Waste Disposal			
RCRA Land Disposal Restrictions (40 CFR 268)	Applicable	This regulation identifies hazardous wastes restricted for land disposal and provides treatment standards for land disposal.	Hazardous wastes will be treated to meet disposal requirements.
RCRA Hazardous Waste Permit Program (40 CFR 270)	Applicable	This regulation establishes provisions covering basic EPA permitting requirements.	All permitting requirements of EPA must be complied with.
Area of Contamination (55FR 8758-8760, March 8, 1990	Applicable	These regulations establish rules for conslidation of contiguous waste within an Area of Concern.	Hazardous wastes may be consolidated and contained within a specific area based on these rules.
Corrective Action Management Units (Subpart S of 40 CFR 264.552)	Applicable	These regulations provide exceptions to LDR requirements and establish rules for consolidation and treatmetn of noncontiguous waste within the Site.	Hazardous wastes that are noncontiguous may be consolidated and contained within the same area at a different location.
New Jersey Land Disposal Restrictions (N.J.A.C. 7:26G-11)	Applicable	These regulations provide exceptions to LDR requirements and establish rules for consolidation of non-contiguous waste from one area to another area within the Site.	Hazardous wastes in one area of the Site may be consolidated in a different portion of the Site.
New Jersey Hazardous Waste (N.J.A.C. 7:26C)	Applicable	These regulations establish rules for the operation of hazardous waste facilities in the state of New Jersey.	All remedial activities must adhere to these regulations while handling hazardous waste during remedial operations.
Water Discharge or Subsurface Injection			
National Pollutant Discharge Elimination System (NPDES) (40 CFR 100 et seq.)	Relevant and Appropriate	NPDES permit requirements for point source discharges must be met, including the NPDES Best Management Practice Program. These regulations include, but are not limited to, requirements for compliance with water quality standards, a discharge monitoring system, and records maintenance.	Project will meet NPDES permit requirements for point source discharges.
Effluent Guidelines and Standards for the Point Source Category (40 CFR 414)	Applicable	These regulations establish effluent limitations on direct discharge and indirect discharge point sources.	Project will meet the standards for the point source category.

Table 2-3
Action-specific ARARs, Criteria, and Guidance
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Ambient Water Quality Criteria (40 CFR 131.36)	Applicable	Establishes toxics criteria for those states not complying with Clean Water Act section 303(c)(2)(B)	The criteria will be considered during the evaluation of discharge practices during any remedial action.
Clean Water Act (CWA) Section 404 (40CFR Parts 230-233)	Applicable	This requirement restricts discharge of dredged or fill material to wetlands or waters of the United States. Provides permitting program for situations with no other practical altemative. Additionally, when remediating the jetty and seawall, an engineering analysis will be needed before the USACE will grant a permit.	This requirement will be considered during the development of alternatives.
The New Jersey Pollutant Discharge Elimination System (N.J.A.C. 7:14A)	Applicable	This permit governs the discharge of any wastes into or adjacent to State waters that may alter the physical, chemical, or biological properties of State waters, except as authorized pursuant to a NPDES or State permit.	Project will meet NPDES permit requirements for surface discharges or groundwater discharge such as injection of reagent for in situ treatment.
Off-Gas Management			
Clean Air Act (CAA)—National Ambient Air Quality Standards (NAAQs) (40 CFR 50)	Applicable	These provide air quality standards for particulate matter, lead, NO_2, SO_2, CO, and volatile organic matter.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these standards.
Standards of Performance for New Stationary Sources (40 CFR 60)	Applicable	Set the general requirements for air quality.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these
National Emission Standards for Hazardous Air Pollutants (40 CFR 61)	Applicable	These provide air quality standards for hazardous air pollutants.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these
New Jersey Air Pollution Control Act (N.J.A.C. 7:27)	Applicable	Describes requirements and procedures for obtaining air permits and certificates; rules that govern the emission of contaminants into the ambient atmosphere.	Air-stripper emission from groundwater remediation activity is considered trivial activity and does not require application for an air permit.
New Jersey Ambient Air Quality Standards (N.J.A.C. 7:27-13)	Applicable	This standard provides the requirement for ambient air quality control.	This standard will be applied to any remediation activities performed at the site.

Table 2-4a
Proposed Preliminary Remediation Goals (PRGs) for Soil
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Chemical Name	NJDEP Residential Direct Contact Soil Remediation Standard (NJRDCSRS)[a]	NJDEP Non-Residential Direct Contact Soil Remediation Standard (NJNRDCSRS)[b]	NJDEP Default Impact to Groundwater Soil Remediation Standard (NJIGWSRS)[c]	Site-Specific Soil Background 95% UPL[d]	HHRA-based PRGs[e] (Cancer risk = $1x10^{-6}$ or HI = 1)	Ecological Risk-Based PRGs [f]	Proposed PRGs	Remarks for PRG Selection	Maximum detected soil concentrations at the site[g]
All units in mg/kg									
Arsenic	19 *	19 *	19 *	3.1	3.3 c	NC [(h)]	19	State-wide chemical-specific ARAR, within EPA's acceptable risk range	2,470 J
Lead	400	800	59	5.7	400	126	126	Ecological risk-based number	198,000

Notes:

[a] NJDEP 2009. Residential Direct Contact Soil Remediation Standards (Last Revised 11/2009); http://www.nj.gov/dep/srp/regs/rs/, downloaded January 24, 2011

[b] NJDEP 2009. Non-Residential Direct Contact and Soil Remediation Standards (Last Revised 11/2009); http://www.nj.gov/dep/srp/regs/rs/, downloaded January 24, 2011

[c] NJDEP 2008. Guidance Document, Development of Site-Specific Impact to Groundwater Soil Remediation Standards Using the Soil-Water Partition Equation (Revised December 2008); http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm, downloaded January 24, 2011

[d] Site specific soil background consisted of 25 surface (<24 inches bgs) soil samples. 95% Upper Prediction Limit (UPL) for the background soil concentrations; 95% UPL is calculated using ProUCL version 4.01.00.

[e] For chemicals other than lead, the PRG for human health is based on a carcinogenic risk of 1×10^{-6} or a non cancer hazard index (HI) of 1 for the most sensitive human receptor, whichever is lower or applicable. For lead, the PRG is based on OSWER screening level for residential soil. It was developed from a CDC recommendation based on no more than 10% of the population should have a blood lead level greater than 10 ug/dl, as predicted from the IEUBK model.

[f] Ecological risk based PRGs consist of the lowest concentration of lead which produced a lowest-observed-adverse-effect-level (LOAEL)- based hazard quotient of 1 in the most sensitive receptor evaluated in the food chain exposure models using literature-based soil-to-food item bioaccumulation factors.

[g] J values indicate that the concentration is estimated

[h] Ecological risk-based PRG for arsenic was not developed as no risks from exposure to arsenic were noted based on food chain exposure models.

* Based on natural background levels as noted in NJDEP standards

mg/kg - milligrams per kilogram
HHRA - Human Health Risk Assessment
OSWER - Office of Solid Waste and Emergency Response
nc - non cancer health hazard for HI = 1
c - carcinogenic risk of $1x10^{-6}$
IEUBK - Integrated Exposure Uptake Biokinetic Model

Table 2-4b
Proposed Preliminary Remediation Goals (PRGs) for Sediment
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Chemical Name	HHRA-based PRGs[a]	Ecological Risk-Based PRGs [b]	Site-Specific Sediment Background 95% UPL[c]	Proposed PRGs	Remarks for PRG Selection	Maximum detected sediment concentrations at the site
All units in mg/kg						
Arsenic	0.81 c	NC [(d)]	15	15	Site-specific background value	88.9
Lead	400	401	20.5	400	Human health risk based number	564

Notes:

[a] For chemicals other than lead, the PRG for human health is based on a carcinogenic risk of 1×10^{-6} or a non cancer hazard index (HI) of 1 for the most sensitive human receptor, whichever is lower or applicable. For lead, the PRG is based on OSWER screening level for residential soil. It was developed from a CDC recommendation based on no more than 10% of the population should have a blood lead level greater than 10 ug/dl, as predicted from the IEUBK model.

[b] Ecological risk based PRGs consist of the lowest concentration of lead which produced a lowest-observed-adverse-effect-level (LOAEL)- based hazard quotient of 1 in the most sensitive receptor evaluated in the food chain exposure models using site-specific sediment-to-food item bioaccumulation factors.

[c] Site specific sediment background consists of 33 sediment samples. 95% Upper Prediction Limit (UPL) for the background sediment concentrations; 95% UPL is calculated using ProUCL version 4.01.00.

[d] Ecological risk-based PRG for arsenic was not developed as no risks from exposure to arsenic were noted based on food chain exposure models.

mg/kg - milligrams per kilogram
HHRA - Human Health Risk Assessment
OSWER - Office of Solid Waste and Emergency Response
nc - non cancer health hazard for HI = 1
c - carcinogenic risk of 1×10^{-6}
IEUBK - Integrated Exposure Uptake Biokinetic Model

Table 2-4c
Proposed Unified Preliminary Remediation Goals (PRGs) for Soil and Sediment
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Chemical Name	Proposed Site-wide Soil PRGs [a]	Proposed Site-wide Sediment PRGs [b]	Proposed Unified PRGs - Soil and Sediment	Remarks for PRG Selection
All units in mg/kg				
Arsenic	19	15	15	Site-specific background value
Lead	126	400	400	Human health risk based number

Notes:

[a] Arsenic PRG is derived from ARAR. Lead PRG is derived via American robin food chain exposure model using literature-based soil-to-earthworm BAFs.

[b] Arsenic PRG is derived from background. Lead PRG is based on OSWER screening level for residential soil.

mg/kg - milligrams per kilogram
MC - Margaret's Creek

Table 2-5
Summary of Volume Estimates with Arsenic = 15 mg/kg and Lead = 400 mg/kg
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

	Source Materials Volume	Source Materials Weight	Soil Volume, CY			Soil Weight	Sediment volume, CY			Sediment Wt.	Total Volume	Total Weight
	Cubic Yards	Ton	Surface	Subsurface	Total	Ton	Surface	Subsurface	Total	Ton	Cubic Yards	Ton
Jetty Sector												
Area 7	-	-	-	-	-	-	9,694	527	10,221	17,376	10,221	17,376
Area 8	4,994	21,474	2,935	828	3,763	5,645	13,169	15,796	28,965	49,241	37,722	76,359
Area 11	-	-	-	2,146	2,146	3,219	15,330	1,516	16,846	28,638	18,992	31,857
Total	5,000	21,500	3,000	3,000	6,000	8,900	38,200	17,800	56,000	95,300	66,900	125,600
Seawall Sector												
Area 1	5,295	22,769	11,131	1,736	12,867	19,301	30,105	381	30,486	51,826	48,648	93,895
Area 2	59	254	3,085	12,850	15,935	23,903	3,793	347	4,140	7,038	20,134	31,194
Area 3	-	-	354	-	354	531	-	-	-	-	354	531
Area 4	-	-	-	653	653	980	-	-	-	-	653	980
Area 5	9	39	3,646	-	3,646	5,469	2,734	-	2,734	4,648	6,389	10,156
Area 6	-	-	534	-	534	801	346	-	346	588	880	1,389
Total	5,400	23,100	18,800	15,200	34,000	51,000	37,000	700	37,700	64,100	77,100	138,100
Margaret's Creek Sector												
Area 9	711	3,100	15,042	2,826	17,900	26,900	92,522	3,052	95,600	162,500	114,200	192,500
Total All Sectors*	**11,100**	**48,000**	**37,000**	**21,000**	**58,000**	**87,000**	**168,000**	**22,000**	**190,000**	**322,000**	**259,000**	**457,000**

CY - Cubic Yards
* - Total volumes for source materials are rounded to the nearest hundred CY and the total volumes for soil and sediment are rounded to the nearest thousand CY

Table 2-6
Screening of Technologies
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

General Response Action	Remedial Technology	Process Option	Description of Response Action	Technical Implementability	Applicable Media	Retained?
No Action	None	No Action	No action would be implemented. The source slag material and associated wastes will remain in their existing condition along with the contaminated soil, sediment, surface water and groundwater. The No Action alternative may include environmental monitoring to track contamination.	Retained (required by National Contingency Plan [NCP] as stand-alone alternative).	All media	Yes. Retained per NCP.
Institutional/ Engineering Controls	Land Use Restrictions	Government and Proprietary Controls	This process includes restriction of future site construction, well drilling activities and any other activities that will result in the disturbance of the soils at the Site.	Technically implementable and potentially applicable.	Soil, Sediment	Yes
	Groundwater Use Controls	Government and Proprietary Controls	Groundwater use restrictions would inhibit use of groundwater in contaminated areas. Groundwater use in contaminated areas is expected to be limited due to high salinity of the groundwater. However, it is a consideration as the some areas are listed as source of potable water.	Technically implementable and potentially applicable.	Groundwater	Yes
	Recreational Use Restrictions	Fencing and Signage	Fencing would limit access to contaminated areas and warning signs will be posted that the fish caught in the waters near the site are contaminated with lead and arsenic.	Technically implementable and potentially applicable.	All media	Yes
	Community Awareness	Information and Education Programs	Community information and education programs would be undertaken to enhance awareness of potential hazards and remedies at the site.	Technically implementable and potentially applicable.	All media	Yes
	Alternate Drinking Water Source	Public Water Supply	Provide hook ups to city potable water system.	Technically implementable and potentially applicable. However, all upland areas near the site that could potentially use impacted groundwater are already connected with public water supply. Also, the groundwater use near the site is unlikely due to high salinity. Hence, this process option is deemed unnecessary and redundant as long as groundwater use controls are implemented.	Groundwater	No
		Bottled Water	Provide alternative drinking water supply (bottled water)	Technically implementable and potentially applicable. However, this option is also deemed unnecessary due to existing public water supply.	Groundwater	No
Monitoring	Sampling and Analysis	Long-Term Groundwater and Surface Water Monitoring	Periodic environmental monitoring to determine extent of contamination. This process option is applicable to groundwater and surface water.	Technically implementable and potentially applicable.	Groundwater and Surface Water	Yes
	Site Inspection	Five-Year Site Review	Five-Year Reviews are generally required by CERCLA or program policy when hazardous substances remain on Site above levels which permit unrestricted use and unlimited exposure.	Retained per CERCLA.	All media	Yes. Retained per CERCLA.
Monitored Natural Attenuation/ Monitored Natural Recovery	Monitored Natural Attenuation	Monitored Natural Attenuation	Reliance on natural destructive (chemical reactions) and nondestructive mechanisms (dilution, dispersion, volatilization, and adsorption) to reduce contaminant levels in the context of a long term monitoring program. Under favorable conditions, these physical, chemical, or biological processes act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in the groundwater and surface water.	Technically implementable and potentially applicable in certain areas at the site for groundwater and surface water.	Groundwater and Surface water	Yes
	Monitored Natural Recovery	Monitored Natural Recovery	Reliance on natural burial of clean sediment on top of contaminated sediment, thus providing a barrier from exposure to contamination. A monitored natural recovery (MNR) alternative will need to demonstrate that the risk of existing contamination is being reduced over time by natural burial through sedimentation.	Technically implementable and potentially applicable pending additional evaluation for individual areas.	Sediment	Yes
	Monitored Natural Recovery	Enhanced Monitored Natural Recovery	Enhancing the natural recovery processes for the sediment by measures such as 1) burial with clean fill and 2) construction of structures that promote drainage patterns that induce deposition in preferred areas.	Technically implementable and potentially applicable pending additional evaluation for individual areas.	Sediment	Yes

Table 2-6
Screening of Technologies
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

General Response Action	Remedial Technology	Process Option	Description of Response Action	Technical Implementability	Applicable Media	Retained?
Containment	Barriers	Engineered Containment Structure (Surface and/or subsurface)	Engineered structure within the Site inside which all contaminated material will be placed to isolate and contain the materials. This structure will be constructed with bottom liners, sidewalls and low-permeable cover on top to prevent direct contact with the contamination as well as to prevent any leaching of contamination into the groundwater.	Technically implementable and potentially applicable.	Slag, soil and sediment	Yes
		Standard Capping	An engineered subaqueous covering will be installed over the sediment that isolates all contamination and reduces risks to ecological receptors from the COCs. This covering needs to be augmented with armoring to withstand erosive forces on habitat layers to encourage benthic recolonization.	Technically implementable and potentially applicable.	Sediment	Yes
		Reactive Capping	In addition to all the features of a standard cap, reactive cap contains a layer of chemical that detoxifies any contamination that may seep through the cap.	Technically implementable and potentially applicable.	Sediment	Yes
Removal	Excavation	Excavation	Removal of slag, battery casings and associated wastes and contaminated soil using standard earthworking equipment. Removal of boulder-sized slag material may require additional use of specialized equipment or on-site crushing prior to removal.	Technically implementable and potentially applicable.	Slag, battery casing and associated wastes and soil	Yes
	Dredging	Mechanical	Use of mechanical equipment such as clam-shell bucket to remove the sediment	Technically implementable and potentially applicable.	Sediment	Yes
		Hydraulic	Use of centrifugal or other types of pumps to remove and transport sediment	Technically implementable and potentially applicable.	Sediment	Yes
	Dewatering	Filter press	Use of the aforementioned process options to remove excess water from the sediment. Dewatering is not a primary technology that achives RAOs. It is an ancillary technology to facilitate material handling during dredging.	Technically implementable and potentially applicable.	Sediment	Yes
		Decantation		Technically implementable and potentially applicable.	Sediment	Yes
		Drying agent such as fly ash		Technically implementable and potentially applicable.	Sediment	Yes
Treatment	Ex-Situ Chemical Treatment	Stabilization and/or Solidification	The contaminated material is removed from its original location and added with phosphate-based reagents that stabilize the metals contamination. The stabilized material may then added with portland cement or equivalent material that solidifies the material, thus rendering it immobile and impermeable. The inert mixture is then either placed back at the original location, moved to another area of the Site or disposed of offsite.	Technically implementable and potentially applicable	Slag, soil and sediment	Yes
	In-Situ Chemical Treatment	Stabilization and/or Solidification	This option is the similar in concept to ex-situ method described above but the mixing of stabilization reagents and solidifying agents are performed in-situ. Special tools for mixing may be required in order to accomplish in-situ mixing. This option must take into consideration the potential for zones with insufficient mixing.	Technically implementable and potentially applicable.	Slag, battery casing, soil and sediment	Yes
Disposal	Disposal	Offsite disposal of Hazardous Wastes	The contaminated soils, sediment and other solid wastes at the Site that are hazardous will be disposed of at an approved offsite facility such as a landfill.	Technically implementable and potentially applicablebut would have to be combined with removal options.	Slag, battery casing and associated wastes, soil, sediment	Yes
		Offsite Disposal of Non-hazardous Waste	Non-hazardous wastes from the Site will be disposed of at an approved offsite facility.	Technically implementable and potentially applicable but would have to be combined with removal options.	Slag, battery casing and associated wastes, soil, sediment	Yes

Notes: denotes that this process option has been excluded from further consideration based on issues related to technical implementability.

Table 2-7
Evaluation of Technologies
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

General Response Action	Remedial Technology	Process Option	Description of Response Action	Effectiveness	Implementability	Relative Cost[a]	Applicable Media	Retained?
No Action	None	No Action	No action would be implemented. The source slag material and associated wastes will remain in their existing condition along with the contaminated soil, sediment, surface water and groundwater. The No Action alternative may include environmental monitoring to track contamination.	Ineffective. No Action alternative retained as baseline for comparison with other alternatives as required by NCP.	Implementable. No significant administrative difficulties anticipated.	No capital, operation, or maintenance costs. Would require some long- term costs for periodic reassessment.	All media	Retained as a baseline per the NCP
Institutional Controls	Land Use Controls	Government and Proprietary Controls	This process includes restriction of future site construction, well drilling activities and any other activities that will result in the disturbance of the soil at the Site. These measures include deed restrictions for properties in Site areas.	May be effective from a human health standpoint through restriction of future site uses or activities which may result in direct contact with contamination. These activities, however, will not reduce the migration and the associated environmental impact of the contamination.	Implementation may require enforcement of administrative measures by the townships of Old Bridge and Sayreville. No significant difficulties are anticipated with land use controls at most parts of the site but may have difficulties implementing the controls at the beach areas.	Implementation cost is low. Some administrative cost would be required.	Soil and sediment	Retained
	Groundwater Use Controls	Government and Proprietary Controls	Groundwater use restrictions would inhibit use of groundwater in the zone of contamination. Groundwater at the Site is saline, hence significant use is not expected. Primary reason for inclusion of this measure is that the Site groundwater is listed as potable and hence is a potential future source for potable water.	Unlikely to have any effect on current exposure. However, these restrictions will prevent any potential future exposure of human receptors to contamination from groundwater use. Will not alter the extent or magnitude of contamination.	Implementation requires administrative measures by the townships of Old Bridge and Sayreville similar to land use controls restrictions.	Implementation cost is low.	Groundwater	Retained
	Recreational Use Restrictions	Fencing and Signage	Fencing would limit access to contaminated areas and warning signs will be posted that the fish caught in the waters near the site are contaminated.	Likely to significantly reduce exposure of human receptors to contamination. However, the effect of this measure on ecological receptors may be insignificant.	Implementable.	Low capital and O&M costs.	All media	Retained
	Community Awareness	Information and Education Programs	Community information and education programs would be undertaken to enhance awareness of potential hazards and remedies.	Educational programs may protect human health by creating awareness and may enhance the benefits of other restrictions or proprietary controls.	Implementable.	Medium capital costs. Maintenance costs depend on duration of educational programs.	All media	Retained
Monitoring	Sampling and Analysis	Long-Term Monitoring	Periodic environmental monitoring to determine extent of contamination. LTM may include sampling of soil, sediment, biota, groundwater and surface water.	Long-term monitoring alone would not alter the effects of the contamination on human health and the environment. Monitoring is a proven and reliable process for tracking the migration of contaminants during and following treatment. It is also helpful in assessing the effectiveness of active remedial measures.	Easily implementable. A long-term commitment would be required to implement a long-term monitoring program.	Low capital costs. Medium operation and maintenance costs. Some long-term costs for periodic reassessment.	Groundwater and Surface Water	Retained
	Site Inspection	Five-Year Site Review	Five-Year Reviews are generally required by CERCLA or program policy when hazardous substances remain on site above levels which permit unrestricted use and unlimited exposure.	Effective for long-term success.	Easily implementable. Required per CERCLA.	Medium capital cost.	All media	Retained
Monitored Natural Attenuation (MNA)/ Monitored Natural Recovery (MNR)	Monitored Natural Attenuation	Monitored Natural Attenuation	This process relies on on natural destructive (chemical reactions) and nondestructive mechanisms (dilution, dispersion, volatilization, and adsorption) to reduce contaminant levels in the context of a long term monitoring program	Effectiveness of MNA depends highly on the ability to effectively remove source materials and the ability of COCs to immobilize. Unlikely to be effective in the immediate future, additional evaluation is required to determine long-term effectiveness.	Easily implementable. Multiple lines of evidence required to sufficiently demonstrate recovery.	Low capital costs. Medium O&M costs for long-term monitoring, and periodic reassessment costs.	Groundwater and Surface Water	Not retained
	Monitored Natural Recovery	Monitored Natural Recovery	This option is applicable only to wetland areas of Margaret's Creek (Area 9). Reliance on natural burial of clean sediment on top of contaminated sediment, thus providing a barrier from exposure to contamination. A monitored natural recovery (MNR) alternative will need to demonstrate that the risk of existing contamination is being reduced over time by natural burial through sedimentation.	May be effective; however, the risks are not completely eliminated and may even increase depending on the magnitude of storm surges.	Easily implementable. Multiple lines of evidence required to sufficiently demonstrate recovery.	Low capital costs. Medium O&M costs for long-term monitoring, and periodic reassessment costs.	Sediment	Retained - additional evaluation required for each area.
		Enhanced Monitored Natural Recovery	If evidence suggests that natural burial is insufficient to prevent sediment recovery, then burial can be enhanced through additional measures such as spreading a clean layer of material over contaminated sediment or installation of engineered structures in order to promote rapid sedimentation and burial.	Likely to be more effective than the option without enhancement. However, risks are not completely eliminated.	Implementable - the degree of difficulty in implementation is higher than the MNR process option.	Low to medium capital costs. Medium O&M costs for long-term monitoring, and periodic reassessment costs.	Sediment	Retained - additional evaluation required for each area.
Containment	Barriers	Engineered Containment Structure	Engineered structure within the Site inside which all contaminated material will be placed to isolate and contain the impacts. This structure will be constructed with bottom liners, sidewalls and low-permeable cover on top and prevent direct contact of receptors with the contamination as well as prevent any leaching of contamination into the groundwater.	Likely to be effective. The structure may be located in either the seawall area or upland within the Margaret's Creek sector. Long-term maintenance of the structure and monitoring in the vicinity of the structure is required to ensure effectiveness.	Implementable with medium degree of difficulty.	Medium to high capital costs and low to medium O & M costs. Less capital costs compared to offsite disposal.	Slag, soil and sediment	Retained

Table 2-7
Evaluation of Technologies
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

General Response Action	Remedial Technology	Process Option	Description of Response Action	Effectiveness	Implementability	Relative Cost[a]	Applicable Media	Retained?
Containment	Barriers	Standard Capping	An engineered subaqueous covering will be installed over the sediment that isolates all contamination and reduces risks to ecological receptors from the COCs.This covering needs to be augmented with armoring to withstand erosive forces on habitat layers to encourage benthic recolonization.	Likely to be effective in select areas. Additional area-specific evaluation will be performed to determine effectiveness.	Easier to implement than the other process options for sediment that involve removal.	Medium capital costs and low to medium O & M costs.	Sediment	Retained
	Barriers	Reactive Capping	In addition to all the features of a standard cap, reactive cap contains a layer of chemical that detoxifies any contamination that may seep through the cap.	Likely to be effective in select areas. Additional area-specific evaluation will be performed to determine effectiveness.	Easier to implement than the other process options for sediment that involve removal.	Medium capital costs and low to medium O & M costs.	Sediment	Retained
Removal	Excavation	Excavation	Excavation technologies use standard earthwork equipment to excavate contaminated soil for consolidation, treatment, and/or disposal. Additional specialized equipment may be required in order to implement the removal of boulder-size slag material at the Site.	Highly effective.	Technically implementable. Necessary equipment and materials are readily available. Medium to high degree of difficulty expected. Logistical difficulties are expected with respect to excavation, handling and processing of boulder-size slag material. Additional implementation issues are expected in the removal of slag from the jetty sector.	High capital costs. No O & M costs.	Slag, battery casings and associated wastes and soil	Retained
	Dredging	Mechanical	Use of mechanical equipment such as clam-shell bucket to remove the sediment.Similar to excavation but performed in the intertidal zone or in the bay. Logistically more challenging because of conditions in the bay and due to difficulty in handling the dredged material.	Effective in the removal of contaminated sediment. However, the operations can adversely affect the benthic organisms.	Technically implementable. Additional health and safety measures are required compared to excavation. Medium to high degree of difficulty expected. Handling of the dredged sediment is expected to be challenging compared to soil.	High capital costs and no O & M costs.	Sediment	Retained
		Hydraulic	Use of centrifugal or other types of pumps to remove and transport sediment.	Effective in the removal of contaminated sediment. However, the operations can adversely affect the benthic organisms.	May not be implementable in most bay areas due to the high amount of space is required for liquid waste management.	High capital costs and no O & M costs.	Sediment	Not retained
	Dewatering	Mechanical filtration	Use of the aforementioned process options to remove excess water from the sediment. Dewatering is not a primary technology that achives RAOs. It is an ancillary technology to facilitate material handling after dredging.	Effective in removal of excess water from the sediment	Technically implementable.	High capital costs and no O & M costs.	Sediment	Retained
		Drying agent		Effective in removal of excess water from the sediment	Technically implementable.	Low capital costs and no O & M costs.	Sediment	Retained
		Decantation		Effective in removal of excess water from the sediment	Technically implementable.	No additional capital or O & M costs	Sediment	Retained
Treatment	Ex-Situ Chemical Treatment	Stabilization and/or Solidification	The contaminated material is removed from its original location and added with phosphate-based reagents that stabilize the metals contamination. The stabilized material is then added with portland cement or equivalent material that solidifies the material, thus rendering it immobile and impermeable. The inert mixture is then either placed back at the original location, moved to another area of the Site or disposed of offsite.	Likely to be effective.	Degree of difficulty increases as follows soil (medium) > sediment (medium to high) > slag (high).	Medium to high capital costs and low O&M costs.	Slag, soil and sediment	Retained
	In-Situ Chemical Treatment	Stabilization and/or Solidification	This option is the similar in concept to ex-situ method described above but the mixing of stabilization reagents and solidifying agents are performed in-situ. Special tools for mixing may be required in order to accomplish in-situ mixing.	Effectiveness depends on the extent of mixing. This option must take into consideration the potential for zones with insufficient mixing; any such zones in beach areas may result in high human health risks. Unlikely to be effective for slag material.	Greater degree of difficulty than with the ex-situ treatment process option. This option may not be implementable for sediment in the western jetty.	Medium to high capital costs and low O&M costs.	Soil and sediment	Retained
Disposal	Offsite Disposal	Offsite Disposal of Hazardous Wastes	The contaminated soil, sediment and other wastes generated from the Site that are hazardous will be disposed of at an approved offsite facility such as a landfill.	Highly effective.	Medium degree of difficulty.	High capital costs and no O & M costs.	Slag, soil and sediment	Retained
		Offsite Disposal of Non-hazardous Wastes	Non-hazardous wastes from the Site will be disposed of at an approved offsite facility.	Highly effective.	Medium to high degree of difficulty.	Medium to high capital costs and no O & M costs.	Slag, soil and sediment	Retained

Notes: denotes that this process option has been excluded from further evaluauation in this FS.

Table 3-1
Screening of Alternative SED-4 - Capping
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Sector	Area	Effectiveness	Implementability	Retained for this Area?
Seawall	Area 1	Sediment treatment zones in this area are predominantly in the intertidal zone and are exposed to storms and waves. Effectiveness would be compromised by groundwater flux and erosional forces.	The seawall sector is important for recreation, and the institutional controls necessary to protect the sediment cap would not be implementable.	No
	Area 2			
	Area 5			
	Area 6			
Jetty	Area 7	Sediment treatment zones in this area are exposed to storms and waves. Effectiveness would be compromised by erosional forces.	No barriers to implementation were identified for this area.	No
	Area 8	The sediment remediation area in Area 8 is protected from the erosional forces of storms and waves by the western jetty. Assuming that a jetty structure remains in place, erosional forces will likely not be great enough to reduce effectiveness of an armored cap. Portions of the remediation area are in the intertidal zone, and the remaining portion is permanently inundated with salt water in the subtidal zone. Groundwater flux would reduce effectiveness in the intertidal zone; groundwater flux would be negligible in the subtidal zone and not reduce effectiveness. Capping would be most effective in the subtidal portions of Area 8. Ebullition would need to be considered during design of the remedy.	A cap could be constructed using a barge and crane. The materials are available, and the cap would not obstruct navigation or recreation. Institutional and engineering controls could be installed to inhibit access to the capped area. The remedy is implementable.	Yes
	Area 11	Sediment in this remediation area are predominantly in the intertidal zone and are exposed to storms and waves. Effectiveness would be compromised by groundwater flux and erosional forces.	No barriers to implementation were identified for this area.	No
Margaret's Creek	Area 9	Groundwater flux upwards is expected to be minimal in the area since the capped area is always inundated; however, the minimal groundwater flux into the cap could cause advective transport of contaminants into the cap material. Contaminants can also diffuse upwards into the cap material over time. Diffusion and advection can reduce the effectiveness of the cap over time, unless reactive media are incorporated into the cap to remove metals from the dissolved phase. The cap would need to be designed to manage ebullition.	Implementability is uncertain considering the difficulty of securing authorization to make changes to a wetland. Implementation across the entire contaminated area would require removal of existing vegetation, installation of the remedy, and restoration.	No

Table 3-2
Screening of Alternative SED-M6a - MNR
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Sector	Area	Effectiveness	Implementability	Retained?
Seawall	Area 1	Reliable natural recovery processes were not identified in the Seawall Sector	Reliable natural recovery processes were not identified in the Seawall Sector	No
	Area 2			
	Area 5			
	Area 6			
Jetty	Area 7	Tidal currents in and out of Cheesequake Creek create a dynamic mixing zone where currents shift direction regularly. A portion of the sediment load discharging from Cheesequake Creek will deposit in Area 7, and the currents will mix these cleaner sediments in with the contaminated sediments. Furthermore, the currents wil disperse the sediments further into Raritan Bay. Over time, the net concentration of contaminants in the sediments in this area will decrease due to dispersion and the mixing in of cleaner sediments from Cheesequake Creek.	No barriers to implementation were identified in this area. Implementability is not affected by the gas pipeline running through this area.	Yes
	Area 8	Reliable natural recovery processes were not identified in this area.	Reliable natural recovery processes were not identified in this area.	No
	Area 11	A westward alongshore current was identified in Area 11. This current will serve to disperse contaminated sediments further west into Rartitan Bay. The result will be a gradual reduction in contaminant concentrations in the sediments.	No barriers to implementation were identified in this area. Implementability is not affected by the gas pipeline running through this area.	Yes
Margaret's Creek	Area 9	Margaret's Creek wetlands are protected from waves and storms, and do not experience strong erosional forces. Reducing conditions and clayey and silty sediments in the wetland areas of Area 9 reduce the mobility and bioavailability of arsenic and lead; these conditions are expected to be the *status quo* in the future. Average contaminant concentrations in the top six inches have been decreasing over time due to regular deposition of cleaner sediment. The geochronology data indicate that there is active sediment deposition, and sediment is accumulating at a rate of between 0.1 and 0.3 inches per year. Groundwater flux upwards is expected to be minimal in the area since it is always inundated; however, the minimal groundwater flux could cause advective transport of contaminants upwards into the top six inches. Contaminants can also diffuse upwards over time.	No barriers to implementation were identified in this area.	Yes

Table 3-3
Screening of Alternative SED-M6b - Enhanced Monitored Natural Recovery (MNR)
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ

Sector	Area	Effectiveness	Implementability	Retained?
Seawall	Area 1	Sediment in this remediation area is predominantly in the intertidal zone and is exposed to storms and waves. Effectiveness would be compromised by groundwater flux and erosional forces.	The seawall sector is important for recreation, and the institutional controls necessary to protect the sediment cap would not be implementable.	No
	Area 2			
	Area 5			
	Area 6			
Jetty	Area 7	Sediment in this remediation area is exposed to storms and waves. Effectiveness would be compromised by erosional forces.	No barriers to implementation were identified for this area.	No
	Area 8	While the western jetty does protect the sediment remediaiton area in Area 8 to a certain extent, the protection is not great enough to ensure effectiveness of an enhanced MNR remedy (thin layer placement of sand or other clean media). Groundwater flux would reduce effectiveness in the intertidal zone; groundwater flux would be negligible in the subtidal zone and not reduce effectiveness.	No barriers to implementation were identified for this area.	No
	Area 11	Sediment in this remediation area is predominantly in the intertidal zone and is exposed to storms and waves. Effectiveness would be compromised by groundwater flux and erosional forces.	No barriers to implementation were identified for this area.	No
Margaret's Creek	Area 9	Margaret's Creek wetlands are protected from waves and storms, and do not experience strong erosional forces. Reducing conditions and clayey and silty sediments in the wetland areas of Area 9 reduce the mobility and bioavailability of arsenic and lead; these conditions are expected to be the status quo in the future. Average contaminant concentrations in the top six inches have been decreasing over time due to regular deposition of cleaner sediment. The geochronology data indicate that new sediment is accumulating in the wetland at a rate of between 0.1 and 0.3 inches per year. Groundwater flux upwards is expected to be minimal in the area since it is always inundated; however, the minimal groundwater flux could cause advective transport of contaminants upwards into the top six inches. Contaminants can also diffuse upwards over time. Diffusion and advection can reduce the effectiveness over time, unless reactive media are incorporated into the remedy to inhibit movement of the contaminants. Ebullition would increase effectiveness since it would promote mixing in of the emplaced thin layer of amended sand. Overall, site conditions indicate that enhanced MNR would be effective.	Implementability is uncertain considering the difficulty of securing authorization to make changes to a wetland. Implementation across the entire contaminated area would require removal of existing vegetation, installation of the remedy, and restoration.	No

Table 4-1
Summary of Volumes Addressed by Remedial Components of Alternatives
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

	Alternative 2				Alternative 3				Alternative 4				Alternative 5				Alternative 6			
	Source Materials		Soil/Sediment		Source Materials		Soil/Sediment		Source Materials		Soil/Sediment		Source Materials		Soil/Sediment		Source Materials		Soil/Sediment	
	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors
Volume addressed by Off-site Disposal (CY) *	5,000	6,100	62,000	185,200	5,000	6,100	44,500	89,800	-	-	44,500	89,800	-	-	28,400	8,800	-	-	38,800	8,800
Volume addressed by On-site Containment (CY) *	-	-	-	-	-	-	-	-	5,000	6,100	-	-	5,000	6,100	5,700	81,000	5,000	6,100	5,700	81,000
Volume addressed by MNR (CY) *	-	-	-	-	-	-	17,500	95,400	-	-	17,500	95,400	-	-	17,500	95,400	-	-	17,500	95,400
Volume addressed by Capping (CY) *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,400	-	-	-	-	-
Total Volume (CY) *	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200

Notes:
CY - Cubic Yards
MC - Margaret's Creek
Alternative 1 - No Action
Alternative 2 – Excavation/Dredging, Offsite Disposal, Institutional Controls And Long-Term Monitoring
Alternative 3 – Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls And Long-Term Monitoring
Alternative 4 – Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
Alternative 5 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring
Alternative 6 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
* - All volumes are rounded to the nearest hundred CY

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Summary of Components	None	■ Pre-design investigation ■ Removal of source materials, excavation of contaminated soil, dredging and dewatering of contaminated sediment ■ Post-removal inspection and sampling ■ Off-site disposal of source materials, soil and sediment ■ Site restoration ■ Wetlands Restoration and monitoring ■ Long-term monitoring ■ Institutional controls	■ Pre-design investigation ■ MNR in portions of Areas 7, 9 & 11 and long-term monitoring of MNR areas ■ Removal of source materials, excavation of contaminated soil, dredging and dewatering of contaminated sediment in remaining areas ■ Post-removal inspection and sampling ■ Off-site disposal of slag, contaminated soil and sediment ■ Site restoration ■ Long-term monitoring ■ Institutional Controls	■ Pre-design investigation ■ MNR in portions of Areas 7, 9 & 11 and long-term monitoring of MNR areas ■ Removal of source materials, excavation of contaminated soil, dredging and dewatering of contaminated sediment in remaining areas ■ Post-removal inspection and sampling ■ On-site containment of source materials within engineered cells and long term maintenance and monitoring of containment cells ■ Offsite disposal of contaminated soil and sediment ■ Site restoration ■ , Long-term monitoring ■ Institutional controls	■ Pre-design investigation ■ Capping in portions of Area 8 ■ MNR in portions of Areas 7, 9 & 11 ■ Long term monitoring of capped and MNR areas ■ Removal of source materials, excavation of contaminated soil, dredging and dewatering of contaminated sediment in remaining areas ■ Post-removal inspection and sampling ■ On-site containment up to cell capacity and long term maintenance and monitoring of containment cells ■ Off-site disposal of remainder of excavated soil and dredged sediment ■ Site Restoration ■ Long term , monitoring ■ Institutional controls	■ Pre-design investigation ■ MNR in portions of Areas 7, 9 & 11 and long-term monitoring of MNR areas ■ Removal of source materials, excavation of contaminated soil, dredging and dewatering of contaminated sediment in remaining areas ■ Post-removal inspection and sampling ■ On-site containment up to cell capacity and long term maintenance and monitoring of containment cells ■ Off-site disposal of remainder of excavated soil and dredged sediment ■ Site Restoration ■ Long term monitoring ■ Institutional controls

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Overall Protection of Human Health and the Environment	The No Action alternative would not protect human health or the environment, since no action would be taken. Contamination would remain at the Site. Human and ecological receptors would not be protected from exposure.	This alternative would provide protection of human health and the environment. Risks at the site would be eliminated or greatly reduced since the contaminated materials would be removed from the site. Confirmation sampling following the removal actions would be performed to document that contaminant concentrations are below PRGs. Short-term risks to human and aquatic habitat exist due to excavation and dredging. This alternative would achieve the RAOs.	This alternative would be protective of human health and the environment over the long term. Risks to human health due to direct contact, ingestion, and inhalation would be reduced to acceptable levels since all slag and battery casings/associated wastes, all contaminated soil and significant portions of contaminated sediment would be removed from the site. For contaminated sediment left in place in Areas 7, 9 and 11, MNR would gradually provide increasing protection of human health and the environment and achieve the RAOs. Confirmation sampling, ICs and LTM would ensure that concentrations remain below PRGs. This alternative would achieve the RAOs. Short-term risks to aquatic habitat exist due to excavation and dredging.	This alternative would be protective of human health and the environment. Risks to human health due to direct contact, ingestion, and inhalation would be reduced to acceptable levels since all source materials would be contained in the on-site containment cells, all contaminated soil and significant portions of contaminated sediment would be removed from the site. For contaminated sediment left in place in Areas 7, 9 and 11, MNR would gradually provide increasing protection of human health and the environment and achieve the RAOs. Confirmation sampling, ICs, LTM and maintenance following the removal actions would confirm that concentrations are below PRGs. Short-term risks to aquatic habitat exist due to excavation and dredging.	Removal and containment or disposal of source materials, soil, and sediment would be protective of human health and the environment. During dredging operations, risks to ecological receptors may temporarily increase due to the disruption caused to the aquatic habitat; but over time, RAOs would be achieved. Cap in Area 8 would provide protection of human health and the environment if the cap is properly maintained and the deed notice enforced. Once the source materials are removed, MNR in Areas 7, 9, and 11 would gradually provide increasing protection of human health and the environment and achieve the RAOs.	Removal and containment or disposal of source materials, soils, and sediments would be protective of human health and the environment. During dredging operations, risks to ecological receptors may temporarily increase due to the disruption caused to the aquatic habitat; but over time, RAOs would be achieved. Once the source materials are removed, MNR in Areas 7, 9, and 11 would gradually provide increasing protection of human health and the environment and achieve the RAOs.

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Compliance with ARARs	This alternative would not achieve chemical-specific ARARs since no action would be taken. Action-specific and location-specific ARARs are not applicable.	This alternative would achieve the chemical-specific ARARs, since contamination above the PRGs would be removed and disposed of offsite. This alternative would follow health and safety requirements, meet the transportation and disposal for hazardous waste criteria to meet the action-specific ARARs. In addition, this alternative would meet location-specific ARARs including coastal zone regulations, wetlands and floodplains regulations, wildlife habitat protection regulations and cultural resources and historic preservation regulations.	This alternative would meet chemical-specific ARARs by removing all source materials, all contaminated soil and significant portions of the contaminated sediment above the PRGs and disposing them in off-site landfills. For contaminated sediment left in place in Areas 7, 9 and 11, MNR would achieve compliance of chemical-specific ARARs over time. This alternative would meet the action-specific ARARs by following health and safety requirements during construction activities and by meeting the criteria for transportation and disposal for hazardous and non-hazardous waste. This alternative would meet location-specific ARARs such as wetland and coastal regulations, and RCRA AOC policy requirements.	This alternative would meet chemical-specific ARARs by removing source materials and placing them in onsite containment cells, and removing all soil and significant portion of the sediment above the PRGs for disposal in off-site landfills. For contaminated sediment left in place in Areas 7, 9 and 11, MNR would achieve compliance of chemical-specific ARARs over time. This alternative would meet the action-specific ARARs by following health and safety regulatory requirements during construction, transportation and disposal. This alternative would meet location-specific ARARs such as wetland and coastal regulations, and RCRA AOC policy requirements.	Chemical-specific ARARs would be complied with since the PRGs would be met either immediately (for areas where contaminated media is removed and for capped zones), or over time (for MNR zones). This alternative would follow health and safety requirements, hazardous and non-hazardous waste transportation and disposal requirements to meet the action-specific ARARs. This alternative would meet location-specific ARARs by complying with permit requirements for the wetland and coastal zones.	Chemical-specific ARARs would be complied with since the PRGs would be met either immediately (for areas where contaminated media is removed), or over time (for MNR zones). This alternative would follow health and safety requirements, hazardous and non-hazardous waste transportation and disposal requirements to meet the action-specific ARARs. This alternative would meet location-specific ARARs by complying with permit requirements for the wetland and coastal zones.

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Long-term Effectiveness and Permanence	This alternative would not be considered a permanent remedy, since no action would be taken and site-related contaminants would remain onsite. The migration of site-related COCs to other media and direct exposure of site-related metals to human and ecological receptors would not be mitigated.	This alternative would provide long-term effectiveness and permanence since removal of source materials, excavation of soil and dredging of sediment followed by off-site disposal of all media is an irreversible process. Wetland restoration activities would mitigate any short-term impacts to the wetland areas of Margaret's Creek Sector due to dredging. Post removal inspection and sampling would confirm that the concentrations in soil/sediment are below PRGs and LTM would confirm that the concentrations in groundwater and surface water are at acceptable levels. Wetlands monitoring in the Margaret's Creek Sector would confirm that the conditions in the wetlands in those areas are restored.	This alternative would provide long-term effectiveness and permanence as contamination above PRGs are either removed and disposed of off-site, or in the case of contaminated sediment left in place in Areas 7, 9 and 11, monitored to confirm natural recovery to acceptable conditions. Post removal inspection and sampling would confirm that the concentrations in soil/sediment are below PRGs and LTM would confirm that the concentrations in groundwater and surface water are at acceptable levels. Once the source materials are remediated, MNR would provide long-term effectiveness and permanence.	This alternative would provide long-term effectiveness and permanence since the contaminated materials above the PRGs would either be removed and disposed of offsite, or in the case of source materials, contained on-site within engineered cells, or in the case of contaminated sediment left in place in Areas 7, 9 and 11, monitored to confirm natural recovery to acceptable conditions. Containment, ICs and LTM can provide reliable control of the contamination if properly designed, constructed, maintained, and monitored over the long term. Post removal inspection and sampling would confirm that the concentrations in soil/sediment are below PRGs and LTM would confirm that the concentrations in groundwater and surface water are at acceptable levels. Once the source materials are remediated, MNR would provide long-term effectiveness and permanence.	This alternative would provide long-term effectiveness and permanence. On-site containment, off-site disposal and MNR would achieve long-term effectiveness and permanence, similar to other alternatives discussed previously. Capping would provide long-term effectiveness and permanence with proper maintenance and monitoring.	Removal and disposal would be effective in removing site risk. The process is not reversible. Long-term maintenance would be required to ensure the integrity and effectiveness of the containment cells. With MNR, once sources are controlled and no further input of contaminants into the recovering areas is occurring, the risk would start to decrease . MNR is expected to provide long-term effectiveness and permanence are expected

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Reduction of Toxicity/ Mobility/Volume (T/M/V) Through Treatment	No reduction of contaminant T/M/V through treatment would be achieved under this alternative, since no action would be taken.	This alternative would provide no reduction of T/M/V through treatment at the site. It moves the contaminated materials from the site to a different location where it can be isolated through containment and managed in the long-term. For the portion of excavated soil and sediment that may be characterized as hazardous waste and require treatment, reduction of toxicity and mobility would occur through treatment at the disposal facility to meet the LDR Treatment Standards for Contaminated Soil.	For contaminated materials designated for off-site disposal and may be characterized as hazardous waste and require treatment, reduction of toxicity and mobility would occur through treatment at the disposal facility to meet the LDR Treatment Standards for Contaminated Soil. For non-hazardous materials disposed of off-site, this alternative simply moves the contaminated materials to a different location. For MNR in areas 7 and 11, mobility and bioavailability are not reduced but the toxicity would be reduced due to decrease in contaminant concentrations. For MNR in Area 9, bioavailability and mobility are reduced over time.	For source materials contained on-site within engineered cells, mobility would be reduced; toxicity and volume remain unchanged. For contaminated soil and sediment that are disposed of off-site and are designated as hazardous, toxicity and mobility would be reduced by treatment at the disposal facility. For non-hazardous soil and sediment that are disposed of off-site, only the mobility is reduced. For MNR in areas 7 and 11, mobility and bioavailability are not reduced but the toxicity would be reduced due to decrease in contaminant concentrations. For MNR in Area 9, bioavailability and mobility are reduced over time.	This alternative would provide no reduction of T/M/V through treatment at the site. Containment onsite or off-site would not reduce toxicity and volume but would reduce mobility. Capping would not reduce the toxicity or volume of contaminants; but would reduce bioavailability and mobility of the contaminants by preventing erosion and resuspension. For MNR in areas 7 and 11, mobility and bioavailability are not reduced but the toxicity would be reduced due to decrease in contaminant concentrations. For MNR in Area 9, bioavailability and mobility are reduced over time.	This alternative would provide no reduction of T/M/V through treatment at the site. Containment and disposal of non-hazardous materials do not reduce toxicity and volume but reduce mobility. For hazardous materials disposed of off-site, toxicity and mobility are reduced. For MNR in areas 7 and 11, mobility and bioavailability are not reduced but the toxicity would be reduced due to decrease in contaminant concentrations. For MNR in Area 9, bioavailability and mobility are reduced over time.

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Short-term Effectiveness	Since no remedial action would be implemented at the site, this alternative would not have any short-term impact. The No Action alternative would not have any environmental footprint since no action would be taken.	Short-term impacts to the communities and workers include increased risk of accidents and release of contamination, heavy traffic within the community, high noise due to heavy construction equipment, increased particulate emissions during soil excavation. Health and safety measures would have to be implemented to protect construction workers and public from exposure to contamination. Re-suspension of sediment during dredging causes significant adverse impact to aquatic habitat temporarily. Wetland areas would require restoration. The major energy consumption would be fuel consumption by construction equipment and vehicles, transportation of disposed materials. Water use under this alternative would be minimal, mainly for dust control and decontamination.	Short-term impacts of off-site disposal would be similar in nature to Alternative 2. Wetland areas of Margaret's Creek Sector would not be disrupted and hence would not require restoration. Lower energy consumption is expected compared to Alternative 2 due to the lower disposal volume. MNR would require less energy for implementation.	The short term impacts of this alternative from excavation, dredging, transportation, construction and off-site disposal would be lower compared to Alternative 2 due to the lower volumes of disposal. Significant short-term impacts are also expected due to construction of containment cells; however, they will be lower when compared to off-site disposal. The impacts of MNR would be minimal and much lower compared to off-site disposal and on-site containment.	Excavation, dredging, containment and disposal would have significant short-term impacts to community and workers. Capping would have some impact due to the limited construction activity required during installation. MNR would have minimal short-term impacts. For containment and off-site disposal, the major energy consumption of this alternative would be fuel use by equipment and vehicles, commute to the site by workers, and transportation for importing clean fill and for offsite disposal of removed contaminated media. The capped zone would require comparatively less energy than containment or off-site disposal and MNR would require even lesser energy.	Excavation, dredging, containment and disposal would have significant short-term impacts to community and workers. MNR would have minimal short-term impacts. For containment and off-site disposal, the major energy consumption of this alternative would be fuel use by equipment and vehicles, commute to the site by workers, and transportation for importing clean fill and for offsite disposal of removed contaminated media. MNR would require very less energy.

Table 4-2
Summary of Detailed Analysis of Remedial Alternatives
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

EVALUATION CRITERION	ALTERNATIVE 1 No Action	ALTERNATIVE 2 Excavation/Dredging, Off-site Disposal, Institutional Controls (ICs) And Long-Term Monitoring (LTM)	ALTERNATIVE 3 Excavation/Dredging, Off-site Disposal, Monitored Natural Recovery (MNR), ICs And LTM	ALTERNATIVE 4 Excavation/Dredging, On-Site Containment of Source Materials, Off-site Disposal of Soil and Sediment, MNR, ICs And LTM	ALTERNATIVE 5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, Capping, ICs And LTM	ALTERNATIVE 6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, MNR, ICs And LTM
Implementability	This alternative would be easy to implement since no action would be taken.	Excavation and offsite disposal is a conventional remediation technology and is widely implemented. Technical and logistical challenges include dewatering concerns, accessibility of bay areas at long distances from the shore, handling and segregation of slag, and traffic and space constraints. Equipment, supplies and services are readily obtainable.	The excavation/dredging and off-site disposal components are similar to Alternative 2 – they are widely implemented. However, there are technical and logistical challenges due to site constraints. MNR is easily implementable.	The excavation/dredging and off-site disposal components are conceptually similar to Alternative 2, although the technical and logistical concerns are lower compared to Alternative 2 due to the lower volume of contaminated materials handled. On-site containment is technically and administratively implementable. Equipment, supplies and services are readily obtainable for on-site containment. Additional implementability issues specific to on-site containment cells include potential settlement of the ground following construction of the cells and presence of wetland areas at the Site. MNR is easily implementable.	The excavation/dredging and off-site disposal components are similar to Alternatives 2 and 3, although the technical and logistical concerns are lower compared to Alternatives 2 or 3 due to the lower volume of contaminated materials handled and the lower volume of off-site disposal. For the on-site containment component of the remedial alternative, concerns due to lack of space are exacerbated compared to Alternative 4 due to the larger size of the containment cells. Construction of cap is easily implementable but ICs and maintenance may not be easily implementable over the long term. MNR is easily implementable.	The implementability concerns for the off-site disposal and on-site containment components are similar to those under Alternative 5. MNR is easily implementable.
Present Worth with Discounting	$0	$217.4 million	$122.6 million	$119.1 million	$80.0 million	$82.6 million

Table 4-3
Summary of Capital, O and M and Present Worth Costs
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

COST TYPE	Alternative 1 - No Action	Alternative 2 - Excavation/Dredging, Offsite Disposal, Institutional Controls And Long-Term Monitoring	Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls And Long-Term Monitoring	Alternative 4 - Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	Alternative 5 — Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring	Alternative 6 — Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
CAPITAL COSTS	$0	$216.0 Million	$117.8 Million	$111.9 Million	$71.2 Million	$74.6 Million
TOTAL OPERATION AND MAINTENANCE (O & M) COSTS (not discounted)	$0	$1.5 Million	$5.9 Million	$9.2 Million	$11.3 Million	$10.2 Million
TOTAL PERIODIC COST (Not discounted)	$0	$0.34 million	$0.34 million	$0.34 million	$0.34 million	$0.34 million
TOTAL PRESENT WORTH COSTS (CAPITAL AND O & M)	$0	$217.4 Million	$122.6 Million	$119.1 Million	$80.0 Million	$82.6 Million

Notes:
Costs presented have an expected accuracy range for feasibility study estimates (-30% to +50% of the actual cost of the alternative).
Present value discounting is not included in total capital cost, O&M cost (30 year period of evaluation) and total periodic costs

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$1,438,377	$1,438,377	See MII Project Cost Summary Report Page 5
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,882,947	$2,882,947	See MII Project Cost Summary Report Page 6
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,220,185	$8,220,185	See MII Project Cost Summary Report Page 7
Jetty Sector Site Activities	1	LS	$10,758,399	$10,758,399	See MII Project Cost Summary Report Page 9
Margaret's Creek Sector Site Activities	1	LS	$18,512,118	$18,512,118	See MII Project Cost Summary Report Page 11
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Seawall Areas	1	LS	$4,677,357	$4,677,357	See MII Project Cost Summary Report Page 11
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	1	LS	$4,355,495	$4,355,495	See MII Project Cost Summary Report Page 12
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	1	LS	$620,194	$620,194	See MII Project Cost Summary Report Page 12
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$21,891,870	$21,891,870	See MII Project Cost Summary Report Page 12
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$18,170,880	$18,170,880	See MII Project Cost Summary Report Page 13
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	1	LS	$34,826,812	$34,826,812	See MII Project Cost Summary Report Page 13
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 14
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 14
Backfill of Excavations	1	LS	$19,311,893	$19,311,893	See MII Project Cost Summary Report Page 14
Wetland Restoration	1	LS	$3,419,385	$3,419,385	See MII Project Cost Summary Report Page 14
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$153,834,888	
Contingency (Scope and Bid)	20%			$30,766,978	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$184,601,866	

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

Project Management	5%			$9,230,093	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$11,076,112	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$11,076,112	Percentage from Exhibit 5-8 was used.
			TOTAL	$215,984,183	
			TOTAL CAPITAL COST	**$215,984,000**	Total capital cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	**QTY**	**UNIT(S)**	**UNIT COST**	**TOTAL**	**NOTES**
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$90,582	
Contingency (Scope and Bid)	20%			$18,116	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$108,698	
Project Management	8%			$8,696	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$16,305	Middle value of the recommended range was used.
			TOTAL	$133,699	
			TOTAL QUARTERLY MONITORING COSTS	**$134,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	**QTY**	**UNIT(S)**	**UNIT COST**	**TOTAL**	**NOTES**
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$56,025	
Contingency (Scope and Bid)	20%			$11,205	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$67,230	
Project Management	10%			$6,723	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$10,085	Middle value of the recommended range was used.
			TOTAL	$84,038	
			TOTAL SEMI-ANNUAL MONITORING COSTS	**$84,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
			SUBTOTAL	$27,197	
Contingency (Scope and Bid)	20%			$5,439	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$32,636	
Project Management	10%			$3,264	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$4,895	Middle value of the recommended range was used.
			TOTAL	$40,795	
			TOTAL ANNUAL MONITORING COSTS	**$41,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate:	**3.11%**
Discount Rate:	**5.25%**

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	**Capital Costs[2]**	**O&M Costs**	**Monitoring Costs**	**Five-Year Review**	**Total Annual Expenditure[3]**	**Escalation Factor**	**Escalated Cost[4]**	**Discount Factor**	**Present Value[5,6]**
0	$215,984,000	$0	$0	$0	$215,984,000	1.0000	$215,984,000	1.0000	$215,984,000
1	$0	$0	$134,000	$0	$134,000	1.0311	$138,167	0.9501	$131,273
2	$0	$0	$134,000	$0	$134,000	1.0632	$142,469	0.9027	$128,607
3	$0	$0	$84,000	$0	$84,000	1.0962	$92,081	0.8577	$78,978
4	$0	$0	$84,000	$0	$84,000	1.1303	$94,945	0.8149	$77,371
5	$0	$0	$84,000	$56,000	$140,000	1.1655	$163,170	0.7743	$126,343
6	$0	$0	$41,000	$0	$41,000	1.2017	$49,270	0.7356	$36,243
7	$0	$0	$41,000	$0	$41,000	1.2391	$50,803	0.6989	$35,506
8	$0	$0	$41,000	$0	$41,000	1.2776	$52,382	0.6641	$34,787
9	$0	$0	$41,000	$0	$41,000	1.3174	$54,013	0.6310	$34,082
10	$0	$0	$41,000	$56,000	$97,000	1.3583	$131,755	0.5995	$78,987
11	$0	$0	$41,000	$0	$41,000	1.4006	$57,425	0.5696	$32,709
12	$0	$0	$41,000	$0	$41,000	1.4441	$59,208	0.5412	$32,043
13	$0	$0	$41,000	$0	$41,000	1.4891	$61,053	0.5142	$31,394
14	$0	$0	$41,000	$0	$41,000	1.5354	$62,951	0.4885	$30,752
15	$0	$0	$41,000	$56,000	$97,000	1.5831	$153,561	0.4642	$71,283
16	$0	$0	$41,000	$0	$41,000	1.6323	$66,924	0.4410	$29,514
17	$0	$0	$41,000	$0	$41,000	1.6831	$69,007	0.4190	$28,914
18	$0	$0	$41,000	$0	$41,000	1.7355	$71,156	0.3981	$28,327
19	$0	$0	$41,000	$0	$41,000	1.7894	$73,365	0.3783	$27,754
20	$0	$0	$41,000	$56,000	$97,000	1.8451	$178,975	0.3594	$64,324
21	$0	$0	$41,000	$0	$41,000	1.9025	$78,003	0.3415	$26,638
22	$0	$0	$41,000	$0	$41,000	1.9616	$80,426	0.3244	$26,090
23	$0	$0	$41,000	$0	$41,000	2.0226	$82,927	0.3082	$25,558
24	$0	$0	$41,000	$0	$41,000	2.0855	$85,506	0.2929	$25,045
25	$0	$0	$41,000	$56,000	$97,000	2.1504	$208,589	0.2783	$58,050
26	$0	$0	$41,000	$0	$41,000	2.2173	$90,909	0.2644	$24,036
27	$0	$0	$41,000	$0	$41,000	2.2862	$93,734	0.2512	$23,546
28	$0	$0	$41,000	$0	$41,000	2.3573	$96,649	0.2387	$23,070
29	$0	$0	$41,000	$0	$41,000	2.4307	$99,659	0.2268	$22,603
30	$0	$0	$41,000	$56,000	$97,000	2.5062	$243,101	0.2154	$52,364
TOTALS:	**$215,984,000**	**$0**	**$1,545,000**	**$336,000**	**$217,865,000**		**$218,966,182**		$217,430,191
TOTAL PRESENT VALUE OF ALTERNATIVE 2									**$217,430,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated previously under this alternative.
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$1,095,516	$1,095,516	See MII Project Cost Summary Report Page 14
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,880,574	$2,880,574	See MII Project Cost Summary Report Page 16
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,224,488	$8,220,185	See MII Project Cost Summary Report Page 17
Jetty Sector Site Activities	1	LS	$7,475,456	$7,473,894	See MII Project Cost Summary Report Page 20
Margaret's Creek Sector Site Activities	1	LS	$1,049,737	$561,533	See MII Project Cost Summary Report Page 21
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Seawall Areas	1	LS	$4,677,357	$4,677,357	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	1	LS	$4,355,495	$4,355,495	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	1	LS	$620,194	$620,194	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$22,085,928	$21,891,870	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$13,089,849	$13,023,926	See MII Project Cost Summary Report Page 23
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	1	LS	$6,197,893	$5,336,400	See MII Project Cost Summary Report Page 24
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 24
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 24
Backfill of Excavations	1	LS	$9,270,465	$9,006,237	See MII Project Cost Summary Report Page 24
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$83,892,157	
Contingency (Scope and Bid)	20%			$16,778,431	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$100,670,588	

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

Project Management	5%		$5,033,529	Percentage from Exhibit 5-8 was used.
Remedial Design	6%		$6,040,235	Percentage from Exhibit 5-8 was used.
Construction Management	6%		$6,040,235	Percentage from Exhibit 5-8 was used.
		TOTAL	$117,784,587	
		TOTAL CAPITAL COST	**$117,785,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 16
			SUBTOTAL	$166,291	
Contingency (Scope and Bid)	20%			$33,258	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$199,549	
Project Management	8%			$15,964	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$29,932	Middle value of the recommended range was used.
			TOTAL	$245,445	
			TOTAL SEMI-ANNUAL MNR MONITORING COSTS	**$245,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 17
			SUBTOTAL	$84,946	
Contingency (Scope and Bid)	20%			$16,989	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,935	
Project Management	8%			$8,155	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,290	Middle value of the recommended range was used.
			TOTAL	$125,380	
			TOTAL ANNUAL MNR MONITORING COSTS	**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$90,582	
Contingency (Scope and Bid)	20%			$18,116	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$108,698	
Project Management	8%			$8,696	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$16,305	Middle value of the recommended range was used.
			TOTAL	$133,699	
	TOTAL QUARTERLY MONITORING COSTS			**$134,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$56,025	
Contingency (Scope and Bid)	20%			$11,205	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$67,230	
Project Management	10%			$6,723	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$10,085	Middle value of the recommended range was used.
			TOTAL	$84,038	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$84,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
			SUBTOTAL	$27,197	
Contingency (Scope and Bid)	20%			$5,439	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$32,636	
Project Management	10%			$3,264	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$4,895	Middle value of the recommended range was used.
			TOTAL	$40,795	
			TOTAL ANNUAL MONITORING COSTS	**$41,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
EA Each
QTY Quantity
LS Lump sum

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate:	**3.11%**
Discount Rate:	**5.25%**

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	**Capital Costs[2]**	**O&M Costs**	**Monitoring Costs**	**Five-year Review**	**Total Annual Expenditure[3]**	**Escalation Factor**	**Escalated Cost[4]**	**Discount Factor**	**Present Value[5,6]**
0	$117,785,000	$0	$0	$0	$117,785,000	1.0000	$117,785,000	1.0000	$117,785,000
1	$0	$0	$379,000	$0	$379,000	1.0311	$390,787	0.9501	$371,287
2	$0	$0	$379,000	$0	$379,000	1.0632	$402,953	0.9027	$363,745
3	$0	$0	$329,000	$0	$329,000	1.0962	$360,650	0.8577	$309,329
4	$0	$0	$329,000	$0	$329,000	1.1303	$371,869	0.8149	$303,036
5	$0	$0	$329,000	$56,000	$385,000	1.1655	$448,718	0.7743	$347,442
6	$0	$0	$166,000	$0	$166,000	1.2017	$199,482	0.7356	$146,739
7	$0	$0	$166,000	$0	$166,000	1.2391	$205,691	0.6989	$143,757
8	$0	$0	$166,000	$0	$166,000	1.2776	$212,082	0.6641	$140,843
9	$0	$0	$166,000	$0	$166,000	1.3174	$218,688	0.6310	$137,992
10	$0	$0	$166,000	$56,000	$222,000	1.3583	$301,543	0.5995	$180,775
11	$0	$0	$166,000	$0	$166,000	1.4006	$232,500	0.5696	$132,432
12	$0	$0	$166,000	$0	$166,000	1.4441	$239,721	0.5412	$129,737
13	$0	$0	$166,000	$0	$166,000	1.4891	$247,191	0.5142	$127,105
14	$0	$0	$166,000	$0	$166,000	1.5354	$254,876	0.4885	$124,507
15	$0	$0	$166,000	$56,000	$222,000	1.5831	$351,448	0.4642	$163,142
16	$0	$0	$166,000	$0	$166,000	1.6323	$270,962	0.4410	$119,494
17	$0	$0	$166,000	$0	$166,000	1.6831	$279,395	0.4190	$117,066
18	$0	$0	$166,000	$0	$166,000	1.7355	$288,093	0.3981	$114,690
19	$0	$0	$166,000	$0	$166,000	1.7894	$297,040	0.3783	$112,370
20	$0	$0	$166,000	$56,000	$222,000	1.8451	$409,612	0.3594	$147,215
21	$0	$0	$166,000	$0	$166,000	1.9025	$315,815	0.3415	$107,851
22	$0	$0	$166,000	$0	$166,000	1.9616	$325,626	0.3244	$105,633
23	$0	$0	$166,000	$0	$166,000	2.0226	$335,752	0.3082	$103,479
24	$0	$0	$166,000	$0	$166,000	2.0855	$346,193	0.2929	$101,400
25	$0	$0	$166,000	$56,000	$222,000	2.1504	$477,389	0.2783	$132,857
26	$0	$0	$166,000	$0	$166,000	2.2173	$368,072	0.2644	$97,318
27	$0	$0	$166,000	$0	$166,000	2.2862	$379,509	0.2512	$95,333
28	$0	$0	$166,000	$0	$166,000	2.3573	$391,312	0.2387	$93,406
29	$0	$0	$166,000	$0	$166,000	2.4307	$403,496	0.2268	$91,513
30	$0	$0	$166,000	$56,000	$222,000	2.5062	$556,376	0.2154	$119,843
TOTALS:	**$117,785,000**	**$0**	**$5,895,000**	**$336,000**	**$124,016,000**		**$127,667,838**		$122,566,336
TOTAL PRESENT VALUE OF ALTERNATIVE 3									**$122,566,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated previously under this alternative.
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$1,494,508	$1,494,508	See MII Project Cost Summary Report Page 24
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,886,705	$2,886,705	See MII Project Cost Summary Report Page 26
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,224,488	$8,220,185	See MII Project Cost Summary Report Page 27
Jetty Sector Site Activities	1	LS	$7,475,456	$7,473,894	See MII Project Cost Summary Report Page 29
Margaret's Creek Sector Site Activities	1	LS	$1,049,737	$561,533	See MII Project Cost Summary Report Page 31
Transportation of Contaminated Materials to Onsite Containment Cell	1	LS	$115,766	$115,766	See MII Project Cost Summary Report Page 32
Onsite Containtment Cell Construction					
Onsite Cell A Near the Western Jetty	1	LS	$1,215,800	$1,215,800	See MII Project Cost Summary Report Page 32
Onsite Cell B Near Margaret's Creek Area	1	LS	$3,654,198	$3,654,198	See MII Project Cost Summary Report Page 35
Groundwater Monitoring Well Installation	1	LS	$38,394	$38,394	See MII Project Cost Summary Report Page 37
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$22,085,928	$21,891,870	See MII Project Cost Summary Report Page 38
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$13,089,949	$13,023,926	See MII Project Cost Summary Report Page 38
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	1	LS	$6,197,893	$5,336,400	See MII Project Cost Summary Report Page 39
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 40
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 40
Backfill of Excavations	1	LS	$9,270,465	$9,006,237	See MII Project Cost Summary Report Page 40
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$79,668,392	
Contingency (Scope and Bid)	20%			$15,933,678	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$95,602,070	

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

Project Management	5%	$4,780,104	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$5,736,124	Percentage from Exhibit 5-8 was used.
Construction Management	6%	$5,736,124	Percentage from Exhibit 5-8 was used.
	TOTAL	$111,854,422	
	TOTAL CAPITAL COST	**$111,854,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 31
			SUBTOTAL	$166,291	
Contingency (Scope and Bid)	20%			$33,258	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$199,549	
Project Management	8%			$15,964	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$29,932	Middle value of the recommended range was used.
			TOTAL	$245,445	
			TOTAL SEMI-ANNUAL MNR MONITORING COSTS	**$245,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 32
			SUBTOTAL	$84,946	
Contingency (Scope and Bid)	20%			$16,989	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,935	
Project Management	8%			$8,155	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,290	Middle value of the recommended range was used.
			TOTAL	$125,380	
			TOTAL ANNUAL MNR MONITORING COSTS	**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Quarterly Containment Cell Sampling per Year	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 40
Quarterly Containment Cell Inspections per Year	1	EA	$14,852	$14,852	See MII Project Cost Summary Report Page 41
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$140,028	
Contingency (Scope and Bid)	20%			$28,006	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$168,034	
Project Management	8%			$13,443	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$25,205	Middle value of the recommended range was used.
			TOTAL	$206,682	
	TOTAL QUARTERLY MONITORING COSTS			**$207,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Containment Cell Sampling per Year	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 41
Semi-Annual Containment Cell Inspections per Year	1	EA	$9,226	$9,226	See MII Project Cost Summary Report Page 41
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$84,348	
Contingency (Scope and Bid)	20%			$16,870	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,218	
Project Management	8%			$8,097	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,183	Middle value of the recommended range was used.
			TOTAL	$124,498	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$124,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
Annual Containment Cell Sampling	1	EA	$11,349	$11,349	See MII Project Cost Summary Report Page 40
Annual Containment Cell Inspections per Year	1	EA	$6,414	$6,414	See MII Project Cost Summary Report Page 41
			SUBTOTAL	$44,960	
Contingency (Scope and Bid)	20%			$8,992	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$53,952	
Project Management	10%			$5,395	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$8,093	Middle value of the recommended range was used.
			TOTAL	$67,440	
			TOTAL ANNUAL MONITORING COSTS	**$67,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

OPERATION & MAINTENANCE ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
O&M of Onsite Containment Cell	1	EA	$54,179	$54,179	See MII Project Cost Summary Report Page 41
			SUBTOTAL	$54,179	
Contingency (Scope and Bid)	20%			$10,836	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$65,015	
Project Management	10%			$6,502	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$9,752	Middle value of the recommended range was used.
			TOTAL	$81,269	
			TOTAL O&M ANNUAL COSTS	**$81,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate:	**3.11%**
Discount Rate:	**5.25%**

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	**Capital Costs[2]**	**O&M Costs**	**Monitoring Costs**	**Five-year Review**	**Total Annual Expenditure[3]**	**Escalation Factor**	**Escalated Cost[4]**	**Discount Factor**	**Present Value[5,6]**
0	$111,854,000	$0	$0	$0	$111,854,000	1.0000	$111,854,000	1.0000	$111,854,000
1	$0	$81,000	$452,000	$0	$533,000	1.0311	$549,576	0.9501	$522,152
2	$0	$81,000	$452,000	$0	$533,000	1.0632	$566,686	0.9027	$511,547
3	$0	$81,000	$369,000	$0	$450,000	1.0962	$493,290	0.8577	$423,095
4	$0	$81,000	$369,000	$0	$450,000	1.1303	$508,635	0.8149	$414,487
5	$0	$81,000	$369,000	$56,000	$506,000	1.1655	$589,743	0.7743	$456,638
6	$0	$81,000	$192,000	$0	$273,000	1.2017	$328,064	0.7356	$241,324
7	$0	$81,000	$192,000	$0	$273,000	1.2391	$338,274	0.6989	$236,420
8	$0	$81,000	$192,000	$0	$273,000	1.2776	$348,785	0.6641	$231,628
9	$0	$81,000	$192,000	$0	$273,000	1.3174	$359,650	0.6310	$226,939
10	$0	$81,000	$192,000	$56,000	$329,000	1.3583	$446,881	0.5995	$267,905
11	$0	$81,000	$192,000	$0	$273,000	1.4006	$382,364	0.5696	$217,794
12	$0	$81,000	$192,000	$0	$273,000	1.4441	$394,239	0.5412	$213,362
13	$0	$81,000	$192,000	$0	$273,000	1.4891	$406,524	0.5142	$209,035
14	$0	$81,000	$192,000	$0	$273,000	1.5354	$419,164	0.4885	$204,762
15	$0	$81,000	$192,000	$56,000	$329,000	1.5831	$520,840	0.4642	$241,774
16	$0	$81,000	$192,000	$0	$273,000	1.6323	$445,618	0.4410	$196,517
17	$0	$81,000	$192,000	$0	$273,000	1.6831	$459,486	0.4190	$192,525
18	$0	$81,000	$192,000	$0	$273,000	1.7355	$473,792	0.3981	$188,616
19	$0	$81,000	$192,000	$0	$273,000	1.7894	$488,506	0.3783	$184,802
20	$0	$81,000	$192,000	$56,000	$329,000	1.8451	$607,038	0.3594	$218,169
21	$0	$81,000	$192,000	$0	$273,000	1.9025	$519,383	0.3415	$177,369
22	$0	$81,000	$192,000	$0	$273,000	1.9616	$535,517	0.3244	$173,722
23	$0	$81,000	$192,000	$0	$273,000	2.0226	$552,170	0.3082	$170,179
24	$0	$81,000	$192,000	$0	$273,000	2.0855	$569,342	0.2929	$166,760
25	$0	$81,000	$192,000	$56,000	$329,000	2.1504	$707,482	0.2783	$196,892
26	$0	$81,000	$192,000	$0	$273,000	2.2173	$605,323	0.2644	$160,047
27	$0	$81,000	$192,000	$0	$273,000	2.2862	$624,133	0.2512	$156,782
28	$0	$81,000	$192,000	$0	$273,000	2.3573	$643,543	0.2387	$153,614
29	$0	$81,000	$192,000	$0	$273,000	2.4307	$663,581	0.2268	$150,500
30	$0	$81,000	$192,000	$56,000	$329,000	2.5062	$824,540	0.2154	$177,606
TOTALS:	**$111,854,000**	**$2,430,000**	**$6,811,000**	**$336,000**	**$121,431,000**		**$127,226,167**		$119,136,962
TOTAL PRESENT VALUE OF ALTERNATIVE 4									**$119,137,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated previously under this alternative.
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$810,759	$810,759	See MII Project Cost Summary Report Page 42
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,888,331	$2,888,331	See MII Project Cost Summary Report Page 43
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Capping of Area 8	1	LS	$3,281,526	$3,281,526	See MII Project Cost Summary Report Page 44
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,220,516	$8,220,516	See MII Project Cost Summary Report Page 45
Jetty Sector Site Activities	1	LS	$5,528,133	$5,528,133	See MII Project Cost Summary Report Page 48
Margaret's Creek Sector Site Activities	1	LS	$561,533	$561,533	See MII Project Cost Summary Report Page 49
Transportation of Contaminated Materials to Onsite Containment Cell	1	LS	$754,290	$754,290	See MII Project Cost Summary Report Page 50
Onsite Containtment Cell Construction					
Onsite Cell 1 Near the Western Jetty	1	LS	$1,239,922	$1,239,922	See MII Project Cost Summary Report Page 50
Onsite Cell 2 Near Margaret's Creek Area	1	LS	$2,688,944	$2,685,454	See MII Project Cost Summary Report Page 53
Onsite Cell 3 Near Margaret's Creek Area	1	LS	$4,991,371	$4,991,371	See MII Project Cost Summary Report Page 55
Groundwater Monitoring Well Installation	1	LS	$38,394	$38,394	See MII Project Cost Summary Report Page 58
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$1,130,916	$573,540	See MII Project Cost Summary Report Page 58
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$6,358,507	$6,296,915	See MII Project Cost Summary Report Page 59
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 59
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 59
Backfill of Excavations	1	LS	$8,326,163	$8,061,935	See MII Project Cost Summary Report Page 60
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$50,681,595	

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

Contingency (Scope and Bid)	20%	$10,136,319	10% Scope, 10% Bid (Low end of the recommended range).
	SUBTOTAL	$60,817,914	
Project Management	5%	$3,040,896	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$3,649,075	Percentage from Exhibit 5-8 was used. Includes pre-design field investigation
Construction Management	6%	$3,649,075	Percentage from Exhibit 5-8 was used.
	TOTAL	$71,156,960	
	TOTAL CAPITAL COST	**$71,157,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR AND AREA 8 MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Area 8 Cap Sampling	1	EA	$39,729	$39,729	See MII Project Cost Summary Report Page 62
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 44
			SUBTOTAL	$206,020	
Contingency (Scope and Bid)	20%			$41,204	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$247,224	
Project Management	8%			$19,778	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$37,084	Middle value of the recommended range was used.
			TOTAL	$304,086	
	TOTAL SEMI-ANNUAL MNR AND AREA 8 MONITORING COSTS			**$304,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

ANNUAL MNR AND AREA 8 MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Area 8 Cap Sampling	1	EA	$21,597	$21,597	See MII Project Cost Summary Report Page 62
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 45
			SUBTOTAL	$106,543	
Contingency (Scope and Bid)	20%			$21,309	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$127,852	
Project Management	8%			$10,228	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$19,178	Middle value of the recommended range was used.
			TOTAL	$157,258	
TOTAL ANNUAL MNR AND AREA 8 MONITORING COSTS				**$157,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Quarterly Containment Cell Sampling per Year	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 60
Quarterly Containment Cell Inspections per Year	1	EA	$14,852	$14,852	See MII Project Cost Summary Report Page 61
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$140,028	
Contingency (Scope and Bid)	20%			$28,006	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$168,034	
Project Management	8%			$13,443	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$25,205	Middle value of the recommended range was used.
			TOTAL	$206,682	
TOTAL QUARTERLY MONITORING COSTS				**$207,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Containment Cell Sampling per Year	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 60
Semi-Annual Containment Cell Inspections per Year	1	EA	$9,226	$9,226	See MII Project Cost Summary Report Page 61
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$84,348	
Contingency (Scope and Bid)	20%			$16,870	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,218	
Project Management	8%			$8,097	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,183	Middle value of the recommended range was used.
			TOTAL	$124,498	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$124,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
Annual Containment Cell Sampling	1	EA	$11,349	$11,349	See MII Project Cost Summary Report Page 60
Annual Containment Cell Inspections per Year	1	EA	$6,414	$6,414	See MII Project Cost Summary Report Page 61
			SUBTOTAL	$44,960	
Contingency (Scope and Bid)	20%			$8,992	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$53,952	
Project Management	10%			$5,395	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$8,093	Middle value of the recommended range was used.
			TOTAL	$67,440	
	TOTAL ANNUAL MONITORING COSTS			**$67,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

ANNUAL ONSITE CONTAINMENT OPERATION & MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
O&M of Onsite Containment Cell	1	EA	$75,470	$75,470	See MII Project Cost Summary Report Page 61
			SUBTOTAL	$75,470	
Contingency (Scope and Bid)	20%			$15,094	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$90,564	
Project Management	10%			$9,056	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$13,585	Middle value of the recommended range was used.
			TOTAL	$113,205	
			TOTAL O&M ANNUAL COSTS	**$113,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Escalation Rate:	**3.11%**
Discount Rate:	**5.25%**

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	Capital Costs[2]	O&M Costs	Monitoring Costs	Five-year Review	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[5,6]
0	$71,157,000	$0	$0	$0	$71,157,000	1.0000	$71,157,000	1.0000	$71,157,000
1	$0	$113,000	$511,000	$0	$624,000	1.0311	$643,406	0.9501	$611,300
2	$0	$113,000	$511,000	$0	$624,000	1.0632	$663,437	0.9027	$598,884
3	$0	$113,000	$428,000	$0	$541,000	1.0962	$593,044	0.8577	$508,654
4	$0	$113,000	$428,000	$0	$541,000	1.1303	$611,492	0.8149	$498,305
5	$0	$113,000	$428,000	$56,000	$597,000	1.1655	$695,804	0.7743	$538,761
6	$0	$113,000	$224,000	$0	$337,000	1.2017	$404,973	0.7356	$297,898
7	$0	$113,000	$224,000	$0	$337,000	1.2391	$417,577	0.6989	$291,844
8	$0	$113,000	$224,000	$0	$337,000	1.2776	$430,551	0.6641	$285,929
9	$0	$113,000	$224,000	$0	$337,000	1.3174	$443,964	0.6310	$280,141
10	$0	$113,000	$224,000	$56,000	$393,000	1.3583	$533,812	0.5995	$320,020
11	$0	$113,000	$224,000	$0	$337,000	1.4006	$472,002	0.5696	$268,852
12	$0	$113,000	$224,000	$0	$337,000	1.4441	$486,662	0.5412	$263,381
13	$0	$113,000	$224,000	$0	$337,000	1.4891	$501,827	0.5142	$258,039
14	$0	$113,000	$224,000	$0	$337,000	1.5354	$517,430	0.4885	$252,764
15	$0	$113,000	$224,000	$56,000	$393,000	1.5831	$622,158	0.4642	$288,806
16	$0	$113,000	$224,000	$0	$337,000	1.6323	$550,085	0.4410	$242,588
17	$0	$113,000	$224,000	$0	$337,000	1.6831	$567,205	0.4190	$237,659
18	$0	$113,000	$224,000	$0	$337,000	1.7355	$584,864	0.3981	$232,834
19	$0	$113,000	$224,000	$0	$337,000	1.7894	$603,028	0.3783	$228,125
20	$0	$113,000	$224,000	$56,000	$393,000	1.8451	$725,124	0.3594	$260,610
21	$0	$113,000	$224,000	$0	$337,000	1.9025	$641,143	0.3415	$218,950
22	$0	$113,000	$224,000	$0	$337,000	1.9616	$661,059	0.3244	$214,448
23	$0	$113,000	$224,000	$0	$337,000	2.0226	$681,616	0.3082	$210,074
24	$0	$113,000	$224,000	$0	$337,000	2.0855	$702,814	0.2929	$205,854
25	$0	$113,000	$224,000	$56,000	$393,000	2.1504	$845,107	0.2783	$235,193
26	$0	$113,000	$224,000	$0	$337,000	2.2173	$747,230	0.2644	$197,568
27	$0	$113,000	$224,000	$0	$337,000	2.2862	$770,449	0.2512	$193,537
28	$0	$113,000	$224,000	$0	$337,000	2.3573	$794,410	0.2387	$189,626
29	$0	$113,000	$224,000	$0	$337,000	2.4307	$819,146	0.2268	$185,782
30	$0	$113,000	$224,000	$56,000	$393,000	2.5062	$984,937	0.2154	$212,155
TOTALS:	**$71,157,000**	**$3,390,000**	**$7,906,000**	**$336,000**	**$82,789,000**		**$89,873,355**		$79,985,581
TOTAL PRESENT VALUE OF ALTERNATIVE 5									**$79,986,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated previously under this alternative.
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Total annual expenditure is the total cost per year with no escalation or discounting.
5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$810,759	$810,759	See MII Project Cost Summary Report Page 62
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,888,331	$2,888,331	See MII Project Cost Summary Report Page 63
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,220,185	$8,220,185	See MII Project Cost Summary Report Page 65
Jetty Sector Site Activities	1	LS	$7,473,894	$7,473,894	See MII Project Cost Summary Report Page 68
Margaret's Creek Sector Site Activities	1	LS	$561,533	$561,533	See MII Project Cost Summary Report Page 69
Transportation of Contaminated Materials to Onsite Containment Cell	1	LS	$754,290	$754,290	See MII Project Cost Summary Report Page 70
Onsite Containtment Cell Construction					
Onsite Cell 1 Near the Western Jetty	1	LS	$1,239,922	$1,239,922	See MII Project Cost Summary Report Page 70
Onsite Cell 2 Near Margaret's Creek Area	1	LS	$2,685,454	$2,685,454	See MII Project Cost Summary Report Page 73
Onsite Cell 3 Near Margaret's Creek Area	1	LS	$4,991,371	$4,991,371	See MII Project Cost Summary Report Page 75
Groundwater Monitoring Well Installation	1	LS	$38,394	$38,394	See MII Project Cost Summary Report Page 78
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$573,340	$573,340	See MII Project Cost Summary Report Page 78
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$9,156,864	$9,156,864	See MII Project Cost Summary Report Page 79
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 79
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 79
Backfill of Excavations	1	LS	$9,006,237	$9,006,237	See MII Project Cost Summary Report Page 80
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$53,149,550	
Contingency (Scope and Bid)	20%			$10,629,910	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$63,779,460	

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

Project Management	5%	$3,188,973	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$3,826,768	Percentage from Exhibit 5-8 was used.
Construction Management	6%	$3,826,768	Percentage from Exhibit 5-8 was used.
	TOTAL	$74,621,969	
	TOTAL CAPITAL COST	**$74,622,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 64
			SUBTOTAL	$166,291	
Contingency (Scope and Bid)	20%			$33,258	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$199,549	
Project Management	8%			$15,964	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$29,932	Middle value of the recommended range was used.
			TOTAL	$245,445	
	TOTAL SEMI-ANNUAL MNR MONITORING COSTS			**$245,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 65
			SUBTOTAL	$84,946	
Contingency (Scope and Bid)	20%			$16,989	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,935	
Project Management	8%			$8,155	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,290	Middle value of the recommended range was used.
			TOTAL	$125,380	
	TOTAL ANNUAL MNR MONITORING COSTS			**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Quarterly Containment Cell Sampling per Year	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 80
Quarterly Containment Cell Inspections per Year	1	EA	$14,852	$14,852	See MII Project Cost Summary Report Page 81
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$140,028	
Contingency (Scope and Bid)	20%			$28,006	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$168,034	
Project Management	8%			$13,443	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$25,205	Middle value of the recommended range was used.
			TOTAL	$206,682	
	TOTAL QUARTERLY MONITORING COSTS			**$207,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Containment Cell Sampling per Year	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 80
Semi-Annual Containment Cell Inspections per Year	1	EA	$9,226	$9,226	See MII Project Cost Summary Report Page 81
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$84,348	
Contingency (Scope and Bid)	20%			$16,870	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,218	
Project Management	8%			$8,097	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,183	Middle value of the recommended range was used.
			TOTAL	$124,498	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$124,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
Annual Containment Cell Sampling	1	EA	$11,349	$11,349	See MII Project Cost Summary Report Page 80
Annual Containment Cell Inspections per Year	1	EA	$6,414	$6,414	See MII Project Cost Summary Report Page 81
			SUBTOTAL	$44,960	
Contingency (Scope and Bid)	20%			$8,992	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$53,952	
Project Management	10%			$5,395	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$8,093	Middle value of the recommended range was used.
			TOTAL	$67,440	
			TOTAL ANNUAL MONITORING COSTS	**$67,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL ONSITE CONTAINMENT OPERATION & MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
O&M of Onsite Containment Cell	1	EA	$75,470	$75,470	See MII Project Cost Summary Report Page 81
			SUBTOTAL	$75,470	
Contingency (Scope and Bid)	20%			$15,094	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$90,564	
Project Management	10%			$9,056	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$13,585	Middle value of the recommended range was used.
			TOTAL	$113,205	
			TOTAL O&M ANNUAL COSTS	**$113,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

Table 4-4
Summary of Cost Estimates – Alternatives 2 through 6
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Escalation Rate:	**3.11%**
Discount Rate:	**5.25%**

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	**Capital Costs[2]**	**O&M Costs**	**Monitoring Costs**	**Five-year Review**	**Total Annual Expenditure[3]**	**Escalation Factor**	**Escalated Cost[4]**	**Discount Factor**	**Present Value[5,6]**
0	$74,622,000	$0	$0	$0	$74,622,000	1.0000	$74,622,000	1.0000	$74,622,000
1	$0	$113,000	$452,000	$0	$565,000	1.0311	$582,572	0.9501	$553,501
2	$0	$113,000	$452,000	$0	$565,000	1.0632	$600,708	0.9027	$542,259
3	$0	$113,000	$369,000	$0	$482,000	1.0962	$528,368	0.8577	$453,182
4	$0	$113,000	$369,000	$0	$482,000	1.1303	$544,805	0.8149	$443,961
5	$0	$113,000	$369,000	$56,000	$538,000	1.1655	$627,039	0.7743	$485,516
6	$0	$113,000	$192,000	$0	$305,000	1.2017	$366,519	0.7356	$269,611
7	$0	$113,000	$192,000	$0	$305,000	1.2391	$377,926	0.6989	$264,132
8	$0	$113,000	$192,000	$0	$305,000	1.2776	$389,668	0.6641	$258,779
9	$0	$113,000	$192,000	$0	$305,000	1.3174	$401,807	0.6310	$253,540
10	$0	$113,000	$192,000	$56,000	$361,000	1.3583	$490,346	0.5995	$293,963
11	$0	$113,000	$192,000	$0	$305,000	1.4006	$427,183	0.5696	$243,323
12	$0	$113,000	$192,000	$0	$305,000	1.4441	$440,451	0.5412	$238,372
13	$0	$113,000	$192,000	$0	$305,000	1.4891	$454,176	0.5142	$233,537
14	$0	$113,000	$192,000	$0	$305,000	1.5354	$468,297	0.4885	$228,763
15	$0	$113,000	$192,000	$56,000	$361,000	1.5831	$571,499	0.4642	$265,290
16	$0	$113,000	$192,000	$0	$305,000	1.6323	$497,852	0.4410	$219,553
17	$0	$113,000	$192,000	$0	$305,000	1.6831	$513,346	0.4190	$215,092
18	$0	$113,000	$192,000	$0	$305,000	1.7355	$529,328	0.3981	$210,725
19	$0	$113,000	$192,000	$0	$305,000	1.7894	$545,767	0.3783	$206,464
20	$0	$113,000	$192,000	$56,000	$361,000	1.8451	$666,081	0.3594	$239,390
21	$0	$113,000	$192,000	$0	$305,000	1.9025	$580,263	0.3415	$198,160
22	$0	$113,000	$192,000	$0	$305,000	1.9616	$598,288	0.3244	$194,085
23	$0	$113,000	$192,000	$0	$305,000	2.0226	$616,893	0.3082	$190,126
24	$0	$113,000	$192,000	$0	$305,000	2.0855	$636,078	0.2929	$186,307
25	$0	$113,000	$192,000	$56,000	$361,000	2.1504	$776,294	0.2783	$216,043
26	$0	$113,000	$192,000	$0	$305,000	2.2173	$676,277	0.2644	$178,808
27	$0	$113,000	$192,000	$0	$305,000	2.2862	$697,291	0.2512	$175,159
28	$0	$113,000	$192,000	$0	$305,000	2.3573	$718,977	0.2387	$171,620
29	$0	$113,000	$192,000	$0	$305,000	2.4307	$741,364	0.2268	$168,141
30	$0	$113,000	$192,000	$56,000	$361,000	2.5062	$904,738	0.2154	$194,881
TOTALS:	**$74,622,000**	**$3,390,000**	**$6,811,000**	**$336,000**	**$85,159,000**		**$91,592,196**		$82,614,283
TOTAL PRESENT VALUE OF ALTERNATIVE 6									**$82,614,000**

Notes:

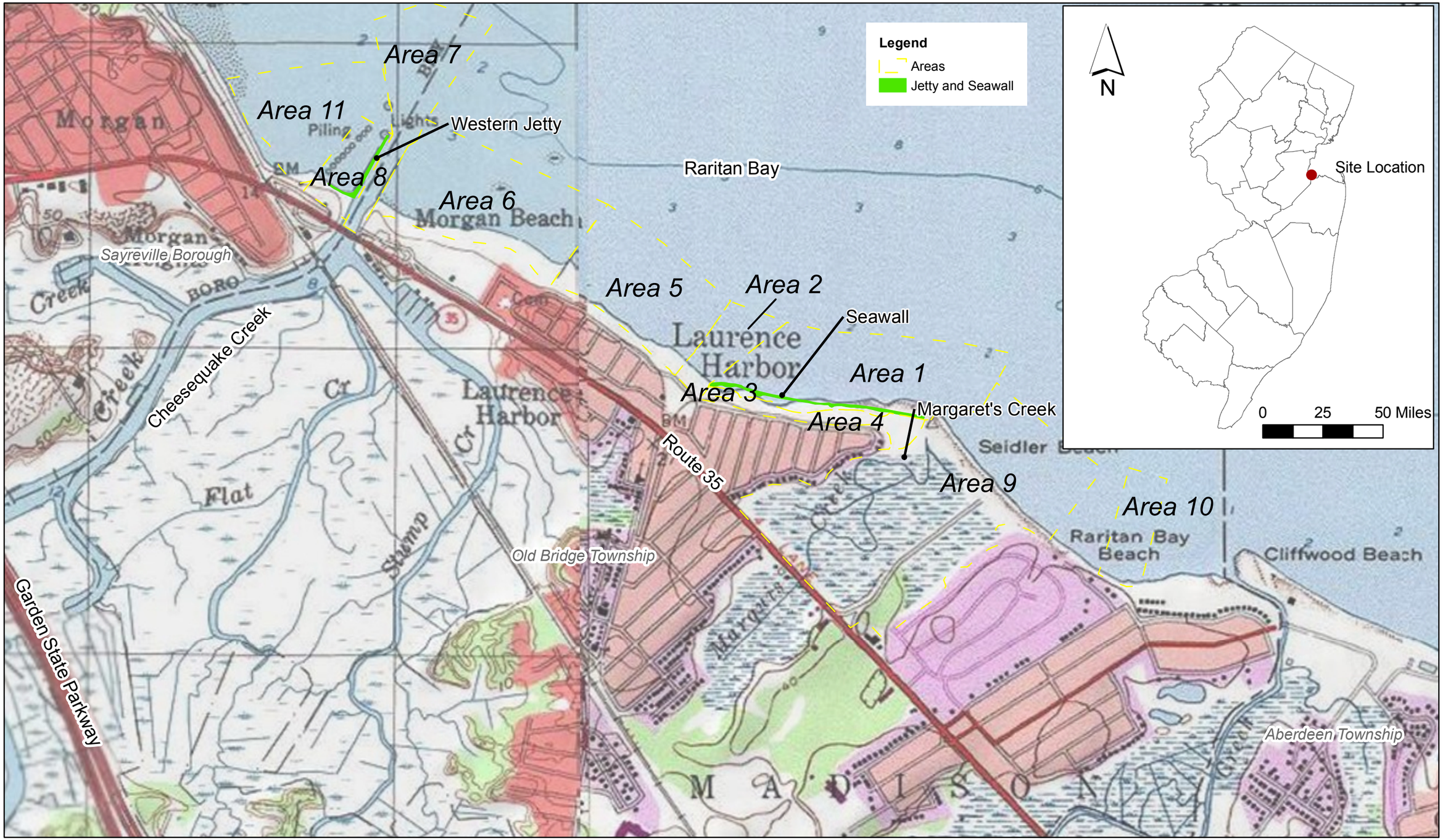
1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated previously under this alternative.
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

Table 4-5
Sensitivity Analysis of Capital Costs
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

	Total Capital Costs[1]			Percent Decrease from Baseline	Percent Increase from Baseline
	A - Quantities Decreased by 20%	B - Baseline	C - Quantities Increased by 20%		
Alt 2	$192,537,000	$215,984,000	$239,431,000	10.9%	10.9%
Alt 3	$104,770,000	$117,785,000	$130,799,000	11.0%	11.0%
Alt 4	$99,398,000	$111,854,000	$124,311,000	11.1%	11.1%
Alt 5	$62,820,000	$71,157,000	$79,494,000	11.7%	11.7%
Alt 6	$66,198,000	$74,622,000	$83,046,000	11.3%	11.3%

[1] - Total Capital Cost of Alternative is assumed to be incurred during Year 0, and therefore, it does not include Periodic and O&M costs

Figures



Source: USGS Topographic Quadrangle

0 500 1,000 2,000 3,000 Feet

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Figure 1-1
Site Location Map
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Seawall Sector	Area 1: Laurence Harbor Seawall	The seawall along Old Bridge Waterfront Park west of Margaret's Creek to the beach area at the foot of Laurence Parkway.
	Area 2: Laurence Harbor Beach	The beach area at the foot of Laurence Parkway between the western end of the seawall and the first jetty.
	Area 3: Laurence Harbor Playground	The park playground adjacent to the western end of the seawall.
	Area 4: Old Bridge Waterfront Park	The park area along the seawall (not including the playground) from the fence to the roadway.
	Area 5: Laurence Harbor Beach	The beach area between the first and third jetty.
	Area 6: Laurence Harbor Beach	The beach area between the third jetty and Cheesequake Creek Inlet eastern jetty.
Jetty Sector	Area 7: Cheesequake Creek Inlet	The inlet between the eastern and western jetties from the Route 35 Bridge into Raritan Bay to the extent of sediment deposition.
	Area 8: Cheesequake Creek Inlet Western Jetty	The jetty and adjacent subtidal area west of the inlet in Sayreville.
	Area 11: Western Extent	The extent of the site west of Area 8.
Margaret's Creek Sector	Area 9: Margaret's Creek	The wetlands and upland areas associated with the Creek (between the beach and Route 35), including the adjacent beach (east of the Creek to the Middlesex County Pumping Station).
Background Area	Area 10: Background Area	The background sampling location.

0 1,000 2,000 4,000 Feet

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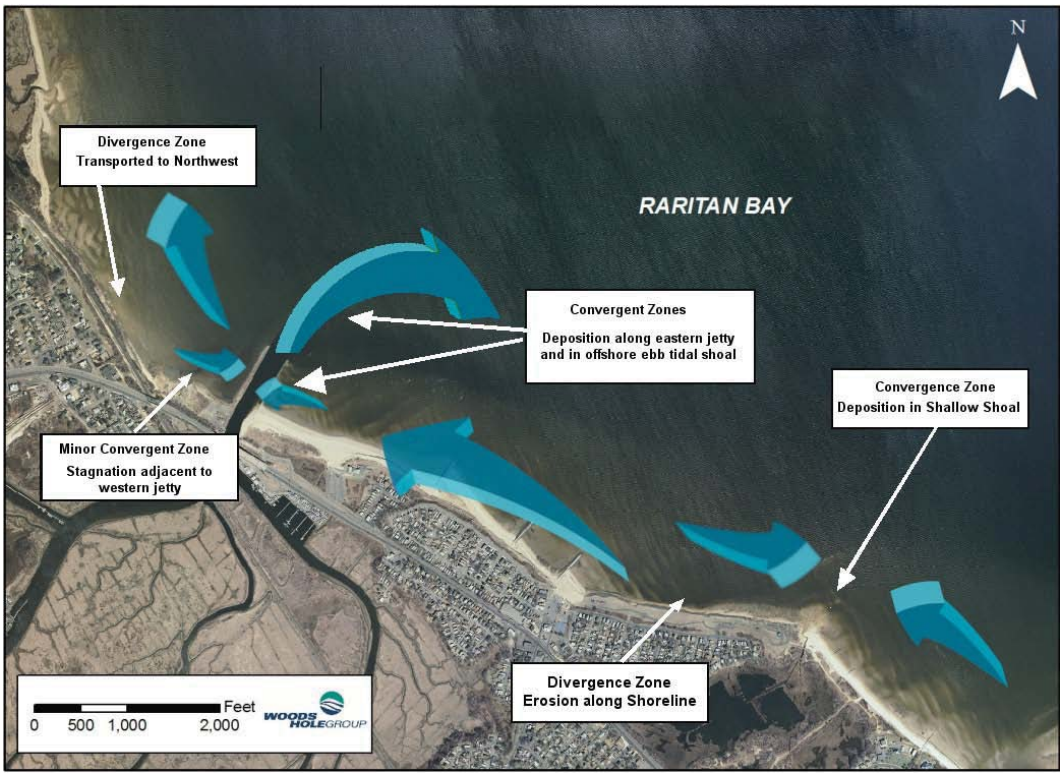
Figure 1-2
Investigation Areas
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Hydrodynamics and sediment dynamics in average annual conditions



. Hydrodynamics and sediment dynamics in storm conditions

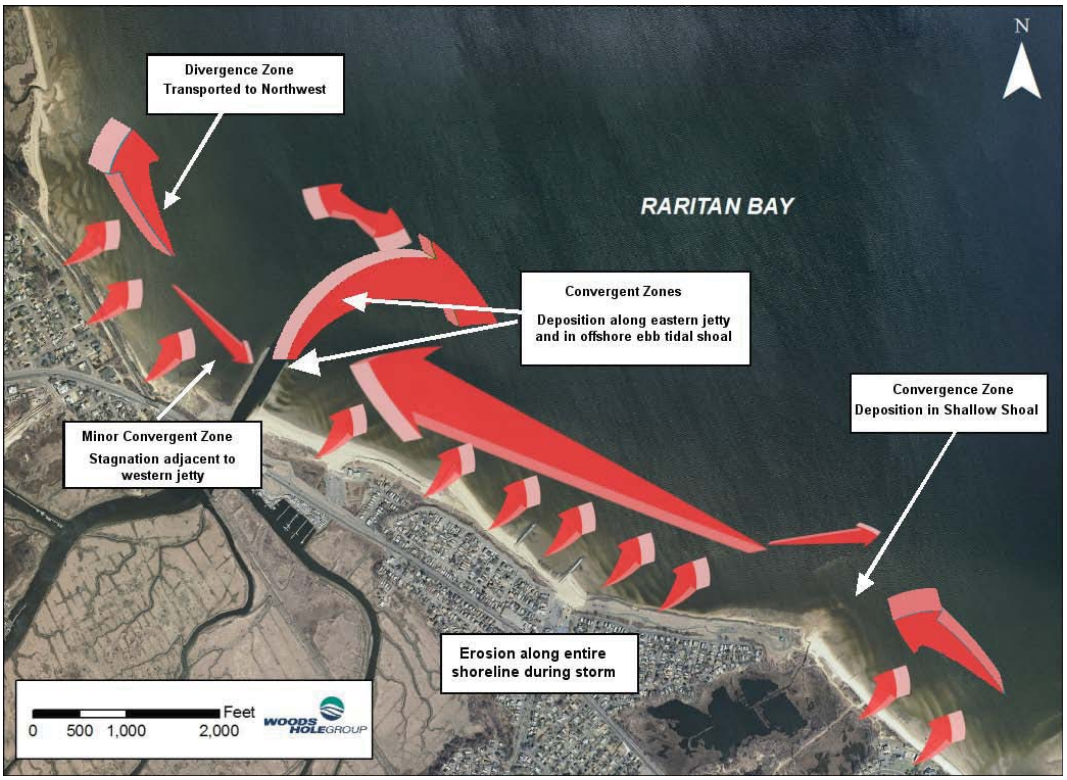
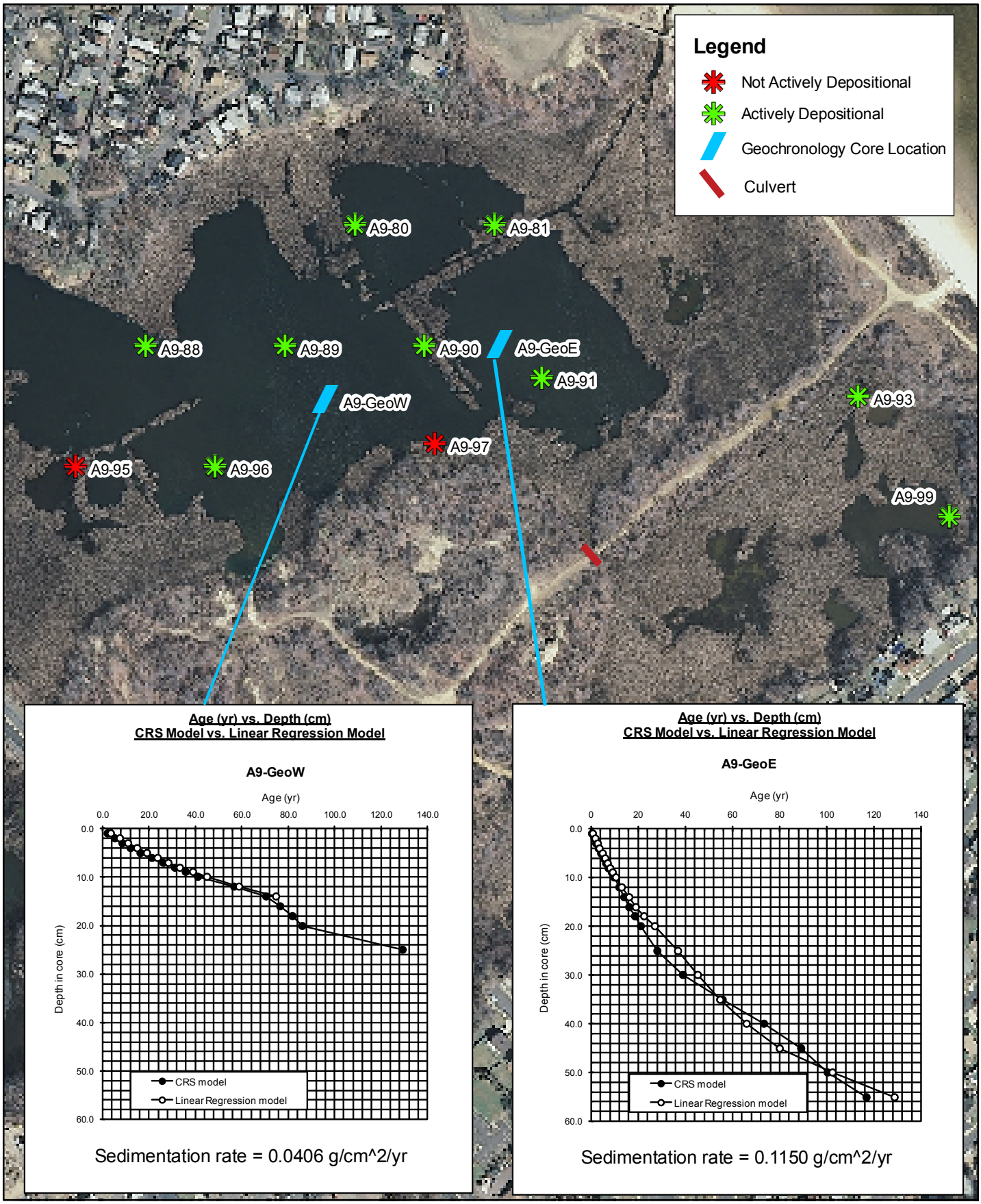


Figure 1-3
Summary of Hydrodynamics and Sediment Dynamics
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



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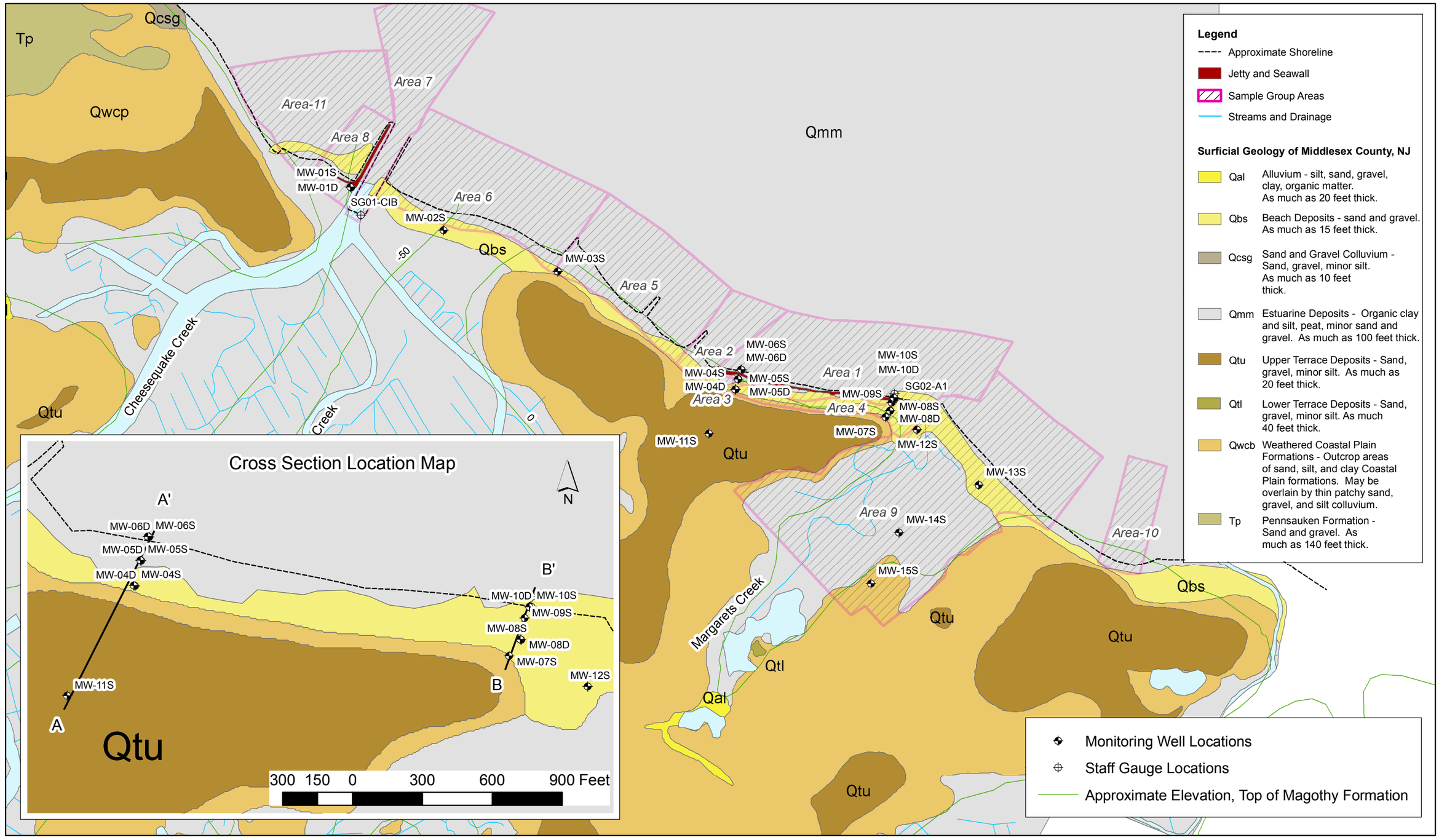
0 80 160 320 Feet

Note: Active or not active deposition was determined by the presence of Be-7 (actively depositional) or absence of Be-7 (not actively depositional)

Figure 1-4
Geochronology Results
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Figure_1-5_Surficial_Geologic_Map.mxd

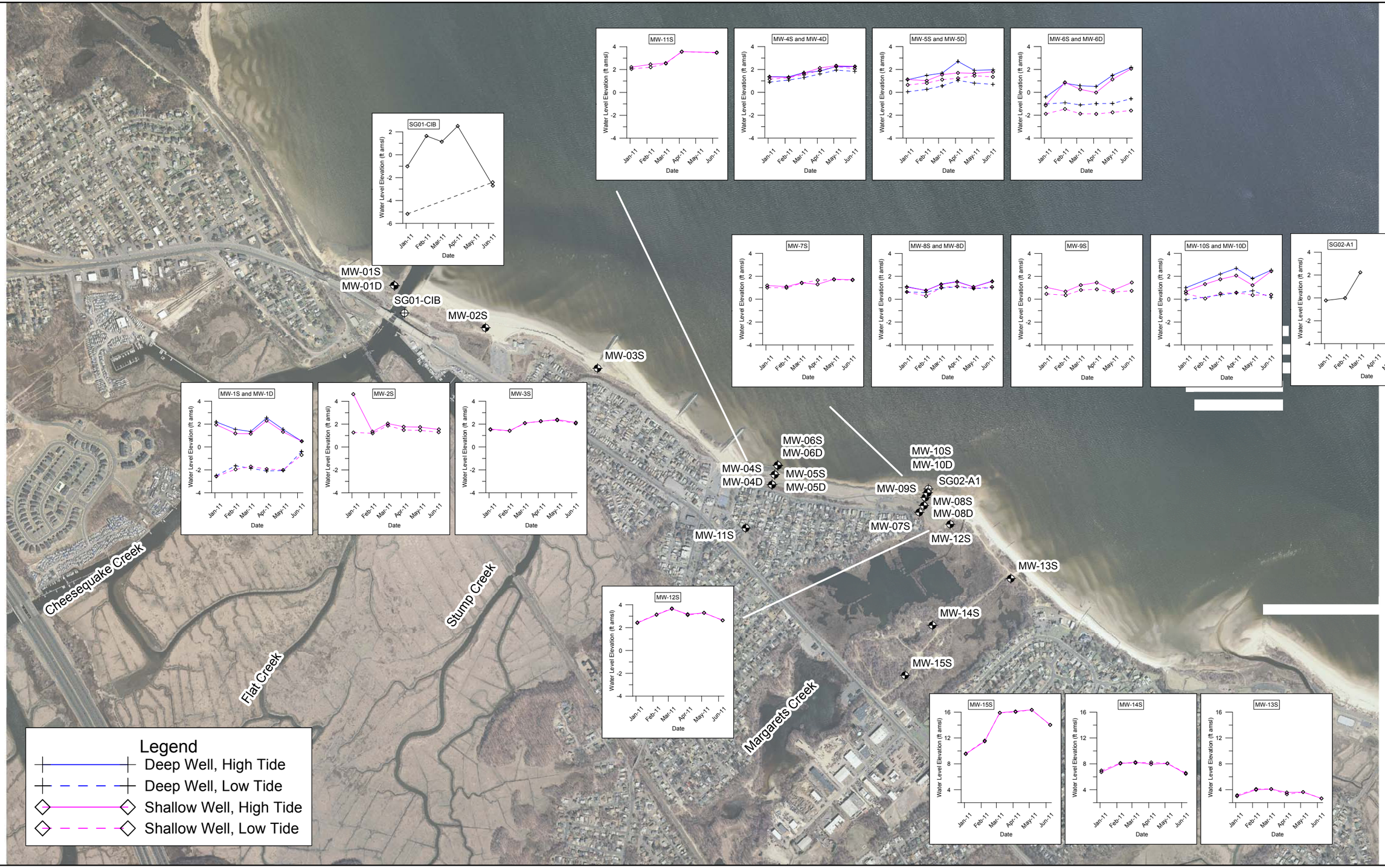


Geologic Data Source: Stanford 1996

EPA

Figure 1-5
Surficial Geologic and Cross Section Location Map
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

\\Ednfedsvr1\gis\Raritan_Bay\MXD\FS\Figure_1-6_Synoptic_WL_Hydrograph_Map.mxd



N

1,200 600 0 1,200 Feet

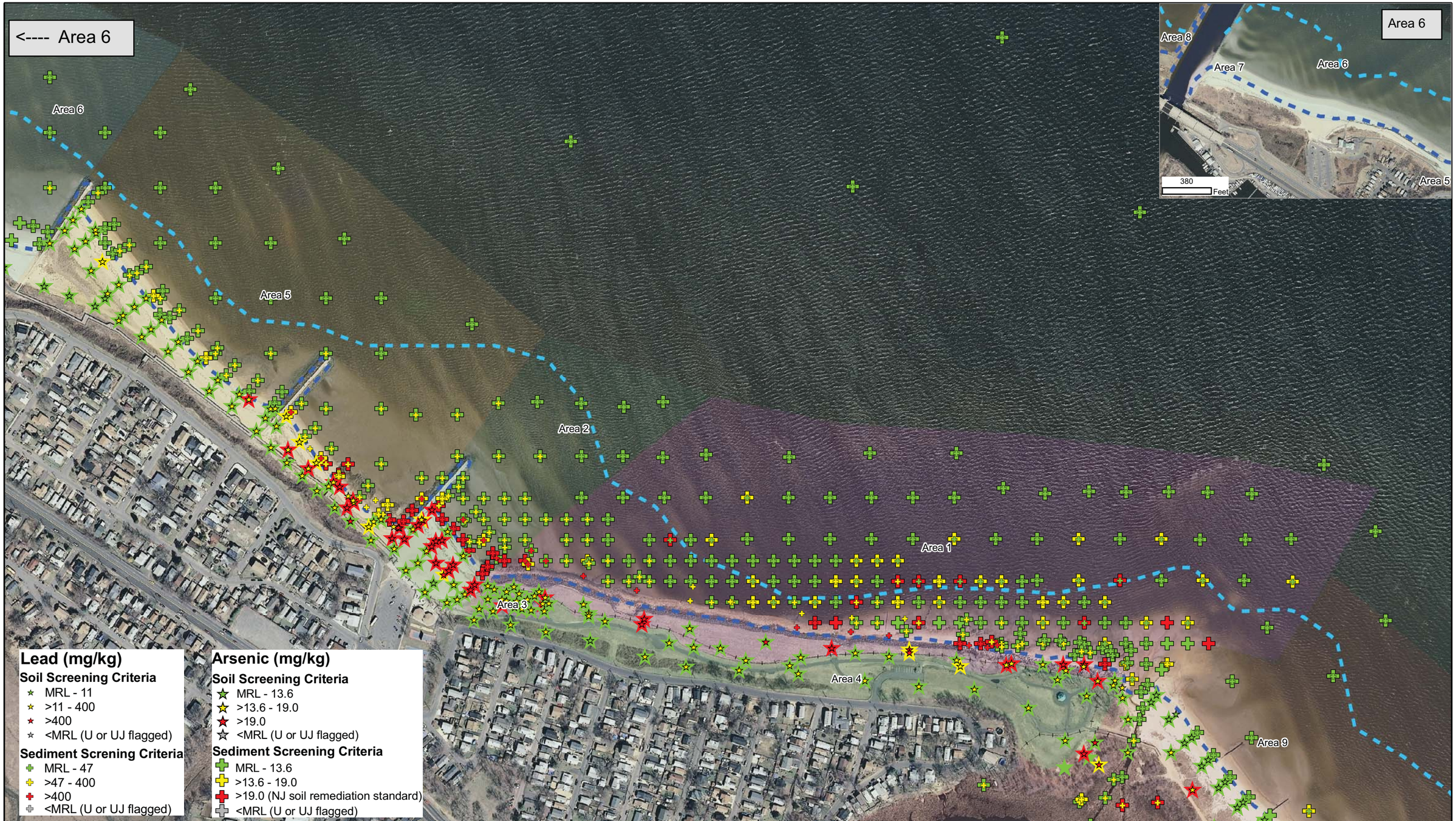
Figure 1-6
Monitoring Well and Staff Gauge Water Level Elevation Hydrographs
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

N

0 350 700 1,400 Feet

EPA

Figure 1-7
Locations of Source Material
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Mean high tide line
Spring low tide line
Fence

Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 260 520 1,040 Feet

EPA

Figure 1-8
Arsenic and Lead - Maximum Surface Concentration (<24 inches)
Seawall Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Mean high tide line
Spring low tide line
Fence

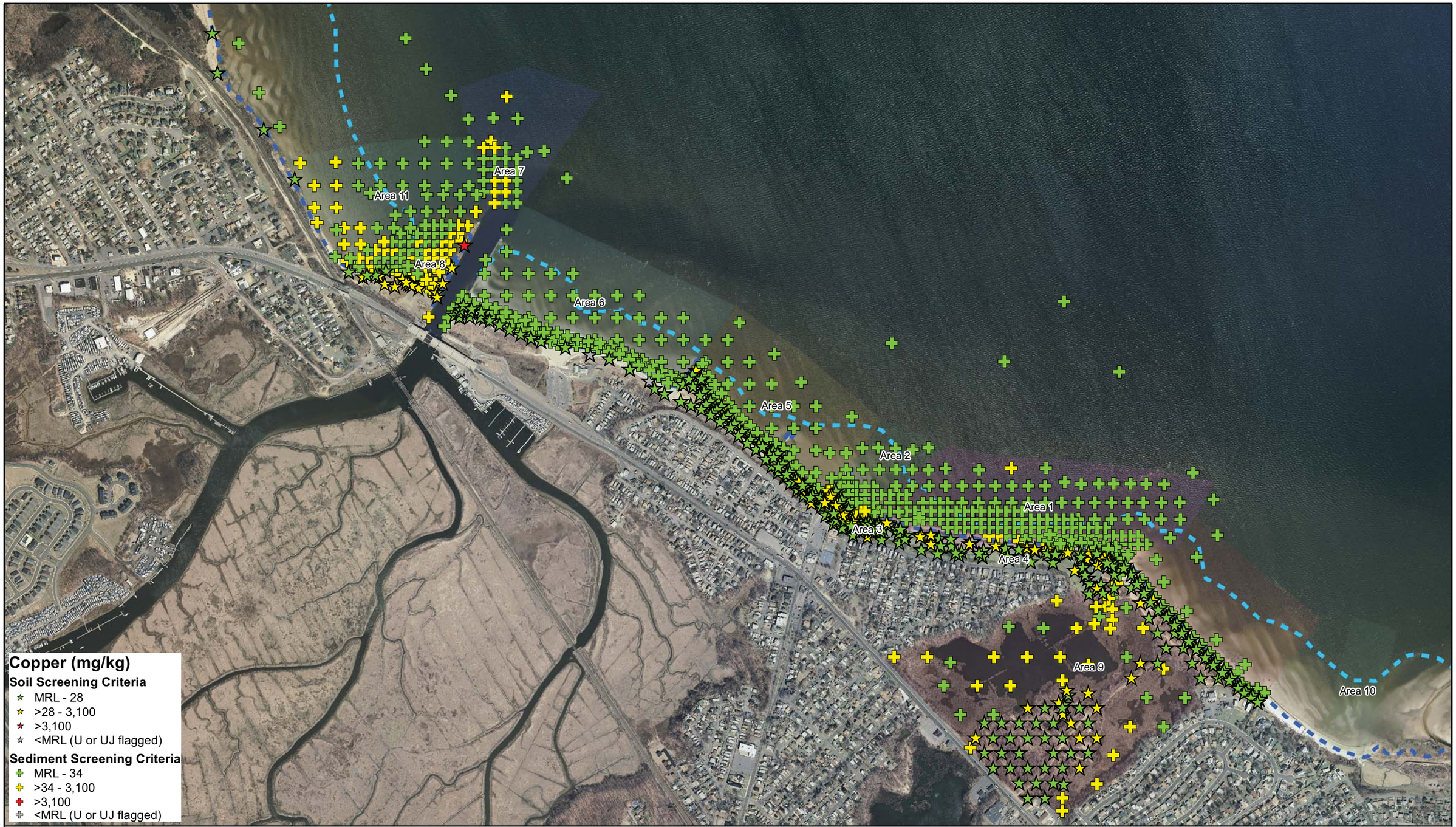
Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 250 500 1,000 Feet

EPA

Figure 1-9
Arsenic and Lead - Maximum Subsurface Concentration (>24 inches)
Seawall Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Mean high tide line
Spring low tide line
Fence

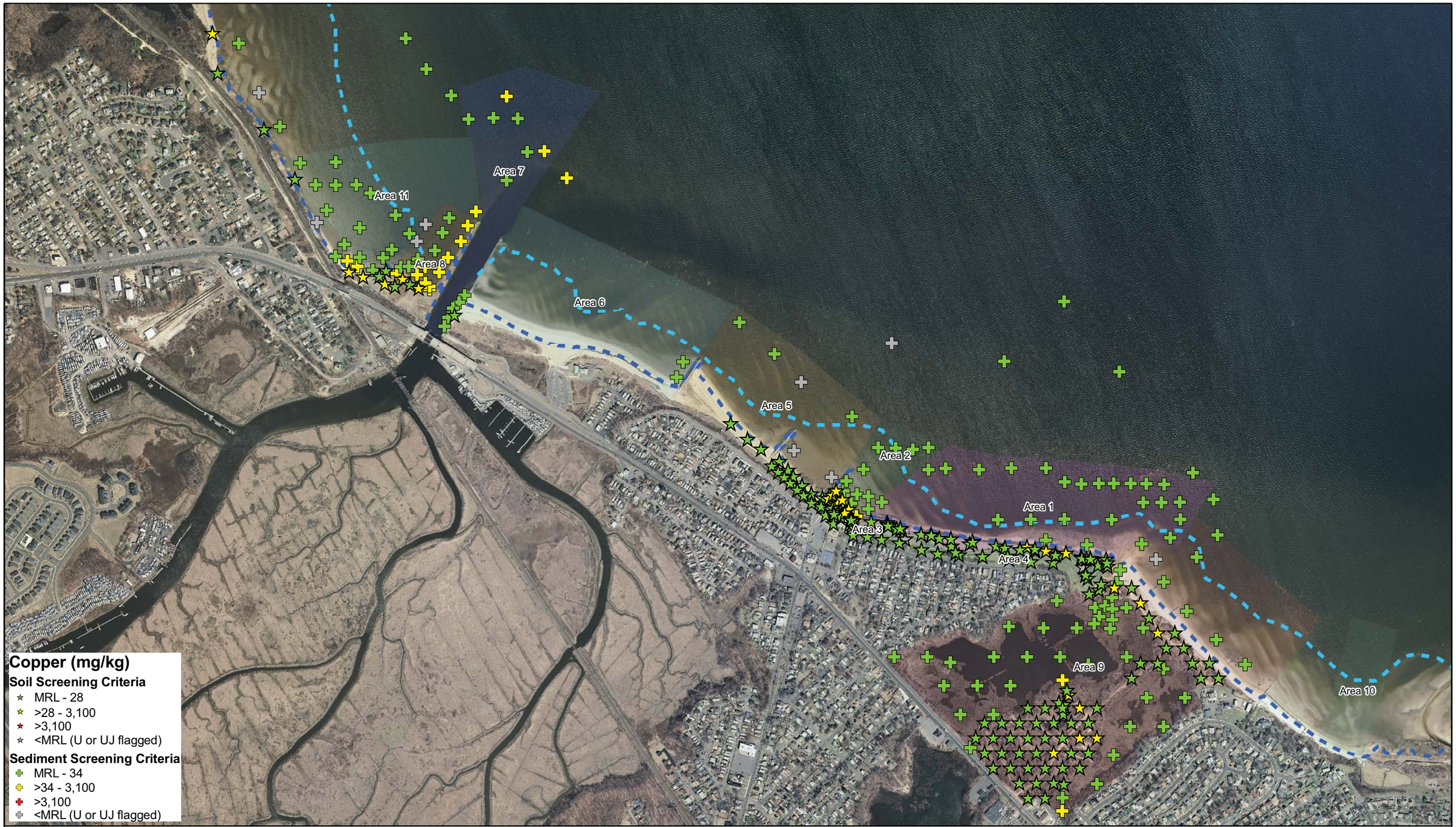
Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 1,000 2,000 4,000 Feet

EPA

Figure 1-10
Copper - Maximum Surface Concentration (<24 inches)
Site Wide
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Mean high tide line
Spring low tide line
Fence

Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 1,000 2,000 4,000 Feet

EPA

Figure 1-11
Copper - Maximum Subsurface Concentration (>24 inches)
Site Wide
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Note
1. The dissolved results for samples collected in 2008, field filtering prior to preservation was not documented in the field logbooks and therefore may not be truly representative of dissolved concentrations.
2. Results from activity-based samples collected in 2008 are included in this figure.

0 750 1,500 3,000 Feet

N

Figure 1-12
Lead - Surface Water Results
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Note
1. The dissolved results for samples collected in 2008, field filtering prior to preservation was not documented in the field logbooks and therefore may not be truly representative of dissolved concentrations.
2. Results from activity-based samples collected in 2008 are included in this figure.

0 750 1,500 3,000 Feet

N

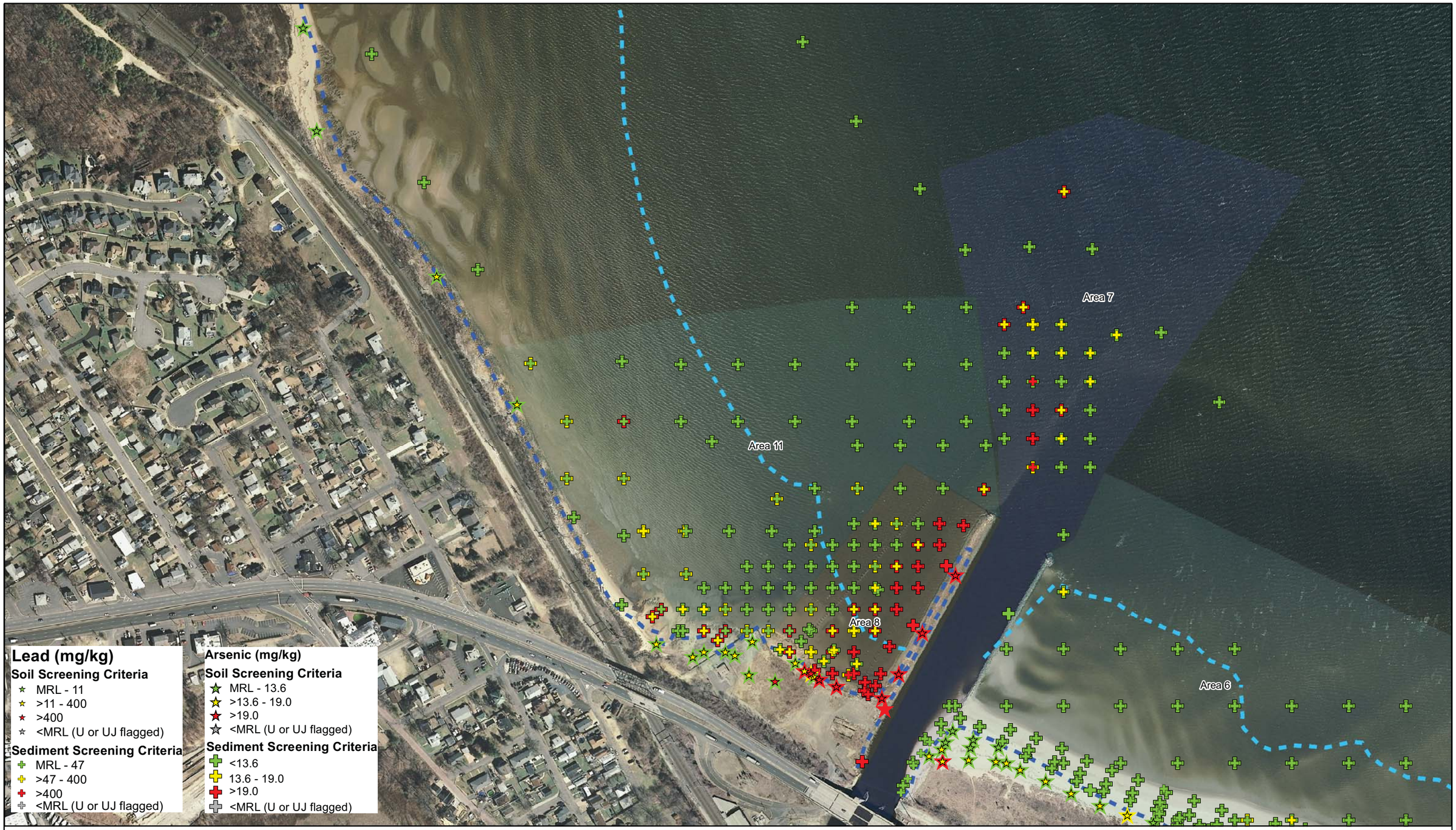
Figure 1-13
Arsenic - Surface Water Results
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Note
1. The dissolved results for samples collected in 2008, field filtering prior to preservation was not documented in the field logbooks and therefore may not be truly representative of dissolved concentrations.
2. Results from activity-based samples collected in 2008 are included in this figure.

0 750 1,500 3,000 Feet

N

Figure 1-14
Copper - Surface Water Results
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Mean high tide line
Spring low tide line
Fence

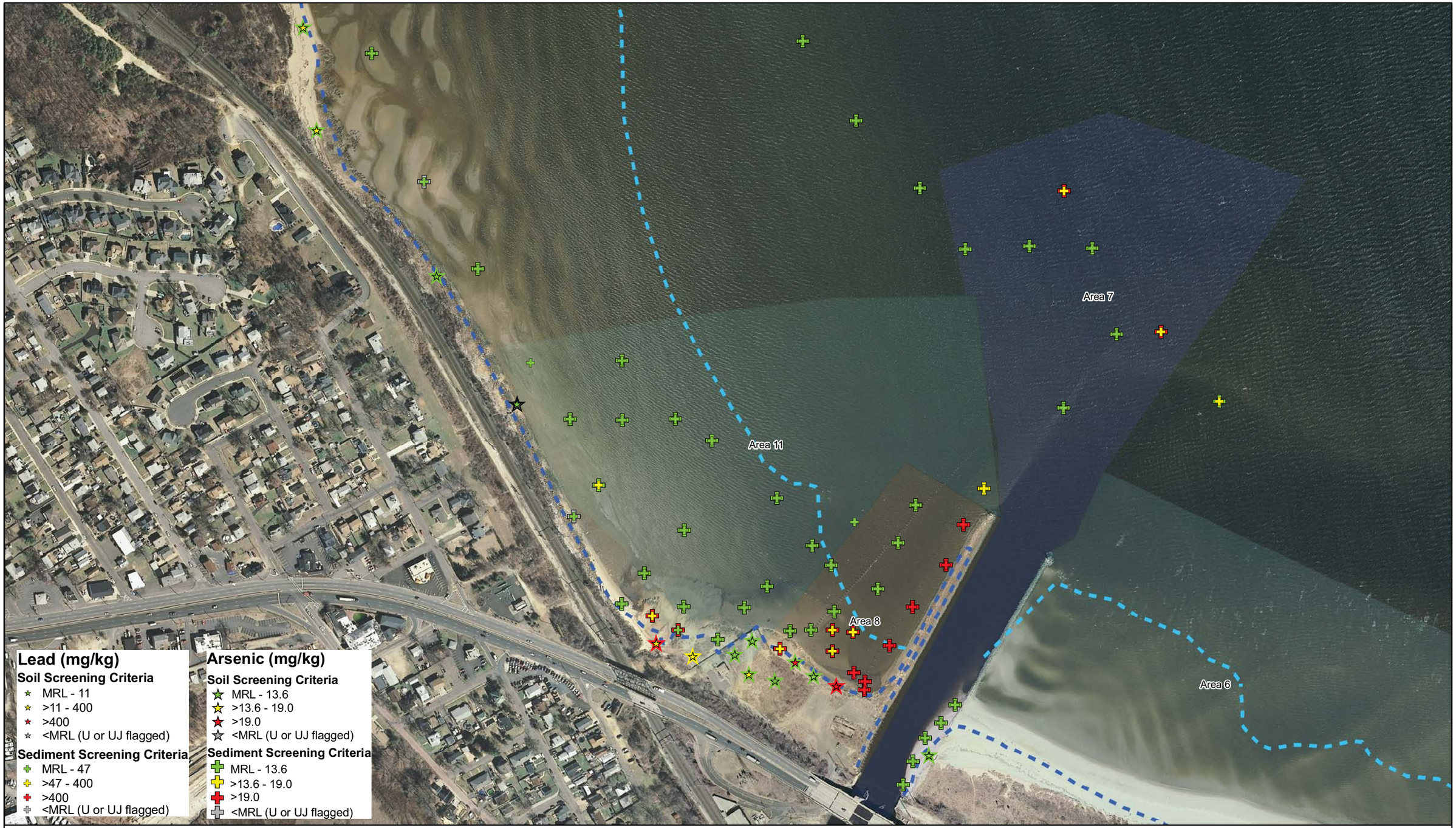
Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 250 500 1,000 Feet

EPA

Figure 1-15
Arsenic and Lead - Maximum Surface Concentration (<24 inches)
Jetty Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Mean high tide line
Spring low tide line
Fence

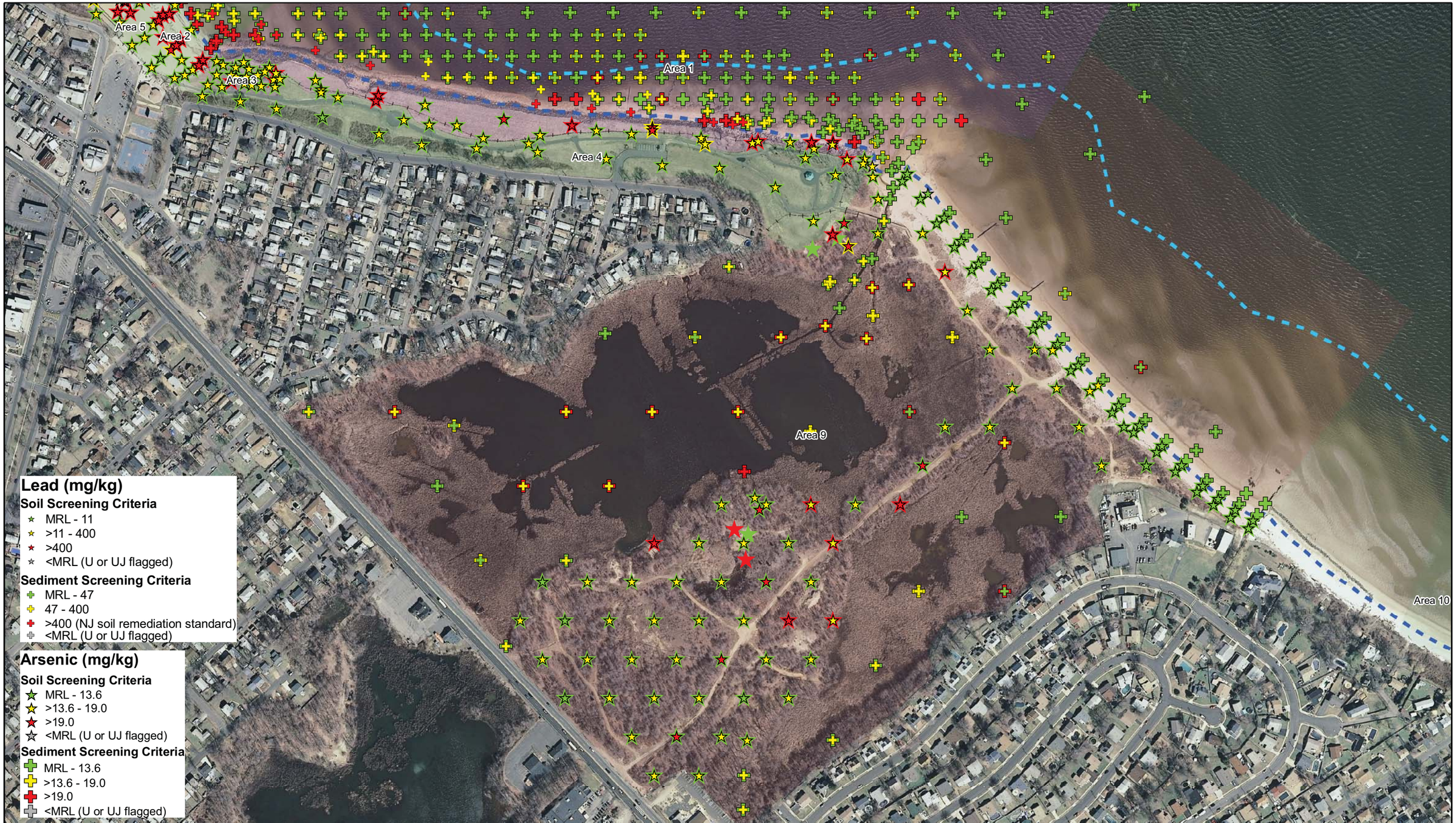
Note:
MRL = method reporting limit
U = not detected
J = estimated

0 250 500 1,000 Feet

N

EPA

Figure 1-16
Arsenic and Lead - Maximum Subsurface Concentration (>24 inches)
Jetty Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Mean high tide line
Spring low tide line
Fence

Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 255 510 1,020 Feet

EPA

Figure 1-17
Arsenic and Lead - Maximum Surface concentration (<24 inches)
Margaret's Creek Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

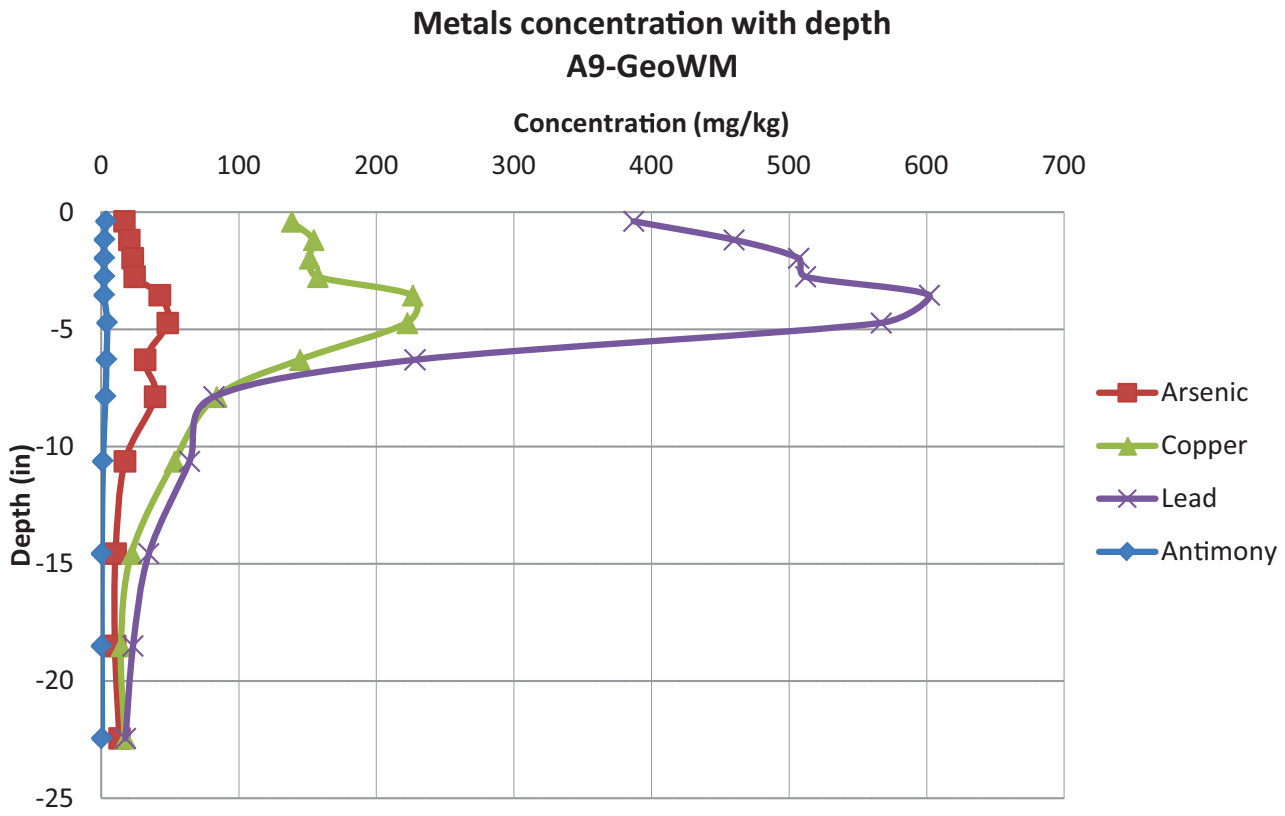
Mean high tide line
Spring low tide line
Fence

Note:
MRL = method reporting limit
U = not detected
J = estimated

N

0 250 500 1,000 Feet

Figure 1-18
Arsenic and Lead - Maximum Subsurface concentration (>24 inches)
Margaret's CreekSector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



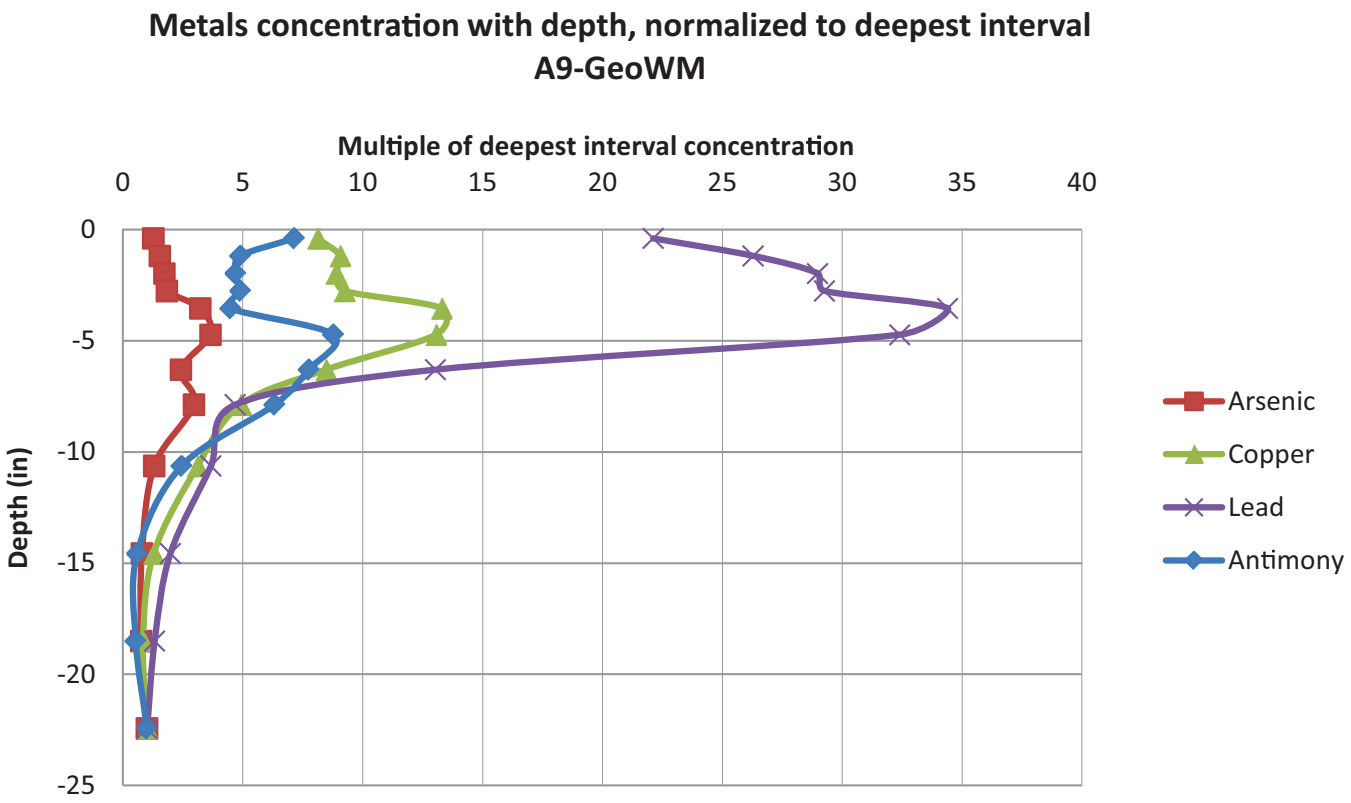
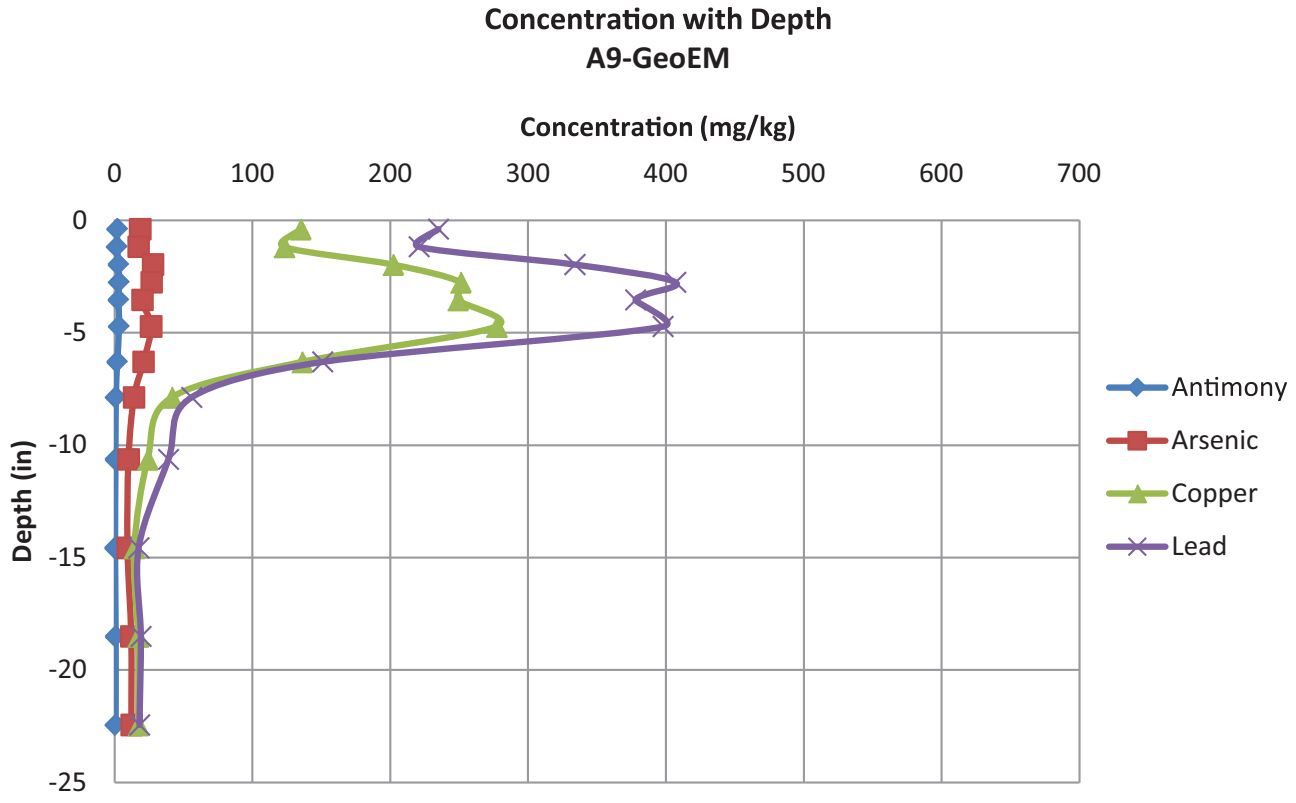


Figure 1-19
Results of High-Resolution Core Analysis
for A9-GeoWM
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



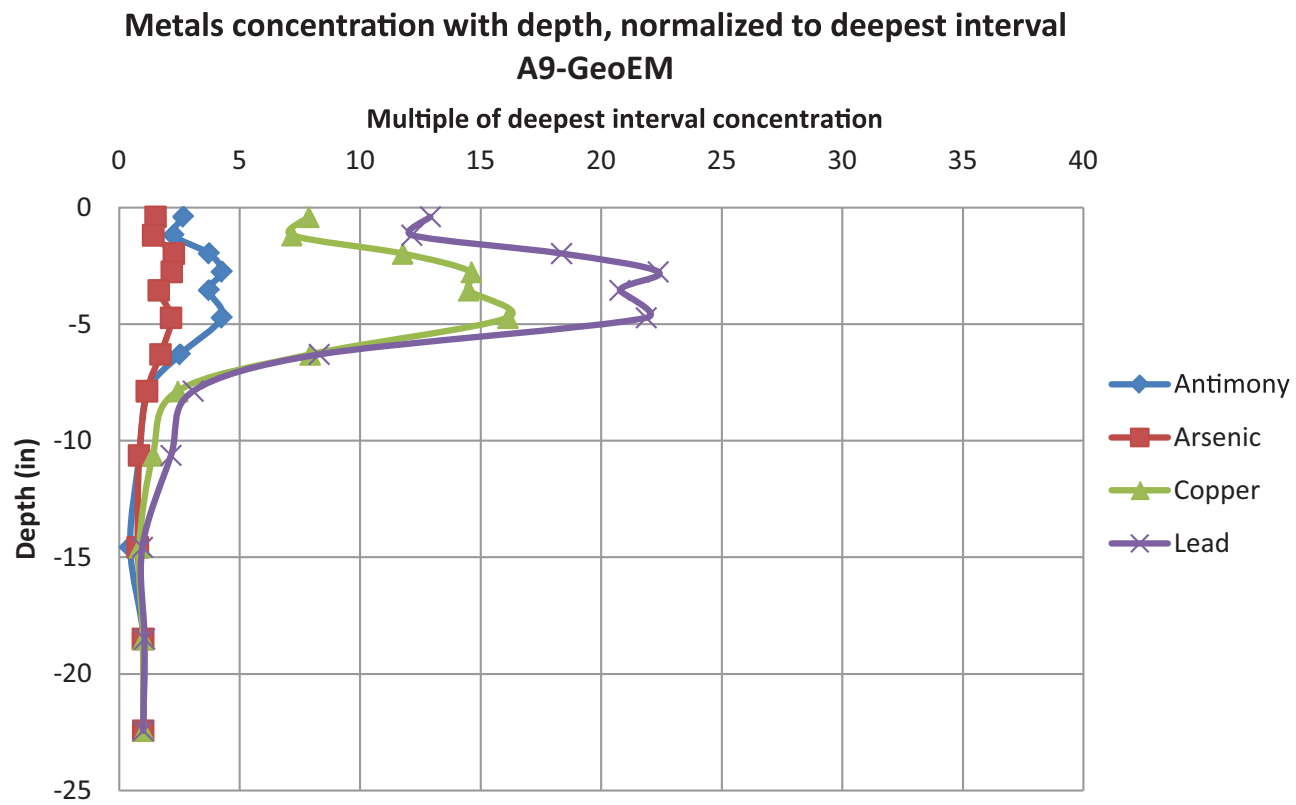
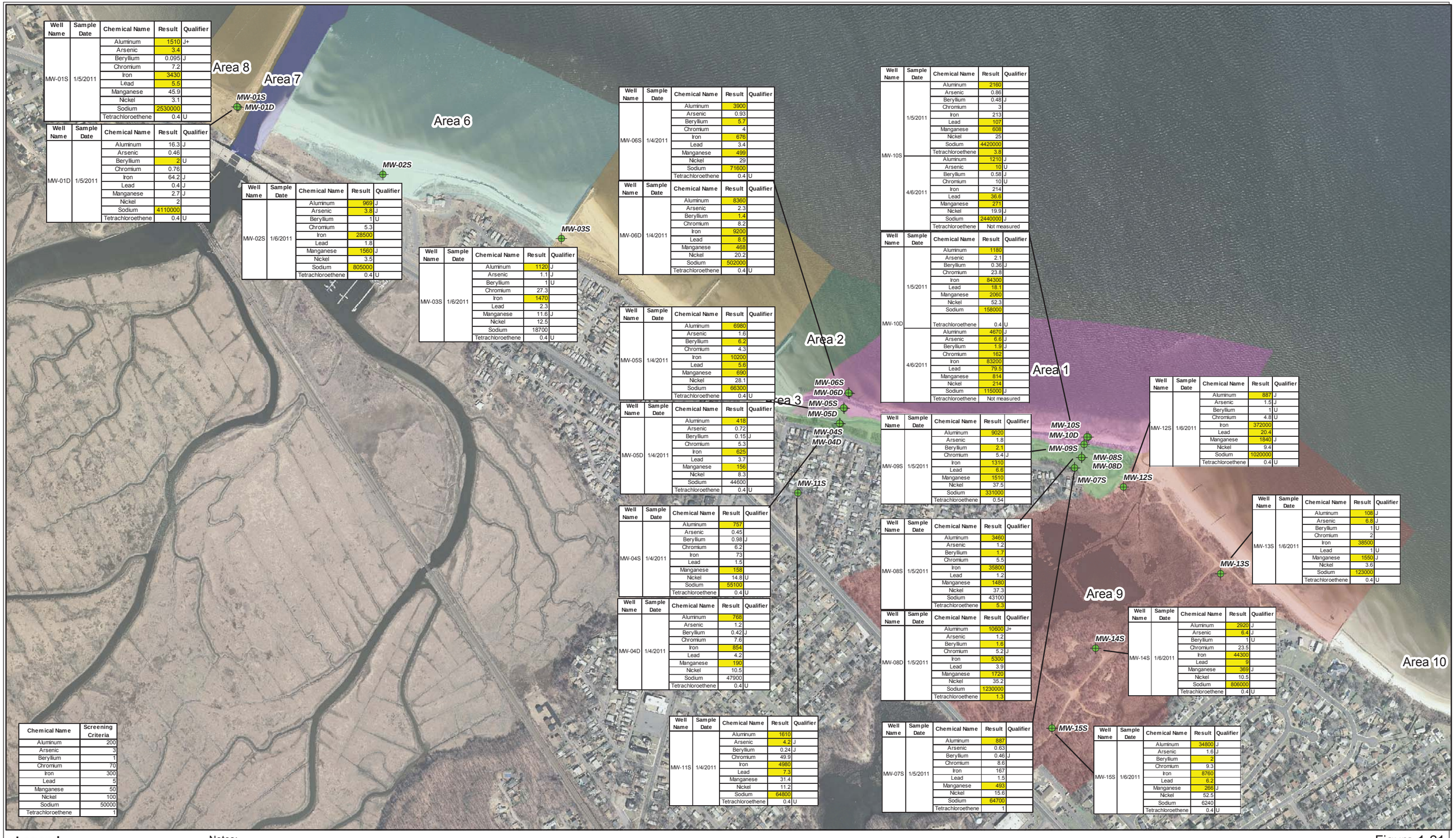


Figure 1-20
Results of High-Resolution Core Analysis
for A9-GeoE M
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-01S	1/5/2011	Aluminum	1510	J+
		Arsenic	3.4	
		Beryllium	0.095	J
		Chromium	7.2	
		Iron	3430	
		Lead	5.5	
		Manganese	45.9	
		Nickel	3.1	
		Sodium	2530000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-01D	1/5/2011	Aluminum	16.3	J
		Arsenic	0.46	
		Beryllium	2	U
		Chromium	0.76	
		Iron	64.2	J
		Lead	0.4	J
		Manganese	2.7	J
		Nickel	2	
		Sodium	4110000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-02S	1/6/2011	Aluminum	969	J
		Arsenic	3.8	J
		Beryllium	1	U
		Chromium	5.3	
		Iron	28500	
		Lead	1.8	
		Manganese	1560	J
		Nickel	3.5	
		Sodium	805000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-03S	1/6/2011	Aluminum	1120	J
		Arsenic	1.1	J
		Beryllium	1	U
		Chromium	27.3	
		Iron	1470	
		Lead	2.3	
		Manganese	11.6	J
		Nickel	12.5	
		Sodium	18700	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-06S	1/4/2011	Aluminum	3900	
		Arsenic	0.93	
		Beryllium	5.7	
		Chromium	4	
		Iron	676	
		Lead	3.4	
		Manganese	499	
		Nickel	29	
		Sodium	71600	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-06D	1/4/2011	Aluminum	8360	
		Arsenic	2.3	
		Beryllium	1.4	
		Chromium	8.2	
		Iron	9200	
		Lead	8.5	
		Manganese	468	
		Nickel	20.2	
		Sodium	502000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-05S	1/4/2011	Aluminum	6980	
		Arsenic	1.6	
		Beryllium	6.2	
		Chromium	4.3	
		Iron	10200	
		Lead	5.6	
		Manganese	690	
		Nickel	28.1	
		Sodium	66300	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-05D	1/4/2011	Aluminum	418	
		Arsenic	0.72	
		Beryllium	0.15	J
		Chromium	5.3	
		Iron	625	
		Lead	3.7	
		Manganese	156	
		Nickel	8.3	
		Sodium	44600	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-04S	1/4/2011	Aluminum	757	
		Arsenic	0.45	
		Beryllium	0.98	J
		Chromium	6.2	
		Iron	73	
		Lead	1.5	
		Manganese	158	
		Nickel	14.8	U
		Sodium	55100	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-04D	1/4/2011	Aluminum	768	
		Arsenic	1.2	
		Beryllium	0.42	J
		Chromium	7.6	
		Iron	854	
		Lead	4.2	
		Manganese	190	
		Nickel	10.5	
		Sodium	47900	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-11S	1/4/2011	Aluminum	1610	
		Arsenic	4.2	J
		Beryllium	0.24	J
		Chromium	49.9	
		Iron	4980	
		Lead	7.3	
		Manganese	31.4	
		Nickel	11.2	
		Sodium	64800	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-10S	1/5/2011	Aluminum	2160	
		Arsenic	0.86	
		Beryllium	0.48	J
		Chromium	3	
		Iron	213	
		Lead	107	
		Manganese	608	
		Nickel	25	
		Sodium	4420000	
		Tetrachloroethene	3.8	
	4/6/2011	Aluminum	1210	J
		Arsenic	10	U
		Beryllium	0.58	J
		Chromium	10	U
		Iron	214	
		Lead	36.6	
		Manganese	271	
		Nickel	19.9	J
		Sodium	2440000	J
		Tetrachloroethene	Not measured	

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-10D	1/5/2011	Aluminum	1180	
		Arsenic	2.1	
		Beryllium	0.36	J
		Chromium	23.8	
		Iron	84300	
		Lead	18.1	
		Manganese	2060	
		Nickel	52.3	
		Sodium	158000	
		Tetrachloroethene	0.4	U
	4/6/2011	Aluminum	4670	J
		Arsenic	6.6	J
		Beryllium	1.9	J
		Chromium	162	
		Iron	83200	
		Lead	79.5	
		Manganese	814	
		Nickel	214	
		Sodium	115000	J
		Tetrachloroethene	Not measured	

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-09S	1/5/2011	Aluminum	9020	
		Arsenic	1.8	
		Beryllium	2.1	
		Chromium	5.4	J
		Iron	1310	
		Lead	6.6	
		Manganese	1510	
		Nickel	37.5	
		Sodium	331000	
		Tetrachloroethene	0.54	

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-08S	1/5/2011	Aluminum	3460	
		Arsenic	1.2	
		Beryllium	1.7	
		Chromium	5.5	
		Iron	35800	
		Lead	1.2	
		Manganese	1480	
		Nickel	37.3	
		Sodium	43100	
		Tetrachloroethene	5.3	

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-08D	1/5/2011	Aluminum	10600	J+
		Arsenic	1.2	
		Beryllium	1.6	
		Chromium	5.2	J
		Iron	5300	
		Lead	3.9	
		Manganese	1720	
		Nickel	35.2	
		Sodium	1230000	
		Tetrachloroethene	1.3	

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-07S	1/5/2011	Aluminum	887	
		Arsenic	0.63	
		Beryllium	0.46	J
		Chromium	8.6	
		Iron	167	
		Lead	1.5	
		Manganese	493	
		Nickel	15.6	
		Sodium	64700	
		Tetrachloroethene	1	

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-12S	1/6/2011	Aluminum	887	J
		Arsenic	1.5	J
		Beryllium	1	U
		Chromium	4.8	U
		Iron	372000	
		Lead	20.4	
		Manganese	1840	J
		Nickel	9.4	
		Sodium	1020000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-13S	1/6/2011	Aluminum	108	J
		Arsenic	6.8	J
		Beryllium	1	U
		Chromium	2	
		Iron	38500	
		Lead	1	U
		Manganese	1550	J
		Nickel	3.6	
		Sodium	123000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-14S	1/6/2011	Aluminum	2920	J
		Arsenic	6.4	J
		Beryllium	1	U
		Chromium	23.5	
		Iron	44300	
		Lead	9	
		Manganese	369	J
		Nickel	10.5	
		Sodium	806000	
		Tetrachloroethene	0.4	U

Well Name	Sample Date	Chemical Name	Result	Qualifier
MW-15S	1/6/2011	Aluminum	34800	J
		Arsenic	1.6	J
		Beryllium	2	
		Chromium	9.3	
		Iron	8760	
		Lead	6.2	
		Manganese	266	J
		Nickel	52.5	
		Sodium	6240	
		Tetrachloroethene	0.4	U

Chemical Name	Screening Criteria
Aluminum	200
Arsenic	3
Beryllium	1
Chromium	70
Iron	300
Lead	5
Manganese	50
Nickel	100
Sodium	50000
Tetrachloroethene	1

Legend

Monitoring Well Locations

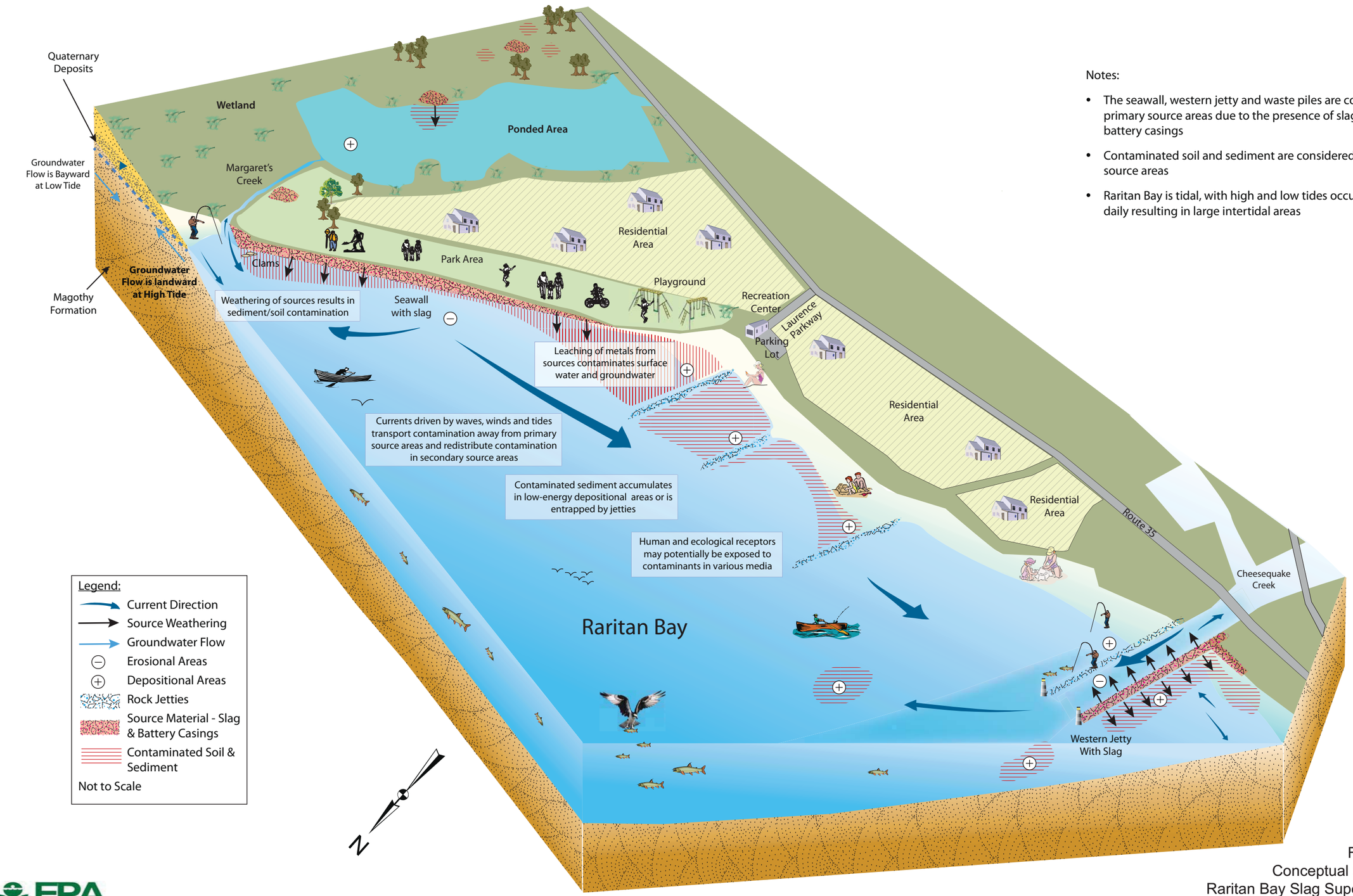
EPA

Notes:
All units in µg/L.
Results exceeding screening criteria are highlighted.
Antimony and copper do not exceed screening criteria in wells sampled.
J: Estimated concentration.
J+: Estimated concentration is biased high.
U: Compound was analyzed for but not detected.

N

600 300 0 600 Feet

Figure 1-21
Groundwater Sampling Results
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



Notes:

- The seawall, western jetty and waste piles are considered primary source areas due to the presence of slag and battery casings
- Contaminated soil and sediment are considered secondary source areas
- Raritan Bay is tidal, with high and low tides occurring twice daily resulting in large intertidal areas

EPA

Figure 1-22
Conceptual Site Model
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

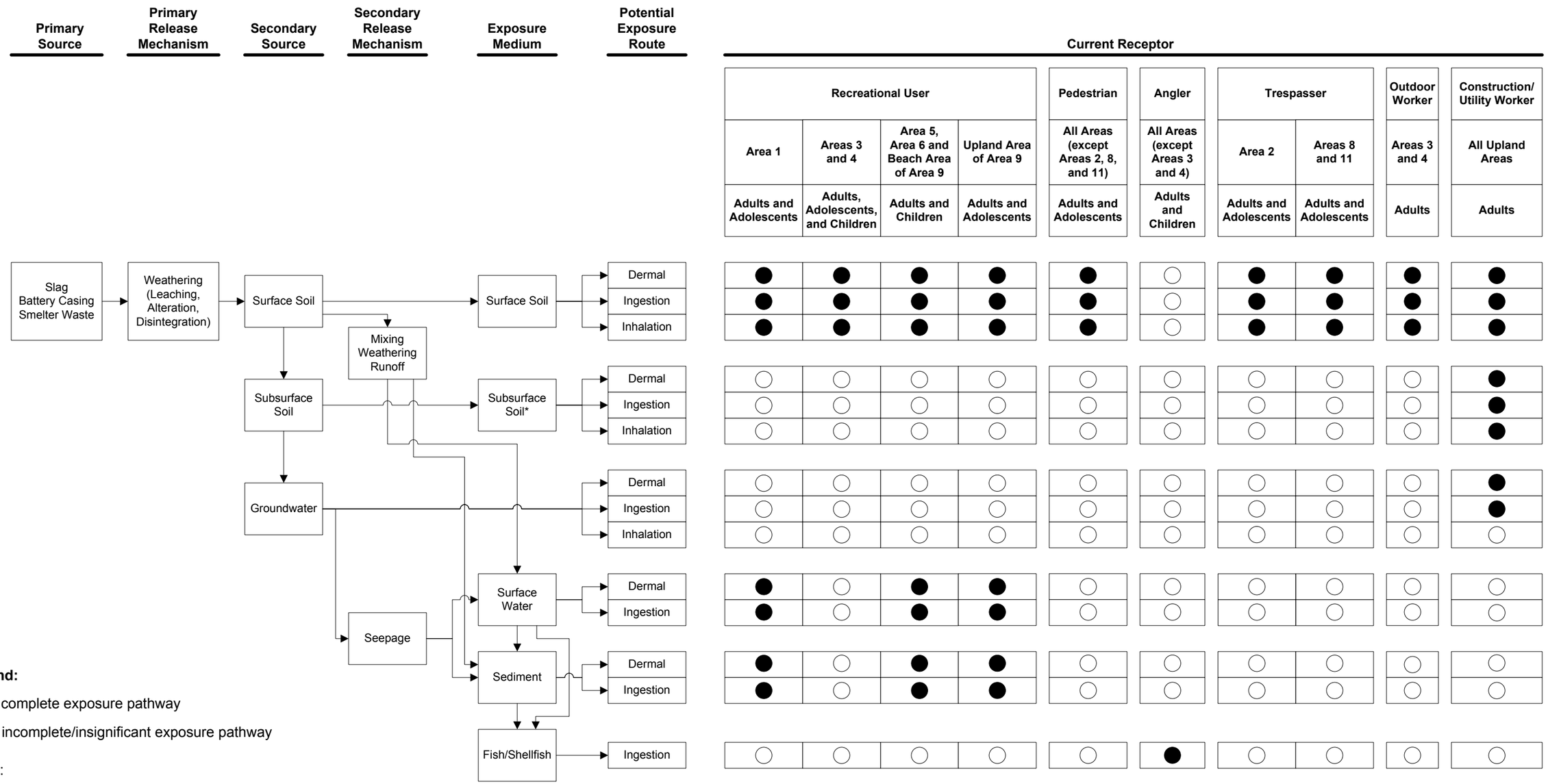
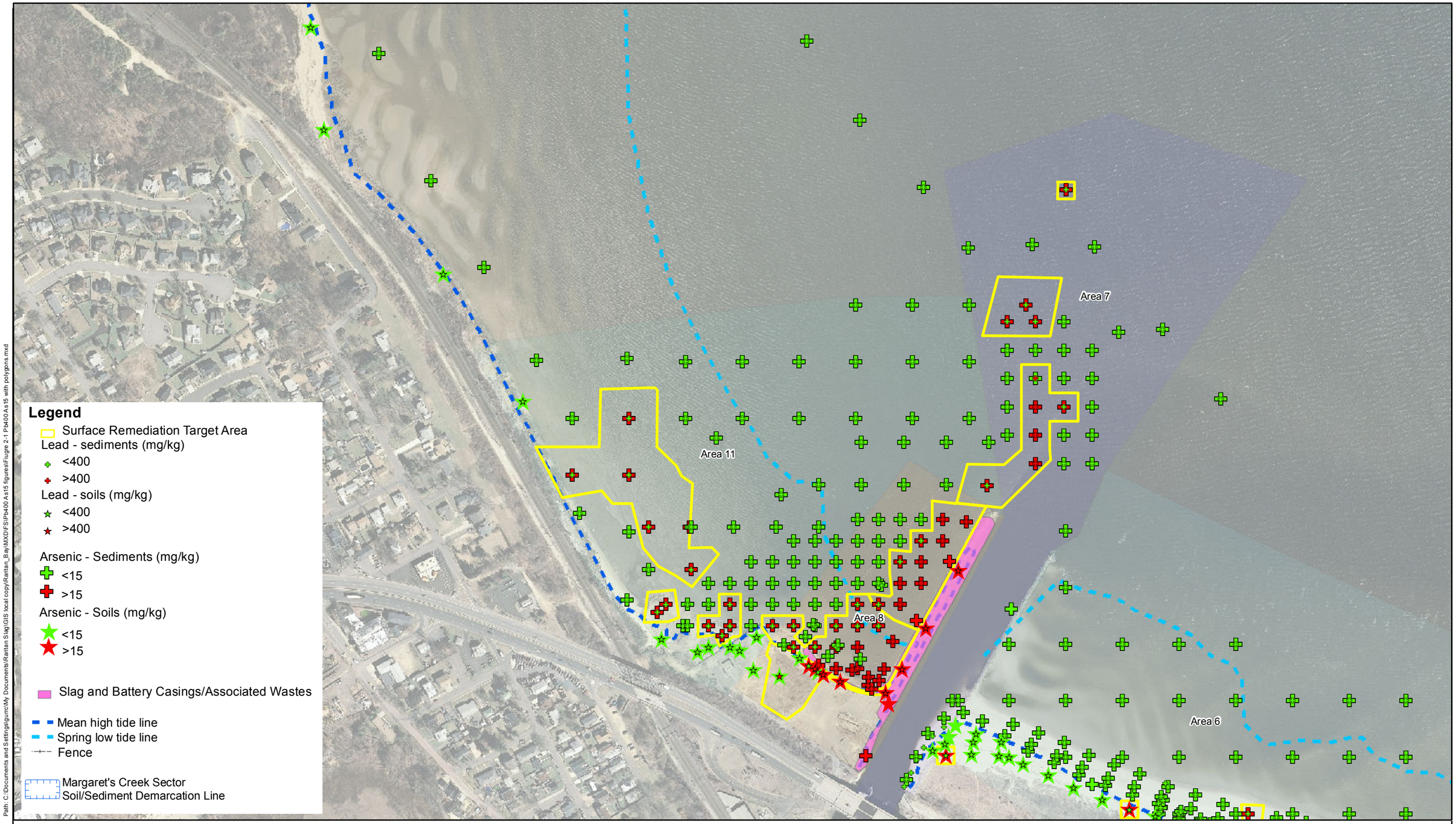


Figure 1-23
Conceptual Site Model - Current Land Use Scenario
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey



N

0 125 250 500 Feet

1. The depth of remediation extends from 0 to 2 feet below ground surface for all areas
2. Source areas consisting of slag and battery casings/associated wastes were delineated based on the slag survey performed in January 2011
3. The soil and sediment remediation target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Figure 2-1a
Surface Remediation Target Areas
Jetty Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA

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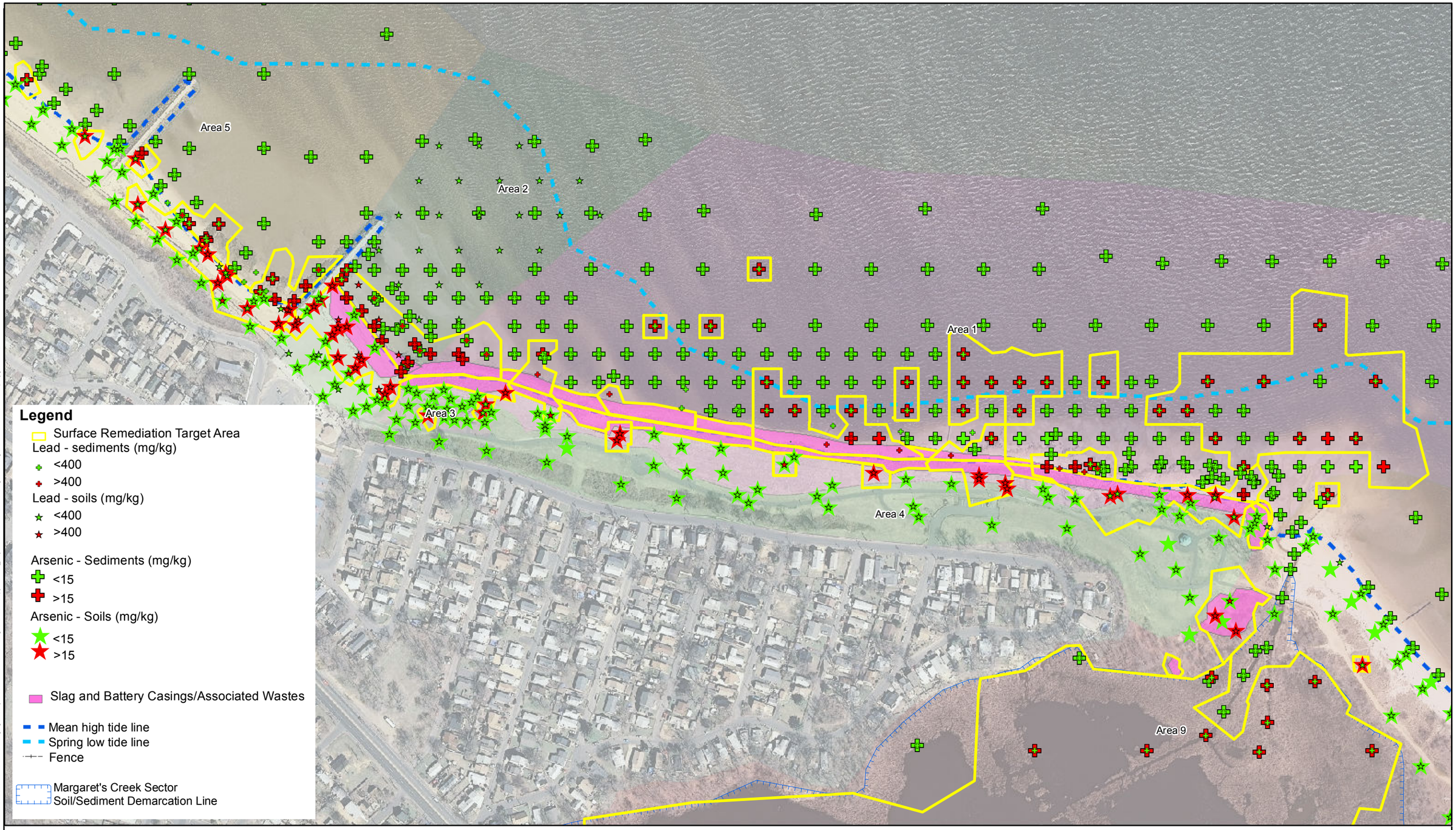

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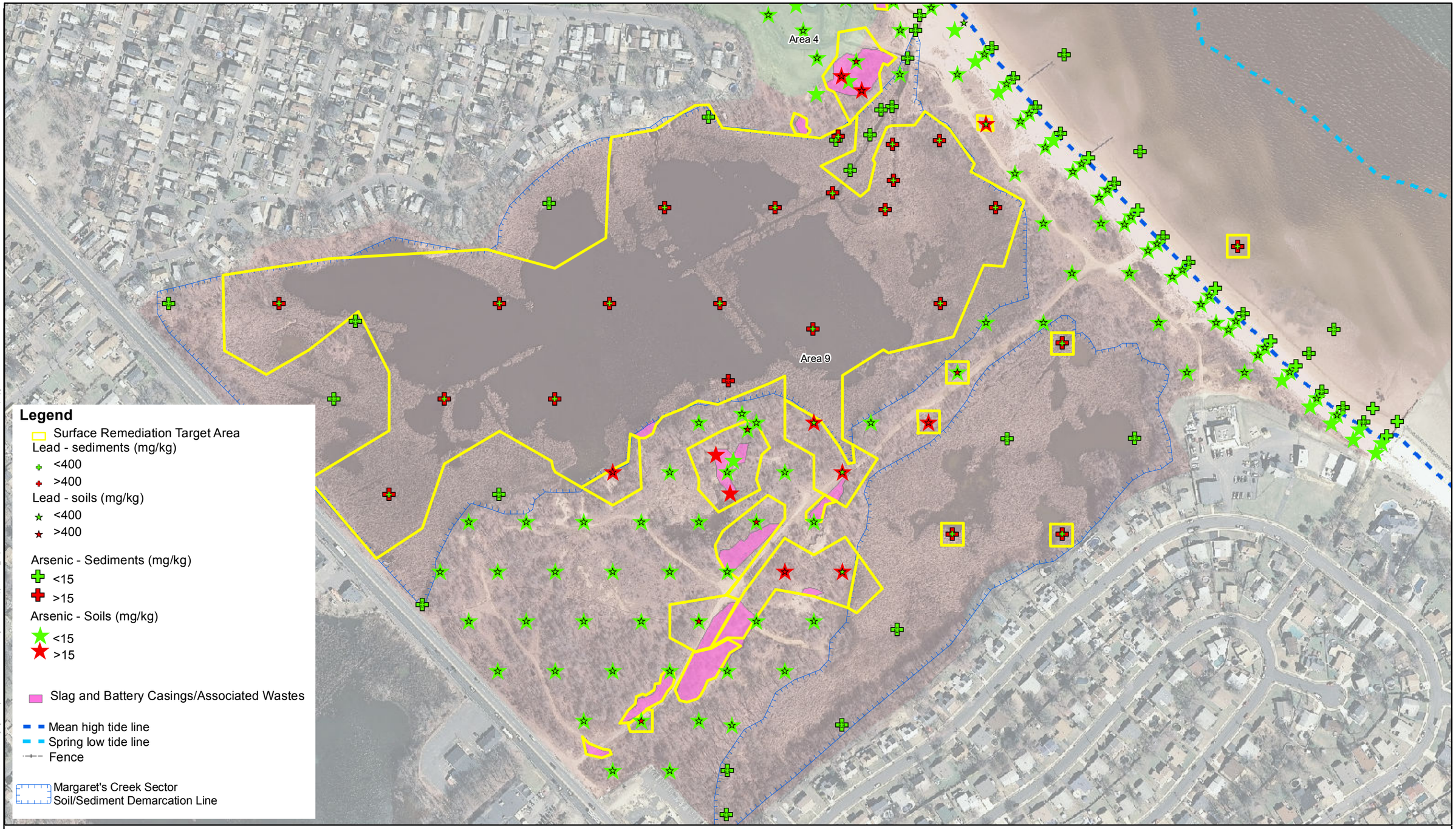
N

0 125 250 500 Feet

1. The depth of remediation extends from 0 to 2 feet below ground surface for all areas
2. Source areas consisting of slag and battery casings/associated wastes were delineated based on the slag survey performed in January 2011
3. The soil and sediment remediation target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Figure 2-1b
Surface Remediation Target Areas
Seawall Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



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N

0 125 250 500 Feet

1. The depth of remediation extends from 0 to 2 feet below ground surface for all areas
2. Source areas consisting of slag and battery casings/associated wastes were delineated based on the slag survey performed in January 2011
3. The soil and sediment remediation target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)
4. In the Margaret's Creek Sector, the term "sediment" refers to all contaminated solids other than slag and battery casings/associated wastes that are continuously inundated and "soil" refers to all contaminated solids other than slag and battery casings/associated that lie upland.

Figure 2-1c
Surface Remediation Target Areas
Margaret's Creek Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA

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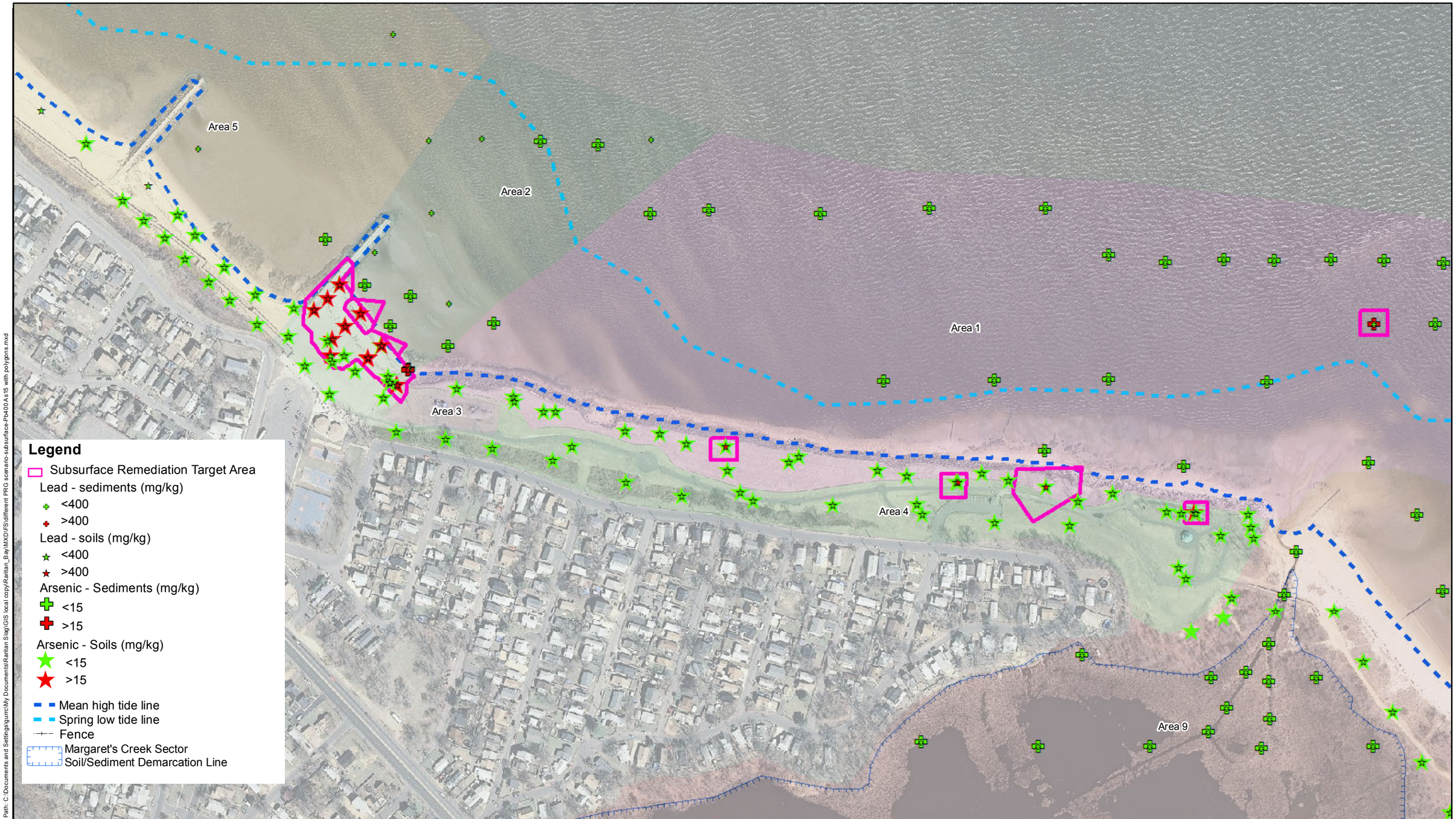
N

0 125 250 500 Feet

NOTES
1. The remediation target area extends from 2 feet below ground surface to approximately the depth of the deepest contaminated sample
2. The target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Figure 2-2a
Subsurface Remediation Target Areas
Jetty Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



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N

0 125 250 500 Feet

NOTES
1. The remediation target area extends from 2 feet below ground surface to approximately the depth of the deepest contaminated sample
2. The target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Figure 2-2b
Subsurface Remediation Target Areas
Seawall Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

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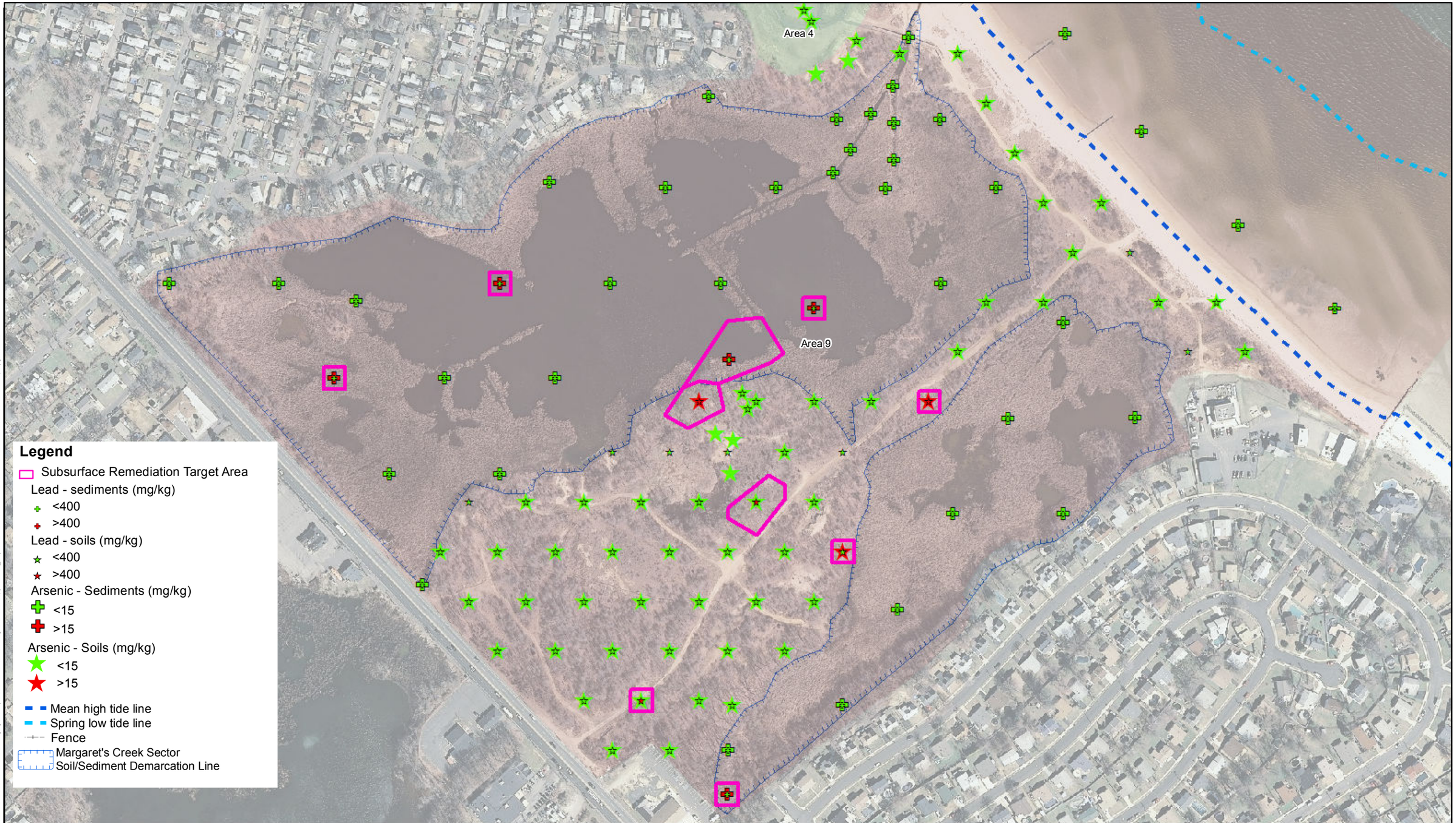

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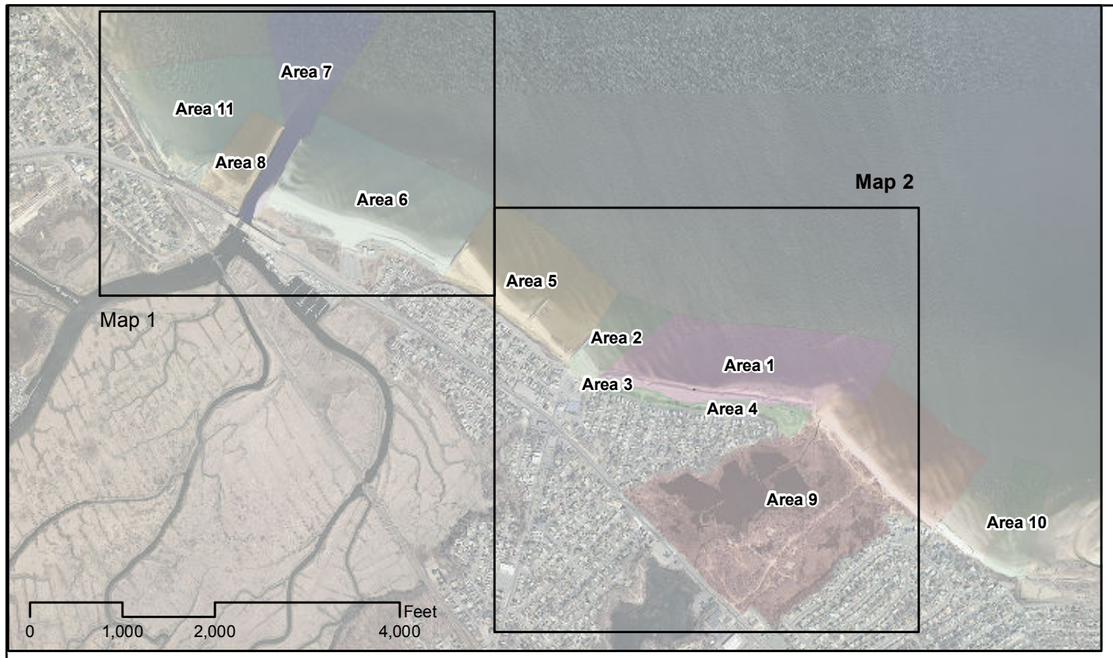
N

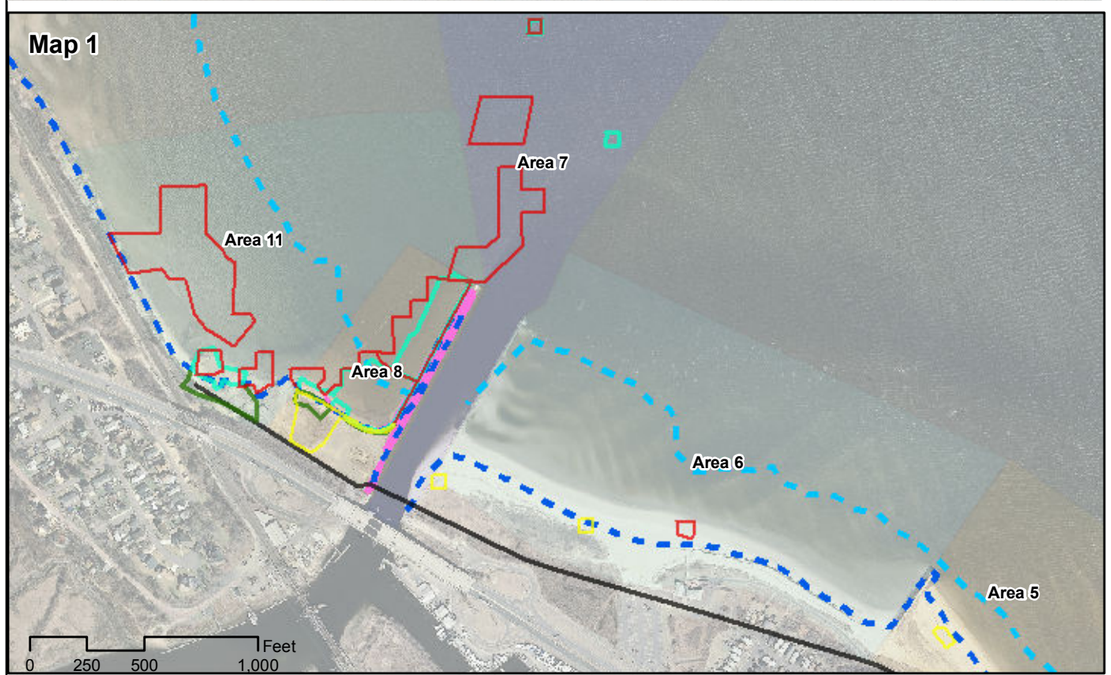
0 125 250 500 Feet

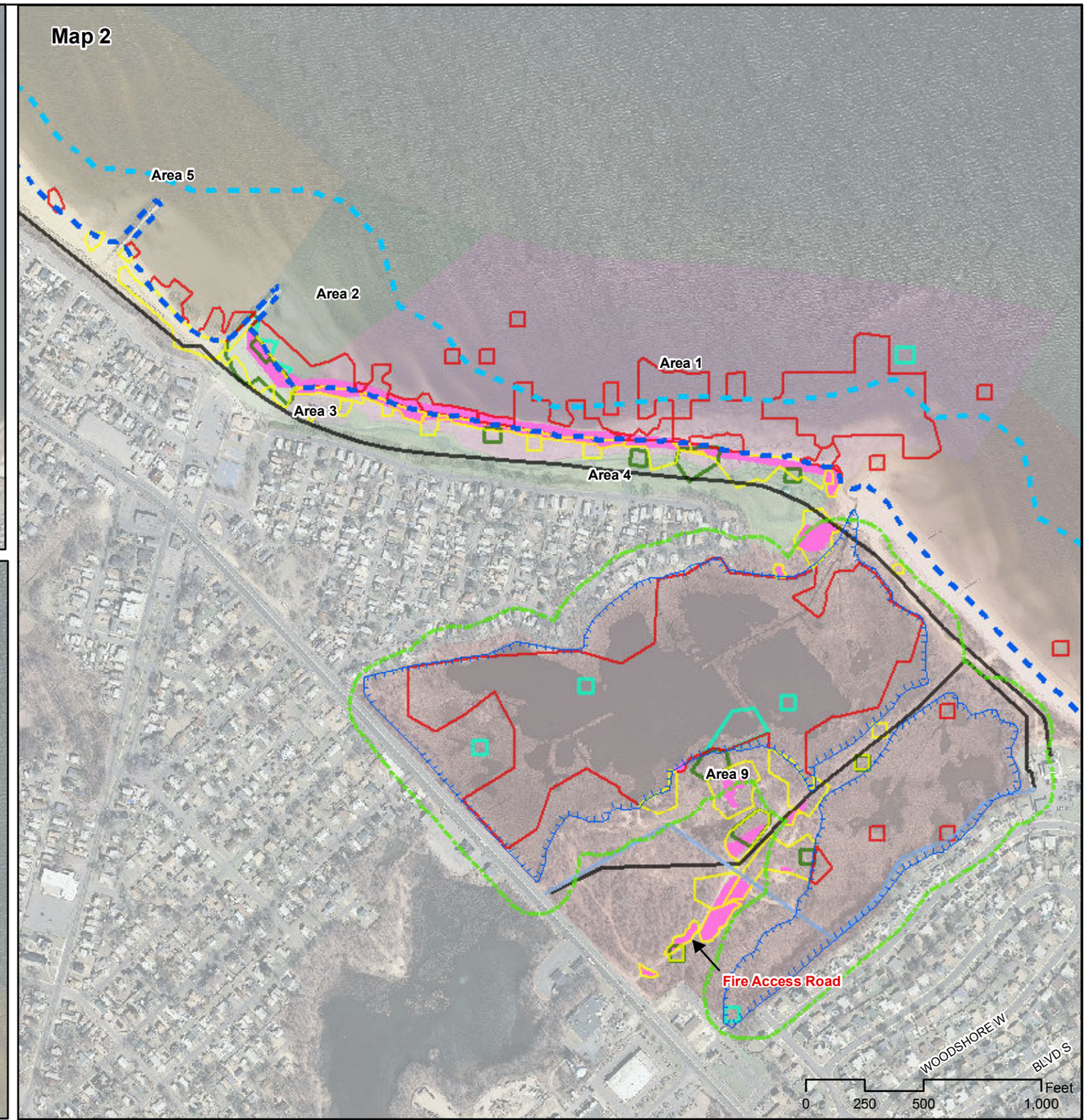
NOTES
1. The remediation target area extends from 2 feet below ground surface to approximately the depth of the deepest contaminated sample
2. The target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Figure 2-2c
Subsurface Remediation Target Areas
Margaret's Creek Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA







Legend

Surface Remediation Target Area

- Surface Soil
- Surface Sediment

Subsurface Remediation Target Area

- Subsurface Soil
- Subsurface Sediment
- Slag and Battery Casings/Associated Wastes

- Existing Sewerline
- Abandoned Sewerline
- Mean high tide line
- Spring low tide line
- Wetlands and wetland transition zone (estimated)

1. Alternative 2 consists of removal and off-site disposal of contaminated materials, long-term monitoring and institutional controls (ICs).
2. The slag and battery casings/associated wastes will be removed from the areas shown and disposed of to Subtitle C landfill.
3. The contaminated soil will be excavated and disposed of to Subtitle D or Subtitle C landfill based on the TCLP test results.
4. The contaminated sediment will be dredged, dewatered and disposed of to a Subtitle D or Subtitle C landfill based on the TCLP test results.
5. IC measures consist of :
   i. restrictions on fishing or other recreational activities in site areas
   ii. restrictions on drilling wells and groundwater use in contaminated areas
   iii. programs to increase community awareness of potential hazards of exposure to contaminant compounds, ways to prevent exposure, and information on the remedial measures and
   iv. deed restriction where applicable
6. The existing sewerline is based on Laurence Harbor Force Main Drawings, dated June 1986 and Laurence Harbor Interceptor overall site plan dated March 2007 provided by Old Bridge Municipal Utilities Authority.

Figure 4-1
Conceptual Design for Alternative 2 - Off-Site Disposal
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

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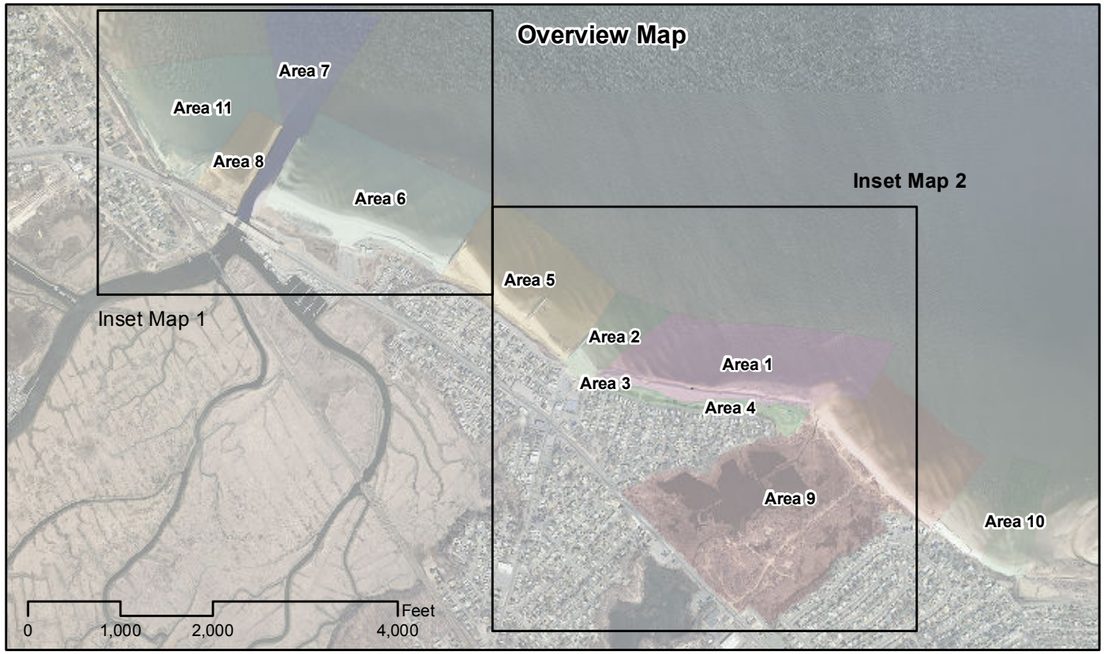

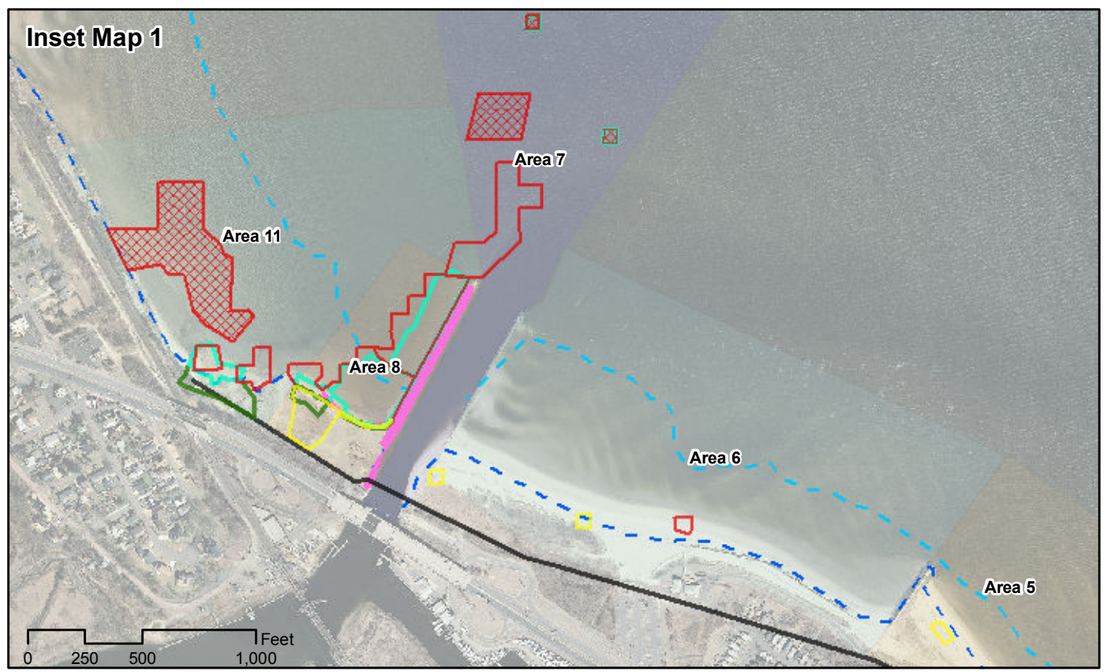

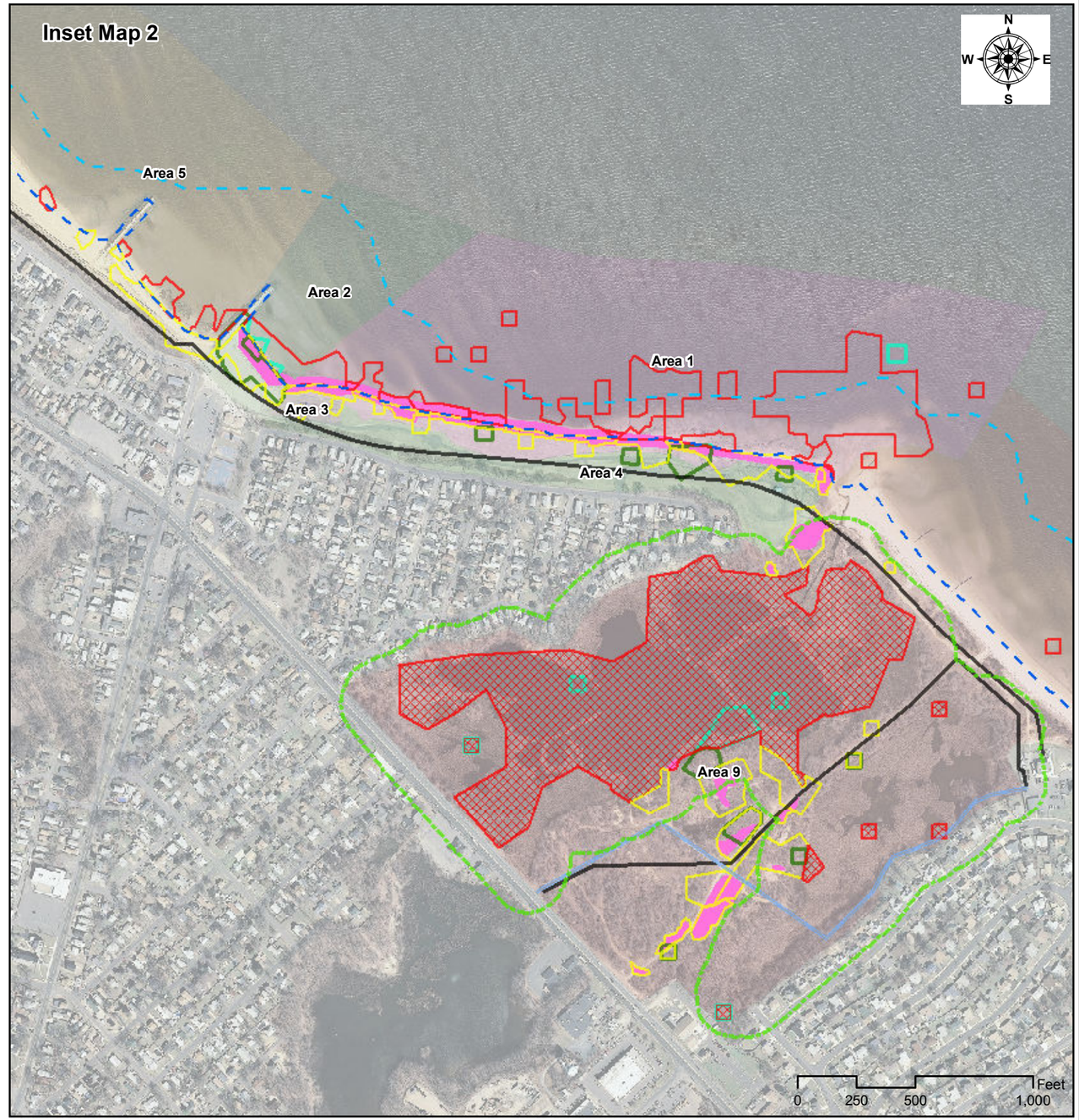

Legend

- Remedy = MNR

Remedy = Removal

- Surface Soil
- Surface Sediment
- Subsurface Soil
- Subsurface Sediment
- Wetlands and wetland transition zone (estimated)
- Existing Sewerline
- Abandoned Sewerline
- Mean high tide line
- Spring low tide line
- Slag and Battery Casings/Associated Wastes

1. Alternative 3 consists of the following components:
   i. Monitored Natural Recovery of contaminated sediment in Margaret's Creek wetlands and select portions of Areas 7 and 11
   ii. Removal and off-site disposal of remaining contaminated materials
   iii. Long-term monitoring and institutional control measures
2. The removal and off-site disposal component of Alternative 3 would be conceptually similar to Alternative 2, except for the reduced volumes.
3. The existing sewer line is based on Laurence Harbor Force Main Drawings, dated June 1986 and Laurence Harbor Interceptor overall site plan dated March 2007 provided by Old Bridge Municipal Utilities Authority.

Figure 4-2
Conceptual Design for Alternative 3 - Off-Site Disposal and MNR
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

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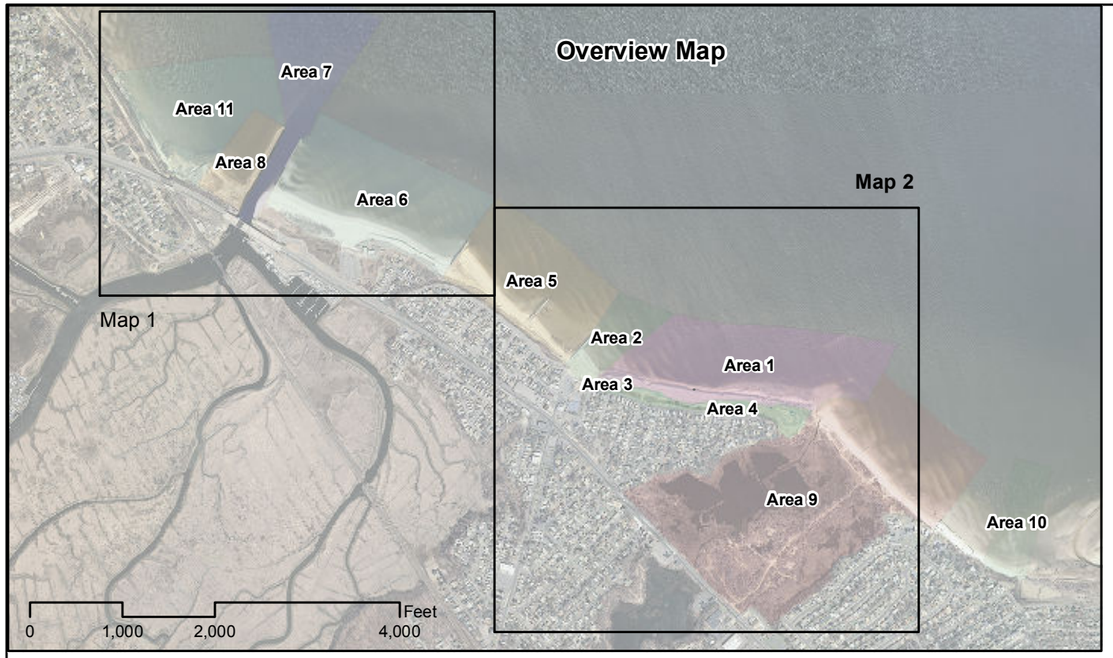

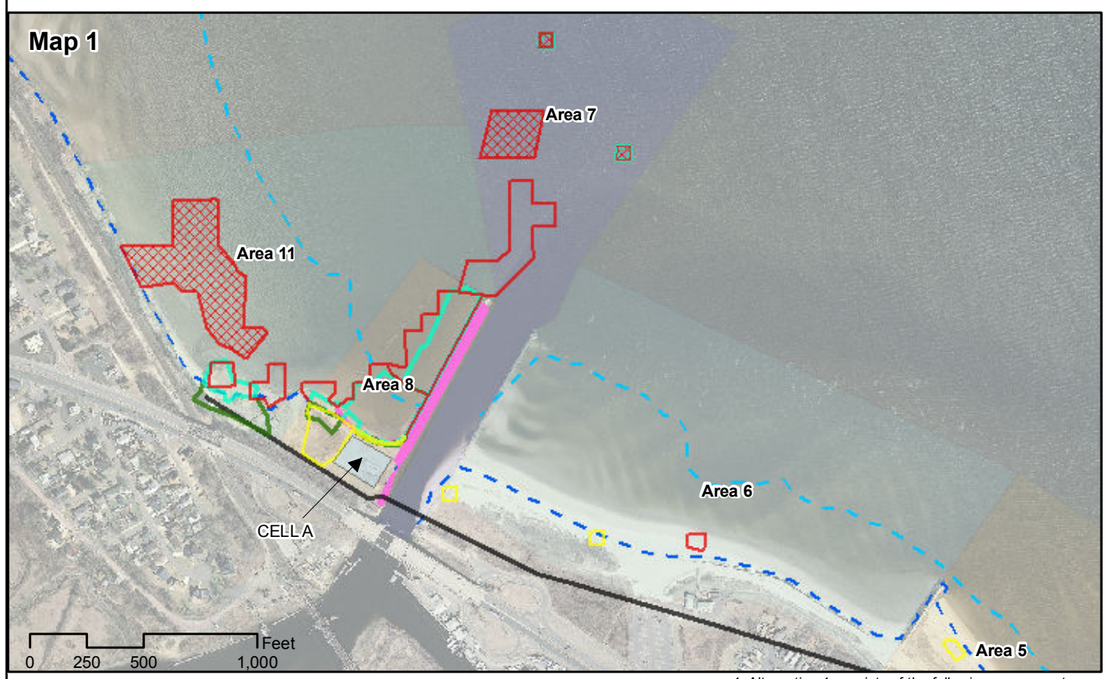

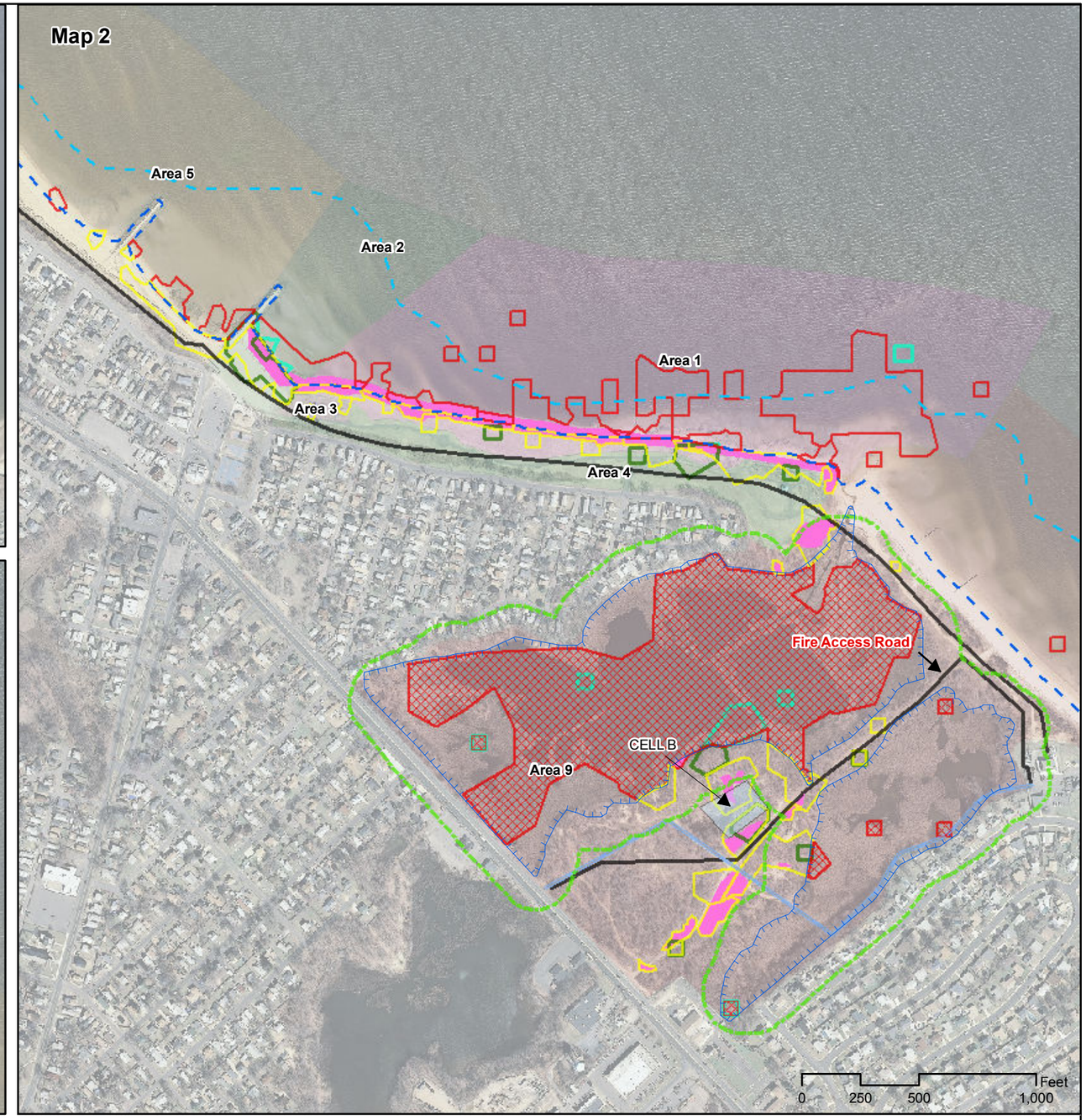

Legend

- Remedy = MNR

Remedy = Removal

- Surface Soil
- Surface Sediment
- Subsurface Soil
- Subsurface Sediment
- Wetlands and wetland transition zone (estimated)
- Existing Sewerline
- Abandoned Sewerline
- Mean high tide line
- Spring low tide line
- Slag and Battery Casings/Associated Wastes
- Soil/Sediment Demarcation Line

1. Alternative 4 consists of the following components:
   i. Monitored Natural Recovery of contaminated sediment in Margaret's Creek wetlands and select portions of Areas 7 and 11
   ii. On-site containment of source materials in containment structures or "cells"
   iii. Removal and off-site disposal of remaining contaminated soil and sediment
   iv. Long-term monitoring of the site, including the monitoring and maintenance of the containment cells and institutional control measures.
2. The slag and battery casings/associated wastes from the jetty sector will be removed and contained within the Cell A near the western jetty and the slag and battery casings from the seawall and Margaret's creek Sectors will be placed within the Cell B in the upland areas of the Margaret's Creek Sector at the locations shown in the figure.
3. The removal and off-site disposal component of Alternative 4 would be conceptually similar to Alternative 2, except for the reduced volumes.
4. Both containment cells would consist of top and bottom liners made of impermeable material, a drainage layer along with pipes for leachate collection, a gas venting layer, a 2-foot layer of sandy loamy material at top with additional 6 inches topsoil in which seeding would be performed.
5. Long-term monitoring and maintenance of the cells would be performed to ensure effectiveness of containment.
6. IC measures would include biennial certification regarding the maintenance of the cells in addition to the IC measures discussed under Alternative 2.
7. The existing sewer line is based on Laurence Harbor Force Main Drawings, dated June 1986 and Laurence Harbor Interceptor overall site plan dated March 2007 provided by Old Bridge Municipal Utilities Authority.

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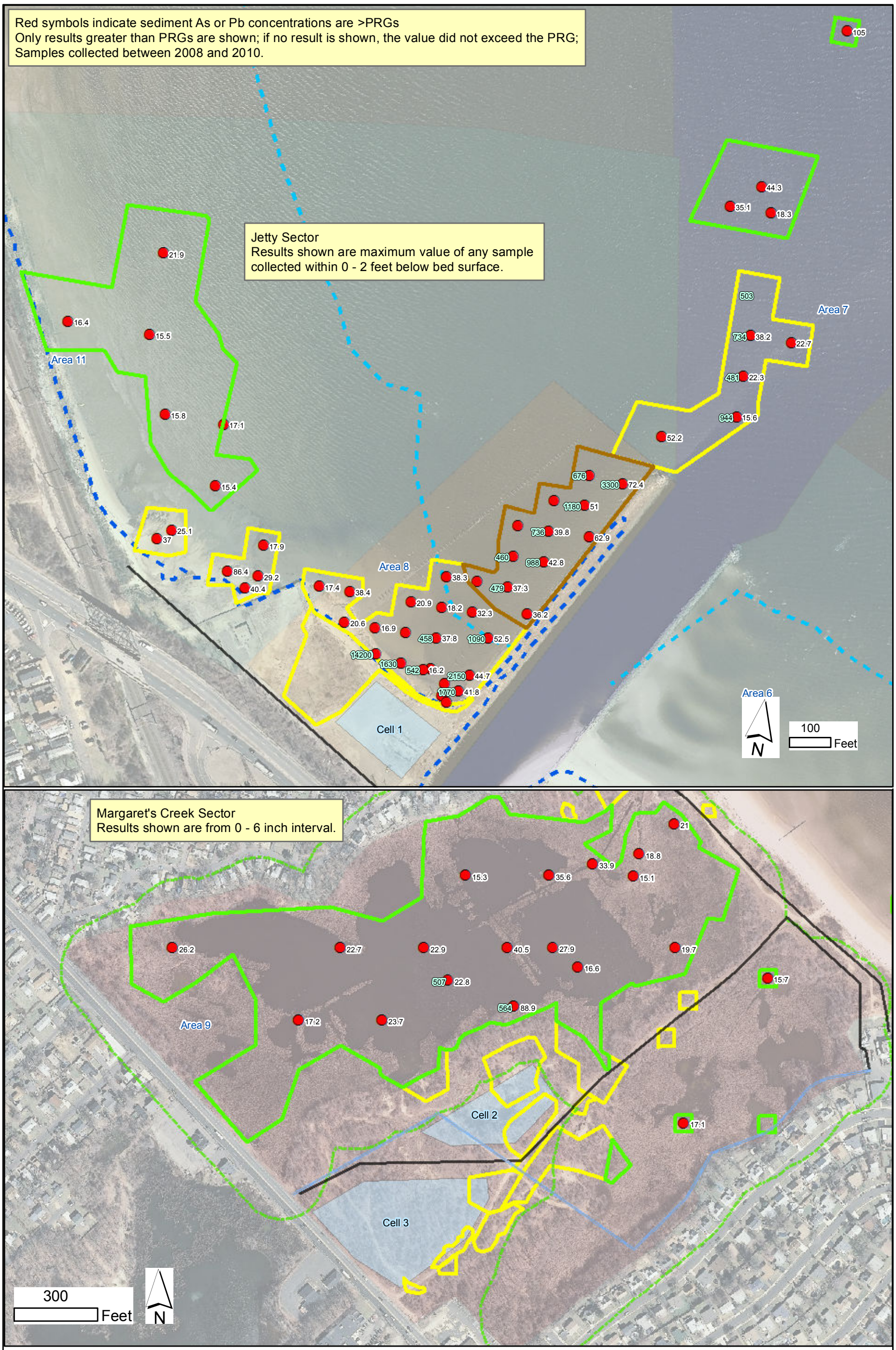
Figure 4-3
Conceptual Design for Alternative 4
On-Site Containment of Source Materials, MNR, and Off-site Disposal of Soil and Sediment
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



Remedy = Capping
Remedy = MNR
Remedy = Removal
Containment Cell

Spring low tide line
Mean high tide line
Wetlands and wetland transition zone (estimated)
Existing Sewerline
Abandoned Sewerline

Lead concentration (mg/kg)
Arsenic Concentration (mg/kg)

Figure 4-4
Alternatives 5 - MNR and Capping Areas
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

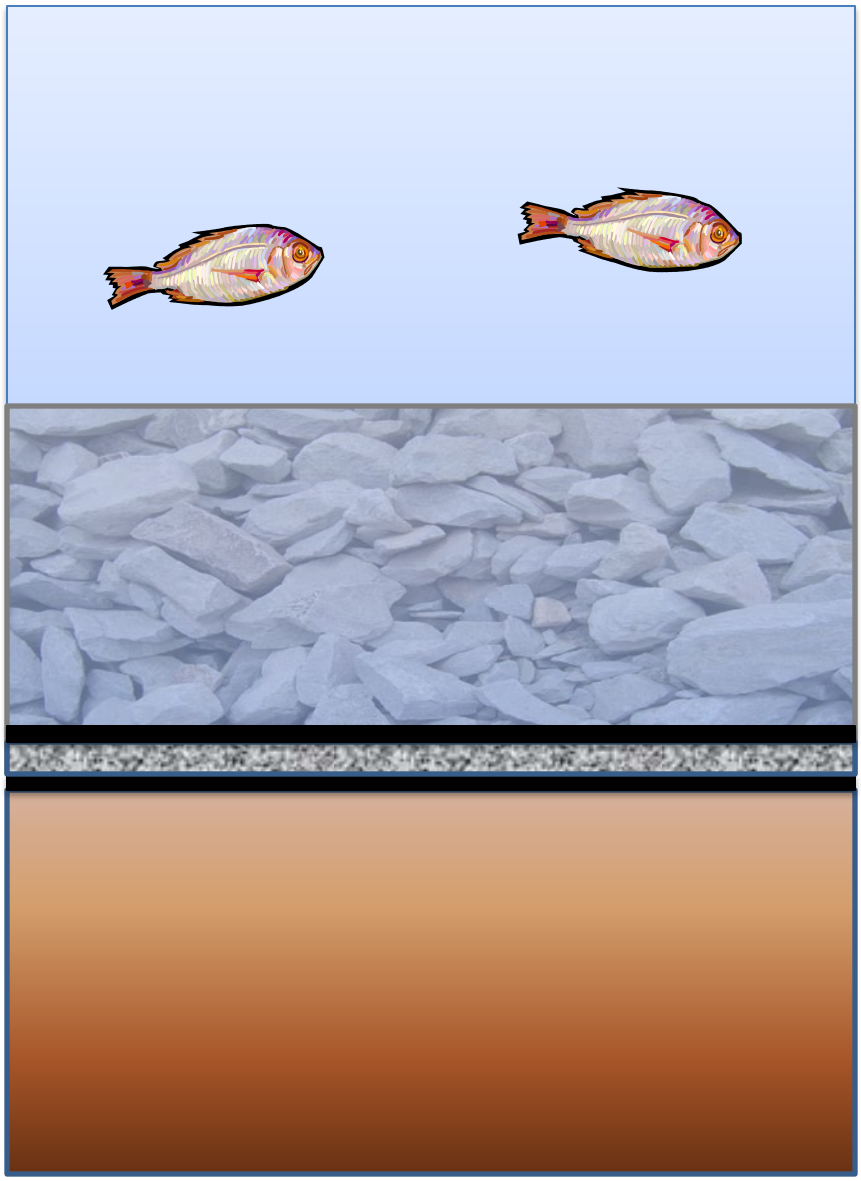
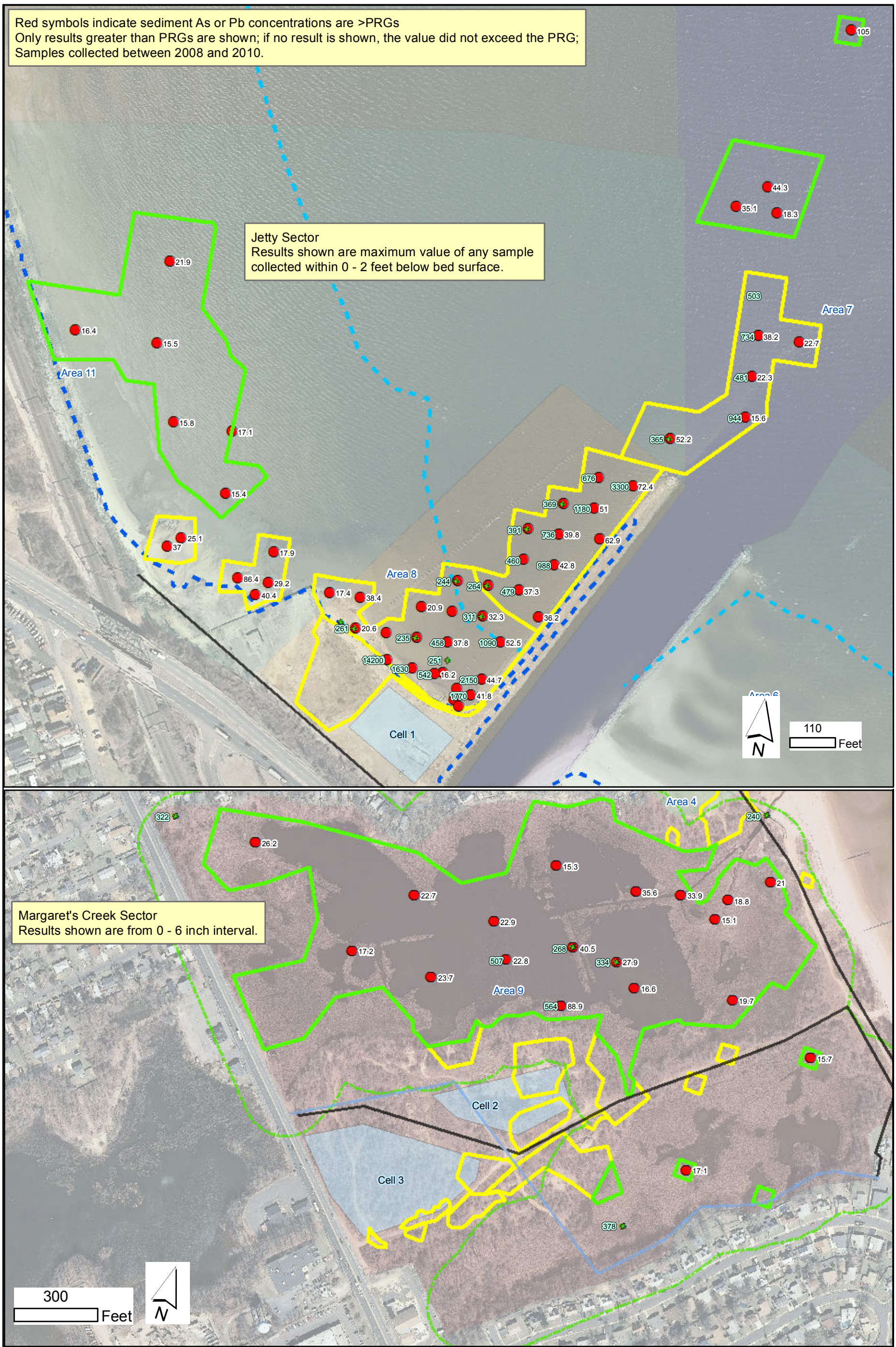


Figure 4-4a
Conceptual Design for Sediment Cap
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

EPA



Remedy = MNR
Remedy = Removal
Containment Cell
Spring low tide line
Mean high tide line
Wetlands and wetland transition zone (estimated)
Existing Sewerline
Abandoned Sewerline
Arsenic Concentration (mg/kg)
Lead concentration (mg/kg)

Figure 4-5
Alternatives 6 - Proposed MNR Areas
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

Appendix A

Slag Survey Technical Memorandum

ESTIMATED SLAG AND BATTERY CASINGS VOLUME

Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

Introduction

The purpose of this memorandum is to describe the process used to estimate the amount of visible slag and crushed battery casings located on the Cheesequake Creek Inlet western jetty (Area 8), the seawall (Area 1), the beachfront (Areas 2 and 5) and the Margaret's Creek area (Area 9).

Field Methods

The data on the visible extent of slag and battery casings was collected by walking Areas 1, 2, 5, 8 and 9 and recording observations. For the seawall and western jetty observations were collected at points where a shallow hole was dug with hand tools to check for the presence or absence of slag. A series of transects were walked along lines perpendicular to the long axis of the western jetty and the seawall and observations on the extent of slag along the line were recorded. The points and transects were located using a GPS unit. In addition, a GPS unit was used to create polygons to represent areas containing slag.

Transects were also walked along parallel to the beachfronts in Areas 2 and 5 to observe the extent of battery casings. Observations were recorded along each transect as to the extent of battery casing. A GPS unit was also used to locate the transects and to create polygons to represent areas containing battery casings. Both battery casings and slag were present in Margaret's Creek area. Observations were recorded through a series of polygons created using a GPS unit. Certain polygons contained both slag and battery casings and observations in these polygons were recorded separately for the slag and battery casings.

Distribution Model

To model the distribution of slag and battery casings a series of polygons were drawn in ArcMAP GIS. Each polygon represents an area where the estimated percent slag and/or battery casings and depth of slag and/or battery casings are uniform. Figures 1 to 6 shows the polygons used to represent the slag and/or battery casings. These polygons are color coded to show the estimated percent of visible slag in each polygon.

Western Jetty

A total of six polygons (numbers 1 to 6) were used to model slag distribution at and near the western jetty. Figure 1 shows the polygons used to represent the western jetty. Table 1 lists the polygons representing the western jetty and the estimated percent and depth of the visible slag. The section of the jetty along the inlet was represented with three polygons to better model change in slag depth. The western most polygon on the jetty, number 1, consisted of approximately 90% slag to a depth of 1 foot. The middle polygon, number 3, consisted of approximately 95% slag to a depth of 4 feet. The eastern part of the jetty, polygon number 2, contained more boulders and was estimated to consist of approximately 60% slag to a depth of 3 feet.

Slag was also observed to the west and to the south of the main section of the western jetty. The area south of the jetty adjacent to the Cheesequake Creek Inlet contained a large amount of slag. This area was split into the upper part and the lower part and was modeled, respectively, by polygon numbers 4 and 5. Most of the slag identified was located in the lower part of the jetty, close to the water, while the upper part was comprised of more concrete and other non-slag fill materials. Out of all the areas surveyed on site, the middle polygon of the western jetty, polygon number 3, had the highest density of visible slag.

A long pile of slag, polygon number 6, extends to the west of the jetty along the shore. It was estimated that this polygon consisted of 80% slag to a depth of 2 feet. Although a few battery casings were observed in this polygon, not enough battery casings were observed to provide a uniform percentage of battery casings greater than 5%.

Seawall

A total of 19 polygons (numbers 7 to 25) were used to model slag distribution along the seawall. Figures 2 and 3 show the polygons used to represent the seawall. Table 1 lists the polygons representing the seawall and the estimated percent and depth of the visible slag. Due to the variability of the slag and other material along the seawall, a total of eight areas were defined which were then subdivided into polygons to estimate the percentage and depth of visible slag. In each area two or three polygons were defined. Each polygon represented a different section of the seawall: the upper seawall, the lower seawall, and the mudflat section.

Transects were walked from the top of the seawall to the limit of visible slag. The upper part of the seawall consisted of a mix of boulders and slag. Most of the large pieces of slag were observed in the lower section of the seawall. The lower section of the seawall was relatively narrow, compared to the other two areas, but was very tightly packed with slag. The mudflat section throughout most of the seawall, excluding the extremities, contained a high percentage of small pieces of slag but at a minimal depth of 0.5 feet.

Beachfront

A total of two polygons and one line, consisting of two sections, (numbers 26 to 28) were used to model battery casing distribution along the beachfront. Figure 4 show the polygons used to represent the battery casings observed on the beaches, while the line shows only the lateral extent of the battery casings. Table 1 lists the polygons and line representing the locations and the estimated percent and depth of battery casings.

Polygon number 26 was recorded along the beachfront in Area 2. This polygon contained only battery casings and consisted of 40% to a depth of 0.2 feet. Polygon number 27 was recorded just off the second jetty in Area 5. This polygon also only contained battery casings and consisted of 15% at a depth of 0.2 feet. A long line of battery casings in two sections

(located between jetties 1 and 2 and jetties 2 and 3), polygon number 28, was observed and recorded along the entire beachfront of Area 5. Each line was approximately 3 feet wide and consisted of 20% battery casing to a depth of 0.2 feet.

Margaret's Creek

A total of 11 polygons (numbers 29 to 39) were used to model slag and battery casing distribution in the Margaret's Creek area. Figures 5 and 6 show the polygons used to represent these locations. Table 1 lists the polygons representing the areas and the estimated percent and depth of the visible slag and/or battery casings.

A total of 5 polygons (numbers 34 to 36, 38 and 39) were used to model the slag distribution in the Margaret's Creek area. Figure 5 shows the polygons used to represent slag distribution in the Margaret's Creek area. Table 1 lists the polygons representing the Margaret's Creek area and the estimated percent and depth of visible slag. The majority of the slag observed can be seen in polygons numbers 38 and 39. Both polygons contained approximately 85% slag to a depth of one foot. Slag was also observed scattered throughout the staging area in polygon number 36 consisting of 30% slag to a depth of 1 foot. Polygon number 34 contained both slag and crushed battery casings.

A total of 7 polygons (numbers 29 to 34 and 37) were used to model the battery casings distribution in the Margaret's Creek area. Figure 6 show the polygons used to represent battery casings distribution in the Margaret's Creek area. Table 1 lists the polygons representing the Margaret's Creek area and the estimated percent and depth of battery casings. Battery casings were most commonly seen along both sides of the pipeline roadway from Route 35 to the beachfront. Polygon number 31 contained the largest amount of crushed battery casings. This polygon consisted of 75% crushed battery casings to a depth of 0.2 feet.

Volume Estimate

The following formula was used to estimate the volume of slag and battery casings in each polygon:

$$V_{slag\ polygon} = ((d * A) * P_{slag\ polygon})/27$$

Where:

$V_{slag\ polygon}$ = volume of slag in a polygon

d = depth of visible slag in the polygon as determined through field observations, feet

A = polygon area, calculated in ArcGIS, square feet

$P_{slag\ polygon}$ = percent slag observed in each polygon, field observations.

27 = conversion factor, 27 ft^3 = 1 $yards^3$

ESTIMATED SLAG AND BATTERY CASINGS VOLUME

Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey

The total volume of slag and battery casings was estimated by summing the volume of each respective polygon type. Table 1 lists the volume of each polygon and the total estimated slag and battery casing volumes.

(4) 2 ft -(Polygon number) estimated slag depth

N

100 50 0 100 Feet

Figure 1
Western Jetty Estimated Extent of Slag
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

CDM

(11) 0.5 ft - (Polygon number) estimated slag depth

N

100 50 0 100 Feet

Figure 2
West Portion of Seawall, Estimated Extent of Slag
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey
CDM

(18) 3 ft - (Polygon number) estimated slag depth

N

100 50 0 100 Feet

Figure 3
East Portion of Seawall, Estimated Extent of Slag
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

CDM

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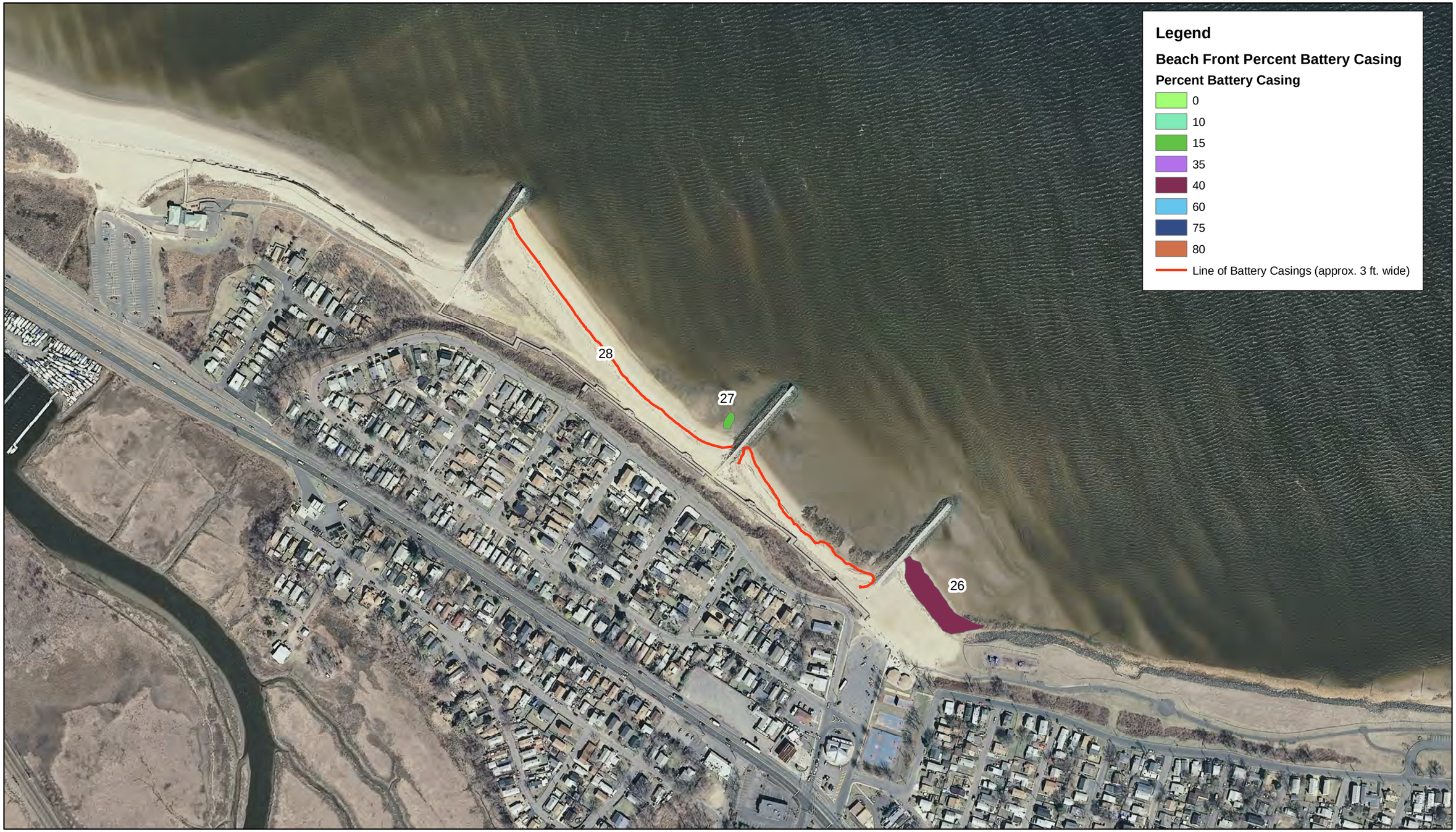

N

300 150 0 300 Feet

Figure 4
Beach Front, Estimated Extent of Battery Casing
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

CDM

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300 150 0 300 Feet

Figure 5
Margarets Creek, Estimated Extent of Slag
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

CDM

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N

300 150 0 300 Feet

Figure 6
Margarets Creek, Estimated Extent of Battery Casing
Raritan Bay Slag Superfund Site
Old Bridge & Sayreville, New Jersey

CDM

Table 1
Raritan Bay Slag Superfund Site
Estimated Slag and Battery Casing Volume

Polygon Number	Polygon Name	Zone	Area	Area of Polygon	Slag Depth (ft)	Percent Slag	Batttery Casing Depth (ft)	Percent Battery Casing	Slag Volume (cu yd) *	Battery Casing Volume (cu yd) *
1	Western Jetty West	Jetty	8	10,746	1	90	0	0	358	0
2	Western Jetty East	Jetty	8	10,852	3	60	0	0	723	0
3	Western Jetty Middle	Jetty	8	23,584	4	95	0	0	3319	0
4	Western Jetty Upper	Jetty	8	1,873	2	35	0	0	49	0
5	Western Jetty Lower	Jetty	8	2,691	2	60	0	0	120	0
6	Western Jetty Extent	Beachfront	8	7,164	2	80	0	0	425	0
7	Seawall Upper Transects 1,2	Seawall	1	9,970	0	0	0	0	0	0
8	Mudflat Transects 1,2	Seawall	1	5,687	1	15	0	0	32	0
9	Seawall Upper Transects 3.4	Seawall	1	10,705	3	60	0	0	714	0
10	Seawall Lower Transects 3,4	Seawall	1	3,339	3	85	0	0	315	0
11	Mudflat Transects 3,4	Seawall	1	8,379	0.5	40	0	0	62	0
12	Seawall Upper Transects 5,6,7	Seawall	1	13,600	3	60	0	0	907	0
13	Seawall Lower Transects 5, 6, 7	Seawall	1	10,272	3	85	0	0	970	0
14	Mudflat Transects 5,6,7	Seawall	1	12,836	0.5	40	0	0	95	0
15	Seawall Upper Transects 8,9	Seawall	1	11,039	3	60	0	0	736	0
16	Lower Transects 8,9	Seawall	1	4,160	3	85	0	0	393	0
17	Mudflat Transects 8,9	Seawall	1	10,677	0.5	40	0	0	79	0
18	Seawall Upper Transect 10	Seawall	1	4,561	3	65	0	0	329	0
19	Seawall Lower Transect 10	Seawall	1	2,765	3	80	0	0	246	0
20	Seawall Upper Transect 11	Seawall	1	9,022	3	35	0	0	351	0
21	Seawall Lower Transect 11	Seawall	1	2,259	0.5	25	0	0	10	0
22	Seawall Upper Transect 12-2	Seawall	1	1,779	0	0	0	0	0	0
23	Seawall Lower Transect 12-2	Seawall	1	2,924	1	10	0	0	11	0
24	Seawall Upper Transect 12-1	Seawall	1	1,015	2	15	0	0	11	0
25	Seawall Lower Transect 12-1	Seawall	1	1,049	2.5	35	0	0	34	0
26	Area 2-Battery Casing Pile	Beachfront	2	19841	0	0	0.2	40	0	59
27	Area 5-Battery Casing Pile	Beachfront	5	1347	0	0	0.2	15	0	1
28	Line of battery Casings**	Beachfront	5	5100	0	0	0.2	20	0	8
29	Marg Creek-Battery Casing Pile 1	Margarets Creek	9	1999	0	0	0.2	60	0	9
30	Marg Creek-Battery Casing Pile 4	Margarets Creek	9	6387	0	0	0.2	80	0	38
31	Marg Creek Battery Casing Pile 5	Margarets Creek	9	25437	0	0	0.2	75	0	141
32	Marg Creek Battery Casing Pile 6	Margarets Creek	9	1233	0	0	0.2	10	0	1
33	Marg Creek Battery Casing Pile 7	Margarets Creek	9	8649	0	0	0.2	40	0	26
34	Marg Creek Slag / BC Pile 8	Margarets Creek	9	6896	1.5	45	0.2	35	172	18
35	Slag Area South of Culvert	Margarets Creek	9	3456	2	45	0	0	115	0

Table 1
Raritan Bay Slag Superfund Site
Estimated Slag and Battery Casing Volume

Polygon Number	Polygon Name	Zone	Area	Area of Polygon	Slag Depth (ft)	Percent Slag	Batttery Casing Depth (ft)	Percent Battery Casing	Slag Volume (cu yd) *	Battery Casing Volume (cu yd) *
36	Slag Delineation	Staging Area	9	13765	1	30	0	0	153	0
37	Crushed Battery Casing Pile	Staging Area	9	4280	0	0	0.2	35	0	11
38	Staging Area-Slag Pile 3	Staging Area	9	486	1	85	0	0	15	0
39	Staging Area-Slag Pile 4	Staging Area	9	366	1	85	0	0	12	0
Total Volume (cu yds)									**10,756**	**311**

Notes:
* The volume in each polygon was calculated as follows: V polygon = ((d * A) * P polygon) / 27
V slag polygon = volume of visible slag or battery casing in polygon
d = depth of visible slag or battery casing in polygon as determined in the field observations feet (ft)
A = polygon area, calculated in ArcGIS, square feet
P polygon = percent slag or battery casing observed in each polygon
27 = conversion factor, 27 ft^3 = 1 $yards^3$
** The total length of the line of battery casings was approximately 1700 feet and the width was approximately 3 feet.

Appendix B

Final Slag Characterization Report

APPENDIX A

STEVENS REPORTS

Homogenization and Sieve Analysis Report
Acid Neutralization Capacity (ANC) Results
X-Ray Powder Diffraction (XRPD) Analysis of Slag-Impacted Sand and Slag Particles
SEM/EDX Report

HOMOGENIZATION AND SIEVE ANALYSIS REPORT

Center for Environmental Systems

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CES

April 12, 2011

Mia Painter, PG.
Project Geologist
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Re: "Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site"
Schnabel Project No. 10615032
Report – Homogenization and Sieve analyses of slag-impacted sand and slag particles.

Dear Ms. Painter,

Stevens Institute of Technology (SIT) is pleased to present this report on the homogenization and sieve analyses test results for the project "Development of Stabilization Approaches for Raritan Bay Slag particles Superfund Site," Schnabel Project No. 10615032. The scope of work involved homogenization of slag-impacted sand and slag particles and sieve analysis conducted on both materials.

EXECUTIVE SUMMARY

The objective of this study was to homogenize the slag-impacted sand and slag particles and determine the grain size distribution and Unified Soil Classification System (USCS) classification for the slag-impacted sand and slag particles.

The homogenization of slag-impacted sand and slag particles was conducted using cone and quarter method (ASTM D6323-98) and the process was repeated 5 times to promote thorough homogenization. The sieve analysis of slag-impacted sand was conducted on the homogenized sample from one 5-gallon container, whereas, the sieve analysis of slag particles was conducted on a representative subsample from the homogenized slag particles (in triplicate). The slag-impacted sand and slag particles both classified as an SP soil by the USCS (ASTM D 2487-00), the materials containing less than 1% and 3% fines, respectively.

CLOSURE

Thank you for the opportunity to work together and we look forward to continued collaboration. Please contact me at (201) 216-8993 if you have any questions with regard to this report.

Best regards,
Stevens Institute of Technology

Mahmoud Wazne, Ph.D
Assistant Professor

Attachment:
Appendix 1: Report – Homogenization and Sieve analyses of slag-impacted sand and slag particles.

Appendix 1

Homogenization and Sieve analyses of slag-impacted sand and slag particles

Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site
Schnabel Engineering Consultants, Inc.

MATERIALS AND METHODS

Sample Preparation

The slag-impacted sand was provided to Stevens in eleven 5-gallon buckets by Schanbel. Each bucket of sand was individually placed in a plastic tray for air-drying. The water content of the air-dried sand in all plastic trays was measured and ranged between 0.6 to 1.0%. Afterwards, the air-dried sand was stored returned to its original containers.

The slag particles were also provided to Stevens in 5-gallon buckets by Schnabel. It was crushed to achieve less than 3/8-inch minus size using a cone crusher at Severstal Steel Plant, Baltimore, Maryland. Sixty percent of the slag was successfully reduced to 3/8-inch minus. The remaining material was re-crushed in a smaller crusher at Test America, Edison laboratory to reduce the particle size to less than 3/8-inch. Afterwards, all slag material was homogenized at Stevens.

Homogenization using cone quarter method

Slag-impacted sand

The homogenization of air-dried slag-impacted sand and slag particles was individually completed using the cone and quarter method (ASTM D6323-98). The method involved placing of all of the sand into a conically shaped stockpile on a heavy duty plastic tarp (Photo 1). The stockpile was then flattened (Photo 2) to create four quarters (Photo 3). The opposite quarters were homogenized in two plastic trays (Photo 4). The remaining material on the tarp was mixed and re-shaped into a conical pile. The material in the plastic trays was then poured on top of the conical stockpile. This mixing process was then repeated 4 times.

After homogenization, the final stockpile was flattened to create 11 sub portions (Photo 5), and each sub portion was placed in a sealable 5-gallon container. These buckets of sand were then randomly selected for grain size analysis.

Crushed slag particles

The slag particles were homogenized using the same procedure. Photos 6 to 10 show the slag particle homogenization process. After five cycles of homogenization process, the stockpile of slag particles was flattened to create 20 subportions; each subportion was placed in a sealable 5-gallon container.

The three subsamples used for sieve analysis were taken from one randomly selected bucket. The required sample size (approximately 1 kg) was obtained using cone and quarter method in accordance with ASTM D6323–98. Briefly, the method involved placing the sample from one 5-gallon container into a conically shaped stock pile in a plastic tray. The stockpile was then flattened to create four quarters. The opposite quarters were removed and returned to its original container. The remaining slag particles were mixed and re-shaped into a conical pile. This process was repeated until the required weight of subsample (approximately 1 kg) was obtained.

Grain Size Distribution

The grain size distribution of the slag-impacted sand and slag particles was determined in accordance with ASTM D421–85 and ASTM D422–63.

Because of the large sample size, the slag-impacted sand sample was first split into two fractions using the No. 10 mesh. The coarser and finer fractions were then analyzed using the rack of sieves identified in Table 1. For slag particles, approximately 1 kg of sample was analyzed using the rack of sieves identified in Table 2. The grain size distribution of the slag particles was conducted in triplicate.

RESULTS AND DISCUSSION

Grain Size Analyses

Slag-impacted sand

The grain size distribution of the slag-impacted sand is presented in Figure 1 and summarized in Table 1 along with the USCS classification. After conducting sieve analysis, the sand sample was separated into its gravel (Photo 11); coarse sand (Photo 12); medium and fine sand (Photo 13); and the fines (Photo 14) fractions for subsequent determinations of the concentrations of heavy metals in each fraction (reported elsewhere). This also required that the gravel and coarse sand fractions be pulverized to pass the No.10 mesh in order to have a homogenous sub sample (0.5 g) for purposes of conducting the total digestion analyses. A subsample of all fractions of sand was shipped to Test America for analytical analyses.

Slag particles

The grain size distribution of the slag particles is presented in Figure 2. Individual subsample and the average of the triplicate subsamples are shown in Table 2 along with the USCS classification.

SUMMARY

The USCS classification for both the materials is SP. The major fraction of slag-impacted sand and slag particles was medium to fine sand, which was approximately 75% and 77%, respectively. The slag-impacted sand and slag particles had approximately less than 1% and 3%, respectively passing the No. 200 sieve (0.075 mm).

REFERENCES

ASTM D421 – 85 (2007), Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants, ASTM International, West Conshohocken, PA, DOI: 10.1520/D0421-85R07, www.astm.org.

ASTM D422 – 63 (2007), Standard Test Method for Particle-Size Analysis of Soils, ASTM International, West Conshohocken, PA, DOI: 10.1520/D0422-63R07, www.astm.org.
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ASTM D2487 – 10 (2003), Standard Practice for classification of soils for engineering purposes (unified classification system), ASTM International, West Conshohocken, PA, DOI: 10.1520/D2487-10, www.astm.org.

ASTM D6323 – 98 (2003), Standard Guide for Laboratory Subsampling of Media Related to Waste Management Activities, ASTM International, West Conshohocken, PA, DOI: 10.1520/D6323-98R03, www.astm.org.

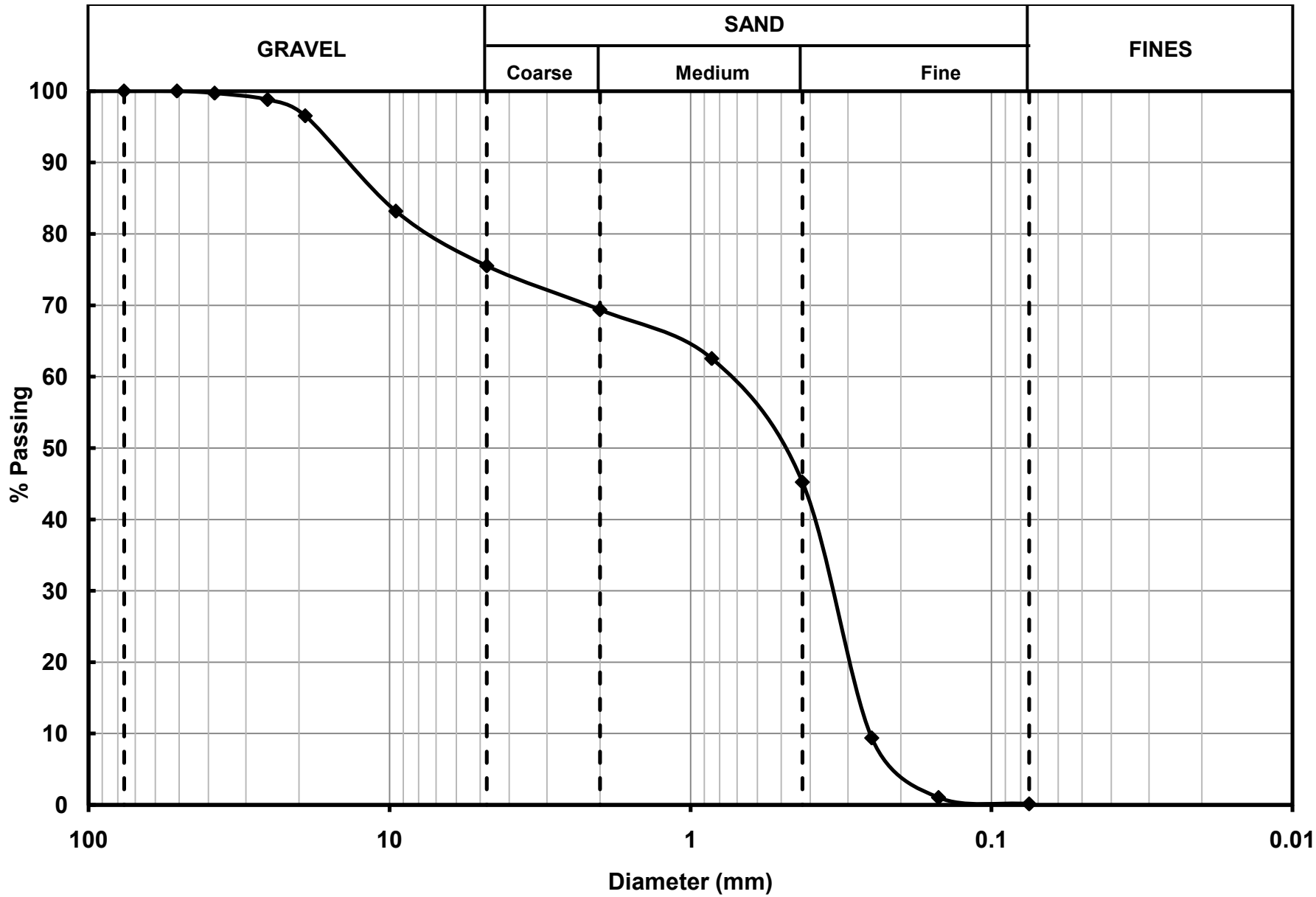

Figure 1 - Grain Size Distribution of Homogenized Slag-impacted Sand.

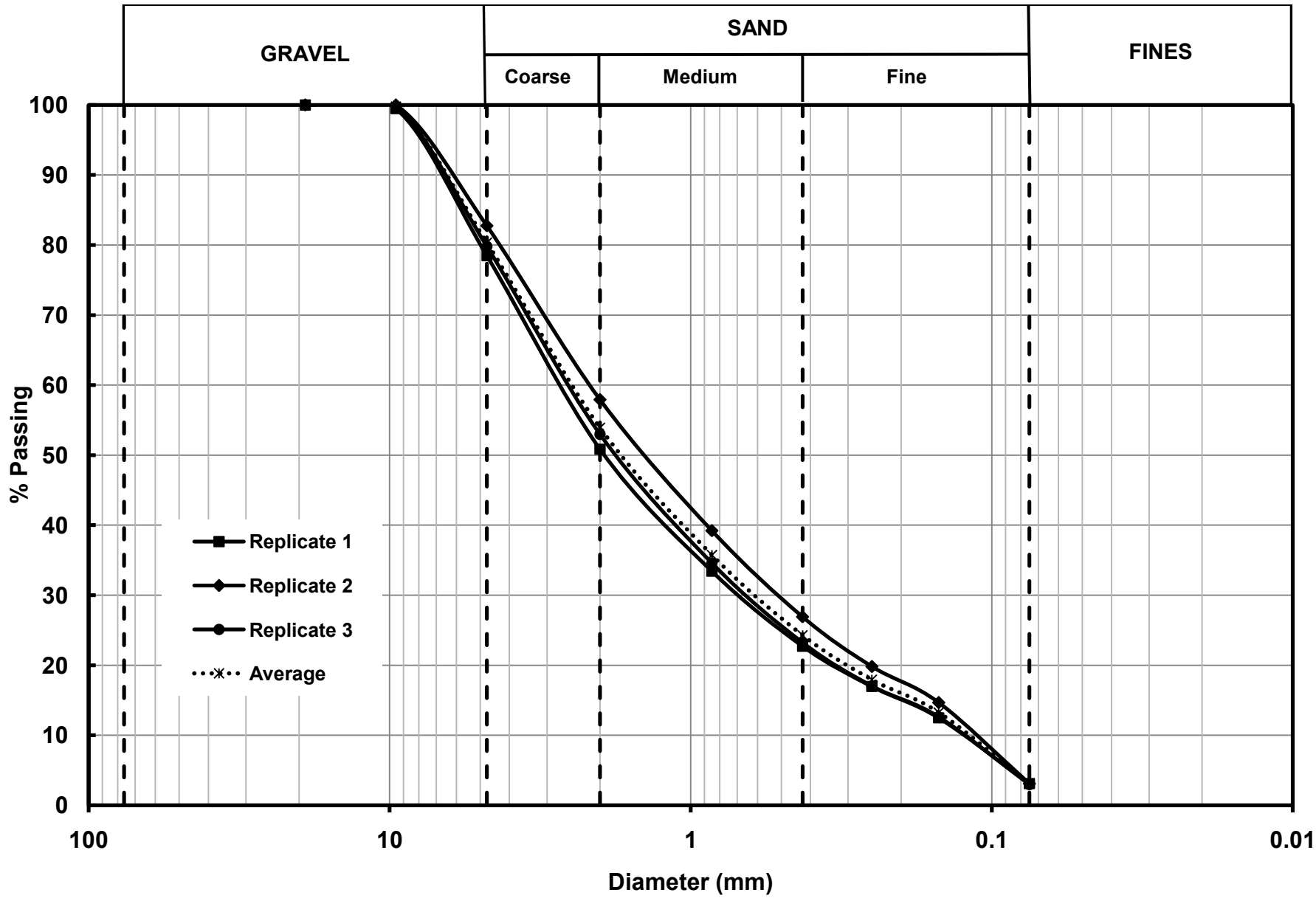

Figure 2 - Grain Size Distribution of Homogenized Slag Particles.

Table 1. Grain size distribution and classification of slag-impacted sand.

Fraction	Sieve No.	Sieve Opening (mm)	% Passing	% Fraction	% Fraction	USCS Classification
Gravel	3"	76.2	100.0	16.8	16.8	SP
	2"	50.8	100.0			
	1.5"	38.1	99.7			
	1"	25.4	98.8			
	3/4"	19.05	96.5			
	3/8"	9.5	83.2			
Coarse Sand	4	4.75	75.5	7.7	7.7	
Medium Sand	10	2	69.4	13.0	75.4	
	20	0.85	62.5			
Fine Sand	40	0.425	45.2	62.4		
	60	0.25	9.4			
	100	0.15	1.0			
	200	0.075	0.14			
Fines	Pan	< 0.075	0.0	0.14	0.14	

Table 2. Grain size distribution and classification of slag particles.

Fraction	Sieve No.	Sieve opening (mm)	Trial 1 % Passing	Trial 2 % Passing	Trial 3 % Passing	Average % Passing	% Fraction	% Fraction	USCS Classification
Gravel	3/4"	19.05	100.0	100.0	100.0	100.0	0.2	0.2	SP
	3/8"	9.525	99.5	100.0	99.8	99.8			
Coarse Sand	4	4.750	78.5	82.8	79.8	80.3	19.4	19.4	
Medium Sand	10	2.000	50.9	57.9	53.0	53.9	44.6	77.3	
	20	0.850	33.4	39.2	34.6	35.7			
Fine Sand	40	0.425	22.7	26.9	23.2	24.3	32.7		
	60	0.250	17.0	19.8	17.0	17.9			
	100	0.150	12.5	14.7	12.6	13.3			
	200	0.075	3.1	3.1	3.0	3.0			
Fines	Pan	< 0.075					3.0	3.0	

Photo 1 – Slag-impacted sand placed in a conically-shaped stockpile (Step 1).

Photo 2 – Flattened the slag-impacted sand stockpile (Step 2).

Photo 3 – Quartering process of slag-impacted sand (Step 3).

(a)

(b)

Photo 4 – Homogenization of opposite quarters of slag-impacted sand (Step 4).

Photo 5 – Subportioning of fully homogenized slag-impacted sand (Step 5).

Photo 6 – Slag particles placed in conically-shaped stockpile (Step 1).

Photo 7 – Flattening the slag particles stockpile (Step 2).

Photo 8 – Quartering process of slag particles (Step 3).

Photo 9 – Homogenization of opposite quarters of slag particles (Step 4).

Photo 10 – Subportioning of fully homogenized slag particles (Step 5).

Photo 11 – Gravel fraction of slag-impacted sand.

Photo 12 – Coarse sand fraction of slag-impacted sand (- No. 4 mesh + No. 10 mesh).

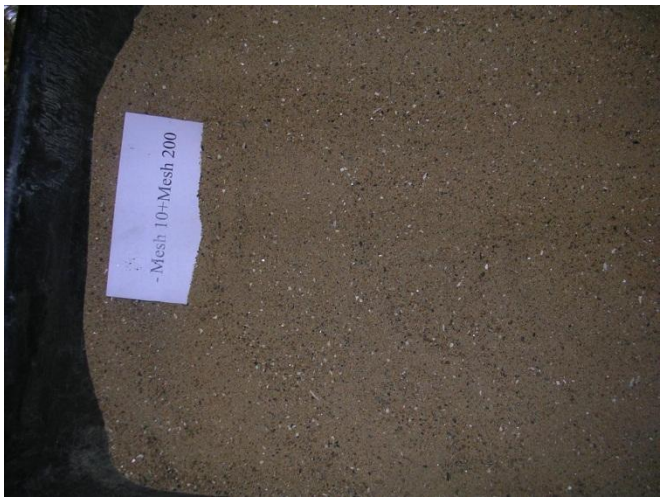

Photo 13 – Medium to fine sand fraction of slag-impacted sand (- No. 10 mesh + No. 200 mesh).

Photo 14 – Fines fraction of slag-impacted sand (- No. 200 mesh).

ACID NEUTRALIZATION CAPACITY (ANC) RESULTS

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510 East Gay Street
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Re: "Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site"
Schnabel Project No. 10615032
Report – Acid Neutralization Capacity (ANC) Results.

Dear Ms. Painter,

Stevens Institute of Technology (SIT) is pleased to present the results of the Acid Neutralizing Capacity (ANC) study for the project "Development of Stabilization Approaches for Raritan Bay Slag particles Superfund Site," Schnabel Project No. 10615032. This scope involved determining the buffering capacity of the raw slag particles. To determine the effects of particle size, the buffering capacity of milled slag particles was also investigated. The alkaline buffering capacity of slag particles and milled slag particles was also evaluated up to pH~12.

EXECUTIVE SUMMARY

The purpose of ANC test is to measure the buffer capacity of soil and soil-like media in response to acid attack which could be taken to simulate an acid rain exposure condition, e.g., repeated additions (equivalents) of an acid of known strength. Likewise, alkaline reagents can be added to evaluate pH response when cementitious agents are added for stabilization/solidification (S/S) applications. The goal here was to determine how many equivalents of acid (or base) it would require to shift the pH of the slag particles and the milled slag particles to pH = 3 (and pH = 12), respectively.

The alkaline dosage (NaOH) needed to increase the pH to 12 was approximately 2 eq/kg for raw and milled slag particles. The ANC test results demonstrated that the pH of slag particles and milled slag particles decreased to less than 7 with only 0.25 eq/kg of acid indicating that the slag is weakly buffered. There was no significant difference in the ANC curves of raw and milled slag particles, except between the acid dose of approximately 0.25 eq/kg to 5 eq/kg. To attain pH ~ 3, approximately 10 eq/kg was consumed by the raw and milled slag particles. The ANC samples of the slag particles had rotten egg odor for pH ≤ 5, indicating the possibility of the presence of sulfide phases.

CLOSURE

Thank you for the opportunity to work together and we look forward to continued collaboration. Please contact me at (201) 216-8993 if you have any questions with regard to this report.

Best regards,
Stevens Institute of Technology

Mahmoud Wazne, Ph.D
Assistant Professor

Attachment:
Acid Neutralization Capacity (ANC) results

Appendix 1

Acid Neutralizing Capacity (ANC) results

Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site
Schnabel Engineering Consultants Inc.

MATERIALS AND METHODS

Sample Preparation for ANC tests

The raw slag particles (9.5 mm minus) were provided to Stevens by Schnabel. The homogenized slag particles were pulverized using a Fritsch Planetary Ball Mill to reduced the particle size to less than No. 100 mesh size (< 0.15 mm). Approximately 80g of the air-dried sample was placed into each milling container and was pulverized for 20 minutes at a rotation speed of 250 RPM. The entire pulverized sample was passed through No.100 mesh (0.15 mm) to avoid any fractionation. Material retained on the No. 100 mesh was hand pulverized using a compaction hammer, then was re-processed.

ANC procedure

The ANC test procedure was based on the Generalized Acid Neutralizing Capacity test (Isenburg and Moore, 1992). The procedure consisted of equilibrating the soil samples to increasing equivalents of reagent per kilogram of dry soil. Specifically, 6.5 g dry weight of each sample was placed in a series of 130 mL bottles. Incremental amounts of 15.8 N nitric acid (HNO_3) were added to the sample (total liquid volume 130 mL), using a liquid:solid ratio of 20:1, identical to the TCLP and SPLP procedures. As the natural pH of slag particles was approximately 9.84, incremental amounts of 10N sodium hydroxide (NaOH) were added to the sample to illustrate the impacts of alkalinity on the sample. All samples were preparded in triplicate. The resultant slurries were tumbled in a standard TCLP rotating extractor for 48 hours. The supernatants were then filtrated through a 0.45 µm nylon membrane filter, and the pH of the leachate was recorded using an Accumet AR20 pH–meter. All samples were stored in the refrigerator at a temperature of $4^{o}C$ before they were shipped to Test America laboratory for additional analyses.

RESULTS

Figures 1 and 2 present the results of the ANC for the homogenized raw and milled slag particles. Tables 1 and 2 summarize the reagent dosing schedules. Two portions of each curve are shown; an acidification curve (HNO_3) and an alkaline curve (NaOH). The amount of NaOH needed to increase the pH ~ 12 was approximately 2 eq/kg for the raw and milled slag particles. The steep ANC curve for the raw slag particles (Figure 1) illustrates the weak buffering capacity. The pH of slag particles decreased from 9.84 to less than 7 consuming approximately 0.25 eq/kg of acid. Similarly, the pH of milled slag particles also dropped from 9.95 to less than 7 consuming approximately 0.25 eq/kg of acid (Figure 2).

Figure 3 presents the comparison of the pH for the slag particles and milled slag particles. There is no significant difference between the average pH of the raw and milled slag particles except between the acid dose of approximately 0.25 eq/kg to 5 eq/kg. The increase in pH buffering response for the milled slag might suggest that destroying the morphology of the slag particles could liberate some alkalinity. To attain pH ~ 3, approximately 10 eq/kg was consumed by the slag particles and milled slag particles. The ANC samples of slag particles and milled slag particles had rotten egg odor when pH decreased to approximately 3, indicating the possibility of the presence of sulfide phases.

REFERENCES

Isenburg, J. and Moore, M. (1992). "Generalized Acid Neutralization Capacity Test," *Stabilization and Solidification of Hazardous, Radioactive and Mixed Wastes, 2nd Volume, ASTM STP 1123,* T.M. Gilliam and C.C. Wiles, Eds, American Society for Testing and Materials, Philadelphia, pp 361-377.

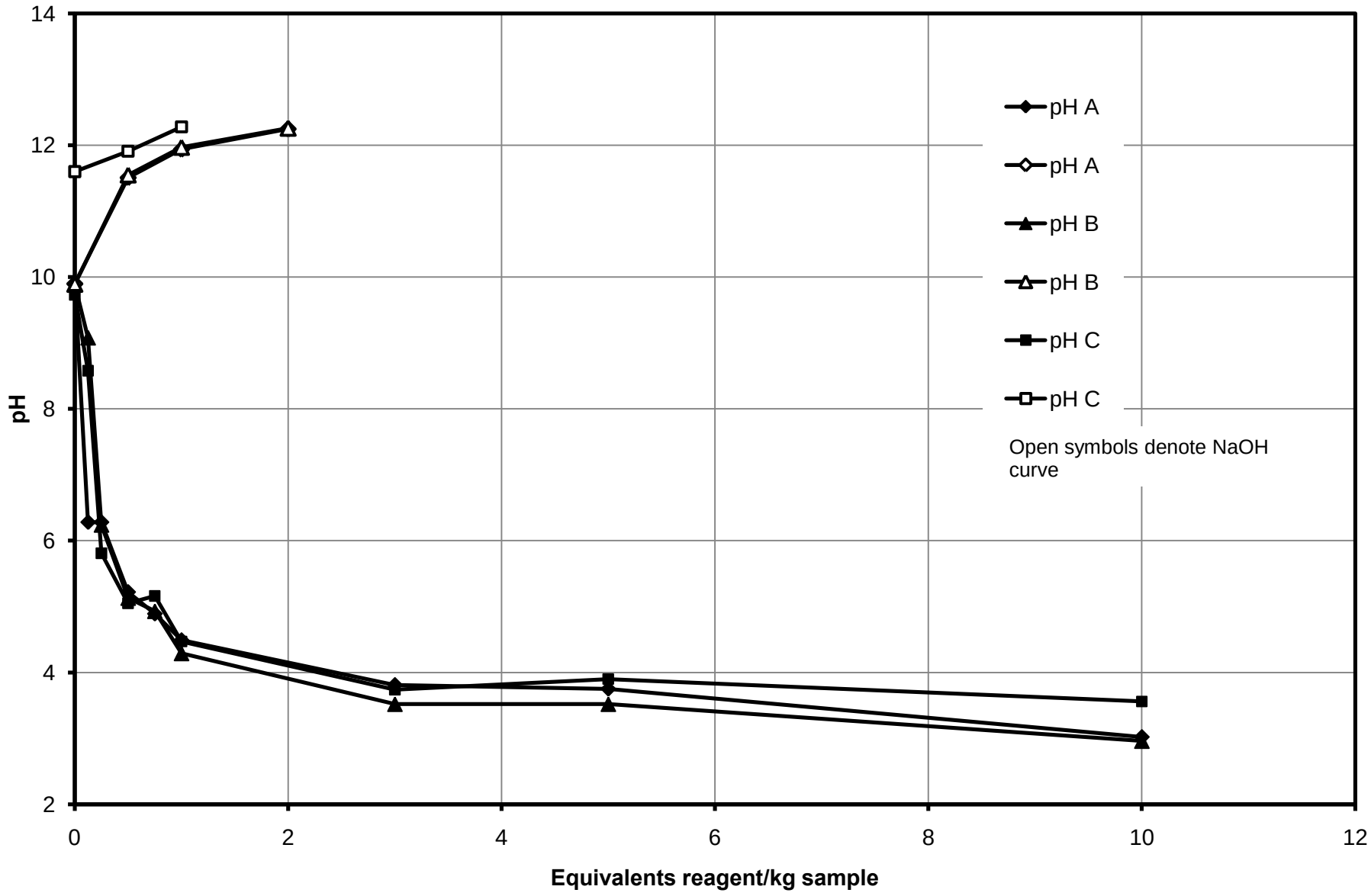

Figure 1 - Acid Neutralization Capacity (ANC) pH response of raw (9 mm minus) Raritan slag particles.

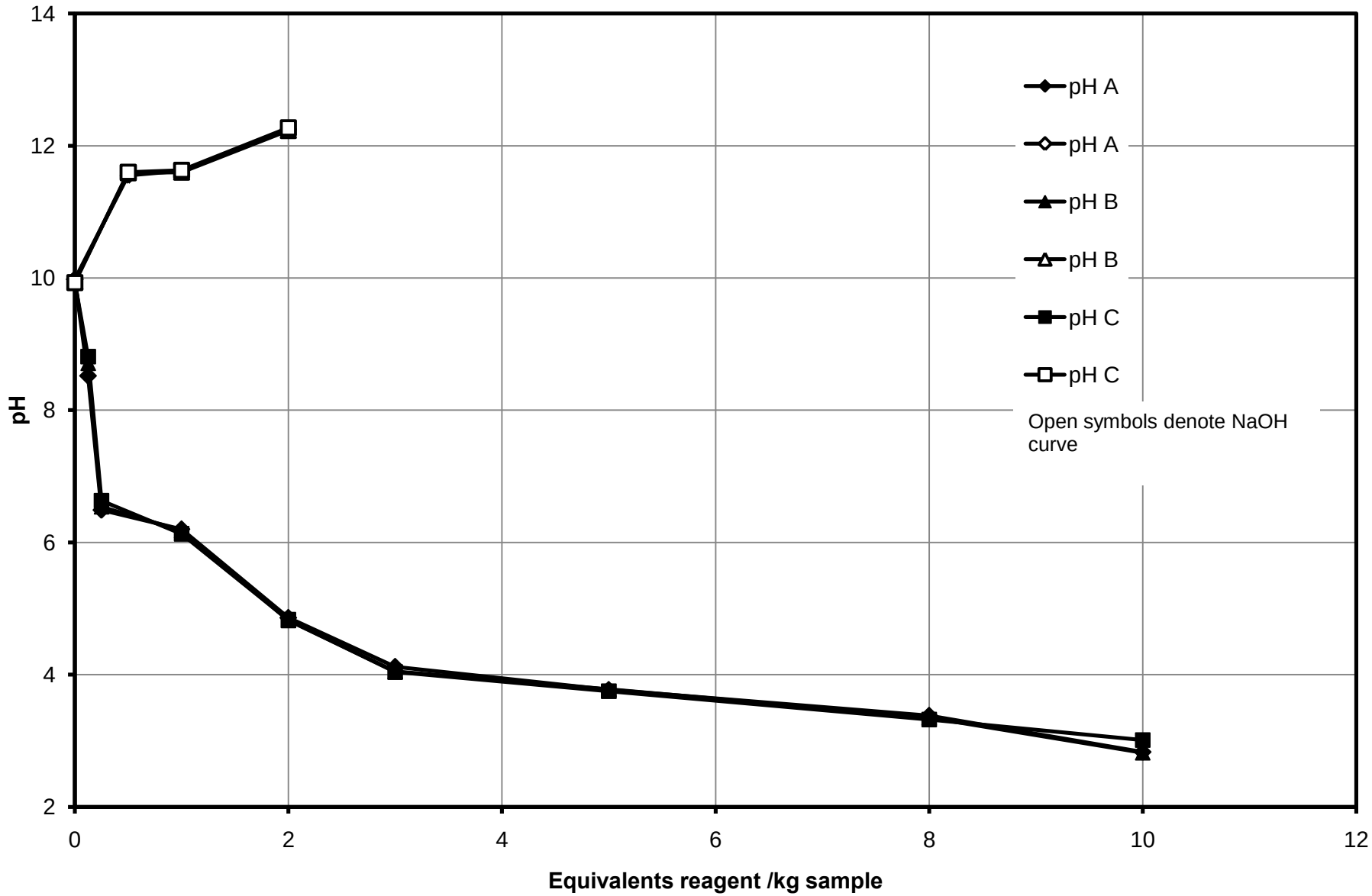

Figure 2 - Acid Neutralization Capacity (ANC) pH response of milled (0.15 mm minus) Raritan slag particles.

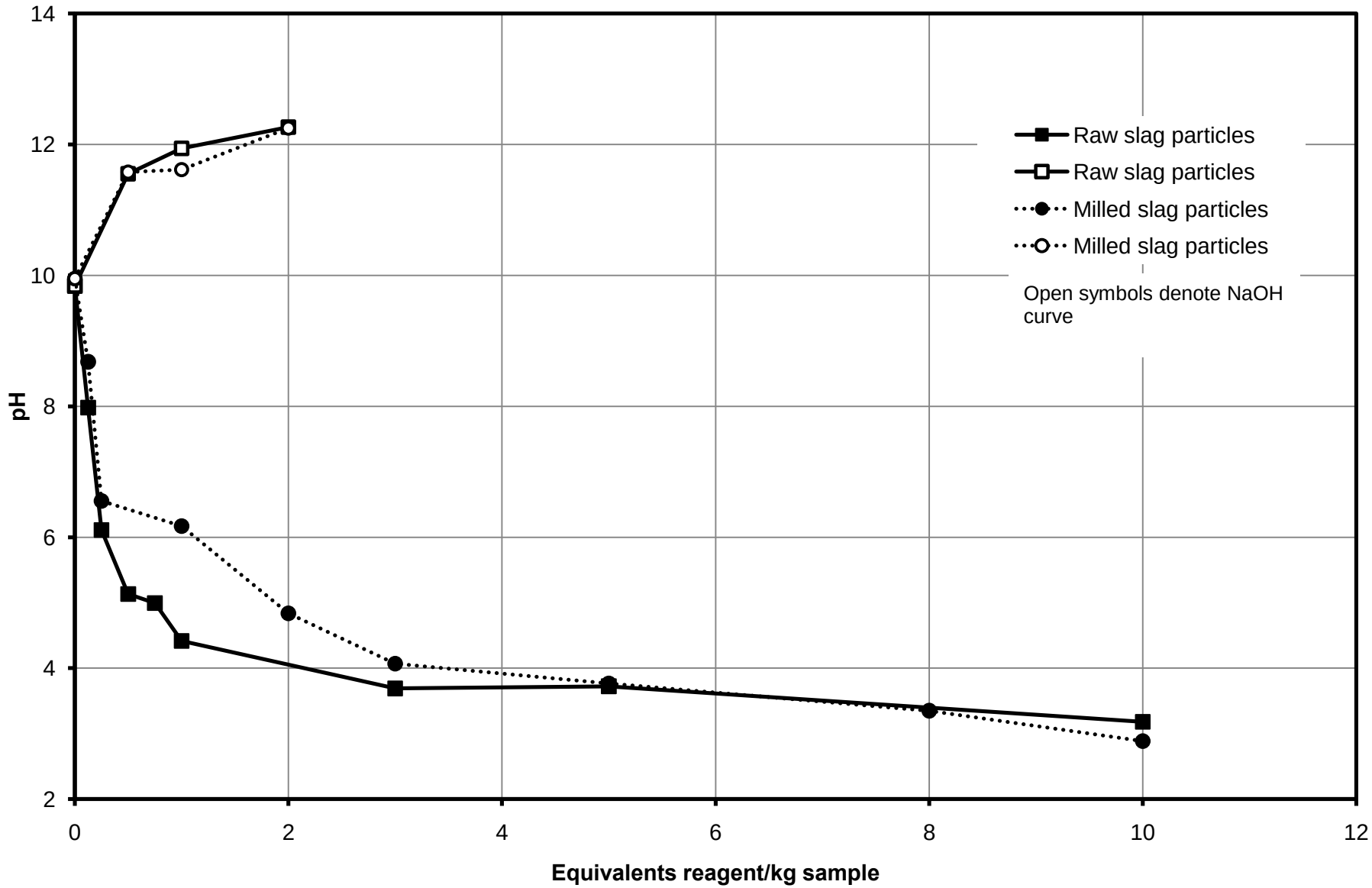

Figure 3 - Average Acid Neutralization Capacity (ANC) pH response of raw (9 mm minus) and milled (0.15 mm minus) Raritan slag particles.

Table 1 – ANC test reagent dosing schedule for raw slag particles.

						pH			
Sample ID	**g Sample**	**Equiv. NaOH/kg sample**	**Equivalents NaOH**	**mL Reagent**	**mL D.I. water**	**A**	**B**	**C**	**Average**
P-ANC-1	6.5	2.0	0.013	1.300	128.700	12.25	12.26	12.28	12.26
P-ANC-2	6.5	1.0	0.007	0.650	129.350	11.94	11.97	11.91	11.94
P-ANC-13	6.5	0.5	0.003	0.325	129.675	11.51	11.55	11.60	11.55
Sample ID	**g Sample**	**Equiv. HNO_3/kg sample**	**Equivalents HNO_3**	**mL Reagent**	**mL D.I. water**	**A**	**B**	**C**	**Average**
P-ANC-3	6.5	0.0	0.000	0.000	130.00	9.90	9.89	9.73	9.84
P-ANC-14	6.5	0.125	0.0008	0.051	129.95	6.28	9.08	8.58	7.98
P-ANC-15	6.5	0.25	0.0016	0.103	129.90	6.28	6.24	5.81	6.11
P-ANC-16	6.5	0.5	0.0033	0.206	129.79	5.22	5.13	5.05	5.13
P-ANC-17	6.5	0.75	0.0049	0.309	129.69	4.89	4.93	5.16	4.99
P-ANC-4	6.5	1.0	0.007	0.411	129.59	4.49	4.29	4.47	4.42
P-ANC-6	6.5	3.0	0.020	1.234	128.77	3.81	3.52	3.74	3.69
P-ANC-7	6.5	5.0	0.033	2.057	127.94	3.75	3.52	3.90	3.72
P-ANC-10	6.5	10.0	0.065	4.114	125.89	3.02	2.96	3.56	3.18

Table 2 – ANC test reagent dosing schedule for milled slag particles.

						pH			
Sample ID	**g Sample**	**Equiv. NaOH/kg sample**	**Equivalents NaOH**	**mL Reagent**	**mL D.I. water**	**A**	**B**	**C**	**Average**
PM-ANC-1	6.5	2.0	0.013	1.300	128.700	12.25	12.23	12.27	12.25
PM-ANC-2	6.5	1.0	0.007	0.650	129.350	11.62	11.60	11.63	11.62
PM-ANC-10	6.5	0.5	0.003	0.325	129.675	11.55	11.59	11.60	11.58
Sample ID	**g Sample**	**Equiv. HNO_3/kg sample**	**Equivalents HNO_3**	**mL Reagent**	**mL D.I. water**	**A**	**B**	**C**	**Average**
PM-ANC-3	6.5	0.0	0.000	0.000	130.00	9.98	9.94	9.93	9.95
PM-ANC-11	6.5	0.125	0.0008	0.051	129.95	8.52	8.71	8.81	8.68
PM-ANC-12	6.5	0.250	0.0016	0.103	129.90	6.49	6.54	6.63	6.55
PM-ANC-4	6.5	1.0	0.0065	0.411	129.59	6.20	6.18	6.13	6.17
PM-ANC-5	6.5	2.0	0.0130	0.823	129.18	4.86	4.82	4.83	4.84
PM-ANC-6	6.5	3.0	0.020	1.234	128.77	4.12	4.05	4.04	4.07
PM-ANC-7	6.5	5.0	0.033	2.057	127.94	3.77	3.78	3.75	3.77
PM-ANC-8	6.5	8.0	0.052	3.291	126.71	3.38	3.35	3.32	3.35
PM-ANC-9	6.5	10.0	0.065	4.114	125.89	2.83	2.82	3.01	2.89

X-RAY POWDER DIFFRACTION (XRPD) ANALYSIS OF SLAG-IMPACTED SAND AND SLAG PARTICLES

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April 14, 2011

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Re: "Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site"
Schnabel Project No. 10615032
Report – X-Ray Powder Diffraction (XRPD) analyses of slag-impacted sand and slag particles

Dear Ms. Painter,

Stevens Institute of Technology (SIT) is pleased to present the results of the X-Ray Powder Diffraction (XRPD) analyses of slag-impacted sand and slag particles for the project "Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site," Schnabel Project No. 10615032.

EXECUTIVE SUMMARY

Qualitative X-ray powder diffraction (XRPD) analyses were conducted for the slag-impacted sand and slag particles to identify and quantify the solid phases present in them and to determine how the various elements are distributed among the solid phases. The XRPD results showed that the slag-impacted sand was comprised mostly of quartz and minor amounts of albite. Conversely, the XRPD analysis of the slag particles identified many solid phases. One of the major findings was that iron sulfide (FeS) was a major phase at approximately 27 wt%. The presence of sulfide at high concentrations could negatively impact the long term durability of cement/lime stabilization/solidification mix designs, if not properly accounted for.

The results of this qualitative XRPD study were also compared to those obtained by the Ohio State University. Even though the minerals identified by both studies were mostly similar, the foci were different. Ohio State scope appears mainly concerned with the identification of the mineral phases in the slag and the potential origin of the slag waste. Whereas, another important difference was that Ohio State performed qualitative XRPD (only) on discrete samples, we performed qualitative and quantitative XRPD analyses on homogenized bulk slag samples. Our scope was mainly concerned with the quantitative mineralogy of the bulk slag and its impact on stabilization process and long term stability of the treated slag.

Even though the solid phases indentified in this report are mostly similar to those presented in the Ohio State report, some of the major phases identified by Ohio State in select discrete samples (based on total Cu and As concentrations) were not identified in this study. For example, Ohio State reported cuprite (CuO) and arsenic copper sulfide (AsCuS) as major phases in samples SW-2 and the West jetty, respectively; however, these phases were not present in significant amounts in the homogenized slag particles.

CLOSURE

Thank you for the fruitful collaboration and we hope to work with you again in the future. Please contact me at (201) 216-8993 if you have any questions with regard to this report.

Best regards,
Stevens Institute of Technology

Mahmoud Wazne, Ph.D
Assistant Professor

Attachment:
X-Ray Powder Diffraction analyses (XRPD) of slag-impacted sand and slag particles

Appendix 1

X-Ray Powder Diffraction analyses (XRPD) of slag-impacted sand and slag particles

Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site
Schnabel Engineering Consultants, Inc.

MATERIALS AND METHODS

Sample Preparation

The slag-impacted sand and slag particles (9.5 mm minus) were provided to Stevens by Schnabel. A subsample of homogenized slag-impacted sand or slag particles was collected in accordance with ASTM D6323-98. The slag-impacted sand was then passed through No. 200 mesh to remove the fines. The sample retained on No. 200 mesh was then pulverized in a Fritsch Pulverisette-5 planetary mill (a planetary motion ball mill) to reduce the particle size to less than No. 100 mesh size (< 0.15 mm). Approximately 80g of the air-dried sample was placed into each milling container and was pulverized for 20 minutes at a rotation speed of 250 RPM. The entire pulverized sample was passed through No.100 mesh (0.15 mm) to avoid any fractionation. Material retained on the No. 100 mesh was hand pulverized using a compaction hammer, then was re-processed. Subsample of the homogenized slag particles were pulverized to less than No. 100 mesh size in a Fritsch Pulverisette-5 planetary mill as previously explained.

XRPD analyses

XRPD techniques were used to assess the mineralogical composition of the slag-impacted sand and slag particles. Three subsamples (2 g each) of each media were taken from the pulverized (< mesh-100) fraction and were pulverized in a McCrone micronizing mill for 10 min using 7 mL cyclohexane as the milling fluid. The resulting slurry was air dried and then mixed with corundum (α-Al2O3, Sawyer, Lot No. C04-AO-41) on an 80:20 ratio by weight, and then subjected to XRPD. The slag-impacted sand and slag particles were analyzed in triplicate.

Step-scanned XRPD data was collected by the Rigaku Ultima 4 computer-automated diffractometer using Bragg-Brentano geometry. Diffractometry was conducted at 40 kV and 40 mA using a diffracted beam graphite-monochromator with Cu radiation. The data was collected in the 2θ range of 5° to 85° with a step size of 0.03° per 8 s. The qualitative and quantitative analyses of the XRPD patterns were performed using the Jade software version 7.5 (Materials Data Inc., 2006) and the Whole Pattern Fitting function of Jade, which is based on the Rietveld method (Rietveld, 1969). The reference databases for powder diffraction and crystal structure data were the International Center for Diffraction Data database (ICDD, 2004) and the Inorganic Crystal Structure Database (ICSD, 2011), respectively.

RESULTS

Slag-impacted sand

The XRPD patterns of the slag-impacted sand are shown in Figure 1 and the quantitative results are presented in Table 1. The major phase identified in these samples was silicon oxide - alpha (SiO_2). The other minor phase observed was albite [$(Na,Ca)Al(Si,Al)_3O_8$]. There was no amorphous content present in the sand samples.

Slag particles

The XRPD patterns of the slag particles are shown in Figure 2 and the quantitative results are presented in Table 2. The individual XRPD patterns of the slag samples are virtually identical. The total digestion data provided by Test America Laboratories, King of Prussia, PA were used to identify the solid phases.

Two major iron phases were observed in the slag samples; iron sulfide and Fayalite with average concentrations of 25.6% and 26.7%, respectively. In addition, three minor iron phases were observed; magnetite ($Fe_{2.964}O_4$), goethite [FeO(OH)], and iron oxide (FeO) with average concentrations of 5.8%, 1.4%, and 0.8%, respectively. The quantity of Fe calculated from these phases was about 35.3%, which is close to the Fe concentration obtained using total digestion (31.3%). Lead was identified in the following solid phases; elemental lead (Pb), galena (PbS), cerussite ($PbCO_3$) which were present at 2%, 2.1%, and 1.3%, respectively. The fraction of the total Pb appearing in the form of elemental lead, galena and cerussite were 44.7, 34 and 23%, respectively, based on the average Pb obtained using total digestion (4.7 wt%). Quartz (SiO_2), silicon (Si), Fayalite and albite ($NaAlSi_3O_8$) were the main silicate phases observed in these samples with weight percentages of 1.7%, 1.1%, 25.6%, and 7.2%, respectively. The quantity of total Si calculated from the observed phases was about 7.8%, which is 2.4% greater than the Si concentration obtained using the total digestion analyses. No calcium phases were identified in the slag particles even though calcium was measured at 4% by total digestion.

The sulfur phases identified were iron sulfide (FeS) and galena (PbS) with average concentrations of 26.7% and 2.1%, respectively. Total sulfur was not measured in the slag samples. However, the presence of sulfur phases at these high concentrations is very significant because it may impact the selection of the reagents used in the stabilization of the slag. Sulfur potentially could oxidize to sulfate in the presence of oxygen and moisture, which in turn it could react with cementitious end-products to form expansive mineral phases.

Finally, the XRD data reported in the Ohio state university document does not contain quantitative data. It appears that their scope of work was mainly concerned with the identification of the mineral phases in the slag and the origin of the slag waste. The Ohio State report presented XRD data for discrete samples emphasizing the different composition between the interior and exterior facies, whereas this scope was mainly concerned with the quantitative mineralogy of the bulk slag and its impact on stabilization process and long term stability of the treated slag.

Even though the solid phases indentified in this report are mostly similar to those presented in the Ohio State report, some of the major phases identified by Ohio State in select discrete samples (based on total Cu and As concentrations) were not identified in this study. For example, Ohio State reported cuprite (CuO) and arsenic copper sulfide (AsCuS) as major phases in samples SW-2 and the West jetty, respectively; however, these phases were not present in significant amounts in the homogenized slag particles.

REFERENCES

Raritan bay slag and sand characterization report (2009), submitted by Ohio state university, U. S. EPA Contract No.: EP-C-04-032.

Materials Data Inc., (2006) Jade Version 7.5, California, USA.

H.M. Rietveld, (1969) A profile refinement method for nuclear and magnetic structures, *J. Appl. Crystallogr.* 2, pp. 65–71.

International Centre for Diffraction Data (ICDD) (2004), Powder Diffraction File, PDF-2 Database Release.

Inorganic Crystal Structure Database (ICSD) (2009). Fachinformationszentrum, Karlsruhe, Germany.

Table 1 – Quantitative results for slag-impacted sand.

				Weight %		
Phase[1]	**Formula**	**PDF[2]**	**CSD[3]**	**S-1**	**S-2**	**S-3**
Silicon oxide - Alpha*	SiO_2	97-002-9817	39830	94.5	95.8	94.8
Albite	$(Na,Ca)Al(Si,Al)_3O_8$	00-041-1480	--	5.5	4.2	5.2
Total				100.0	100.0	100.0

1) Asterisked phases reported with same formula by Ohio State (2009)
2) Powder Diffraction File No. from ICDD (2004)
3) Crystal Structure Database No. from ICSD (2009)

Table 2 – Quantitative results for slag particles.

				Weight %				
Phase[1]	**Formula**	**PDF[2]**	**CSD[3]**	**P-1**	**P-2**	**P-3**	**Average**	**% Pb_{ave} [4]**
Fayalite*	$(Mg_{.028}Fe_{.908}Mn_{.064})(Mg_{.028}Fe_{.892}Mn_{.057}Ca_{.023})(SiO_4)$	01-087-0676	64953	26.0	24.8	26.0	25.6	NA
Iron Sulfide*	FeS	01-080-1030	68849	26.0	26.0	28.3	26.8	
Magnetite*	$Fe_{2.964}O_4$	01-087-0244	50271	5.8	5.6	5.8	5.7	
Albite	$NaAlSi_3O_8$	97-001-3798	9830	5.5	7.5	8.6	7.2	
Quartz*	SiO_2	01-085-0794	27826	1.8	1.6	1.8	1.7	
Silicon*	Si	01-077-2108	60386	1.4	1.0	1.0	1.1	
Goethite*	FeO(OH)	01-081-0462	71808	1.2	1.4	1.1	1.2	
Iron oxide*	FeO	01-089-0687	82233	0.9	0.7	0.7	0.8	
Lead*	Pb	00-004-0686	52253	2.1	2.0	2.1	2.1	44.7
Galena	PbS	00-005-0592	62194	1.9	2.1	2.3	2.1	34.0
Cerrussite*	$PbCO_3$	00-047-1734		1.3	1.3	1.4	1.3	21.3
Amorphous				26.2	26.2	20.8	24.4	
Total				100.0	100.0	100.0	100.0	100.0

1) Asterisked phases reported with same pdf files by Ohio State (2009)
2) Powder Diffraction File No. from ICDD (2004)
3) Crystal Structure Database No. from ICSD (2009)
4) Fraction of total Pb appearing in each phase based on 47,000 mg/kg

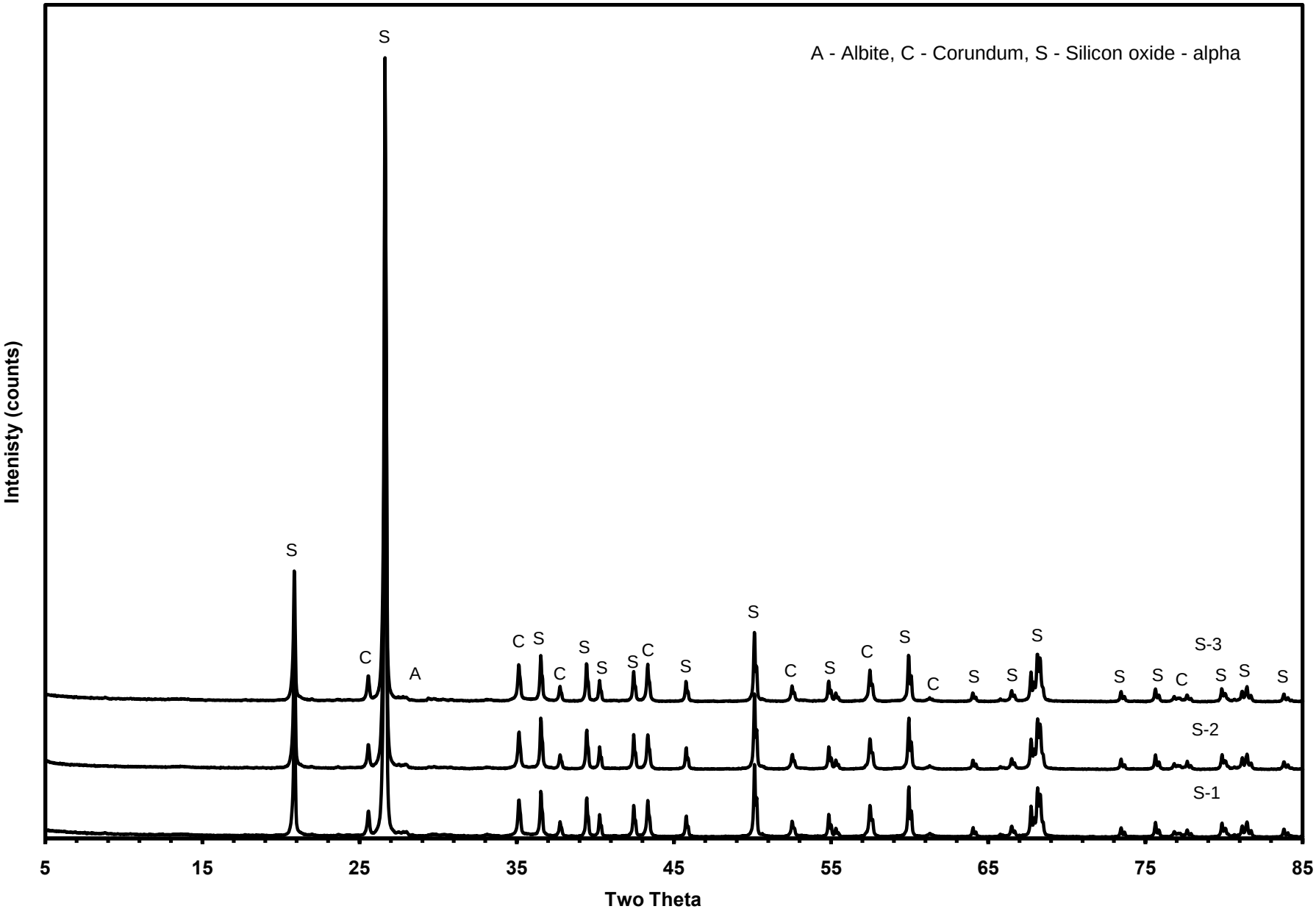

Figure 1 - Annotated XRPD patterns for slag-impacted sand.

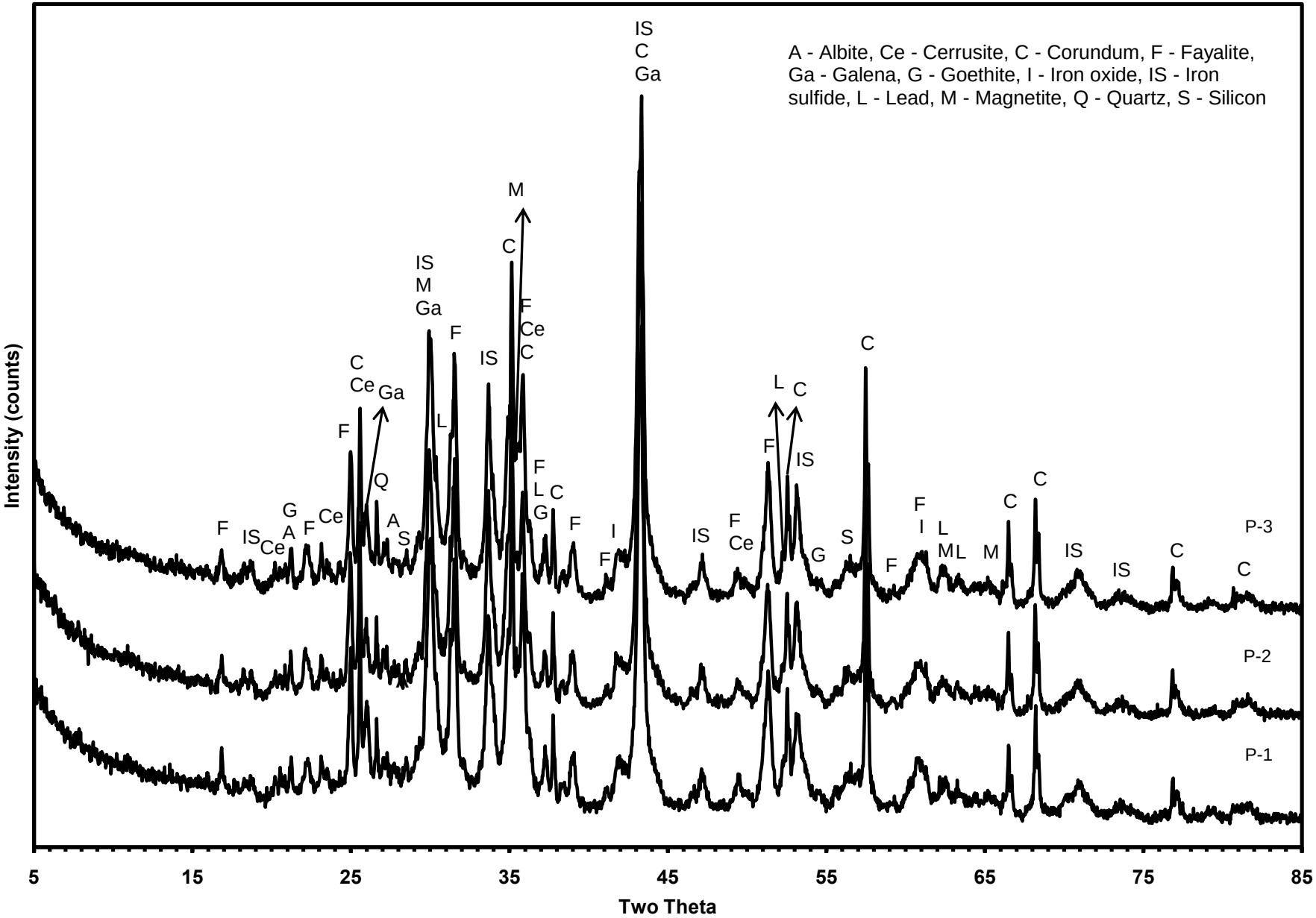

Figure 2 - Annotated XRPD patterns for slag particles (3/8-inch minus).

SEM/EDX REPORT

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CES

April 15, 2011

Mia Painter, PG.
Project Geologist
Schnabel Engineering Consultants, Inc.
510 East Gay Street
West Chester, PA 19380.

Re: "Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site"
Schnabel Project No. 10615032
Report – SEM-EDX analyses of slag-impacted sand and slag particles.

Dear Ms. Painter,

Stevens Institute of Technology (SIT) is pleased to present the results of the Scanning Electron Microscopy (SEM) – Energy dispersive X-ray spectroscopy (EDX) analyses of slag-impacted sand and slag particles for the project "Development of Stabilization Approaches for Raritan Bay Slag particles Superfund Site," Schnabel Project No. 10615032.

EXECUTIVE SUMMARY

SEM-EDX analyses were conducted for homogenized slag-impacted sand and crushed slag samples. The analyses results indicated that the slag-impacted sand was comprised mostly of silicon and oxygen with minor amounts of iron, calcium, magnesium, and sulfur. The elemental mapping did not show strong correlation among the various elements except for silicon and oxygen, which is expected given that the samples is comprised mostly of quartz, as shown in the XRPD analyses.

Conversely, the SEM-EDX analyses of the crushed slag indicated that the sample is comprised of multi major elements including silicon, lead, iron, sulfur, calcium, and minor amounts of sodium, magnesium, and potassium. Elemental mapping showed a strong correlation between iron-oxygen, silicon-oxygen, iron-silicon, and iron-lead-sulfur. The iron-lead-sulfur is a major finding supporting the XRPD results which indicated the presence of the iron-sulfide phase (FeS) and the lead sulfide phase (PbS). The association of iron with silicon was also confirmed in the XRPD analyses by the presence of fayalite as a major crystal phase. It appears that the 3-way correlation of iron-lead-sulfur is probably due to the co-precipitation of iron and lead with sulfide.

CLOSURE

Thank you for the opportunity to work together and we look forward to continued collaboration. Please contact me at (201) 216-8993 if you have any questions with regard to this report.

Best regards,
STEVENS INSTITUTE OF TECHNOLOGY

Mahmoud Wazne, Ph.D
Assistant Professor

Attachment:
SEM-EDX analyses of slag-impacted sand and slag particles

Appendix 1

SEM-EDX analyses of As-spiked slag fines

Development of Stabilization Approaches for Raritan Bay Slag Particles Superfund Site
Schnabel Engineering Consultants, Inc.

MATERIALS AND METHODS

Sample Preparation

The raw materials slag-impacted sand and slag particles (3/8-inch minus) were provided to Stevens by Schnabel. A subsample of homogenized slag-impacted sand and slag particles was individually collected in accordance with ASTM D6323-98.

Slag-impacted sand

The homogenized slag-impacted sand was passed through No. 200 mesh to remove the fines. The particle size of gravel and coarse sand fractions were reduced to less than No. 10 mesh size and mixed with the medium and fine sands in order to have a homogeneous subsample for SEM-EDX analysis.

Slag particles

The slag particles were pulverized to three different sizes. Firstly, a homogenous subsample (~300 g) of slag was taken and the particle size of the entire sample was reduced to less than No. 10 mesh size (< 2 mm) manually using compaction hammer. Then, a subsample (~160 g) from the minus No. 10 mesh size was taken and pulverized to less than No. 100 mesh size (< 0.15 mm) using planetary ball mill pulverizer (Fritsch Pulverisette 5) for 20 minutes at a rotation speed of 250 RPM. The entire pulverized sample was passed through No.100 mesh (0.15 mm) to avoid any fractionation. Material retained on the No. 100 mesh was hand pulverized using a compaction hammer, and then was re-processed. A subsample (2 g) was taken from the pulverized (< No.100 mesh) fraction and was pulverized in a McCrone micronizing mill for 10 min using 7 mL cyclohexane as the milling fluid.

SEM-EDX analyses

SEM analyses were performed using a Zeiss Auriga Small Dual-Beam FIB-SEM system equipped with a 80 mm^2 Oxford SDD (silicon drift detector) EDS system. The subsamples of each media were prepared using double-sided carbon tape. EDX spectrum was recorded up to 15 keV, but as no peaks were observed above 9 keV; the images were truncated to 9 keV to improve resolution.

RESULTS

Slag-impacted sand

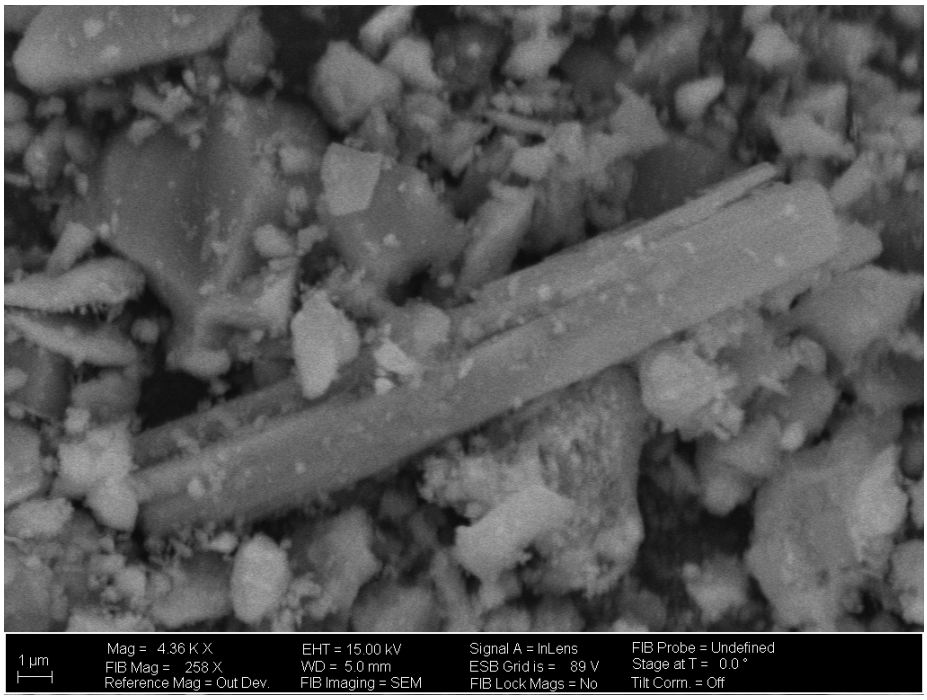
The SEM-EDX image of S-1 is shown in Figure 1 and the corresponding elemental mapping image is shown in Figure 2. The EDX spectrum indicates that silicon and oxygen are the major elements present in the sample with minor quantities of iron, calcium, magnesium, and sulfur. The elemental mapping does not show strong correlation among the various elements except for silicon and oxygen, which is expected given that the samples is comprised mostly of quartz, as was shown in the XRPD analyses.

Figures 3 and 4 show the SEM-EDX image of S-2 and the corresponding elemental mapping image, respectively, for a crystal structure observed abundantly in the sand sample. The EDX spectrum indicated that the sample is comprised mostly of silicon and oxygen. The corresponding elemental mapping image (Figure 4) showed a strong correlation between the silicon and oxygen dots indicating that the crystal structure is most likely quartz. Similarly, Figures 5 and 6 show that S-3 was comprised of a similar crystal shape and elemental composition to sample S-2.

Slag particles

The SEM-EDX image of P-1 is shown in Figure 7 and the corresponding elemental mapping image is shown in Figure 8. The EDX spectrum indicates that the sample is comprised of multi major elements including silicon, lead, iron, sulfur, calcium, and minor amounts of sodium, magnesium, and potassium. The corresponding elemental mapping (Figure 8) showed a strong correlation between iron-oxygen, silicon-oxygen, iron-silicon, and iron-lead-sulfur. The iron-oxygen and silicon-oxygen correlations are expected, but the iron-lead-sulfur correlation supports the XRPD results which indicated the presence of the iron-sulfide phase (FeS) and the lead sulfide Galena phase (PbS). The association of iron with silicon was also confirmed in the XRPD analyses by the presence of fayalite as a major crystal phase.

The SEM-EDX images for sample P-2 (Figures 9 and 10) and P-3 (Figures 11 and 12) repeatedly show the strong iron-lead-sulfur correlation on a single crystal structure scale.



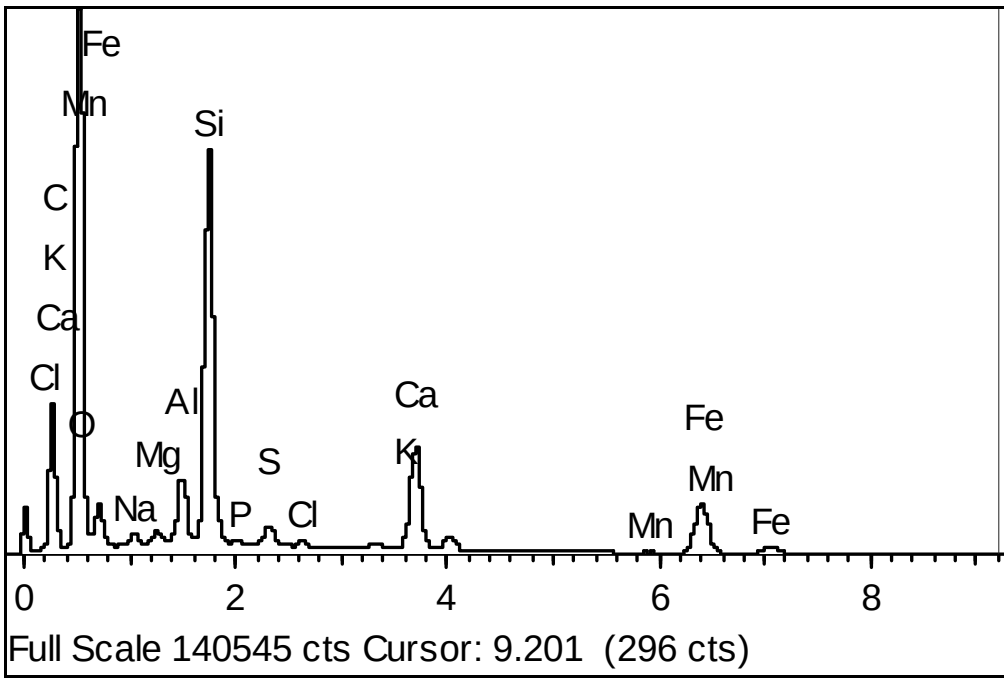


Figure 1 – SEM image and EDX spectrum of slag-impacted sand (S-1) (< 2 mm).

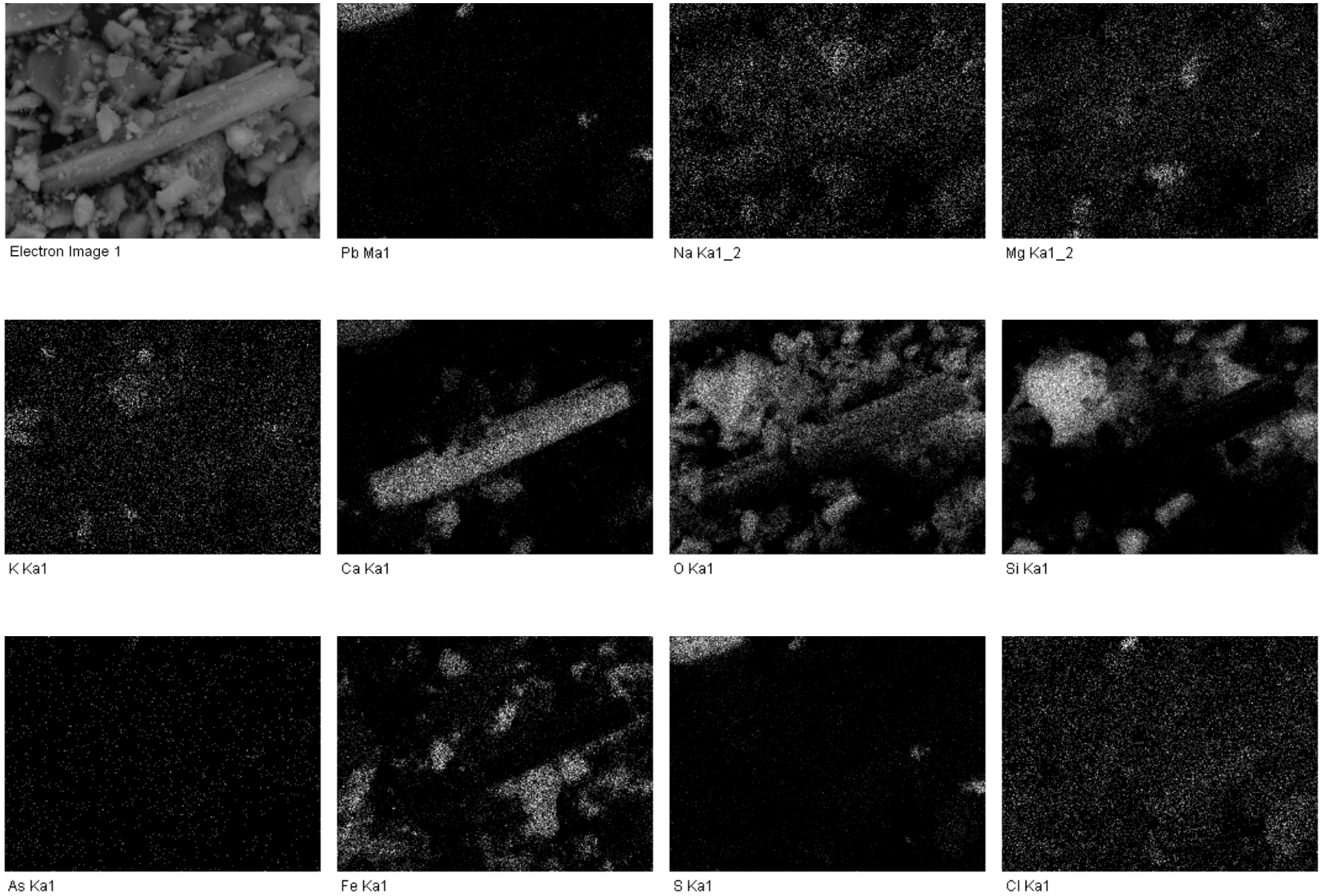
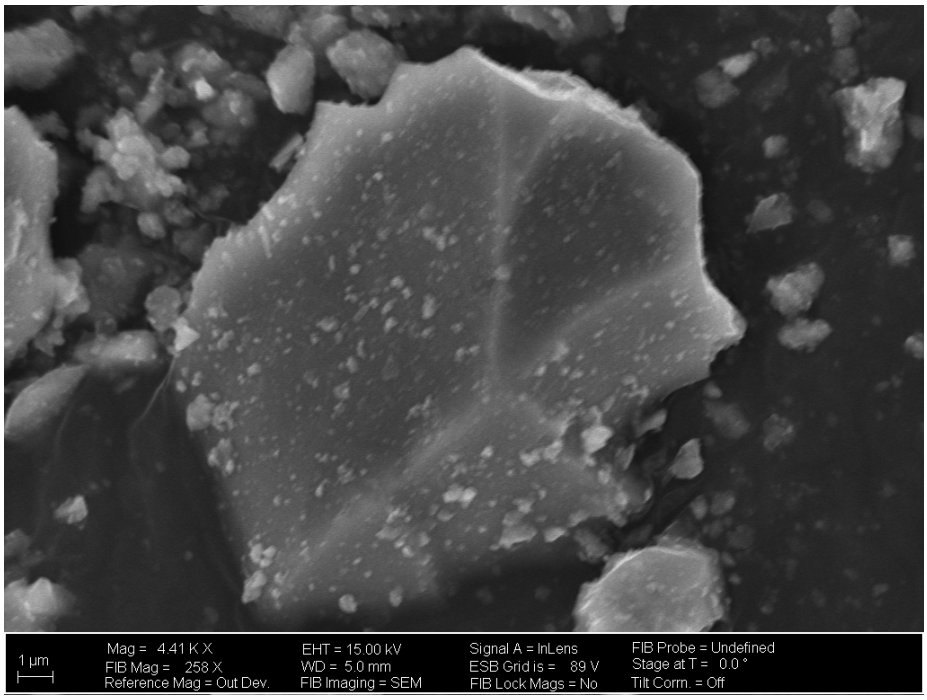


Figure 2 – Elemental mapping for the SEM image of slag-impacted sand in Figure 1.



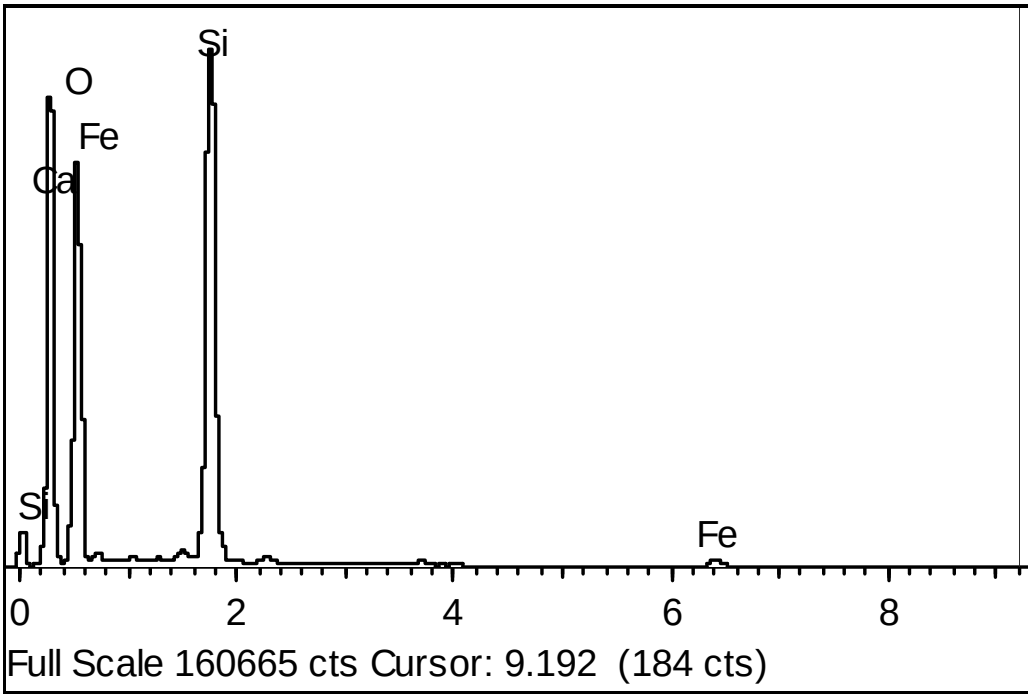


Figure 3- SEM image and EDX spectrum of slag-impacted sand (S-2) (< 2 mm).

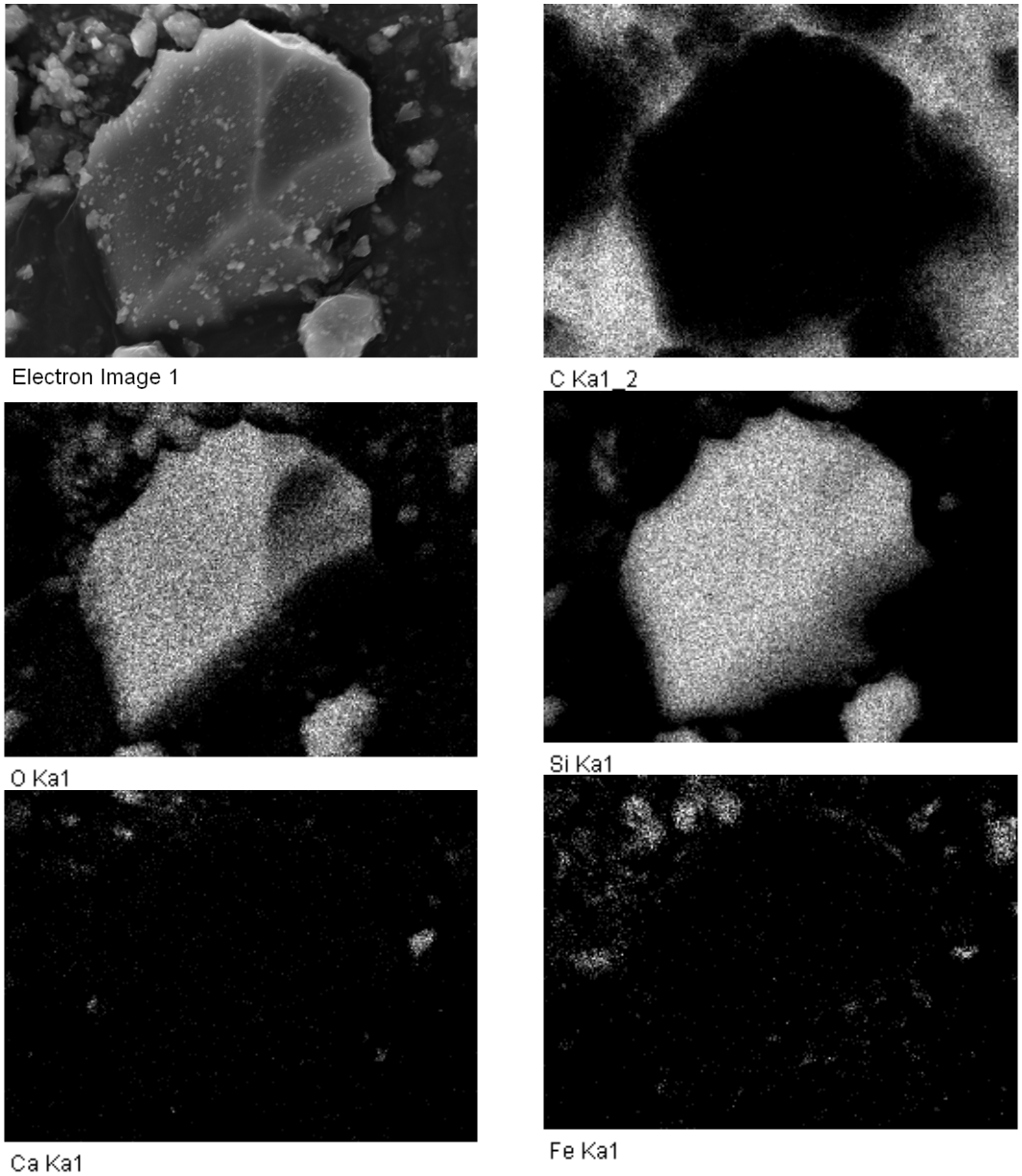
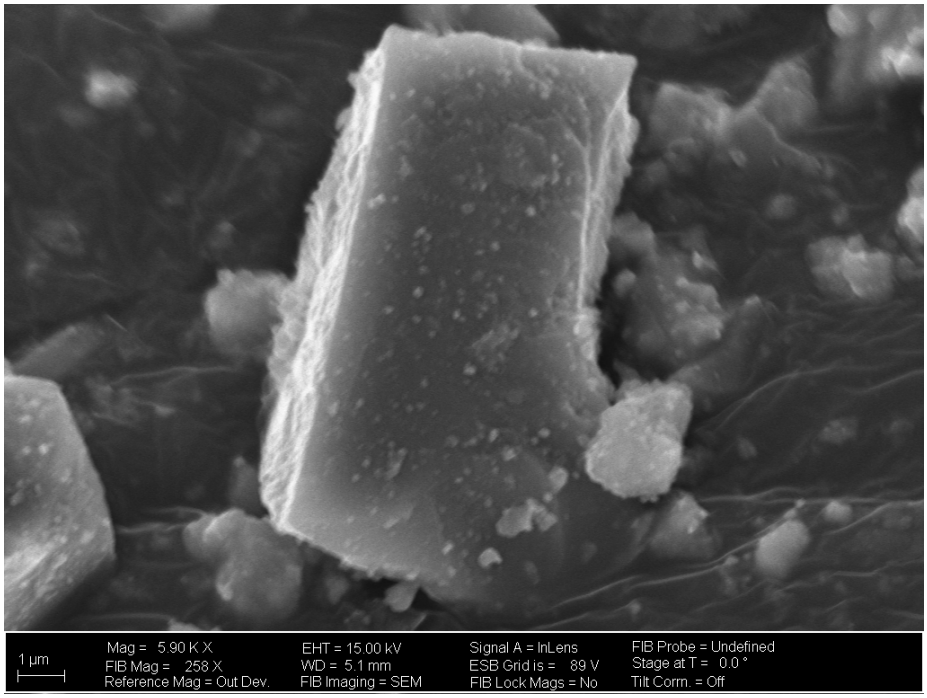


Figure 4 – Elemental mapping for the SEM image of slag-impacted sand in Figure 3.



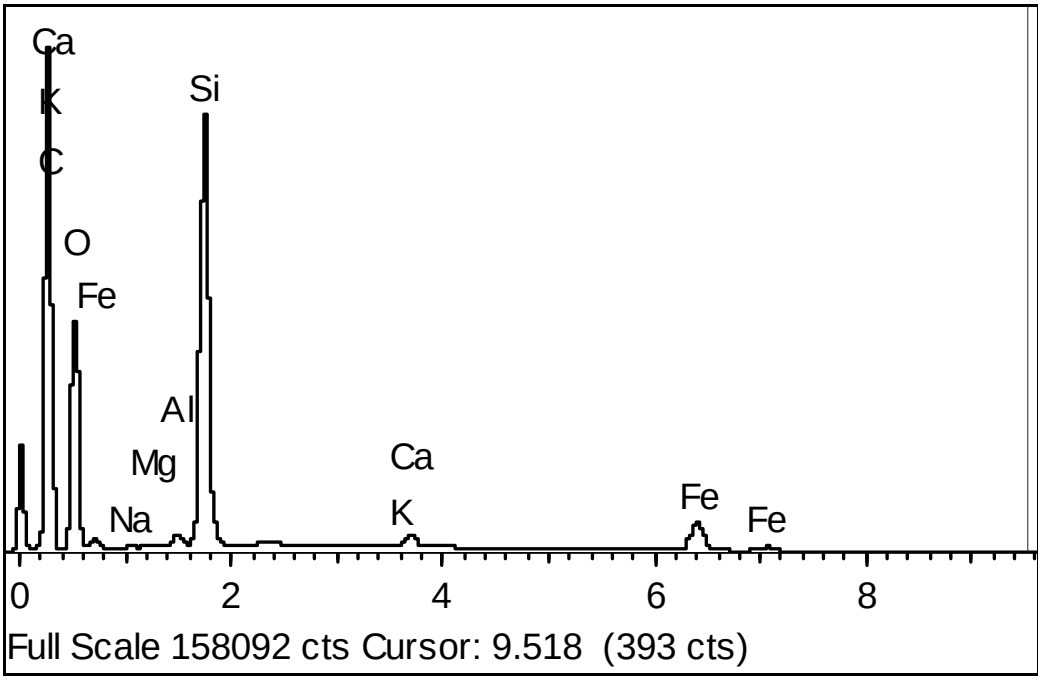


Figure 5 – SEM image and EDX spectrum of slag-impacted sand (S-3) (< 2 mm).

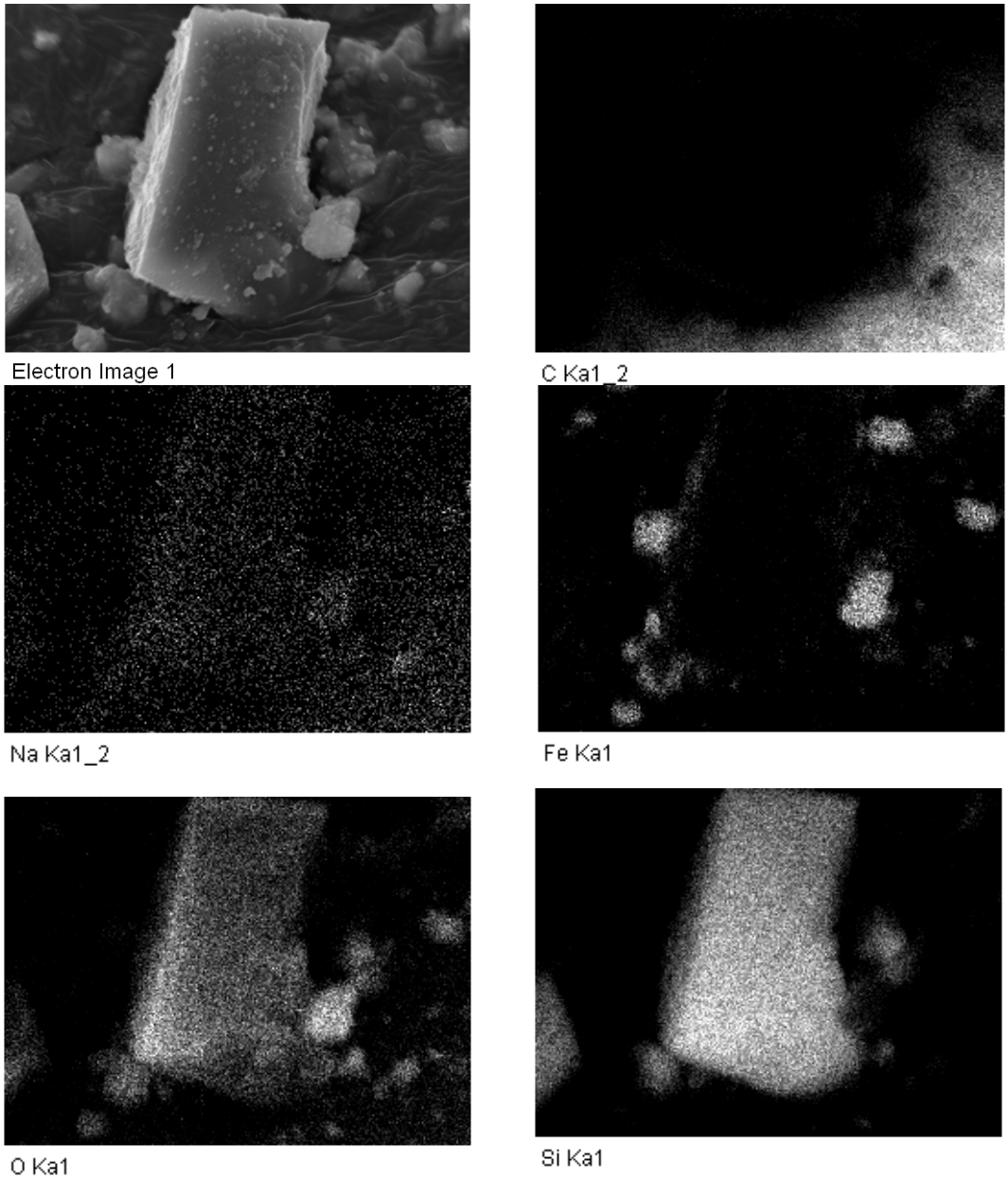
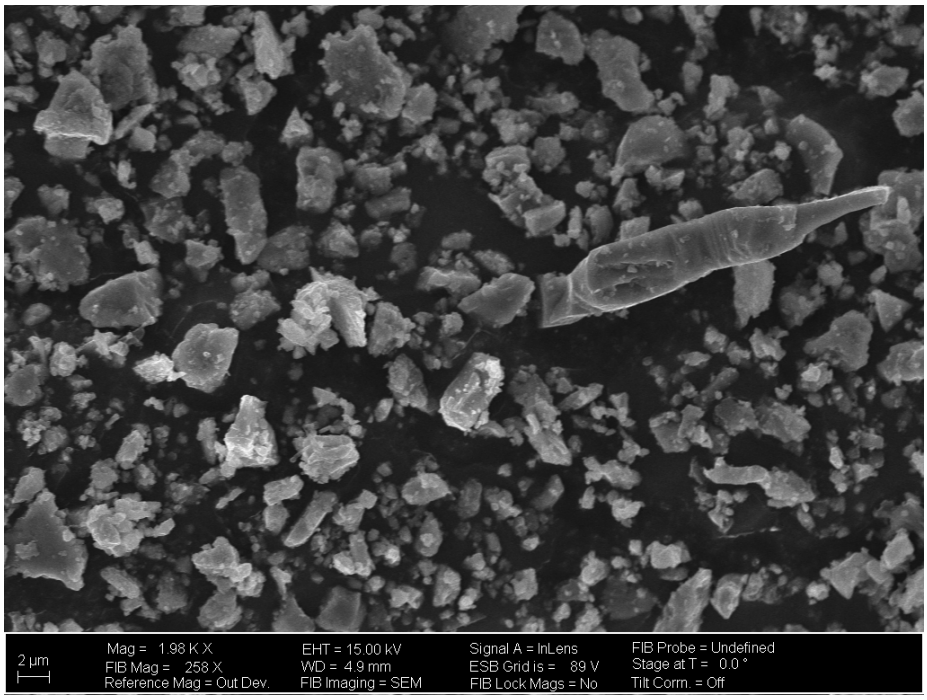


Figure 6 – Elemental mapping for the SEM image of slag-impacted sand in Figure 5.



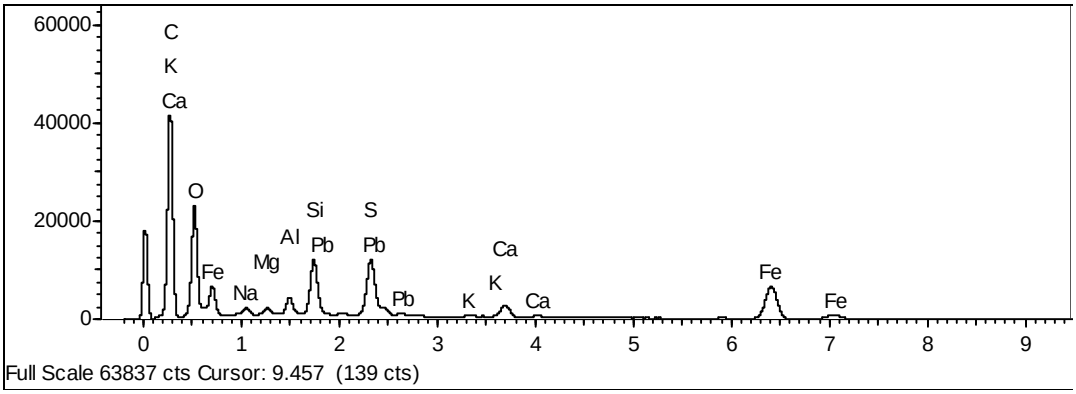


Figure 7 – SEM image and EDX spectrum of micronized slag particles (P-1) (< 0.010 mm).

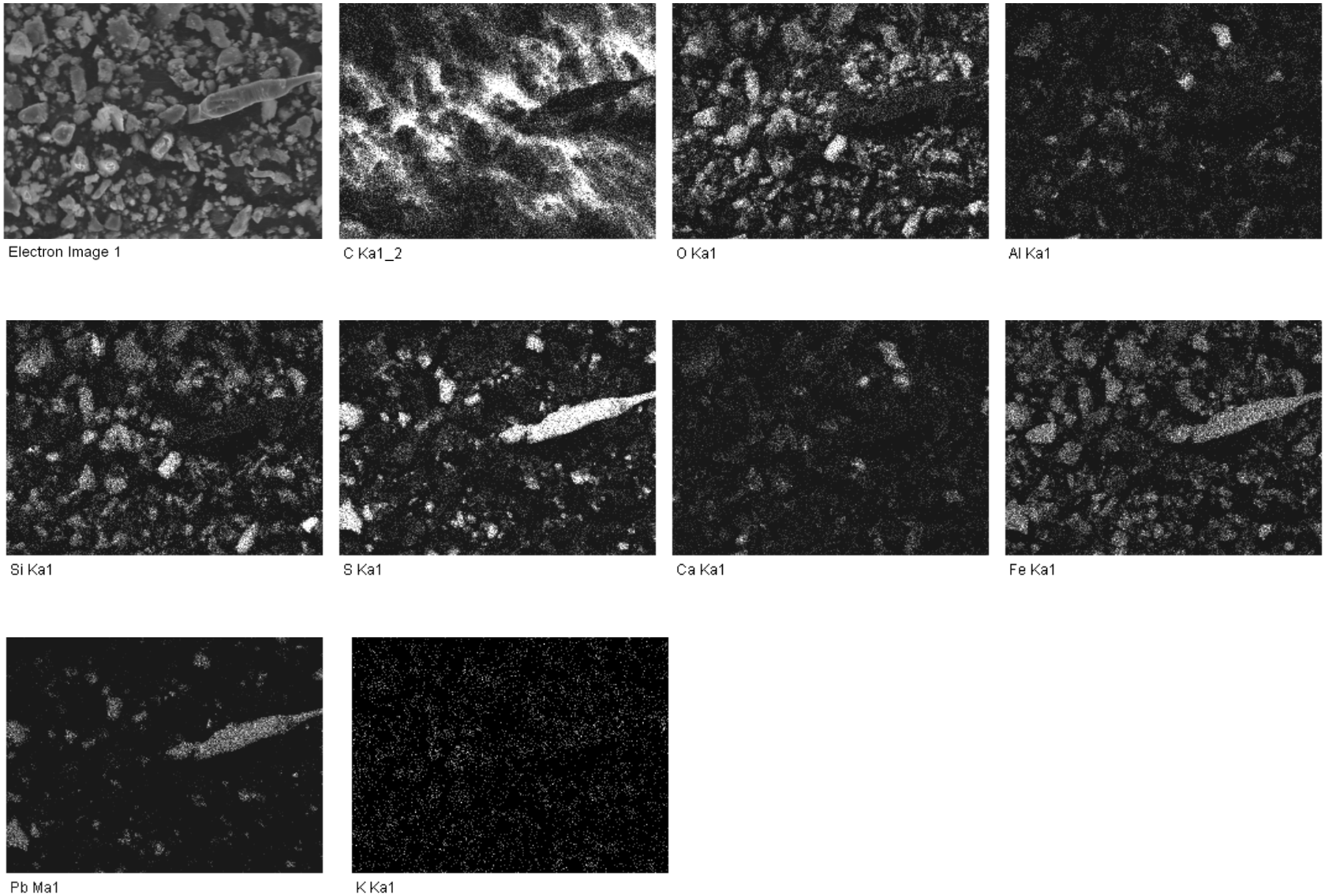
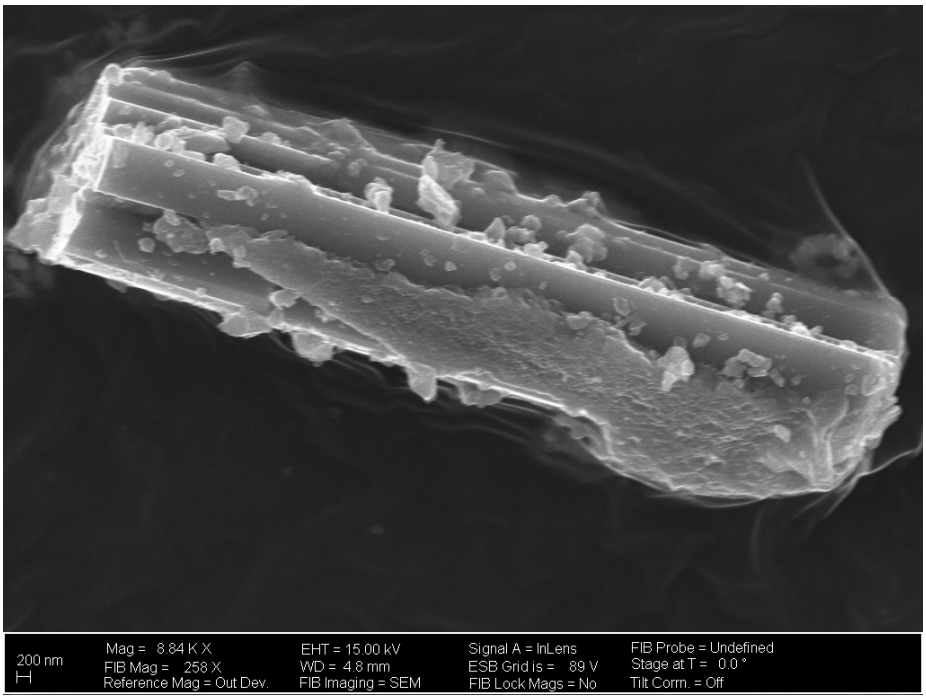


Figure 8 – Elemental mapping for the SEMimage of micronized slag particles in Figure 7.



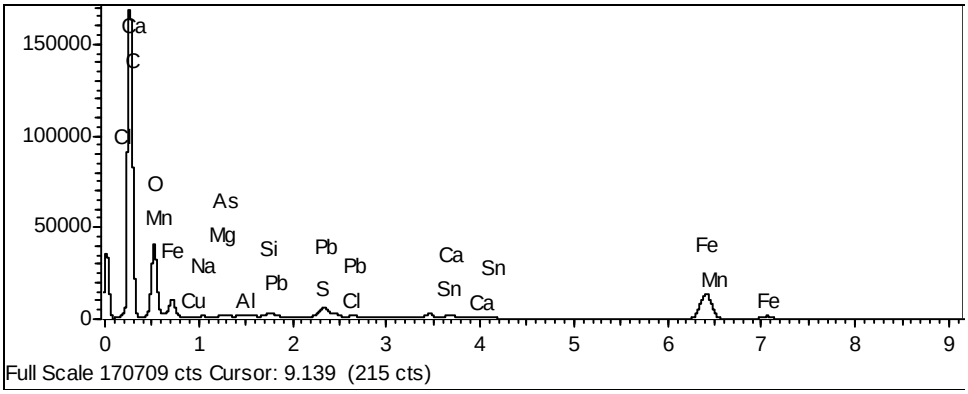


Figure 9 – SEM image and EDX spectrum of milled slag particles (P-2) (< 0.15 mm).

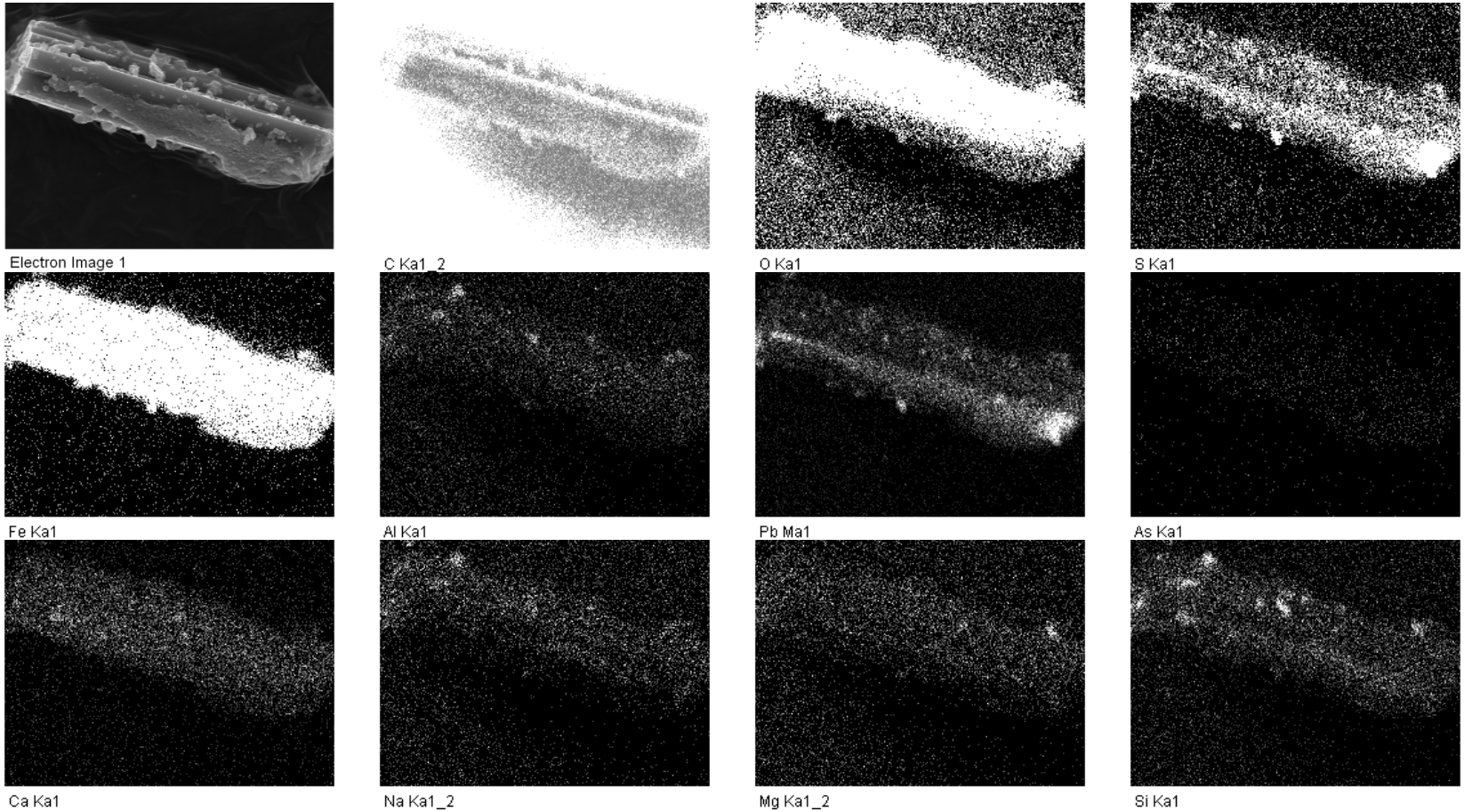


Figure 10 – Elemental mapping for the SEM image of milled slag particles in Figure 9.

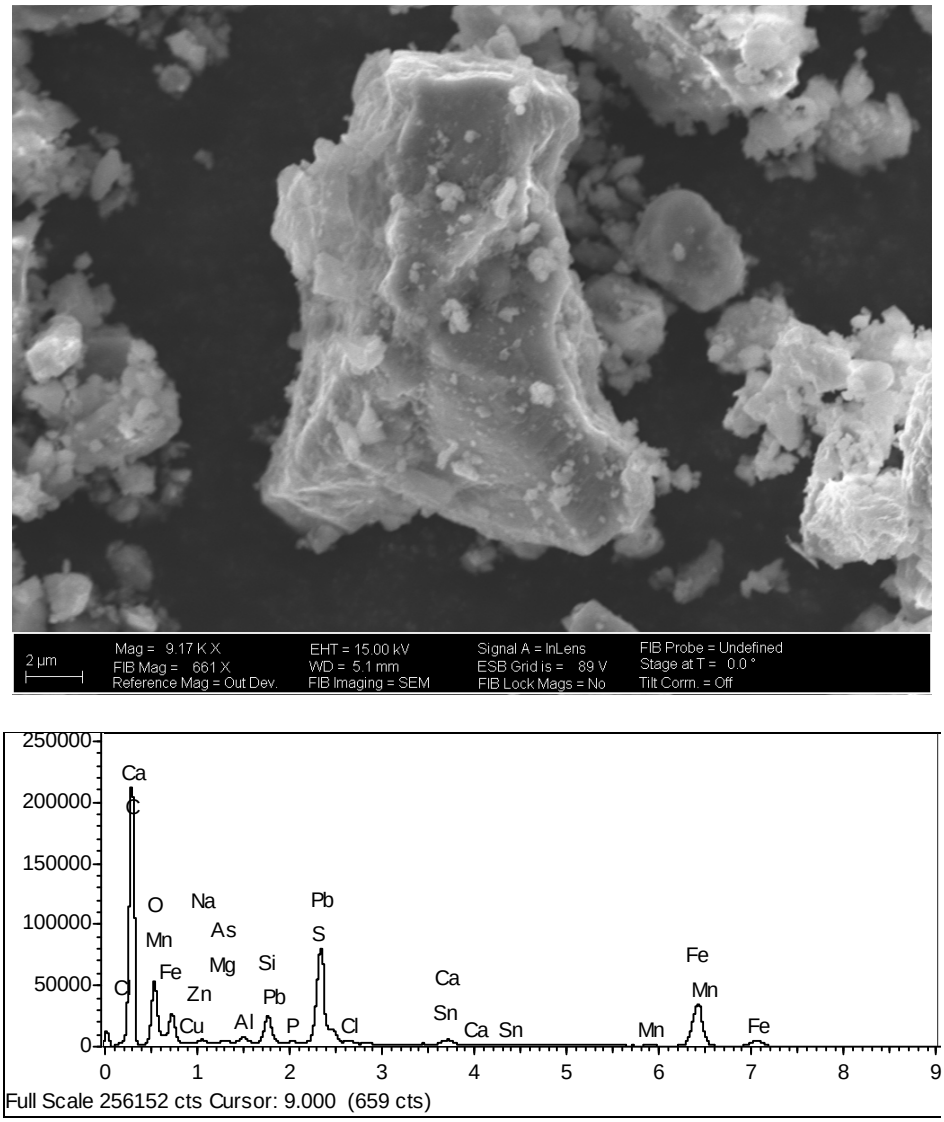


Figure 11 – SEM image and EDX spectrum of crushed slag particles (P-3) (< 2 mm).

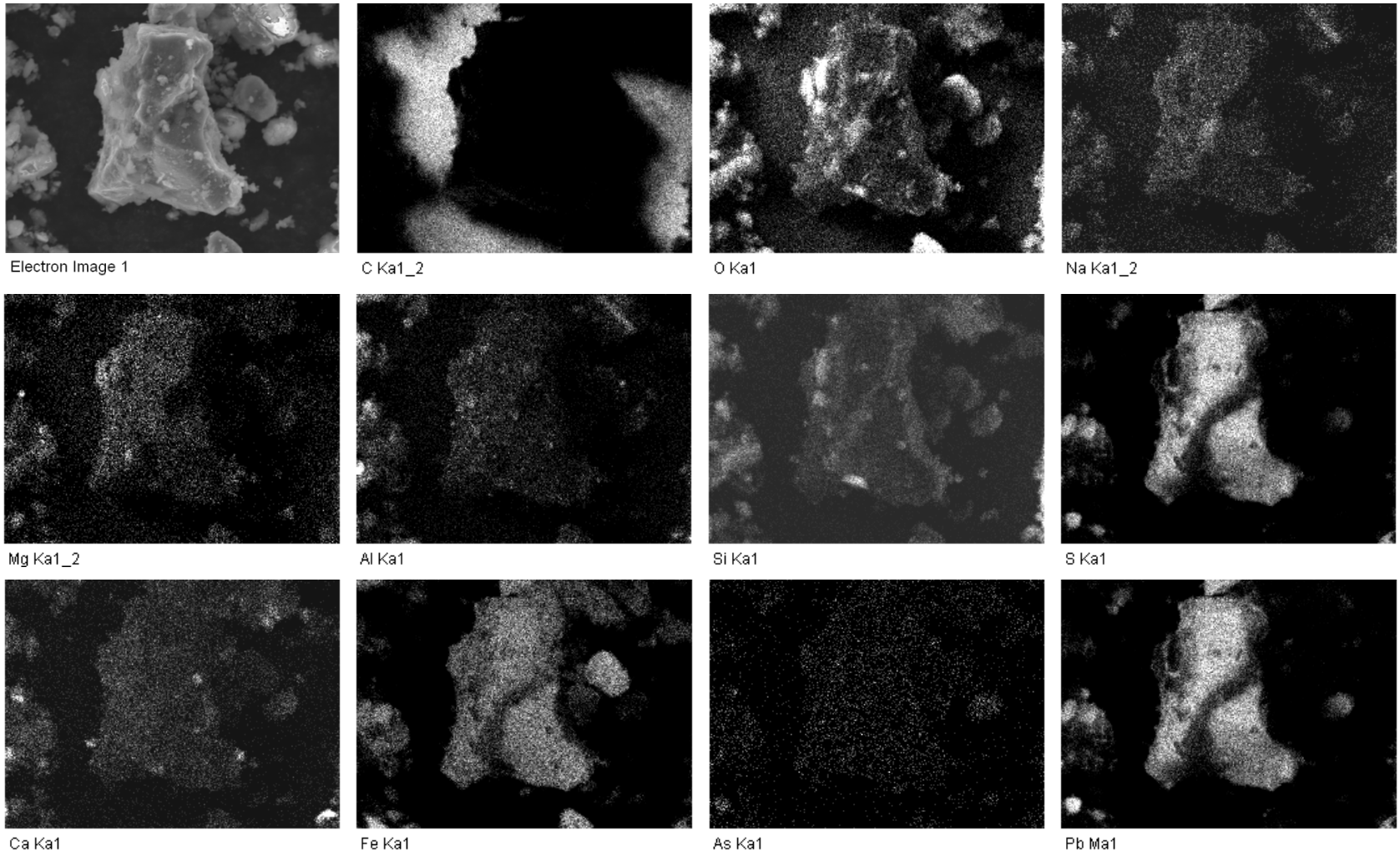


Figure 12 – Elemental mapping for the SEM image of crushed slag particles in Figure 11.

APPENDIX B

ENVIRONMENTAL ANALYTICAL RESULTS

Table B-1: Slag-Impacted Sand and Slag Particle Subsample Details
Table B-2: Summary of Chain of Custody Sample Information

TestAmerica Reports:

KUC0089 – Sample E-1
KUC0090 – Samples E-4, E-5
KUB0345 – Samples MFS-1 to 3, SC-1 to 3
KUB0381 – Samples CS-1 to 3, G-1 to 3
KUC0524 – Samples P-1 to 3, E-6
KUC0128 – Samples S-1 to 3
KUC0641 – Samples P-ANC-1 to 4, 6, 10, 13 to 17; A, B, C for each
KUC0092 – Samples PM-ANC-1 to 12,; A, B, C for each

Element One Reports:

Analytical Report 16313 – Samples S-4 to 6
Analytical Report 16360 – Samples P-4 to 6

Table B-1
Slag-Impacted Sand and Slag Particle Subsample Details

Material	Sample Batch	Subsamples or Chain of Custody Designation	Testing Location	Test
Slag-Impacted Sand	**Sieve**	G, CS, MFS, SC	Stevens	Sieve Analysis
	S-1	S-1	TA	Total Metals, TCLP, SPLP, DIW
		S-1	Stevens	XRPD, SEM/EDX
		S-4	EO	Silicon Totals
	S-2	S-2	TA	Total Metals, TCLP, SPLP, DIW
		S-2	Stevens	XRPD, SEM/EDX
		S-5	EO	Silicon Totals
	S-3	S-3	TA	Total Metals, TCLP, SPLP, DIW
		S-3	Stevens	XRPD, SEM
		S-6	EO	Silicon Totals
	S-7	Test 1, Test 2, Test 3	Schnabel Baltimore	MC/LOI
Slag Particles	**P-1**	P-1	TA	Total Metals, TCLP, SPLP, DIW
		P-1	Stevens	Sieve Analysis, XRPD, SEM/EDX
		P-4	EO	Silicon Totals
	P-2	P-2	TA	Total Metals, TCLP, SPLP, DIW
		P-2	Stevens	Sieve analysis, XRPD, SEM/EDX
		P-5	EO	Silicon Totals
	P-3	P-3	TA	Total Metals, TCLP, SPLP, DIW
		P-3	Stevens	Sieve analysis, XRPD, SEM/EDX
		P-6	EO	Silicon Totals
	P-7	Test 1, Test 2, Test 3	Schnabel Baltimore	MC
	P-ANC	1 to 4, 6, 7, 10, 13 to 17 - A	Stevens/TA	ANC
		1 to 4, 6, 7, 10, 13 to 17 - B	Stevens/TA	ANC
		1 to 4, 6, 7, 10, 13 to 17 - C	Stevens/TA	ANC
	PM-ANC	1 to 12 - A	Stevens/TA	ANC
		1 to 12 - B	Stevens/TA	ANC
		1 to 12 - C	Stevens/TA	ANC

Table B-2

Summary of Chain of Custody Sample Information

Sample Media	Sample ID	Matrix	container information	from	to	for	Lab ID number	Note
Slag-Impacted Sand	**S-1**	**solid**	1 2-oz plastic container 2 32-oz glass jar	Stevens	TA	6010B TAL Metals +Sn SPLP, TCLP, DIW, Anions of DIW	KUC0128-01	plastic container for total digestion glass jars for extractions
Slag-Impacted Sand	**S-2**	**solid**	1 2-oz plastic container 2 32-oz glass jar	Stevens	TA	6010B TAL Metals +Sn SPLP, TCLP, DIW, Anions of DIW	KUC0128-02	plastic container for total digestion glass jars for extractions
Slag-Impacted Sand	**S-3**	**solid**	1 2-oz plastic container 2 32-oz glass jar	Stevens	TA	6010B TAL Metals +Sn SPLP, TCLP, DIW, Anions of DIW	KUC0128-03	plastic container for total digestion glass jars for extractions
Slag-Impacted Sand	**S-4**	**solid**	1 4-oz plastic container	Stevens	EO	6010B Si	16313-1	
Slag-Impacted Sand	**S-5**	**solid**	1 4-oz plastic container	Stevens	EO	6010B Si	16313-2	
Slag-Impacted Sand	**S-6**	**solid**	1 4-oz plastic container	Stevens	EO	6010B Si	16313-3	
Slag-Impacted Sand	**S-7**	**solid**	2 8-oz glass jars	Stevens	Schanbel Baltimore	LOI/MC ASTM D2974	S-7	one jar broke during shipment, triplicate samples run on intact jar
Slag Particles	**P-1**	**solid**	1 2-oz plastic container 2 32-oz glass jar	Stevens	TA	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0524-01	plastic container for total digestion glass jars for extractions
Slag Particles	**P-2**	**solid**	1 2-oz plastic container 2 32-oz glass jar	Stevens	TA	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0524-02	plastic container for total digestion glass jars for extractions
Slag Particles	**P-3**	**solid**	1 2-oz plastic container 2 32-oz glass jar	Stevens	TA	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0524-03	plastic container for total digestion glass jars for extractions
Slag Particles	**P-4**	**solid**	1 4-oz plastic container	Stevens	EO	6010B Si	16360-1	
Slag Particles	**P-5**	**solid**	1 4-oz plastic container	Stevens	EO	6010B Si	16360-2	
Slag Particles	**P-6**	**solid**	1 4-oz plastic container	Stevens	EO	6010B Si	16360-3	
Slag Particles	**P-7**	**solid**	2 8-oz glass jars	Stevens	Schanbel Baltimore	MC ASTM D2974	P-7	LOI not conducted on slag particles
Cored Slag	**WJ3-C1**	**solid**	bubble wrap and plastic bag	Schnabel	Kemron	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0128-04	
Cored Slag	**SW2-C2**	**solid**	bubble wrap and plastic bag	Schnabel	Kemron	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0128-05	
Cored Slag	**SW4-C5**	**solid**	bubble wrap and plastic bag	Schnabel	Kemron	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0128-06	
Cored Slag - Crushed	**WJ3-C1**	**solid**	1 1-oz plastic container 1 4-oz glass jar	Stevens	TA	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0128-04	plastic container for total digestion glass jars for extractions
Cored Slag - Crushed	**SW2-C2**	**solid**	1 1-oz plastic container 1 4-oz glass jar	Stevens	TA	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0128-05	plastic container for total digestion glass jars for extractions
Cored Slag - Crushed	**SW4-C5**	**solid**	1 1-oz plastic container 1 4-oz glass jar	Stevens	TA	6010B TAL Metals + Sn, TCLP, DIW, Anions of DIW, pH pre and post-extraction	KUC0128-06	plastic container for total digestion glass jars for extractions
Equipment Blank	**E-1**	**water**	17-oz plastic container	Schnabel	TA	6010B TAL Metals + Si+Sn	KUC0089-01	
Equipment Blank	**E-2 Core**	**water**	17-oz plastic container	Schnabel	TA	6010B TAL Metals + Si+Sn	KUC0090-01	
Equipment Blank	**E-4 Sieve**	**water**	17-oz plastic container	Schnabel	TA	6010B TAL Metals + Si+Sn	KUC0090-03	
Equipment Blank	**E-5 Bucket**	**water**	17-oz plastic container	Schnabel	TA	6010B TAL Metals + Si+Sn	KUC0090-04	
Equipment Blank	**E-6 TA Mill**	**water**	17-oz plastic container	Stevens	TA	6010B TAL Metals + Si+Sn	KUC0524-04	
ANC Leachate	**P-ANC-1 to 4, 6, 7, 10, 13 to 17 ABC each**	**water**	7-oz plastic container	Stevens	TA	6010B TAL Metals + Si+Sn + pH	KUC0641-01 to -36	
ANC Leachate	**PM-ANC-1 to 12 ABC each**	**water**	7-oz plastic container	Stevens	TA	6010B TAL Metals + Si+Sn + pH	KUD0092-01 to -36	

TESTAMERICA REPORTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0089
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ
Revision: 1

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/01/2011 10:05:29 AM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

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Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0089

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0089-01	E-1	Water	02/14/11 14:00	02/15/11 11:30

Case Narrative

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0089

Job ID: KUC0089

Laboratory: TestAmerica King Of Prussia

Narrative

Revision:

Silicon added to report at the clients request

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0089

Qualifiers

Metals

Qualifier	Qualifier Description
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0089

Client Sample ID: E-1

Lab Sample ID: KUC0089-01

Date Collected: 02/14/11 14:00
Matrix: Water
Date Received: 02/15/11 11:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/07/11 04:44	03/07/11 10:20	1.00
Calcium	**0.135**		0.100		mg/L		03/07/11 04:44	03/07/11 10:20	1.00
Iron	ND		0.10		mg/L		03/07/11 04:44	03/07/11 10:20	1.0
Magnesium	ND		0.50		mg/L		03/07/11 04:44	03/07/11 10:20	1.0
Potassium	ND	C	10		mg/L		03/07/11 04:44	03/07/11 16:00	1.0
Sodium	**0.54**		0.50		mg/L		03/07/11 04:44	03/07/11 10:20	1.0
Tin	ND		0.10		mg/L		03/07/11 04:44	03/07/11 10:20	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Antimony	ND		1.0		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Arsenic	ND		1.0		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Barium	ND		0.96		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Beryllium	ND		0.56		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Cadmium	ND		0.43		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Chromium	ND		1.4		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Cobalt	ND		0.18		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Copper	ND		1.0		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Lead	**1.7**		0.96		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Manganese	ND		10		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Nickel	ND		0.97		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Selenium	ND		3.6		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Silver	ND		0.40		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Thallium	ND		0.40		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Vanadium	ND		0.51		ug/l		03/07/11 04:46	03/07/11 11:24	2.0
Zinc	ND		20		ug/l		03/07/11 04:46	03/07/11 11:24	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L	1.00		ug/l		03/07/11 04:27	03/07/11 11:31	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0089

Client Sample ID: E-1

Date Collected: 02/14/11 14:00
Date Received: 02/15/11 11:30

Lab Sample ID: KUC0089-01

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0105_P	03/07/11 04:44	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000415	03/07/11 10:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0105_P	03/07/11 04:44	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000415	03/07/11 10:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0104_P	03/07/11 04:27	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000414	03/07/11 11:31	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000415	03/07/11 16:00	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0106_P	03/07/11 04:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	U000536	03/07/11 11:24	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11C0105_P	03/07/11 04:44	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0105	03/07/11 10:20	MKR	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0089

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Cooler Receipt Form

WORK ORDER #: KUC0089

Client: Schunkel Project: Raritan

Temperature Upon Receipt by IR: 0 °C

Cooler received from: **TA Courier** **Client** **FedEx** **UPS** **Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**
Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? **Y N**
All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**
All Sample Containers received: **Y N** All Container labels match COC: **Y N**
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	**Yes**	**No**
2. Project Name and/or Number included	**Yes**	**No**
3. Field Sampler Name listed	**Yes**	**No**
4. Field ID/Location - one sample per line	**Yes**	**No**
5. Date collected (for each sample)	**Yes**	**No**
6. Time collected (for each sample)	**Yes**	**No**
7. Matrix (for each sample)	**Yes**	**No**
8. Number & Types of bottles per sample (and preservation type)	**Yes**	**No**
9. Analysis Requested	**Yes**	**No**
10. Sign & Date in the Relinquished Box	**Yes**	**No**

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature:_____ **Date/Time:** 3/4/11

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

04/01/2011

Client: Schnabel Engineering
Address: 510 E. Gay St
West Chester PA 19063
Report to: E-mail: mpainter@schnabel-eng.com
Phone #: (610) 696 6066
Fax #: (610) 696 7771

Bill To: Schnabel Attn: Mia Painter
Address: 510 E. Gay St
West Chester PA 19063
Terms: Net 30 days
State & Program: USEPA Region 2
Phone #: ( )
Fax #: ( )

TAT: (STD) 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 0

Project Name: Raritan
Project #/PO#: 106150032
Sampler: Mia Painter

	Date Collected	Time Collected	Sample Matrix	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	Total # of Bottles	Samples Field Filtered ☐ YES ☒ NO	6020 TAL+Tin								Cracked/Broken	Improperly Sealed	Laboratory ID Number
1 E-1 PID:	2/14/11	2pm	Aqueous				1				1		X										KUC0089-01
2 PID:																							
3 PID:																							
4 PID:																							
5 PID:																							
6 PID:																							
7 PID:																							
8 PID:																							
9 PID:																							
10 PID:																							

Analysis Type: 6020 TAL+Tin
Sample Control: Cracked/Broken; Improperly Sealed

Relinquished	Date / Time	Received	Date / Time	Relinquished	Date / Time	Received	Date / Time
[illegible]	2/15/11 11:30	[illegible]	2/15/11 11:30				
Relinquished	Date / Time	Received	Date / Time	Relinquished	Date / Time	Received	Date / Time

COMMENTS:

PAGE 1 OF 1

TAL-4124-450 (0509)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0090
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/01/2011 11:06:44 AM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0090-01	E-2 Core	Water	02/22/11 08:02	03/03/11 08:25
KUC0090-02	E-3 Saw Blade	Water	02/22/11 10:07	03/03/11 08:25
KUC0090-03	E-4 Sieve	Water	03/02/11 09:30	03/03/11 08:25
KUC0090-04	E-5 Bucket	Water	03/02/11 09:30	03/03/11 08:25

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Qualifiers

Metals

Qualifier	Qualifier Description
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
R2	The RPD exceeded the acceptance limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Client Sample ID: E-2 Core

Lab Sample ID: KUC0090-01

Date Collected: 02/22/11 08:02
Matrix: Water
Date Received: 03/03/11 08:25
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 14:58	1.00
Calcium	**0.101**		0.100		mg/L		03/08/11 04:57	03/08/11 14:58	1.00
Iron	**0.36**		0.10		mg/L		03/08/11 04:57	03/08/11 14:58	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 14:58	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 14:58	1.0
Sodium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 14:58	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 14:58	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**34**		20		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Antimony	**3.8**		1.0		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Barium	**4.9**		0.96		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Cobalt	**20**		0.18		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Copper	**24**		1.0		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Lead	**40**		0.96		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Nickel	**2.1**		0.97		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Silver	**1.7**		0.40		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 13:30	2.0
Zinc	**31**		20		ug/l		03/08/11 04:52	03/08/11 13:30	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**170**		10		ug/l		03/08/11 04:52	03/14/11 10:19	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:10	1.00

Client Sample ID: E-3 Saw Blade

Lab Sample ID: KUC0090-02

Date Collected: 02/22/11 10:07
Matrix: Water
Date Received: 03/03/11 08:25
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:01	1.00
Calcium	**0.305**		0.100		mg/L		03/08/11 04:57	03/08/11 15:01	1.00
Iron	**0.92**		0.10		mg/L		03/08/11 04:57	03/08/11 15:01	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:01	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:01	1.0
Sodium	**1.4**		0.50		mg/L		03/08/11 04:57	03/08/11 15:01	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:01	1.0

Client Sample ID: E-3 Saw Blade

Lab Sample ID: KUC0090-02

Date Collected: 02/22/11 10:07
Matrix: Water
Date Received: 03/03/11 08:25
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**54**		20		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Antimony	ND		1.0		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Barium	**14**		0.96		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Chromium	**3.6**		1.4		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Cobalt	**32**		0.18		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Copper	**29**		1.0		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Lead	ND		0.96		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Nickel	**1.4**		0.97		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 13:55	2.0
Zinc	**26**	**M7, R2**	20		ug/l		03/08/11 04:52	03/08/11 13:55	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**21**		10		ug/l		03/08/11 04:52	03/14/11 10:24	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:17	1.00

Client Sample ID: E-4 Sieve

Lab Sample ID: KUC0090-03

Date Collected: 03/02/11 09:30
Matrix: Water
Date Received: 03/03/11 08:25
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	**1.22**		0.500		mg/L		03/08/11 04:57	03/08/11 15:03	1.00
Calcium	**3.17**		0.100		mg/L		03/08/11 04:57	03/08/11 15:03	1.00
Iron	**0.54**		0.10		mg/L		03/08/11 04:57	03/08/11 15:03	1.0
Magnesium	**0.65**		0.50		mg/L		03/08/11 04:57	03/08/11 15:03	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:03	1.0
Sodium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:03	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:03	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**340**		20		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Antimony	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Barium	**6.6**		0.96		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Chromium	**1.4**		1.4		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Cobalt	ND		0.18		ug/l		03/08/11 04:52	03/08/11 14:10	2.0

Client Sample ID: E-4 Sieve

Lab Sample ID: KUC0090-03

Date Collected: 03/02/11 09:30
Matrix: Water
Date Received: 03/03/11 08:25
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Lead	ND		0.96		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Nickel	ND		0.97		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Vanadium	**1.4**		0.51		ug/l		03/08/11 04:52	03/08/11 14:10	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:10	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**84**		10		ug/l		03/08/11 04:52	03/14/11 10:29	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:19	1.00

Client Sample ID: E-5 Bucket

Lab Sample ID: KUC0090-04

Date Collected: 03/02/11 09:30
Matrix: Water
Date Received: 03/03/11 08:25
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	**16.7**		0.500		mg/L		03/08/11 04:57	03/08/11 15:05	1.00
Calcium	**87.1**		0.100		mg/L		03/08/11 04:57	03/08/11 15:05	1.00
Iron	**61**		0.10		mg/L		03/08/11 04:57	03/08/11 15:05	1.0
Magnesium	**26**		0.50		mg/L		03/08/11 04:57	03/08/11 15:05	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:05	1.0
Sodium	**2.3**		0.50		mg/L		03/08/11 04:57	03/08/11 15:05	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:05	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3500**		20		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Antimony	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Barium	**34**		0.96		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Chromium	**120**		1.4		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Cobalt	**0.48**		0.18		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Copper	**10**		1.0		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Lead	**14**		0.96		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Nickel	**3.4**		0.97		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Vanadium	**100**		0.51		ug/l		03/08/11 04:52	03/08/11 14:15	2.0
Zinc	**92**		20		ug/l		03/08/11 04:52	03/08/11 14:15	2.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Client Sample ID: E-5 Bucket

Lab Sample ID: KUC0090-04

Date Collected: 03/02/11 09:30

Matrix: Water

Date Received: 03/03/11 08:25

Sampler Name:

Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**4600**		10		ug/l		03/08/11 04:52	03/14/11 10:34	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:24	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Client Sample ID: E-2 Core

Lab Sample ID: KUC0090-01
Date Collected: 02/22/11 08:02
Matrix: Water
Date Received: 03/03/11 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 14:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 14:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:10	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	U000534	03/08/11 13:30	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 10:19	RW	TestAmerica King Of Prussia

Client Sample ID: E-3 Saw Blade

Lab Sample ID: KUC0090-02
Date Collected: 02/22/11 10:07
Matrix: Water
Date Received: 03/03/11 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:01	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:01	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:17	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	U000534	03/08/11 13:55	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 10:24	RW	TestAmerica King Of Prussia

Client Sample ID: E-4 Sieve

Lab Sample ID: KUC0090-03
Date Collected: 03/02/11 09:30
Matrix: Water
Date Received: 03/03/11 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:03	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:03	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:19	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	U000534	03/08/11 14:10	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Client Sample ID: E-4 Sieve

Lab Sample ID: KUC0090-03
Date Collected: 03/02/11 09:30
Matrix: Water
Date Received: 03/03/11 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 10:29	RW	TestAmerica King Of Prussia

Client Sample ID: E-5 Bucket

Lab Sample ID: KUC0090-04
Date Collected: 03/02/11 09:30
Matrix: Water
Date Received: 03/03/11 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:05	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:05	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:24	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	U000534	03/08/11 14:15	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 10:34	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0090

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

TestAmerica
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CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

04/01/2011

Client: Schnabel
Address: 510 E Gay St, West Chester PA
Report to: mpainter@schnabel-eng.com
E-mail: Phone #: (610) 696 6066 Fax #: (610) 696 7771
Project Name: Raritan
Project #/PO#: 10615032
Sampler: Steve Penzone

Bill To: Schnabel
Address: SAME
Terms: Net 30 days
State & Program: NJ
Phone #: (SAME) Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
Temp. Upon Receipt: 0
If Yes, please explain:

	FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	6010 BTAL + Sn + Si								SAMPLE CONTROL: CRACKED-BROKEN	SAMPLE CONTROL: IMPROPERLY SEALED	LABORATORY ID NUMBER
1	E-2 Core PID:	2/22/11	8:02 AM	Aq.				1				1		X										KUC0090-01
2	E-3 Saw Blade PID:	2/22/11	10:07 AM	Aq.				1				1		X										-02
3	E-4 Sieve PID:	3/2/11	9:30 AM	Aq.				1				1		X										-03
4	E-5 bucket PID:	3/2/11	9:30 AM	Aq.				1				1		X										-04
5	PID:																							
6	PID:																							
7	PID:																							
8	PID:																							
9	PID:																							
10	PID:																							

RELINQUISHED	DATE	RECEIVED	DATE	RELINQUISHED	DATE	RECEIVED	DATE
Mr Painter	3/3/11	Frank	3/3/11				
	TIME 8:25 AM		TIME 08:25		TIME		TIME
RELINQUISHED	DATE	RECEIVED	DATE	RELINQUISHED	DATE	RECEIVED	DATE
	TIME		TIME		TIME		TIME

COMMENTS: TA Quote # 45000372-2 2/15/11

PAGE 1 OF 1

TAL 4124.450 (0509)

Cooler Receipt Form

WORK ORDER #: KUC0090

Client: Schnabel Project: Raritan

Temperature Upon Receipt by IR: 0

Cooler received from: **TA Courier** (Client) **FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**
Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N** (N/A)
Sufficient volume for all analyses? (Y) **N**
All Sample Containers Intact: (Y) **N** All Sample Containers labeled: (Y) **N**
All Sample Containers received: (Y) **N** All Container labels match COC: (Y) **N**
List Discrepancies below if indicated:

_____

_____

_____

_____

_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	(Yes)	**No**
2. Project Name and/or Number included	(Yes)	**No**
3. Field Sampler Name listed	(Yes)	**No**
4. Field ID/Location - one sample per line	(Yes)	**No**
5. Date collected (for each sample)	(Yes)	**No**
6. Time collected (for each sample)	(Yes)	**No**
7. Matrix (for each sample)	(Yes)	**No**
8. Number & Types of bottles per sample (and preservation type)	(Yes)	**No**
9. Analysis Requested	(Yes)	**No**
10. Sign & Date in the Relinquished Box	(Yes)	**No**

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature:_____ **Date/Time:** 3/4/11

Property of TestAmerica King of Prussia

TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUB0345
TestAmerica Sample Delivery Group: KUB0345
Client Project/Site: 10615032
Client Project Description: Raritan

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
2/25/2011 3:34 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0345

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUB0345-01	MFS-1	Solid	02/21/11 13:00	02/22/11 11:00
KUB0345-02	MFS-2	Solid	02/21/11 13:00	02/22/11 11:00
KUB0345-03	MFS-3	Solid	02/21/11 13:00	02/22/11 11:00
KUB0345-04	SC-1	Solid	02/21/11 13:00	02/22/11 11:00
KUB0345-05	SC-2	Solid	02/21/11 13:00	02/22/11 11:00
KUB0345-06	SC-3	Solid	02/21/11 13:00	02/22/11 11:00

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0345
SDG: KUB0345

Qualifiers

Metals

Qualifier	Qualifier Description
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
M8	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
RL7	Sample required dilution due to high concentrations of target analyte.

Glossary

Glossary	Glossary Description
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.

Client Sample ID: MFS-1

Date Collected: 02/21/11 13:00
Date Received: 02/22/11 11:00

Lab Sample ID: KUB0345-01

Matrix: Solid
Percent Solids: 99.8

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1100	MHA	50		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Antimony	36		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Arsenic	31		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Barium	7.6		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Cadmium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Calcium	7400	MHA	25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Chromium	11		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Copper	34		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Iron	19000	MHA	10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Lead	800	MHA	2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Magnesium	310	MHA	25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Manganese	53		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Nickel	ND		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Potassium	ND		1000		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Silver	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Sodium	510	MHA	80		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Tin	29	M7, M8	10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Vanadium	20		2.5		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0
Zinc	55		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:15	2.0

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/23/11 13:34	02/24/11 12:35	1.00

Client Sample ID: MFS-2

Date Collected: 02/21/11 13:00
Date Received: 02/22/11 11:00

Lab Sample ID: KUB0345-02

Matrix: Solid
Percent Solids: 99.8

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		50		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Antimony	35		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Arsenic	26		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Barium	15		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Cadmium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Calcium	4000		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Chromium	12		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Copper	27		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Iron	18000		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Lead	770		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Magnesium	410		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Manganese	58		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Nickel	ND		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Potassium	ND		1000		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0

Client Sample ID: MFS-2

Lab Sample ID: KUB0345-02
Date Collected: 02/21/11 13:00
Matrix: Solid
Date Received: 02/22/11 11:00
Percent Solids: 99.8

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Sodium	**520**		80		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Tin	**25**		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Vanadium	**21**		2.5		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0
Zinc	**77**		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:21	2.0

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/23/11 13:34	02/24/11 12:37	1.00

Client Sample ID: MFS-3

Lab Sample ID: KUB0345-03
Date Collected: 02/21/11 13:00
Matrix: Solid
Date Received: 02/22/11 11:00
Percent Solids: 99.7

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**860**		50		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Antimony	**32**		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Arsenic	**23**		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Barium	**12**		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Cadmium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Calcium	**1400**		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Chromium	**10**		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Copper	**40**		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Iron	**11000**		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Lead	**930**		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Magnesium	**280**		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Manganese	**39**		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Nickel	ND		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Potassium	ND		1000		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Silver	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Sodium	**460**		80		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Tin	**32**		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Vanadium	**14**		2.5		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0
Zinc	**36**		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:23	2.0

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/23/11 13:34	02/24/11 12:42	1.00

Client Sample ID: SC-1

Lab Sample ID: KUB0345-04
Date Collected: 02/21/11 13:00
Matrix: Solid
Date Received: 02/22/11 11:00
Percent Solids: 98.2

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	500		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Arsenic	480		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Calcium	26000		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Magnesium	3400		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Manganese	380		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Nickel	64		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Potassium	1200		1000		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Silver	2.2		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Sodium	5700		80		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Tin	600		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Vanadium	84		2.5		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0
Zinc	410		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:25	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6600	RL1	250		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10
Barium	68	RL1	5.0		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10
Cadmium	ND	RL1	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10
Chromium	72	RL1	25		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10
Copper	1600	RL1	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10
Iron	120000	RL7	50		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10
Lead	14000	RL7	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:31	10

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.219		0.100		mg/kg dry	☼	02/23/11 13:34	02/24/11 12:44	1.00

Client Sample ID: SC-2

Lab Sample ID: KUB0345-05
Date Collected: 02/21/11 13:00
Matrix: Solid
Date Received: 02/22/11 11:00
Percent Solids: 99

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	450		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Cadmium	7.3		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Calcium	25000		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Magnesium	3500		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Manganese	360		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Nickel	57		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Potassium	1100		1000		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Silver	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Sodium	5600		80		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Tin	550		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0

Client Sample ID: SC-2

Lab Sample ID: KUB0345-05
Date Collected: 02/21/11 13:00
Matrix: Solid
Date Received: 02/22/11 11:00
Percent Solids: 99

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	78		2.5		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0
Zinc	380		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:27	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6700	RL1	250		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10
Arsenic	530	RL1	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10
Barium	67	RL1	5.0		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10
Chromium	70	RL1	25		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10
Copper	1500	RL1	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10
Iron	110000	RL7	50		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10
Lead	13000	RL7	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:33	10

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.250		0.100		mg/kg dry	☼	02/23/11 13:34	02/24/11 12:46	1.00

Client Sample ID: SC-3

Lab Sample ID: KUB0345-06
Date Collected: 02/21/11 13:00
Matrix: Solid
Date Received: 02/22/11 11:00
Percent Solids: 98

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	360		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Arsenic	450		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Beryllium	0.40		0.40		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Calcium	25000		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Magnesium	3300		25		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Manganese	350		1.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Nickel	55		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Potassium	1000		1000		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Silver	2.0		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Sodium	5600		80		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Tin	480		10		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Vanadium	77		2.5		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0
Zinc	390		5.0		mg/kg dry	☼	02/23/11 07:40	02/23/11 14:29	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6200	RL1	250		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10
Barium	65	RL1	5.0		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10
Cadmium	ND	RL1	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10
Chromium	66	RL1	25		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10
Copper	1500	RL1	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10
Iron	110000	RL7	50		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10
Lead	13000	RL7	10		mg/kg dry	☼	02/23/11 07:40	02/25/11 09:35	10

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0345
SDG: KUB0345

Client Sample ID: SC-3

Date Collected: 02/21/11 13:00
Date Received: 02/22/11 11:00

Lab Sample ID: KUB0345-06

Matrix: Solid
Percent Solids: 98

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.208		0.100		mg/kg dry	☼	02/23/11 13:34	02/24/11 12:48	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0345
SDG: KUB0345

Client Sample ID: MFS-1 — Lab Sample ID: KUB0345-01

Date Collected: 02/21/11 13:00 — **Matrix: Solid**
Date Received: 02/22/11 11:00 — **Percent Solids: 99.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0490_P	02/23/11 13:34	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000345	02/24/11 12:35	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.89	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000336	02/23/11 14:15	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0511_P	02/24/11 10:04	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0511	02/24/11 10:24	DRH	TestAmerica King Of Prussia

Client Sample ID: MFS-2 — Lab Sample ID: KUB0345-02

Date Collected: 02/21/11 13:00 — **Matrix: Solid**
Date Received: 02/22/11 11:00 — **Percent Solids: 99.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0490_P	02/23/11 13:34	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000345	02/24/11 12:37	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.0	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000336	02/23/11 14:21	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0511_P	02/24/11 10:04	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0511	02/24/11 10:24	DRH	TestAmerica King Of Prussia

Client Sample ID: MFS-3 — Lab Sample ID: KUB0345-03

Date Collected: 02/21/11 13:00 — **Matrix: Solid**
Date Received: 02/22/11 11:00 — **Percent Solids: 99.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0490_P	02/23/11 13:34	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000345	02/24/11 12:42	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.94	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000336	02/23/11 14:23	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0511_P	02/24/11 10:04	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0511	02/24/11 10:24	DRH	TestAmerica King Of Prussia

Client Sample ID: SC-1 — Lab Sample ID: KUB0345-04

Date Collected: 02/21/11 13:00 — **Matrix: Solid**
Date Received: 02/22/11 11:00 — **Percent Solids: 98.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0490_P	02/23/11 13:34	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000345	02/24/11 12:44	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.1	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000336	02/23/11 14:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	1.1	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	10	U000350	02/25/11 09:31	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0511_P	02/24/11 10:04	DRH	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0345
SDG: KUB0345

Client Sample ID: SC-1
Date Collected: 02/21/11 13:00
Date Received: 02/22/11 11:00

Lab Sample ID: KUB0345-04
Matrix: Solid
Percent Solids: 98.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 160.3		1.00	11B0511	02/24/11 10:24	DRH	TestAmerica King Of Prussia

Client Sample ID: SC-2
Date Collected: 02/21/11 13:00
Date Received: 02/22/11 11:00

Lab Sample ID: KUB0345-05
Matrix: Solid
Percent Solids: 99

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0490_P	02/23/11 13:34	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000345	02/24/11 12:46	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.89	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000336	02/23/11 14:27	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	0.89	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	10	U000350	02/25/11 09:33	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0511_P	02/24/11 10:04	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0511	02/24/11 10:24	DRH	TestAmerica King Of Prussia

Client Sample ID: SC-3
Date Collected: 02/21/11 13:00
Date Received: 02/22/11 11:00

Lab Sample ID: KUB0345-06
Matrix: Solid
Percent Solids: 98

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0490_P	02/23/11 13:34	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000345	02/24/11 12:48	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.93	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000336	02/23/11 14:29	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	0.93	11B0474_P	02/23/11 07:40	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	10	U000350	02/25/11 09:35	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0511_P	02/24/11 10:04	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0511	02/24/11 10:24	DRH	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0345
SDG: KUB0345

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Total Digestion 3050B and 6010B (TAL metals, Tin)						Preservation
MFS - 1	Soil	2/21/2011	1pm	Solid	1	Plastic Bottle	x			KUB0345		-01	None
MFS - 2	Soil	2/21/2011	1pm	Solid	1	Plastic Bottle	x					-02	None
MFS - 3	Soil	2/21/2011	1pm	Solid	1	Plastic Bottle	x					-03	None
SC - 1	Soil	2/21/2011	1pm	Solid	1	Plastic Bottle	x					-04	None
SC - 2	Soil	2/21/2011	1pm	Solid	1	Plastic Bottle	x					-05	None
SC - 3	Soil	2/21/2011	1pm	Solid	1	Plastic Bottle	x					-06	None

Relinquished By: (Print & Sign)	Received By:	Date/Time	Comments:
Santhi Jagupilla [signature]	Fed Ex	02/21/11 3pm	Turn Around Time of 3 days
Relinquished By: (Print & Sign) Fed Ex	Received By: Nick Fodette	Date/Time 11:00 2-22-11	
Relinquished By: (Print & Sign)	Received By:	Date/Time	Method of Shipment: FEDEX

Iced: Yes No

Track# 8759 2349 2358 6 NF

02/25/2011

Cooler Receipt Form

WORK ORDER #: KUR0345

Client: Schnabel Project: Raritan

Temperature Upon Receipt by IR: 0°

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: 1 2 3+ Custody Seals Intact? Y N
Ice Present? Y N N/A Melted Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? Y N
All Sample Containers Intact: Y N All Sample Containers labeled: Y N
All Sample Containers received: Y N All Container labels match COC: Y N
List Discrepancies below if indicated:

_____

_____

_____

_____

_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: _____ **Date/Time:** 2/22/11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUB0381
TestAmerica Sample Delivery Group: KUB0381
Client Project/Site: 10615032
Client Project Description: Raritan

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
2/28/2011 5:00 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0381

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUB0381-01	CS-1	Solid	02/22/11 16:00	02/23/11 17:30
KUB0381-02	CS-2	Solid	02/22/11 16:00	02/23/11 17:30
KUB0381-03	CS-3	Solid	02/22/11 16:00	02/23/11 17:30
KUB0381-04	G-1	Solid	02/22/11 16:00	02/23/11 17:30
KUB0381-05	G-2	Solid	02/22/11 16:00	02/23/11 17:30
KUB0381-06	G-3	Solid	02/22/11 16:00	02/23/11 17:30

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0381
SDG: KUB0381

Qualifiers

Metals

Qualifier	Qualifier Description
B1	Analyte was detected in the associated method blank. Analyte concentration in the sample is greater than 10x the concentration found in the method blank.
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
M8	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
R2	The RPD exceeded the acceptance limit.

Glossary

Glossary	Glossary Description
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.

Client Sample ID: CS-1

Lab Sample ID: KUB0381-01
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.6

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5500	MHA	50		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Antimony	100	M7, M8	10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Arsenic	110	M7, M8	2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Barium	180	M8, R2	1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Beryllium	0.65	R2	0.40		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Calcium	22000	MHA	25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Chromium	54	R2	5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Cobalt	ND	R2	2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Magnesium	1400	MHA	25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Manganese	300	MHA	1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Nickel	10	R2	5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Potassium	ND	R2	1000		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Selenium	ND	R2	8.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Silver	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Sodium	1200	MHA	80		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Tin	130	M8, R2	10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Vanadium	93	R2	2.5		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0
Zinc	230	MHA	5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:31	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:50	10
Copper	140		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:50	10
Iron	110000	B1	50		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:50	10
Lead	2300		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:50	10

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/25/11 07:21	02/25/11 13:53	1.00

Client Sample ID: CS-2

Lab Sample ID: KUB0381-02
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.9

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	110		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Arsenic	150		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Barium	120		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Beryllium	0.94		0.40		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Calcium	28000		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Magnesium	2100		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Manganese	350		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Nickel	14		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Potassium	ND		1000		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Silver	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Sodium	1400		80		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0

Client Sample ID: CS-2

Lab Sample ID: KUB0381-02
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.9

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	130		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Vanadium	130		2.5		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0
Zinc	190		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:37	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8200		250		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:56	10
Cadmium	ND		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:56	10
Chromium	78		25		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:56	10
Copper	200		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:56	10
Iron	150000	B1	50		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:56	10
Lead	3200		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:56	10

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/25/11 07:21	02/25/11 13:55	1.00

Client Sample ID: CS-3

Lab Sample ID: KUB0381-03
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.5

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6200		50		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Antimony	120		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Arsenic	140		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Barium	140		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Beryllium	0.84		0.40		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Calcium	25000		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Magnesium	1600		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Manganese	320		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Nickel	13		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Potassium	ND		1000		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Silver	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Sodium	1300		80		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Tin	130		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Vanadium	120		2.5		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0
Zinc	200		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:43	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:58	10
Chromium	76		25		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:58	10
Copper	200		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:58	10
Iron	130000	B1	50		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:58	10
Lead	3100		10		mg/kg dry	☼	02/25/11 07:11	02/28/11 12:58	10

Client Sample ID: CS-3

Lab Sample ID: KUB0381-03
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.5

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/25/11 07:21	02/25/11 14:00	1.00

Client Sample ID: G-1

Lab Sample ID: KUB0381-04
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.6

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4100**		50		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Antimony	**18**		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Arsenic	**40**		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Barium	**100**		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Cadmium	**3.3**		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Calcium	**5100**		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Chromium	**19**		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Copper	**40**		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Iron	**24000**	**B1**	10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Lead	**530**		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Magnesium	**3100**		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Manganese	**330**		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Nickel	**11**		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Potassium	ND		1000		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Silver	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Sodium	**790**		80		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Tin	**31**		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Vanadium	**34**		2.5		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0
Zinc	**87**		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:45	2.0

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/25/11 07:21	02/25/11 14:02	1.00

Client Sample ID: G-2

Lab Sample ID: KUB0381-05
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.7

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4400**		50		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Antimony	**64**		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Arsenic	**87**		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Barium	**240**		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Cadmium	**3.8**		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Calcium	**5500**		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Chromium	**22**		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0

Client Sample ID: G-2

Lab Sample ID: KUB0381-05
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.7

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	220		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Iron	28000	B1	10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Lead	2000		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Magnesium	3100		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Manganese	400		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Nickel	13		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Potassium	ND		1000		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Silver	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Sodium	1000		80		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Tin	95		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Vanadium	30		2.5		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0
Zinc	160		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:47	2.0

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/25/11 07:21	02/25/11 14:04	1.00

Client Sample ID: G-3

Lab Sample ID: KUB0381-06
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.7

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3900		50		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Antimony	16		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Arsenic	35		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Barium	130		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Beryllium	ND		0.40		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Cadmium	3.1		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Calcium	4600		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Chromium	16		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Cobalt	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Copper	39		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Iron	24000	B1	10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Lead	530		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Magnesium	3000		25		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Manganese	320		1.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Nickel	11		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Potassium	ND		1000		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Selenium	ND		8.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Silver	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Sodium	830		80		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Thallium	ND		2.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Tin	62		10		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Vanadium	28		2.5		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0
Zinc	100		5.0		mg/kg dry	☼	02/25/11 07:11	02/25/11 16:49	2.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0381
SDG: KUB0381

Client Sample ID: G-3

Date Collected: 02/22/11 16:00
Date Received: 02/23/11 17:30

Lab Sample ID: KUB0381-06

Matrix: Solid
Percent Solids: 99.7

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	02/25/11 07:21	02/25/11 14:05	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0381
SDG: KUB0381

Client Sample ID: CS-1 — Lab Sample ID: KUB0381-01

Date Collected: 02/22/11 16:00 — **Matrix: Solid**
Date Received: 02/23/11 17:30 — **Percent Solids: 99.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0536_P	02/25/11 07:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000356	02/25/11 13:53	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.96	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000359	02/25/11 16:31	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.96	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	11B0534	02/28/11 12:50	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0523_P	02/24/11 12:01	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0523	02/24/11 15:23	DRH	TestAmerica King Of Prussia

Client Sample ID: CS-2 — Lab Sample ID: KUB0381-02

Date Collected: 02/22/11 16:00 — **Matrix: Solid**
Date Received: 02/23/11 17:30 — **Percent Solids: 99.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0536_P	02/25/11 07:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000356	02/25/11 13:55	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.97	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000359	02/25/11 16:37	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.97	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	11B0534	02/28/11 12:56	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0523_P	02/24/11 12:01	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0523	02/24/11 15:23	DRH	TestAmerica King Of Prussia

Client Sample ID: CS-3 — Lab Sample ID: KUB0381-03

Date Collected: 02/22/11 16:00 — **Matrix: Solid**
Date Received: 02/23/11 17:30 — **Percent Solids: 99.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0536_P	02/25/11 07:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000356	02/25/11 14:00	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.0	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000359	02/25/11 16:43	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	1.0	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	11B0534	02/28/11 12:58	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0523_P	02/24/11 12:01	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0523	02/24/11 15:23	DRH	TestAmerica King Of Prussia

Client Sample ID: G-1 — Lab Sample ID: KUB0381-04

Date Collected: 02/22/11 16:00 — **Matrix: Solid**
Date Received: 02/23/11 17:30 — **Percent Solids: 99.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0536_P	02/25/11 07:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000356	02/25/11 14:02	MR	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0381
SDG: KUB0381

Client Sample ID: G-1

Lab Sample ID: KUB0381-04
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 3050B Soil		1.1	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000359	02/25/11 16:45	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0523_P	02/24/11 12:01	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0523	02/24/11 15:23	DRH	TestAmerica King Of Prussia

Client Sample ID: G-2

Lab Sample ID: KUB0381-05
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0536_P	02/25/11 07:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000356	02/25/11 14:04	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.97	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000359	02/25/11 16:47	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0523_P	02/24/11 12:01	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0523	02/24/11 15:23	DRH	TestAmerica King Of Prussia

Client Sample ID: G-3

Lab Sample ID: KUB0381-06
Date Collected: 02/22/11 16:00
Matrix: Solid
Date Received: 02/23/11 17:30
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7471A		1.00	11B0536_P	02/25/11 07:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000356	02/25/11 14:05	MR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.98	11B0534_P	02/25/11 07:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000359	02/25/11 16:49	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11B0523_P	02/24/11 12:01	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11B0523	02/24/11 15:23	DRH	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUB0381
SDG: KUB0381

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Total Digestion 3050B and 6010B (TAL metals, Tin)						Preservation
CS - 1	Soil	2/22/2011	4pm	Solid	1	Plastic Bottle	x			KUB0381-01			None
CS - 2	Soil	2/22/2011	4pm	Solid	1	Plastic Bottle	x				-02		None
CS - 3	Soil	2/22/2011	4pm	Solid	1	Plastic Bottle	x				-03		None
G - 1	Soil	2/22/2011	4pm	Solid	1	Plastic Bottle	x				-04		None
G - 2	Soil	2/22/2011	4pm	Solid	1	Plastic Bottle	x				-05		None
G - 3	Soil	2/22/2011	4pm	Solid	1	Plastic Bottle	x				-06		None

Relinquished By: (Print & Sign)	Received By:	Date/Time	Comments:
Santhi Jagupilla 02/22/11 5pm	Fed Ex	2/22/11	Turn Around Time of 3 days
Relinquished By: (Print & Sign) Fed Ex 2/23/11	Received By:	Date/Time 2/23/11 1736	
Relinquished By: (Print & Sign)	Received By:	Date/Time	Method of Shipment: FEDEX

Iced: Yes / No

Cooler Receipt Form

WORK ORDER #: KUB0381

Client: Schnabel Project: Raritan

Temperature Upon Receipt by IR: 2°

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: 1 2 3+ Custody Seals Intact? Y N
Ice Present? Y N N/A Melted Packing Material: Bubble Wrap Other None

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? Y N N/A
Residual Chlorine checks done on each container that needs it? Y N N/A

Voa Vials have air bubbles > 6mm? Y N N/A
Sufficient volume for all analyses? Y N
All Sample Containers Intact: Y N All Sample Containers labeled: Y N
All Sample Containers received: Y N All Container labels match COC: Y N
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature:_____ **Date/Time:** 2/23/11

Property of TestAmerica King of Prussia

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0524
Client Project/Site: 10615032
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/06/2011 01:35:25 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

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Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0524-01	P-1	Solid	03/22/11 16:00	03/23/11 00:00
KUC0524-02	P-2	Solid	03/22/11 16:00	03/23/11 00:00
KUC0524-03	P-3	Solid	03/22/11 16:00	03/23/11 00:00
KUC0524-04	E-6 TA Mill	Water	03/22/11 16:00	03/23/11 13:00

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Qualifiers

Metals

Qualifier	Qualifier Description
B1	Analyte was detected in the associated method blank. Analyte concentration in the sample is greater than 10x the concentration found in the method blank.
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
RL7	Sample required dilution due to high concentrations of target analyte.

Wet Chem

Qualifier	Qualifier Description
HFT	The holding time for this test is immediate. It was analyzed in the laboratory as soon as possible after receipt

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: P-1

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.31**		0.20		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Antimony	**0.061**		0.050		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Arsenic	ND		0.050		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Barium	**0.41**		0.0050		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Beryllium	ND		0.0040		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Cadmium	ND		0.0040		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Calcium	**72**	**B1, MHA**	0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Chromium	ND		0.050		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Cobalt	ND		0.020		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Copper	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Iron	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Lead	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Magnesium	**0.70**		0.50		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Manganese	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Nickel	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Potassium	ND		10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Selenium	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Silver	ND		0.020		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Sodium	**11**	**MHA**	0.50		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Thallium	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Tin	ND		0.200		mg/L		03/30/11 10:00	03/31/11 11:49	1.00
Vanadium	ND		0.025		mg/L		03/30/11 10:00	03/31/11 11:49	1.0
Zinc	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:49	1.0

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.44**		0.20		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Arsenic	**0.093**		0.050		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Barium	**0.32**		0.0050		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Beryllium	ND		0.0040		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Cadmium	ND		0.0040		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Calcium	**86**	**B1, MHA**	0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Chromium	ND		0.050		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Cobalt	ND		0.020		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Copper	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Iron	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Lead	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Magnesium	**0.75**		0.50		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Manganese	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Nickel	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Potassium	ND		10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Selenium	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Sodium	**14**	**MHA**	0.50		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Thallium	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Vanadium	ND		0.025		mg/L		03/30/11 06:17	03/30/11 15:29	1.0
Zinc	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:29	1.0

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.23**		0.050		mg/L		03/31/11 14:25	04/01/11 12:12	1.0

Client Sample ID: P-1

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.020		mg/L		03/31/11 14:25	04/01/11 12:12	1.0
Tin	ND		0.200		mg/L		03/31/11 14:25	04/01/11 12:12	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/29/11 05:38	03/29/11 12:43	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.8**		0.050		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Barium	**1.8**		0.0050		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Cadmium	**0.033**		0.0040		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Calcium	**140**	**B1, MHA**	0.10		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Chromium	ND		0.050		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Iron	**220**	**MHA**	0.10		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Manganese	**8.8**	**MHA**	0.10		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Nickel	**0.59**		0.10		mg/L		03/29/11 05:38	03/29/11 12:43	1.0
Selenium	ND	M7	0.20		mg/L		03/29/11 05:38	03/29/11 12:43	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.92**	**RL1**	0.80		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Antimony	**1.3**	**RL1**	0.20		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Beryllium	ND	RL1	0.016		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Cobalt	**0.12**	**RL1**	0.080		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Copper	ND	RL1	0.40		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Magnesium	**22**	**RL1**	2.0		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Potassium	ND	RL1	40		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Silver	ND	RL1	0.080		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Sodium	**1400**	**RL7**	2.0		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Thallium	ND	RL1	0.80		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Vanadium	ND	RL1	0.10		mg/L		03/29/11 05:38	03/29/11 13:18	4.0
Zinc	**2.0**	**RL1**	0.40		mg/L		03/29/11 05:38	03/29/11 13:18	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**440**	**RL7**	2.0		mg/L		03/29/11 05:38	03/30/11 16:18	20

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2000**		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Beryllium	**0.45**		0.40		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Calcium	**26000**		25		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Magnesium	**6200**		25		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Manganese	**4200**		1.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Nickel	**170**		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Potassium	**2300**		1000		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Silver	**6.6**		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Sodium	**9100**		80		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0

Client Sample ID: P-1

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Tin	**2300**		10		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Vanadium	**90**		2.5		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0
Zinc	**2600**		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:47	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**20000**	**RL1**	1200		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Antimony	**2400**	**RL7**	250		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Barium	**650**	**RL1**	25		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Calcium	**41000**	**RL1**	620		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Chromium	**120**	**RL1**	120		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Copper	**3600**	**RL7**	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Iron	**320000**	**B1, RL7**	250		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50
Lead	**43000**	**RL7**	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:10	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/30/11 13:00	03/31/11 11:01	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/30/11 13:02	03/31/11 11:39	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/29/11 07:25	03/30/11 09:33	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/28/11 09:11	03/29/11 10:47	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.55**	**HFT**	0.01000		pH Units		04/01/11 11:04	04/01/11 11:47	1.000

Method: EPA 9040B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10**	**HFT**	0.10		pH Units		04/01/11 11:05	04/01/11 12:10	1.0

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.3**		1.0		pH Units		03/30/11 11:50	03/30/11 13:15	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**8.82**	**HFT**	0.100		pH Units		03/28/11 07:46	03/28/11 11:15	1.00

Client Sample ID: P-1

Lab Sample ID: KUC0524-01

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**19.3**		0.00		°C		03/28/11 07:46	03/28/11 11:15	1.00

Method: SW 9056A - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		1.00		mg/L		04/06/11 08:27	04/06/11 09:02	1.00
Chloride	**87.2**		5.00		mg/L		04/06/11 08:27	04/06/11 10:11	5.00
Sulfate as SO4	**44.8**		1.00		mg/L		04/06/11 08:27	04/06/11 09:02	1.00
Fluoride, Undistilled	**1.42**		0.0500		mg/L		04/06/11 08:27	04/06/11 09:02	1.00
Nitrate as N	ND		0.0500		mg/L		04/06/11 08:27	04/06/11 09:02	1.00
Nitrite as N	ND		0.0500		mg/L		04/06/11 08:27	04/06/11 09:02	1.00

Client Sample ID: P-2

Lab Sample ID: KUC0524-02

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Antimony	**0.15**		0.050		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Arsenic	**0.051**		0.050		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Barium	**0.37**		0.0050		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Beryllium	ND		0.0040		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Cadmium	ND		0.0040		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Calcium	**73**	**B1**	0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Chromium	ND		0.050		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Cobalt	ND		0.020		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Copper	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Iron	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Lead	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Magnesium	**0.76**		0.50		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Manganese	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Nickel	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Potassium	ND		10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Selenium	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Silver	ND		0.020		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Sodium	**13**		0.50		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Thallium	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Tin	ND		0.200		mg/L		03/30/11 10:00	03/31/11 11:55	1.00
Vanadium	ND		0.025		mg/L		03/30/11 10:00	03/31/11 11:55	1.0
Zinc	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:55	1.0

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Arsenic	**0.082**		0.050		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Barium	**0.32**		0.0050		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Beryllium	ND		0.0040		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Cadmium	ND		0.0040		mg/L		03/30/11 06:17	03/30/11 15:35	1.0

Client Sample ID: P-2

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**73**	**B1**	0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Chromium	ND		0.050		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Cobalt	ND		0.020		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Copper	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Iron	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Lead	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Magnesium	**1.2**		0.50		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Manganese	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Nickel	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Potassium	ND		10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Selenium	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Sodium	**12**		0.50		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Thallium	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Vanadium	ND		0.025		mg/L		03/30/11 06:17	03/30/11 15:35	1.0
Zinc	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:35	1.0

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.47**		0.050		mg/L		03/31/11 14:25	04/01/11 12:14	1.0
Silver	ND		0.020		mg/L		03/31/11 14:25	04/01/11 12:14	1.0
Tin	ND		0.200		mg/L		03/31/11 14:25	04/01/11 12:14	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/29/11 05:38	03/29/11 12:49	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.8**		0.050		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Barium	**1.9**		0.0050		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Cadmium	**0.033**		0.0040		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Calcium	**150**	**B1**	0.10		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Chromium	ND		0.050		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Iron	**210**		0.10		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Manganese	**7.5**		0.10		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Nickel	**0.68**		0.10		mg/L		03/29/11 05:38	03/29/11 12:49	1.0
Selenium	ND		0.20		mg/L		03/29/11 05:38	03/29/11 12:49	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.81**	**RL1**	0.80		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Antimony	**1.4**	**RL1**	0.20		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Beryllium	ND	RL1	0.016		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Cobalt	**0.14**	**RL1**	0.080		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Copper	ND	RL1	0.40		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Magnesium	**18**	**RL1**	2.0		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Potassium	ND	RL1	40		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Silver	ND	RL1	0.080		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Sodium	**1400**	**RL7**	2.0		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Thallium	ND	RL1	0.80		mg/L		03/29/11 05:38	03/29/11 13:20	4.0

Client Sample ID: P-2

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE1 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	ND	RL1	0.10		mg/L		03/29/11 05:38	03/29/11 13:20	4.0
Zinc	**2.1**	**RL1**	0.40		mg/L		03/29/11 05:38	03/29/11 13:20	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**450**	**RL7**	2.0		mg/L		03/29/11 05:38	03/30/11 16:25	20

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**1700**		10		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Arsenic	**1600**		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Beryllium	**0.54**		0.40		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Calcium	**26000**		25		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Chromium	**88**		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Magnesium	**6200**		25		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Manganese	**3800**		1.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Nickel	**140**		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Potassium	**2900**		1000		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Silver	**6.8**		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Sodium	**9600**		80		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Tin	**2500**		10		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Vanadium	**96**		2.5		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0
Zinc	**2800**		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:49	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**19000**	**RL1**	1200		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:16	50
Barium	**660**	**RL1**	25		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:16	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:16	50
Copper	**3400**	**RL7**	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:16	50
Iron	**270000**	**B1, RL7**	250		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:16	50
Lead	**47000**	**RL7**	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:16	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/30/11 13:00	03/31/11 11:08	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/30/11 13:02	03/31/11 11:46	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/29/11 07:25	03/30/11 09:34	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/28/11 09:11	03/29/11 10:49	1.00

Client Sample ID: P-2

Lab Sample ID: KUC0524-02

Date Collected: 03/22/11 16:00
Matrix: Solid
Date Received: 03/23/11 00:00
Percent Solids: 99.6
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	10.09	HFT	0.01000		pH Units		04/01/11 11:04	04/01/11 11:47	1.000

Method: EPA 9040B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	10	HFT	0.10		pH Units		04/01/11 11:05	04/01/11 12:10	1.0

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	5.3		1.0		pH Units		03/30/11 11:50	03/30/11 13:15	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.32	HFT	0.100		pH Units		03/28/11 07:46	03/28/11 11:15	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	19.3		0.00		°C		03/28/11 07:46	03/28/11 11:15	1.00

Method: SW 9056A - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		1.00		mg/L		04/06/11 08:27	04/06/11 11:03	1.00
Chloride	123		5.00		mg/L		04/06/11 08:27	04/06/11 12:30	5.00
Sulfate as SO4	66.8		1.00		mg/L		04/06/11 08:27	04/06/11 11:03	1.00
Fluoride, Undistilled	0.860		0.0500		mg/L		04/06/11 08:27	04/06/11 11:03	1.00
Nitrate as N	ND		0.0500		mg/L		04/06/11 08:27	04/06/11 11:03	1.00
Nitrite as N	ND		0.0500		mg/L		04/06/11 08:27	04/06/11 11:03	1.00

Client Sample ID: P-3

Lab Sample ID: KUC0524-03

Date Collected: 03/22/11 16:00
Matrix: Solid
Date Received: 03/23/11 00:00
Percent Solids: 99.8
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.66		0.20		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Antimony	0.11		0.050		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Arsenic	0.064		0.050		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Barium	0.39		0.0050		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Beryllium	ND		0.0040		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Cadmium	ND		0.0040		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Calcium	79	B1	0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Chromium	ND		0.050		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Cobalt	ND		0.020		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Copper	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Iron	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Lead	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Magnesium	0.55		0.50		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Manganese	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Nickel	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Potassium	ND		10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0

Client Sample ID: P-3

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Silver	ND		0.020		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Sodium	**14**		0.50		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Thallium	ND		0.20		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Tin	ND		0.200		mg/L		03/30/11 10:00	03/31/11 11:57	1.00
Vanadium	ND		0.025		mg/L		03/30/11 10:00	03/31/11 11:57	1.0
Zinc	ND		0.10		mg/L		03/30/11 10:00	03/31/11 11:57	1.0

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.34**		0.20		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Arsenic	**0.094**		0.050		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Barium	**0.33**		0.0050		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Beryllium	ND		0.0040		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Cadmium	ND		0.0040		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Calcium	**95**	**B1**	0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Chromium	ND		0.050		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Cobalt	ND		0.020		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Copper	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Iron	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Lead	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Magnesium	**0.77**		0.50		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Manganese	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Nickel	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Potassium	ND		10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Selenium	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Sodium	**13**		0.50		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Thallium	ND		0.20		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Vanadium	ND		0.025		mg/L		03/30/11 06:17	03/30/11 15:41	1.0
Zinc	ND		0.10		mg/L		03/30/11 06:17	03/30/11 15:41	1.0

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.21**		0.050		mg/L		03/31/11 14:25	04/01/11 12:17	1.0
Silver	ND		0.020		mg/L		03/31/11 14:25	04/01/11 12:17	1.0
Tin	ND		0.200		mg/L		03/31/11 14:25	04/01/11 12:17	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/29/11 05:38	03/29/11 12:52	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.4**		0.050		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Barium	**1.6**		0.0050		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Cadmium	**0.039**		0.0040		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Calcium	**210**	**B1**	0.10		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Chromium	ND		0.050		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Cobalt	**0.13**		0.020		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Iron	**160**		0.10		mg/L		03/29/11 05:38	03/29/11 12:52	1.0

Client Sample ID: P-3

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Lab Sample ID: KUC0524-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	10		0.10		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Nickel	0.72		0.10		mg/L		03/29/11 05:38	03/29/11 12:52	1.0
Selenium	ND		0.20		mg/L		03/29/11 05:38	03/29/11 12:52	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.94	RL1	0.80		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Antimony	1.1	RL1	0.20		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Beryllium	ND	RL1	0.016		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Copper	ND	RL1	0.40		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Magnesium	22	RL1	2.0		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Potassium	ND	RL1	40		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Silver	ND	RL1	0.080		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Sodium	1300	RL7	2.0		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Thallium	ND	RL1	0.80		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Vanadium	ND	RL1	0.10		mg/L		03/29/11 05:38	03/29/11 13:23	4.0
Zinc	2.3	RL1	0.40		mg/L		03/29/11 05:38	03/29/11 13:23	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	480	RL7	2.0		mg/L		03/29/11 05:38	03/30/11 16:27	20

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	420		1.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Calcium	27000		25		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Chromium	120		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Magnesium	6400		25		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Manganese	4200		1.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Nickel	220		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Potassium	2500		1000		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Silver	8.2		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Sodium	9100		80		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Tin	2700		10		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Vanadium	110		2.5		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0
Zinc	3000		5.0		mg/kg dry	☼	03/28/11 08:51	03/29/11 11:52	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	20000	RL1	1200		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50
Antimony	2600	RL7	250		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50
Arsenic	2300	RL7	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50
Copper	4800	RL7	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50
Iron	350000	B1, RL7	250		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50
Lead	52000	RL7	50		mg/kg dry	☼	03/28/11 08:51	03/30/11 15:19	50

Client Sample ID: P-3

Lab Sample ID: KUC0524-03

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/30/11 13:00	03/31/11 11:10	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/30/11 13:02	03/31/11 11:48	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/29/11 07:25	03/30/11 09:36	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/28/11 09:11	03/29/11 10:50	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.63**	**HFT**	0.01000		pH Units		04/01/11 11:04	04/01/11 11:47	1.000

Method: EPA 9040B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11**	**HFT**	0.10		pH Units		04/01/11 11:05	04/01/11 12:10	1.0

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.3**		1.0		pH Units		03/30/11 11:50	03/30/11 13:15	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.61**	**HFT**	0.100		pH Units		03/28/11 07:46	03/28/11 11:15	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**19.5**		0.00		°C		03/28/11 07:46	03/28/11 11:15	1.00

Method: SW 9056A - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		1.00		mg/L		04/06/11 08:27	04/06/11 11:38	1.00
Chloride	**55.5**		1.00		mg/L		04/06/11 08:27	04/06/11 11:38	1.00
Sulfate as SO4	**24.1**		1.00		mg/L		04/06/11 08:27	04/06/11 11:38	1.00
Fluoride, Undistilled	**0.571**		0.0500		mg/L		04/06/11 08:27	04/06/11 11:38	1.00
Nitrate as N	ND		0.0500		mg/L		04/06/11 08:27	04/06/11 11:38	1.00
Nitrite as N	ND		0.0500		mg/L		04/06/11 08:27	04/06/11 11:38	1.00

Client Sample ID: E-6 TA Mill

Lab Sample ID: KUC0524-04

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 13:00
Sampler Name:

Matrix: Water
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/30/11 06:31	03/30/11 12:09	1.00

Client Sample ID: E-6 TA Mill

Lab Sample ID: KUC0524-04

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 13:00
Sampler Name:

Matrix: Water
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.100		mg/L		03/30/11 06:31	03/30/11 12:09	1.00
Iron	ND		0.10		mg/L		03/30/11 06:31	03/30/11 12:09	1.0
Magnesium	ND		0.50		mg/L		03/30/11 06:31	03/30/11 12:09	1.0
Potassium	ND		10		mg/L		03/30/11 06:31	03/30/11 12:09	1.0
Sodium	**0.85**		0.50		mg/L		03/30/11 06:31	03/30/11 12:09	1.0
Tin	ND		0.10		mg/L		03/30/11 06:31	03/30/11 12:09	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Antimony	**1.3**		1.0		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Arsenic	**1.2**		1.0		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Barium	ND		0.96		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Beryllium	ND		0.56		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Cadmium	ND		0.43		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Chromium	ND		1.4		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Cobalt	ND		0.18		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Copper	ND		1.0		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Lead	**5.8**		0.96		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Manganese	ND		10		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Nickel	ND		0.97		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Selenium	ND		3.6		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Silver	ND		0.40		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Thallium	ND		0.40		ug/l		03/28/11 06:51	03/29/11 17:53	2.0
Vanadium	ND		0.51		ug/l		03/28/11 06:51	03/29/11 17:53	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		20		ug/l		03/28/11 06:51	03/31/11 13:09	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/29/11 13:27	03/30/11 12:06	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Client Sample ID: P-1

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00

Lab Sample ID: KUC0524-01

Matrix: Solid
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0693_P	03/30/11 13:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000609	03/31/11 11:01	MR	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0620_P	03/28/11 09:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000592	03/29/11 10:47	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0694_P	03/30/11 13:02	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000610	03/31/11 11:39	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0631	03/28/11 14:53	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0640_P	03/29/11 07:25	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000601	03/30/11 09:33	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0682_P	03/30/11 10:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000613	03/31/11 11:49	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0664_P	03/30/11 06:17	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000604	03/30/11 15:29	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.0	U000595	03/29/11 12:43	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.90	11C0619_P	03/28/11 08:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000595	03/29/11 11:47	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.00	11C0682_P	03/30/11 10:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.00	U000613	03/31/11 11:49	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000595	03/29/11 12:43	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0727_P	03/31/11 14:25	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000624	04/01/11 12:12	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE1	1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE1	4.0	U000595	03/29/11 13:18	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.90	11C0619_P	03/28/11 08:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	50	U000604	03/30/11 15:10	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction	RE1	1.00	11C0660	03/29/11 14:58	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.00	11C0727_P	03/31/11 14:25	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.00	U000624	04/01/11 12:12	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	20	U000604	03/30/11 16:18	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0027_P	04/01/11 11:05	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9040B		1.0	11D0027	04/01/11 12:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0610_P	03/28/11 07:46	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0610	03/28/11 11:15	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11D0026_P	04/01/11 11:04	TYH	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11D0026	04/01/11 11:47	TYH	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Client Sample ID: P-1

Lab Sample ID: KUC0524-01
Date Collected: 03/22/11 16:00
Matrix: Solid
Date Received: 03/23/11 00:00
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Prep	General Prep WC		1.0	11C0691_P	03/30/11 11:50	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0691	03/30/11 13:15	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0601_P	03/26/11 11:42	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0601	03/26/11 12:13	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0610_P	03/28/11 07:46	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0610	03/28/11 11:15	TYH	TestAmerica King Of Prussia
total	Prep	Wet Chem No Prep		1.00	11D0193_P	04/06/11 08:27	RLM	TestAmerica Dayton
total	Analysis	SW 9056A		1.00	11D0193	04/06/11 09:02	RLM	TestAmerica Dayton
total	Analysis	SW 9056A		5.00	11D0193	04/06/11 10:11	RLM	TestAmerica Dayton

Client Sample ID: P-2

Lab Sample ID: KUC0524-02
Date Collected: 03/22/11 16:00
Matrix: Solid
Date Received: 03/23/11 00:00
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0693_P	03/30/11 13:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000609	03/31/11 11:08	MR	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0620_P	03/28/11 09:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000592	03/29/11 10:49	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0694_P	03/30/11 13:02	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000610	03/31/11 11:46	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0631	03/28/11 14:53	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0640_P	03/29/11 07:25	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000601	03/30/11 09:34	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0682_P	03/30/11 10:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000613	03/31/11 11:55	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0664_P	03/30/11 06:17	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000604	03/30/11 15:35	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.0	U000595	03/29/11 12:49	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.99	11C0619_P	03/28/11 08:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000595	03/29/11 11:49	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.00	11C0682_P	03/30/11 10:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.00	U000613	03/31/11 11:55	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000595	03/29/11 12:49	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0727_P	03/31/11 14:25	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000624	04/01/11 12:14	MKR	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Client Sample ID: P-2

Lab Sample ID: KUC0524-02
Date Collected: 03/22/11 16:00
Matrix: Solid
Date Received: 03/23/11 00:00
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Prep	EPA 200.7 TCLP	RE1	1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE1	4.0	U000595	03/29/11 13:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.99	11C0619_P	03/28/11 08:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	50	U000604	03/30/11 15:16	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction	RE1	1.00	11C0660	03/29/11 14:58	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.00	11C0727_P	03/31/11 14:25	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.00	U000624	04/01/11 12:14	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	20	U000604	03/30/11 16:25	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0027_P	04/01/11 11:05	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9040B		1.0	11D0027	04/01/11 12:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0610_P	03/28/11 07:46	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0610	03/28/11 11:15	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11D0026_P	04/01/11 11:04	TYH	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11D0026	04/01/11 11:47	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0691_P	03/30/11 11:50	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0691	03/30/11 13:15	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0601_P	03/26/11 11:42	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0601	03/26/11 12:13	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0610_P	03/28/11 07:46	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0610	03/28/11 11:15	TYH	TestAmerica King Of Prussia
total	Prep	Wet Chem No Prep		1.00	11D0193_P	04/06/11 08:27	RLM	TestAmerica Dayton
total	Analysis	SW 9056A		1.00	11D0193	04/06/11 11:03	RLM	TestAmerica Dayton
total	Analysis	SW 9056A		5.00	11D0193	04/06/11 12:30	RLM	TestAmerica Dayton

Client Sample ID: P-3

Lab Sample ID: KUC0524-03
Date Collected: 03/22/11 16:00
Matrix: Solid
Date Received: 03/23/11 00:00
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0693_P	03/30/11 13:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000609	03/31/11 11:10	MR	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0620_P	03/28/11 09:11	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000592	03/29/11 10:50	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0694_P	03/30/11 13:02	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000610	03/31/11 11:48	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0631	03/28/11 14:53	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0640_P	03/29/11 07:25	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000601	03/30/11 09:36	MR	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Client Sample ID: P-3

Date Collected: 03/22/11 16:00
Date Received: 03/23/11 00:00

Lab Sample ID: KUC0524-03

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 TCLP		1.0	11C0682_P	03/30/11 10:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000613	03/31/11 11:57	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0664_P	03/30/11 06:17	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000604	03/30/11 15:41	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.0	U000595	03/29/11 12:52	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.89	11C0619_P	03/28/11 08:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000595	03/29/11 11:52	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.00	11C0682_P	03/30/11 10:00	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.00	U000613	03/31/11 11:57	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000595	03/29/11 12:52	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0727_P	03/31/11 14:25	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000624	04/01/11 12:17	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE1	1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE1	4.0	U000595	03/29/11 13:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.89	11C0619_P	03/28/11 08:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	50	U000604	03/30/11 15:19	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction	RE1	1.00	11C0660	03/29/11 14:58	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.00	11C0727_P	03/31/11 14:25	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.00	U000624	04/01/11 12:17	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0636_P	03/29/11 05:38	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	20	U000604	03/30/11 16:27	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0027_P	04/01/11 11:05	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9040B		1.0	11D0027	04/01/11 12:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0610_P	03/28/11 07:46	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0610	03/28/11 11:15	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11D0026_P	04/01/11 11:04	TYH	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11D0026	04/01/11 11:47	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0691_P	03/30/11 11:50	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0691	03/30/11 13:15	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0601_P	03/26/11 11:42	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0601	03/26/11 12:13	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0610_P	03/28/11 07:46	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0610	03/28/11 11:15	TYH	TestAmerica King Of Prussia
total	Prep	Wet Chem No Prep		1.00	11D0193_P	04/06/11 08:27	RLM	TestAmerica Dayton
total	Analysis	SW 9056A		1.00	11D0193	04/06/11 11:38	RLM	TestAmerica Dayton

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Client Sample ID: E-6 TA Mill

Lab Sample ID: KUC0524-04

Date Collected: 03/22/11 16:00

Matrix: Water

Date Received: 03/23/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000604	03/30/11 12:09	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000604	03/30/11 12:09	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0655_P	03/29/11 13:27	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000603	03/30/11 12:06	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0605_P	03/28/11 06:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0605	03/29/11 17:53	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0605_P	03/28/11 06:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0605	03/31/11 13:09	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0524

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505
TestAmerica Dayton	Indiana	State Program	5	C-OH-10
TestAmerica Dayton	Kentucky	Kentucky UST	4	8
TestAmerica Dayton	Michigan	State Program	5	9931
TestAmerica Dayton	Ohio	OVAP	5	CL0018
TestAmerica Dayton	Ohio	State Program	5	OH-00010
TestAmerica Dayton	Ohio	State Program	5	OH-00010
TestAmerica Dayton	Ohio	State Program	5	OH-00010
TestAmerica Dayton	Ohio	State Program	5	OH-00010
TestAmerica Dayton	Ohio	State Program	5	OH-00010
TestAmerica Dayton	Pennsylvania	NELAC	3	68-00577

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin)	TCLP EPA Method 1311 (TAL metals, Tin)	SPLP EPA Method 1312 (TAL metals, Tin)	DI Water EPA Method 1312 (TAL metals, Tin)	pH	Totals, 6010B (Si)	6°C Preservation
P - 1	Slag	3/22/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x	KU05524-01	None
P - 2	Slag	3/22/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None -02
P - 3	Slag	3/22/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None -03
E - 6 TA Mill	Liquid	3/22/2011	4pm	Liquid	1	Plastic bottle	x					x	Nitric Acid -04

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	[signature]	3/23/11 1300
Relinquished By: (Print & Sign)	Received By:	Date/Time
Relinquished By: (Print & Sign)	Received By:	Date/Time

For total digestion, use the samples in plastic bottles as labeled.

Please report pre- and post-extraction pH for all the analyses.

Method of Shipment: FEDEX

Iced: Yes No

Cooler Receipt Form

WORK ORDER #: KUC0524

Client: Schnabel Project: Raritan

Temperature Upon Receipt by IR: 6°

Cooler received from: **TA Courier Client (FedEx) UPS Other:** _____

For Received Shipments only:
Number of Coolers: (1) 2 3+ Custody Seals Intact? Y (N)
Ice Present? Y N N/A (Melted) Packing Material: (Bubble Wrap) Other None

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N (N/A)**
Sufficient volume for all analyses? (Y) N
All Sample Containers Intact: (Y) N All Sample Containers labeled: (Y) N
All Sample Containers received: (Y) N All Container labels match COC: (Y) N
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	(Yes)	No
2. Project Name and/or Number included	(Yes)	No
3. Field Sampler Name listed	(Yes)	No
4. Field ID/Location - one sample per line	(Yes)	No
5. Date collected (for each sample)	(Yes)	No
6. Time collected (for each sample)	(Yes)	No
7. Matrix (for each sample)	(Yes)	No
8. Number & Types of bottles per sample (and preservation type)	(Yes)	No
9. Analysis Requested	(Yes)	No
10. Sign & Date in the Relinquished Box	(Yes)	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature:_____ **Date/Time:** 3/23/11

Miller, Jill

From: Mia Painter [mpainter@schnabel-eng.com]
Sent: Friday, March 25, 2011 5:09 PM
To: Miller, Jill
Subject: RE: Chloride

Please add Anions of the DI water extraction to the work order. I am sorry this was missed.

—
Mia Painter, PG / Project Geologist
Schnabel ENGINEERING **T/** 610-696-6066 **F/** 610-696-7771 **http://www.schnabel-eng.com**

From: Miller, Jill [mailto:Jill.Miller@testamericainc.com]
Sent: Friday, March 25, 2011 4:59 PM
To: Mia Painter
Subject: RE: Chloride

No anions were listed on that COC

JILL MILLER
Project Manager
484.685.0871

From: Mia Painter [mailto:mpainter@schnabel-eng.com]
Sent: Friday, March 25, 2011 4:57 PM
To: Miller, Jill
Subject: RE: Chloride

OK, thanks.
This got me thinking, I need to check the COC for the slag you just received (KUC0524) – I believe we want anions on that too and I don't remember if it was listed…I'll get back to you, or if you can pull it please check it
Thanks,
Mia

—
Mia Painter, PG / Project Geologist
Schnabel ENGINEERING **T/** 610-696-6066 **F/** 610-696-7771 **http://www.schnabel-eng.com**

From: Miller, Jill [mailto:Jill.Miller@testamericainc.com]
Sent: Friday, March 25, 2011 4:49 PM
To: Mia Painter
Subject: Chloride

Mia,

They can add chloride, but it must rerun due to the high concentration. Results 4/4 at the latest.

Sorry for the delay.

JILL MILLER
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

1008 W. Ninth Avenue
King of Prussia, PA 19406
Tel 484.685.0871 Fax 610.337.9939
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at:
Project Feedback

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0128
Client Project/Site: [none]
Client Project Description: Raritan NJ
Revision: 1

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/01/2011 09:28:39 AM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Table of Contents

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0128-01	S-1	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-02	S-2	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-03	S-3	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-04	WJ3-C1	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-05	SW2-C2	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-06	SW4-C5	Solid	03/03/11 16:00	03/04/11 11:20

Case Narrative

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Job ID: KUC0128

Laboratory: TestAmerica King Of Prussia

Narrative

Revision:

This report was revised to correct the tin results due to a reporting error.
Chloride was added to all samples in this report.
Barium was added to sample 05

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Qualifiers

Metals

Qualifier	Qualifier Description
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
M8	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
RL7	Sample required dilution due to high concentrations of target analyte.
T5	Less than the prescribed sample amount was available to perform the leachate extraction. The volume of extraction fluid was adjusted proportionately based on the method prescribed ratio of extraction fluid to sample weight.

Wet Chem

Qualifier	Qualifier Description
HFT	The holding time for this test is immediate. It was analyzed in the laboratory as soon as possible after receipt

WetChem

Qualifier	Qualifier Description
H3	Sample was received and analyzed past holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.72**		0.20		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Barium	**0.0084**		0.0050		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Calcium	**6.7**		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Iron	**2.5**		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Lead	**0.27**		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Magnesium	**1.8**		0.50		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Potassium	ND	M7	10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Sodium	**24**	**MHA**	0.50		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.11**		0.050		mg/L		03/18/11 14:45	03/21/11 14:12	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:12	1.00

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.27**		0.20		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Barium	**0.030**		0.0050		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Copper	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Iron	**1.0**	**M7, M8**	0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Lead	**0.16**		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Magnesium	**2.3**		0.50		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Potassium	ND		10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Silver	ND	M8	0.020		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Sodium	**16**	**MHA**	0.50		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Tin	ND	M8	0.200		mg/L		03/16/11 10:11	03/18/11 14:02	1.00
Vanadium	ND		0.025		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.13**		0.050		mg/L		03/16/11 10:11	03/22/11 12:56	1.0
Calcium	**12**		0.10		mg/L		03/16/11 10:11	03/22/11 12:56	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:11	03/22/11 12:56	1.0

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:47	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**0.14**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Cadmium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Calcium	**290**		0.10		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Cobalt	**0.029**		0.020		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Iron	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Nickel	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:49	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Antimony	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Arsenic	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Beryllium	ND	RL1	0.016		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Chromium	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Lead	**8.9**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Magnesium	**7.2**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Manganese	**0.48**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Sodium	**1200**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Thallium	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Vanadium	ND	RL1	0.10		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Zinc	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1200**	**MHA**	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Antimony	**130**	**M8**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Arsenic	**110**	**M8**	2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Barium	**30**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Cadmium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Calcium	**5300**	**MHA**	25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Chromium	**9.1**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Copper	**35**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Iron	**16000**	**MHA**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Lead	**1400**	**MHA**	2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	340	MHA	25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Manganese	53	M7	1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Nickel	ND		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Silver	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Sodium	470	MHA	80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Tin	44	M8	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Vanadium	16		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Zinc	59		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/16/11 09:56	03/17/11 08:01	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 09:52	03/16/11 14:50	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 14:49	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:28	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.900	HFT	0.01000		pH Units		03/16/11 07:19	03/16/11 08:45	1.000

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	5.4		1.0		pH Units		03/07/11 10:38	03/09/11 08:25	1.0
TCLP pH pre-leach	9.4		1.0		pH Units		03/07/11 10:38	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.00	HFT	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.2		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.1**		0.20		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Barium	**0.010**		0.0050		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Calcium	**6.1**		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Iron	**4.2**		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Lead	**0.43**		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Magnesium	**1.9**		0.50		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Sodium	**52**		0.50		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.088**		0.050		mg/L		03/18/11 14:45	03/21/11 14:18	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:18	1.00

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.44**		0.20		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Barium	**0.015**		0.0050		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Copper	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Iron	**3.9**		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Lead	**0.46**		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Magnesium	**2.7**		0.50		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Potassium	ND		10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Silver	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Sodium	**29**		0.50		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Tin	ND		0.200		mg/L		03/16/11 10:11	03/18/11 14:08	1.00
Vanadium	ND		0.025		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.066**		0.050		mg/L		03/16/11 10:11	03/22/11 13:02	1.0
Calcium	**9.9**		0.10		mg/L		03/16/11 10:11	03/22/11 13:02	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:11	03/22/11 13:02	1.0

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:54	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.11**		0.050		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Arsenic	ND		0.050		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Barium	**0.18**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Cadmium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Calcium	**220**		0.10		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Cobalt	**0.030**		0.020		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Iron	**0.18**		0.10		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Nickel	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:51	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Beryllium	ND	RL1	0.016		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Chromium	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Lead	**11**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Magnesium	**6.8**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Manganese	**0.57**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Sodium	**1200**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Thallium	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Vanadium	ND	RL1	0.10		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Zinc	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1000**		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Antimony	**25**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Arsenic	**19**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Barium	**6.7**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Cadmium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Calcium	**2900**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Chromium	**8.8**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Copper	**19**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Iron	**13000**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Lead	**650**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	**600**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Manganese	**49**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Nickel	ND		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Silver	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Sodium	**430**		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Tin	**16**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Vanadium	**17**		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Zinc	**38**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/16/11 09:56	03/17/11 08:08	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 09:52	03/16/11 14:57	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	M7	0.00100		mg/L		03/09/11 10:58	03/10/11 14:56	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:29	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**9.230**	**HFT**	0.01000		pH Units		03/16/11 07:19	03/16/11 08:45	1.000

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.2**		1.0		pH Units		03/07/11 10:38	03/09/11 08:25	1.0
TCLP pH pre-leach	**9.0**		1.0		pH Units		03/07/11 10:38	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**8.21**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.1**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.90**		0.20		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Barium	**0.025**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Calcium	**8.5**		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Iron	**2.9**		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Lead	**0.27**		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Magnesium	**2.1**		0.50		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Sodium	**28**		0.50		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.075**		0.050		mg/L		03/18/11 14:45	03/21/11 14:20	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:20	1.00

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.81**		0.20		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Barium	**0.013**		0.0050		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Copper	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Iron	**7.8**		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Lead	**0.78**		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Magnesium	**2.6**		0.50		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Potassium	ND		10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Silver	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Sodium	**29**		0.50		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Tin	ND		0.200		mg/L		03/16/11 10:11	03/18/11 14:10	1.00
Vanadium	ND		0.025		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.074**		0.050		mg/L		03/16/11 10:11	03/22/11 13:04	1.0
Calcium	**8.3**		0.10		mg/L		03/16/11 10:11	03/22/11 13:04	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:11	03/22/11 13:04	1.0

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:56	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.090**		0.050		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Barium	**0.19**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Cadmium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Calcium	**520**		0.10		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Cobalt	**0.036**		0.020		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Iron	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Nickel	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:53	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Arsenic	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Beryllium	**0.051**	**RL1**	0.016		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Chromium	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Lead	**5.4**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Magnesium	**7.5**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Manganese	**0.56**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Sodium	**1300**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Thallium	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Vanadium	ND	RL1	0.10		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Zinc	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**800**		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Antimony	**48**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Arsenic	**40**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Barium	**8.1**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Cadmium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Calcium	**1800**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Chromium	**8.2**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Copper	**55**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Iron	**12000**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Lead	**980**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	310		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Manganese	39		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Nickel	ND		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Silver	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Sodium	370		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Tin	37		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Vanadium	13		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Zinc	36		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/16/11 09:56	03/17/11 08:09	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 09:52	03/16/11 14:59	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 14:58	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:31	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.290	HFT	0.01000		pH Units		03/16/11 07:19	03/16/11 08:45	1.000

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	5.7		1.0		pH Units		03/07/11 10:38	03/09/11 08:25	1.0
TCLP pH pre-leach	9.9		1.0		pH Units		03/07/11 10:38	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.28	HFT	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.2		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-04

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Barium	**0.35**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Calcium	**20**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Cobalt	**0.089**		0.020		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Iron	**1.7**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Lead	**23**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Magnesium	**9.7**		0.50		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Nickel	**0.22**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Sodium	**28**		0.50		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Zinc	**0.14**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050		mg/L		03/18/11 14:45	03/21/11 14:22	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:22	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:58	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**1.6**		0.050		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Barium	**0.28**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Beryllium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Calcium	**12**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Chromium	ND		0.050		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Magnesium	**6.4**		0.50		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Manganese	**0.18**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Nickel	**0.52**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Thallium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Vanadium	ND		0.025		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Zinc	**2.4**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Arsenic	**4.5**	**RL1**	0.20		mg/L		03/14/11 12:21	03/15/11 15:43	4.0

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-04

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.028	RL1	0.016		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Cobalt	0.16	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Iron	380	RL7	0.40		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Sodium	1300	RL1	2.0		mg/L		03/14/11 12:21	03/15/11 15:43	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	650	RL7	2.0		mg/L		03/14/11 12:21	03/16/11 14:35	20

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Calcium	1300		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Magnesium	670		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Manganese	250		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Nickel	320		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Silver	15		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Sodium	670		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Vanadium	2.6		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Zinc	3700		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		250		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Antimony	9600	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Arsenic	5700	RL1	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Barium	46	RL1	5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Tin	8400	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5000	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Chromium	ND	RL1	120		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Copper	16000	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Iron	450000	RL7	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Lead	63000	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	T5	0.00100		mg/L		03/16/11 09:56	03/17/11 08:11	1.00

Client Sample ID: WJ3-C1

Lab Sample ID: KUC0128-04

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 15:00	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.100**		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:33	1.00

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.4**		1.0		pH Units		03/09/11 08:00	03/09/11 08:25	1.0
TCLP pH pre-leach	**5.6**		1.0		pH Units		03/08/11 09:59	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.23**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.4**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Method: EPA 300.0 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**10.5**		1.00		mg/L		03/25/11 16:14	03/31/11 00:10	1.00
Fluoride	**0.274**		0.100		mg/L		03/17/11 13:05	03/17/11 20:47	1.00
Nitrate as N	**0.235**	**H3**	0.100		mg/L		03/17/11 13:05	03/17/11 20:47	1.00
Nitrite as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 20:47	1.00
Sulfate	**1.70**		1.00		mg/L		03/17/11 13:05	03/17/11 20:47	1.00

Method: EPA 300.1 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**1.02**		1.00		mg/L		03/17/11 13:05	03/17/11 20:47	1.00

Client Sample ID: SW2-C2

Lab Sample ID: KUC0128-05

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Arsenic	**0.29**		0.050		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Barium	**0.087**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Cadmium	**0.0044**		0.0040		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Calcium	**5.1**		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Cobalt	**0.26**		0.020		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Iron	**68**		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Magnesium	**1.3**		0.50		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	**1.0**		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Sodium	**13**		0.50		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**2.0**		0.050		mg/L		03/18/11 14:45	03/21/11 14:24	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:24	1.00

Method: EPA 6010B - ASTM Leachate - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**170**	**RL7**	1.0		mg/L		03/16/11 10:21	03/22/11 13:06	10

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 10:04	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**2.0**		0.050		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Barium	**0.097**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Beryllium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Calcium	**2.6**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Chromium	ND		0.050		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Copper	ND	M8	0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Magnesium	**0.96**		0.50		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Manganese	**0.20**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Nickel	**1.0**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Potassium	ND		10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Silver	**0.056**		0.020		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Thallium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Vanadium	ND		0.025		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Zinc	**0.39**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.98**	**RL1**	0.80		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Arsenic	**4.8**	**RL1**	0.20		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Cadmium	**0.023**	**RL1**	0.016		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Cobalt	**0.18**	**RL1**	0.080		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Iron	**370**	**RL7**	0.40		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Sodium	**1100**	**RL7**	2.0		mg/L		03/14/11 12:21	03/15/11 15:45	4.0

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1200	RL7	5.0		mg/L		03/14/11 12:21	03/15/11 15:50	50

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	120		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Calcium	870		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Magnesium	190		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Manganese	350		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Nickel	950		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Silver	16		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Sodium	190		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Tin	1600		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Vanadium	ND		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Zinc	600		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	250		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10
Antimony	11000	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10
Barium	22		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10
Copper	7000	RL7	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7000	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Chromium	ND	RL1	120		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Cobalt	51	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Iron	500000	RL7	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Lead	91000	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	T5	0.00100		mg/L		03/16/11 09:56	03/17/11 08:13	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 15:01	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:34	1.00

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	5.5		1.0		pH Units		03/09/11 08:00	03/09/11 08:25	1.0
TCLP pH pre-leach	5.9		1.0		pH Units		03/08/11 09:59	03/08/11 16:19	1.0

Client Sample ID: SW2-C2

Lab Sample ID: KUC0128-05

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.14	HFT	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.6		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Method: EPA 300.0 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.47		1.00		mg/L		03/25/11 16:14	03/31/11 00:30	1.00
Fluoride	ND		0.100		mg/L		03/17/11 13:05	03/17/11 21:27	1.00
Nitrate as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:27	1.00
Nitrite as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:27	1.00
Sulfate	1.45		1.00		mg/L		03/17/11 13:05	03/17/11 21:27	1.00

Method: EPA 300.1 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	1.33		1.00		mg/L		03/17/11 13:05	03/17/11 21:27	1.00

Client Sample ID: SW4-C5

Lab Sample ID: KUC0128-06

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Arsenic	0.063		0.050		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Barium	0.12		0.0050		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Calcium	5.2		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Cobalt	0.15		0.020		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Iron	2.7		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Lead	30		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Magnesium	0.80		0.50		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Nickel	0.31		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Sodium	13		0.50		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.22		0.050		mg/L		03/18/11 14:45	03/21/11 14:26	1.0

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate - RE1 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:26	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 10:07	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Antimony	**2.2**		0.050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Arsenic	**6.5**		0.050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Barium	**0.20**		0.0050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Beryllium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Cadmium	**0.050**		0.0040		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Calcium	**3.9**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Chromium	ND		0.050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Cobalt	**0.32**		0.020		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Copper	ND		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Iron	**310**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Magnesium	**0.85**		0.50		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Manganese	**0.11**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Nickel	**1.4**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Potassium	ND		10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Silver	**0.034**		0.020		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Thallium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Vanadium	ND		0.025		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Zinc	**1.5**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	**1200**		2.0		mg/L		03/14/11 12:21	03/15/11 15:47	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**700**	**RL7**	5.0		mg/L		03/14/11 12:21	03/15/11 15:52	50

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Calcium	**140**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Cobalt	**55**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Magnesium	ND		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Manganese	**230**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Nickel	**930**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Silver	**8.3**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Sodium	**110**		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	**2500**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Vanadium	ND		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Zinc	**1900**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**20**	**RL1**	5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10
Chromium	ND	RL1	25		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10
Cobalt	**74**	**RL1**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10
Copper	**5200**	**RL7**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**18000**	**RL7**	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Arsenic	**4700**	**RL1**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Iron	**270000**	**RL7**	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Lead	**38000**	**RL7**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	T5	0.00100		mg/L		03/16/11 09:56	03/17/11 08:19	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 15:07	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:36	1.00

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.4**		1.0		pH Units		03/09/11 08:00	03/09/11 08:25	1.0
TCLP pH pre-leach	**6.1**		1.0		pH Units		03/08/11 09:59	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.82**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.7**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Method: EPA 300.0 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1.89**		1.00		mg/L		03/25/11 16:14	03/31/11 00:50	1.00
Fluoride	**0.133**		0.100		mg/L		03/17/11 13:05	03/17/11 21:47	1.00
Nitrate as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:47	1.00
Nitrite as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:47	1.00
Sulfate	ND		1.00		mg/L		03/17/11 13:05	03/17/11 21:47	1.00

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: SW4-C5

Lab Sample ID: KUC0128-06

Date Collected: 03/03/11 16:00
Matrix: Solid
Date Received: 03/04/11 11:20
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 300.1 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		1.00		mg/L		03/17/11 13:05	03/17/11 21:47	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:01	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:28	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0374_P	03/16/11 09:52	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000501	03/16/11 14:50	SPC	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 14:49	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 14:52	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000522	03/18/11 14:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:35	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction		1.00	11C0353	03/15/11 15:11	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.00	11C0376_P	03/16/11 10:11	JGS	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.00	U000522	03/18/11 14:02	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:47	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:35	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:12	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000544	03/22/11 12:56	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:12	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:49	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:36	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11C0364_P	03/16/11 07:19	SPC	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11C0364	03/16/11 08:45	SPC	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0195_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0195	03/09/11 08:25	DRH	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-01
Matrix: Solid
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Prep	General Prep WC		1.0	11C0194_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0194	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-02
Matrix: Solid
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:08	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:29	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0374_P	03/16/11 09:52	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000501	03/16/11 14:57	SPC	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 14:56	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 14:58	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000522	03/18/11 14:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.91	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:41	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction		1.00	11C0353	03/15/11 15:11	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.00	11C0376_P	03/16/11 10:11	JGS	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.00	U000522	03/18/11 14:08	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:54	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:41	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:18	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000544	03/22/11 13:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:18	MKR	TestAmerica King Of Prussia

Client Sample ID: S-2

Lab Sample ID: KUC0128-02
Date Collected: 03/03/11 16:00
Matrix: Solid
Date Received: 03/04/11 11:20
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:51	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:38	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11C0364_P	03/16/11 07:19	SPC	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11C0364	03/16/11 08:45	SPC	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0195_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0195	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0194_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0194	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia

Client Sample ID: S-3

Lab Sample ID: KUC0128-03
Date Collected: 03/03/11 16:00
Matrix: Solid
Date Received: 03/04/11 11:20
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:09	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:31	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0374_P	03/16/11 09:52	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000501	03/16/11 14:59	SPC	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 14:58	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:00	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000522	03/18/11 14:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.0	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:44	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction		1.00	11C0353	03/15/11 15:11	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.00	11C0376_P	03/16/11 10:11	JGS	TestAmerica King Of Prussia

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-03
Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
SPLP	Analysis	EPA 6010B		1.00	U000522	03/18/11 14:10	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:56	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:20	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000544	03/22/11 13:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:20	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:53	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:41	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11C0364_P	03/16/11 07:19	SPC	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11C0364	03/16/11 08:45	SPC	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0195_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0195	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0194_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0194	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-04
Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:11	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:33	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1
Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-04
Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 15:00	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.96	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:46	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:22	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.96	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	U000483	03/15/11 14:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:22	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	11C0185	03/15/11 14:02	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	0.96	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	50	U000496	03/16/11 10:57	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:43	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE4	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE4	20	U000496	03/16/11 14:35	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0304_P	03/09/11 08:00	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0304	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0302_P	03/08/11 09:59	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0302	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
total	Prep	NO PREP		1.00	11C4136_P	03/17/11 13:05	amc	TestAmerica Nashville
total	Analysis	EPA 300.1		1.00	U004443	03/17/11 20:47	JMR2	TestAmerica Nashville
total	Prep	NO PREP		1.00	11C6464_P	03/25/11 16:14	amc	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U005266	03/31/11 00:10	JMR2	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U004443	03/17/11 20:47	JMR2	TestAmerica Nashville

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:13	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:34	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 15:01	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	SPC	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:52	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 10:04	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:52	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	SPC	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:24	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	U000483	03/15/11 14:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:24	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	50	U000496	03/16/11 10:59	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE3	1.0	11C0377_P	03/16/11 10:21	SPC	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE3	10	U000544	03/22/11 13:06	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:45	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE4	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE4	50	11C0310	03/15/11 15:50	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0304_P	03/09/11 08:00	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0304	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0302_P	03/08/11 09:59	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0302	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
total	Prep	NO PREP		1.00	11C4136_P	03/17/11 13:05	amc	TestAmerica Nashville
total	Analysis	EPA 300.1		1.00	U004443	03/17/11 21:27	JMR2	TestAmerica Nashville
total	Prep	NO PREP		1.00	11C6464_P	03/25/11 16:14	amc	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U005266	03/31/11 00:30	JMR2	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U004443	03/17/11 21:27	JMR2	TestAmerica Nashville

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:19	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:36	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 15:07	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:11	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.2	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:54	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 10:07	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:54	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	1.2	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	U000483	03/15/11 14:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:26	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 15:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	1.2	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	50	U000496	03/16/11 11:01	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:47	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE4	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Analysis	EPA 6010B	RE4	50	11C0310	03/15/11 15:52	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0304_P	03/09/11 08:00	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0304	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0302_P	03/08/11 09:59	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0302	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
total	Prep	NO PREP		1.00	11C4136_P	03/17/11 13:05	amc	TestAmerica Nashville
total	Analysis	EPA 300.1		1.00	U004443	03/17/11 21:47	JMR2	TestAmerica Nashville
total	Prep	NO PREP		1.00	11C6464_P	03/25/11 16:14	amc	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U005266	03/31/11 00:50	JMR2	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U004443	03/17/11 21:47	JMR2	TestAmerica Nashville

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505
TestAmerica Nashville		AIHA		100790
TestAmerica Nashville		USDA		S-48469
TestAmerica Nashville	A2LA	A2LA	0	0453.07
TestAmerica Nashville	A2LA	WY UST	0	453.07
TestAmerica Nashville	Alabama	State Program	4	41150
TestAmerica Nashville	Alaska	Alaska UST	10	UST-087
TestAmerica Nashville	Arizona	State Program	9	AZ0473
TestAmerica Nashville	Arkansas	State Program	6	88-0737
TestAmerica Nashville	CALA	CALA	0	3744
TestAmerica Nashville	California	NELAC	9	1168CA
TestAmerica Nashville	Colorado	State Program	8	N/A
TestAmerica Nashville	Connecticut	State Program	1	PH-0220
TestAmerica Nashville	Florida	NELAC	4	E87358
TestAmerica Nashville	Illinois	NELAC	5	200010
TestAmerica Nashville	Iowa	State Program	7	131
TestAmerica Nashville	Kansas	NELAC	7	E-10229
TestAmerica Nashville	Kentucky	Kentucky UST	4	19
TestAmerica Nashville	Kentucky	State Program	4	90038
TestAmerica Nashville	Louisiana	NELAC	6	LA100011
TestAmerica Nashville	Louisiana	NELAC	6	30613
TestAmerica Nashville	Massachusetts	State Program	1	M-TN032
TestAmerica Nashville	Minnesota	NELAC	5	047-999-345
TestAmerica Nashville	Mississippi	State Program	4	N/A
TestAmerica Nashville	Montana	MT DEQ UST	8	NA
TestAmerica Nashville	Nevada	State Program	9	TN00032
TestAmerica Nashville	New Hampshire	NELAC	1	2963
TestAmerica Nashville	New Jersey	NELAC	2	TN965
TestAmerica Nashville	New York	NELAC	2	11342
TestAmerica Nashville	North Carolina	North Carolina DENR	4	387
TestAmerica Nashville	North Dakota	State Program	8	R-146
TestAmerica Nashville	Ohio	OVAP	5	CL0033
TestAmerica Nashville	Oklahoma	State Program	6	9412
TestAmerica Nashville	Oregon	NELAC	10	TN200001
TestAmerica Nashville	Pennsylvania	NELAC	3	68-00585
TestAmerica Nashville	Rhode Island	State Program	1	LAO00268
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	Tennessee	State Program	4	2008
TestAmerica Nashville	Texas	NELAC	6	T104704077-09-TX
TestAmerica Nashville	Utah	NELAC	8	TAN
TestAmerica Nashville	Virginia	State Program	3	00323
TestAmerica Nashville	Washington	State Program	10	C789
TestAmerica Nashville	West Virginia	West Virginia DEP	3	219
TestAmerica Nashville	Wisconsin	State Program	5	998020430

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: 10615032

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin)	TCLP EPA Method 1311 (TAL metals, Tin)	SPLP EPA Method 1312 (TAL metals, Tin)	DI Water EPA Method 1312 (TAL metals, Tin)	pH	Anions (from DI Extraction)	Preservation
S - 1	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None
S - 2	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None
S - 3	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None
WJ3-C1	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x	x	x	None
SW2-C2	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x	x	x	None
SW4-C5	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x	x	x	None

Relinquished By: (Print & Sign) Santhi Jagupilla — Received By: — Date/Time

Comments: For WJ3-C1, use lesser sample for TCLP and DI Water analyses.
For total digestion, use the samples in plastic bottles as labelled

Relinquished By: (Print & Sign) — Received By: — Date/Time

Please report pH for all the analyses.

Relinquished By: (Print & Sign) — Received By: — Date/Time

Method of Shipment: FEDEX

Iced: Yes No

all pre and post extraction pH!

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

6°C

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin)	TCLP EPA Method 1311 (TAL metals, Tin)	SPLP EPA Method 1312 (TAL metals, Tin)	DI Water EPA Method 1312 (TAL metals, Tin)	pH		Preservation
							Analyses to be Performed						
S - 1	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x	KVC0128	None 01
S - 2	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None 02
S - 3	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None 03
WJ3-C1	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x			None 04
SW2-C2	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x			None 05
SW4-C5	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x			None 06

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	Fed Ex	
Relinquished By: (Print & Sign) Fed Ex	Received By: Nick Fudetti	3/4 Date/Time 11:20
Relinquished By: (Print & Sign)	Received By:	Date/Time

Comments: For WJ3-C1, use lesser sample for TCLP and DI Water analyses.
For total digestion, use the samples in plastic bottles as labelled

Please report pH for all the analyses.

Method of Shipment: FEDEX

Iced: Yes No

Track # 8746 2100 6268

Lohr, Linda

From: Lohr, Linda
Sent: Wednesday, March 09, 2011 10:53 AM
To: 'Mia Painter'
Cc: Pollock, Crystal; Jeff Keehn
Subject: RE: my contact info

Mia--we do have these samples. They are our sample ID # KUC0128. This COC contains both soil (3 samples) and cored slag (3 samples). It is the core slag that is being discussed.

The 3 core slag samples are to be logged in for:
1) Total metals (TAL + Sn) by EPA method 6010B
2) TCLP leach EPA method 1311 for TAL metals + Sn
3) DI water leach for TAL metals + Sn
4) DI water leach--anion scan EPA method 300
5) pH for pre/post extraction

If any revisions need to be made to the information above, please let me know . I have copied this email to our login dept and to Crystal clarify what the analytical instructions are.
Linda

From: Mia Painter [mailto:mpainter@schnabel-eng.com]
Sent: Wednesday, March 09, 2011 10:32 AM
To: Lohr, Linda
Subject: my contact info

[illegible] Geologist
Schnabel ENGINEERING
[illegible] 610-696-7771 http://www.schnabel-eng.com
[illegible] West Chester, PA / 19380

[illegible] Firm List / CE News, Best Civil Engineering Firms To Work For 2010

This e-mail including attached files is confidential. Its transmission is solely as an accommodation for the benefit of the recipient. The recipient bears the responsibility for checking its accuracy against corresponding originally signed documents provided by Schnabel Engineering. If you received this e-mail in error, its use is prohibited. Please destroy it and immediately notify postmaster@schnabel-eng.com.

3/9/2011

Cooler Receipt Form

Client: Stevens Institute of Technology Schnabel **WORK ORDER #:** KUC0128

Project: Raritan Bay Slag Superfund Site

Temperature Upon Receipt by IR: 6°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:

Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**

Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:

ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**

Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**

Sufficient volume for all analyses? **Y N**

All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**

All Sample Containers received: **Y N** All Container labels match COC: **Y N**

List Discrepancies below if indicated:

Sample S-1 one 32oz Jar received broken

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature: Nick Fiedetti **Date/Time:** 3/7/11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0641
Client Project/Site: 10615032
Client Project Description: Raritan NJ
Revision: 2

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/14/2011 01:34:31 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0641

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0641-01	P-ANC-1 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-02	P-ANC-1 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-03	P-ANC-1 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-04	P-ANC-2 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-05	P-ANC-2 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-06	P-ANC-2 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-07	P-ANC-3 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-08	P-ANC-3 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-09	P-ANC-3 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-10	P-ANC-4 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-11	P-ANC-4 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-12	P-ANC-4 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-13	P-ANC-6 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-14	P-ANC-6 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-15	P-ANC-6 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-16	P-ANC-7 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-17	P-ANC-7 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-18	P-ANC-7 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-19	P-ANC-10 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-20	P-ANC-10 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-21	P-ANC-10 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-22	P-ANC-13 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-23	P-ANC-13 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-24	P-ANC-13 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-25	P-ANC-14 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-26	P-ANC-14 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-27	P-ANC-14 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-28	P-ANC-15 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-29	P-ANC-15 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-30	P-ANC-15 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-31	P-ANC-16 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-32	P-ANC-16 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-33	P-ANC-16 C	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-34	P-ANC-17 A	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-35	P-ANC-17 B	Water	03/30/11 16:00	03/31/11 10:00
KUC0641-36	P-ANC-17 C	Water	03/30/11 16:00	03/31/11 10:00

Job ID: KUC0641

Laboratory: TestAmerica King Of Prussia

Narrative

Revision:

Cadmium added to sample 10
RL7 flags added to sample 20 and 21

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0641

Qualifiers

Metals

Qualifier	Qualifier Description
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8	Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
L1	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above acceptance limits.
L2	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was below acceptance limits.
MNR1	There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate.
RL1	Reporting limit raised due to sample matrix effects.
RL7	Sample required dilution due to high concentrations of target analyte.

Wet Chem

Qualifier	Qualifier Description
HFT	The holding time for this test is immediate. It was analyzed in the laboratory as soon as possible after receipt

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: P-ANC-1 A

Lab Sample ID: KUC0641-01

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8.2	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Silicon	1.80	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.00
Antimony	0.61	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Arsenic	4.0	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Barium	0.52	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Calcium	15	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Tin	0.80	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 10:50	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:50	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	520	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 11:52	10
Sodium	1800	MNR1 RL1	12		mg/L		04/04/11 14:15	04/11/11 11:52	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:29	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	13.0	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	12.6		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-1 B

Lab Sample ID: KUC0641-02

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5.3	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Silicon	1.76	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.00
Antimony	0.51	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:53	1.0

Client Sample ID: P-ANC-1 B

Lab Sample ID: KUC0641-02

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.5**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Barium	**0.58**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Calcium	**18**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Silver	**0.050**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Tin	**0.50**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 10:53	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:53	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**480**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 11:54	10
Sodium	**1800**	**MNR1 RL1**	12		mg/L		04/04/11 14:15	04/11/11 11:54	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:31	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**13.1**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**13.3**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-1 C

Lab Sample ID: KUC0641-03

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.68**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Silicon	**1.47**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Arsenic	**0.35**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Barium	**0.53**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:55	1.0

Client Sample ID: P-ANC-1 C

Lab Sample ID: KUC0641-03

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Calcium	**15**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 10:55	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:55	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**13**	**MNR1 RL1**	0.25		mg/L		04/04/11 14:15	04/11/11 11:57	1.0
Sodium	**200**	**MNR1 RL1**	1.2		mg/L		04/04/11 14:15	04/11/11 11:57	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:33	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**13.1**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**12.7**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-2 A

Lab Sample ID: KUC0641-04

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8.5**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Silicon	ND	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Arsenic	**1.9**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Barium	**0.46**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Calcium	**17**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 10:57	1.0

Client Sample ID: P-ANC-2 A

Lab Sample ID: KUC0641-04

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Sodium	**910**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Tin	**0.46**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 10:57	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 10:57	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**260**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 11:59	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:34	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.9**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**13.7**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-2 B

Lab Sample ID: KUC0641-05

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5.0**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Silicon	ND	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.00
Antimony	**0.12**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Arsenic	**1.8**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Barium	**0.53**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Calcium	**20**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0

Client Sample ID: P-ANC-2 B

Lab Sample ID: KUC0641-05

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Sodium	**900**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Tin	**0.27**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:04	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:04	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**270**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:01	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:36	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.9**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**13.9**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-2 C

Lab Sample ID: KUC0641-06

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.4**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Silicon	ND	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Arsenic	**1.4**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Barium	**0.59**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Calcium	**15**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Cobalt	**0.92**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0

Client Sample ID: P-ANC-2 C

Lab Sample ID: KUC0641-06

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Silver	**0.097**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Sodium	**920**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Tin	**0.40**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:06	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:06	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**250**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:03	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:38	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.9**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.4**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-3 A

Lab Sample ID: KUC0641-07

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.64**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Silicon	**2.53**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.00
Antimony	**0.38**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Arsenic	**0.12**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Barium	**0.47**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Calcium	**76**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Lead	**0.48**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:08	1.0

Client Sample ID: P-ANC-3 A

Lab Sample ID: KUC0641-07

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Sodium	**18**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:08	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:08	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:39	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.5**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.3**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-3 B

Lab Sample ID: KUC0641-08

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.1**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Silicon	**1.79**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.00
Antimony	**0.16**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Arsenic	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Barium	**0.72**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Calcium	**90**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Lead	**1.5**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Sodium	**6.8**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:10	1.0

Client Sample ID: P-ANC-3 B

Lab Sample ID: KUC0641-08

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:10	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**3.45**	**C8, MNR1**	1.00		ug/l		04/06/11 08:37	04/07/11 12:41	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.8**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.1**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-3 C

Lab Sample ID: KUC0641-09

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.92**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Silicon	**1.61**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.00
Antimony	**0.19**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Arsenic	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Barium	**0.52**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Calcium	**110**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Lead	**1.1**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Sodium	**8.1**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:13	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:13	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:47	1.00

Client Sample ID: P-ANC-3 C

Lab Sample ID: KUC0641-09

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	10.1	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	16.5		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-4 A

Lab Sample ID: KUC0641-10

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7.0	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Silicon	98.6	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.00
Antimony	1.2	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Arsenic	5.9	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Barium	9.8	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Cadmium	0.034	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Calcium	240	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Cobalt	0.14	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Iron	510	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Magnesium	35	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Manganese	18	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Nickel	1.1	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Sodium	48	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:15	1.0
Zinc	7.2	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:15	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	380	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:05	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, MNR1	1.00		ug/l		04/06/11 08:37	04/07/11 12:48	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	4.44	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-4 A

Lab Sample ID: KUC0641-10

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.2		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-4 B

Lab Sample ID: KUC0641-11

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9.3	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Silicon	95.5	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.00
Antimony	1.4	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Arsenic	7.7	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Barium	9.2	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Cadmium	0.045	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Calcium	290	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Cobalt	0.23	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Iron	420	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Magnesium	40	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Manganese	19	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Nickel	1.5	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Silver	0.053	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Sodium	46	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:17	1.0
Zinc	7.5	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:17	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	800	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:07	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:28	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	4.32	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.5		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-4 C

Lab Sample ID: KUC0641-12

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3.7	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Silicon	80.6	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.00
Antimony	1.8	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Arsenic	7.2	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Barium	8.9	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Cadmium	0.049	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Calcium	330	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Cobalt	0.35	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Iron	380	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Magnesium	42	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Manganese	19	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Nickel	1.8	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Sodium	42	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:19	1.0
Zinc	6.4	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:19	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	520	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:10	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:30	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	4.48	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	13.9		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-6 A

Lab Sample ID: KUC0641-13

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	72	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Antimony	1.6	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Arsenic	13	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:21	1.0

Client Sample ID: P-ANC-6 A

Lab Sample ID: KUC0641-13

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	25	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Beryllium	0.013	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Calcium	500	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Magnesium	94	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Manganese	49	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Nickel	1.5	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Potassium	32	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Sodium	140	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Vanadium	0.42	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:21	1.0
Zinc	19	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:21	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	266	MNR1 RL7	12.5		mg/L		04/04/11 14:15	04/11/11 12:12	10.0
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:12	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:12	10
Cobalt	ND	MNR1 RL1	0.50		mg/L		04/04/11 14:15	04/11/11 12:12	10
Iron	1300	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:12	10
Lead	500	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:12	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:32	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.62	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.8		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-6 B

Lab Sample ID: KUC0641-14

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	92	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Antimony	1.8	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Arsenic	15	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Beryllium	0.014	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Calcium	540	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0

Client Sample ID: P-ANC-6 B

Lab Sample ID: KUC0641-14

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	100	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Manganese	56	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Nickel	1.4	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Potassium	34	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Sodium	140	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Vanadium	0.52	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:23	1.0
Zinc	20	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:23	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	312	MNR1 RL7	12.5		mg/L		04/04/11 14:15	04/11/11 12:18	10.0
Barium	30	MNR1 RL1	0.12		mg/L		04/04/11 14:15	04/11/11 12:18	10
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:18	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:18	10
Cobalt	ND	MNR1 RL1	0.50		mg/L		04/04/11 14:15	04/11/11 12:18	10
Iron	1400	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:18	10
Lead	510	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:18	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:34	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.55	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	16.6		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-6 C

Lab Sample ID: KUC0641-15

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	83	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Antimony	1.7	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Arsenic	15	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Barium	19	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Beryllium	0.016	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Calcium	660	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Magnesium	120	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Manganese	67	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0

Client Sample ID: P-ANC-6 C

Lab Sample ID: KUC0641-15

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	1.6	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Potassium	27	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Sodium	120	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Vanadium	0.42	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:30	1.0
Zinc	16	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:30	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	257	MNR1 C8, RL7	12.5		mg/L		04/04/11 14:15	04/11/11 12:20	10.0
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:20	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:20	10
Cobalt	ND	MNR1 RL1	0.50		mg/L		04/04/11 14:15	04/11/11 12:20	10
Iron	1100	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:20	10
Lead	520	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:20	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:35	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.66	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.1		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-7 A

Lab Sample ID: KUC0641-16

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	49	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Antimony	1.0	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Arsenic	8.1	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Barium	9.9	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Beryllium	0.018	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Calcium	640	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Lead	13	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Magnesium	130	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Manganese	80	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Nickel	2.1	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0

Client Sample ID: P-ANC-7 A

Lab Sample ID: KUC0641-16

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	53	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Sodium	210	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Vanadium	0.53	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:32	1.0
Zinc	32	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:32	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	460	MNR1 C8, RL7	12.5		mg/L		04/04/11 14:15	04/11/11 12:23	10.0
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:23	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:23	10
Cobalt	ND	MNR1 RL1	0.50		mg/L		04/04/11 14:15	04/11/11 12:23	10
Iron	3700	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:23	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:37	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.51	HFT	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.9		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-7 B

Lab Sample ID: KUC0641-17

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	130	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Antimony	1.8	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Arsenic	12	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Beryllium	0.024	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Calcium	760	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Magnesium	150	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Manganese	90	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Nickel	1.7	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Potassium	58	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Sodium	240	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:34	1.0

Client Sample ID: P-ANC-7 B

Lab Sample ID: KUC0641-17

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Vanadium	**0.79**	**MNR1**	0.062		mg/L		04/04/11 14:15	04/08/11 11:34	1.0
Zinc	**37**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:34	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	**600**	**MNR1 C8, RL7**	12.5		mg/L		04/04/11 14:15	04/11/11 12:25	10.0
Barium	**44**	**MNR1 RL1**	0.12		mg/L		04/04/11 14:15	04/11/11 12:25	10
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:25	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:25	10
Cobalt	ND	MNR1 RL1	0.50		mg/L		04/04/11 14:15	04/11/11 12:25	10
Iron	**3700**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:25	10
Lead	**170**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:25	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:39	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**3.37**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.5**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-7 C

Lab Sample ID: KUC0641-18

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**36**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Antimony	**0.49**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Arsenic	**5.4**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Beryllium	**0.016**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Calcium	**650**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Magnesium	**150**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Manganese	**91**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Nickel	**1.4**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Potassium	**54**	**MNR1**	25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Sodium	**230**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:37	1.0

Client Sample ID: P-ANC-7 C

Lab Sample ID: KUC0641-18

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Vanadium	**0.63**	**MNR1**	0.062		mg/L		04/04/11 14:15	04/08/11 11:37	1.0
Zinc	**32**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:37	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	**400**	**MNR1 C8, RL7**	12.5		mg/L		04/04/11 14:15	04/11/11 12:27	10.0
Barium	**8.8**	**MNR1 RL1**	0.12		mg/L		04/04/11 14:15	04/11/11 12:27	10
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:27	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:27	10
Iron	**3500**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:27	10
Lead	**5.3**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:27	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:40	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**3.52**	**HFT**	1.00		pH Units		04/01/11 08:59	04/01/11 09:06	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.9**		0.00		°C		04/01/11 08:59	04/01/11 09:06	1.00

Client Sample ID: P-ANC-10 A

Lab Sample ID: KUC0641-19

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**1.3**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Beryllium	**0.040**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Calcium	**750**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Magnesium	**170**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Manganese	**120**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Nickel	**0.46**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Potassium	**110**	**MNR1**	25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Silver	**0.057**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Sodium	**340**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Tin	**0.30**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Vanadium	**0.92**	**MNR1**	0.062		mg/L		04/04/11 14:15	04/08/11 11:39	1.0
Zinc	**1.7**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:39	1.0

Client Sample ID: P-ANC-10 A

Lab Sample ID: KUC0641-19

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	510	MNR1 RL1	5.0		mg/L		04/04/11 14:15	04/11/11 17:13	10
Arsenic	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 17:13	10
Barium	13	MNR1 RL1	0.12		mg/L		04/04/11 14:15	04/11/11 17:13	10
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 17:13	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 17:13	10
Iron	7000	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 17:13	10
Lead	5.1	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 17:13	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	1900	MNR1 C8, RL7	25.0		mg/L		04/04/11 14:15	04/11/11 17:26	20.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:46	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	2.90	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	17.4		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-10 B

Lab Sample ID: KUC0641-20

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	7.7	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Beryllium	0.046	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Calcium	870	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Chromium	1.6	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Magnesium	210	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Manganese	140	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Nickel	2.2	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Potassium	87	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Silver	0.066	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Sodium	340	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Tin	3.0	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Vanadium	1.3	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:41	1.0
Zinc	61	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:41	1.0

Client Sample ID: P-ANC-10 B

Lab Sample ID: KUC0641-20

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	550	MNR1 RL1	5.0		mg/L		04/04/11 14:15	04/11/11 12:31	10
Arsenic	12	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:31	10
Barium	64	MNR1 RL1	0.12		mg/L		04/04/11 14:15	04/11/11 12:31	10
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:31	10
Iron	6800	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:31	10
Lead	280	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:31	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	1940	MNR1 C8, RL7	25.0		mg/L		04/04/11 14:15	04/11/11 16:19	20.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1	1.00		ug/l		04/06/11 08:39	04/07/11 14:47	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	2.77	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.9		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-10 C

Lab Sample ID: KUC0641-21

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	100	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Antimony	0.18	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Beryllium	0.029	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Calcium	950	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Magnesium	230	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Manganese	140	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Potassium	85	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Silver	0.070	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Sodium	360	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Vanadium	0.38	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:44	1.0
Zinc	0.62	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:44	1.0

Client Sample ID: P-ANC-10 C

Lab Sample ID: KUC0641-21

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	**282**	**MNR1 C8, RL7**	12.5		mg/L		04/04/11 14:15	04/11/11 12:33	10.0
Arsenic	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:33	10
Barium	**16**	**MNR1 RL1**	0.12		mg/L		04/04/11 14:15	04/11/11 12:33	10
Cadmium	ND	MNR1 RL1	0.10		mg/L		04/04/11 14:15	04/11/11 12:33	10
Chromium	ND	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:33	10
Iron	**7500**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:33	10
Lead	ND	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:33	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**1.89**	**C8, L1**	1.00		ug/l		04/11/11 06:44	04/11/11 14:52	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**3.39**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**19.4**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-13 A

Lab Sample ID: KUC0641-22

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5.8**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Silicon	ND	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Arsenic	**0.20**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Barium	**0.55**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Calcium	**27**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Iron	**2.2**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Sodium	**430**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:46	1.0

Client Sample ID: P-ANC-13 A

Lab Sample ID: KUC0641-22

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:46	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**130**	**MNR1 RL1**	1.2		mg/L		04/04/11 14:15	04/11/11 12:36	5.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:37	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.1**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**21.0**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-13 B

Lab Sample ID: KUC0641-23

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5.5**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Silicon	ND	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Arsenic	**0.26**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Barium	**0.59**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Calcium	**26**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Iron	**0.49**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Sodium	**480**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:48	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:48	1.0

Client Sample ID: P-ANC-13 B

Lab Sample ID: KUC0641-23

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	140	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:38	5.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:38	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	12.2	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	19.5		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-13 C

Lab Sample ID: KUC0641-24

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5.8	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Silicon	ND	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Arsenic	0.31	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Barium	0.56	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Calcium	25	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Magnesium	ND	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Sodium	470	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:51	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:51	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	130	MNR1 RL1	1.2		mg/L		04/04/11 14:15	04/11/11 12:44	5.0

Client Sample ID: P-ANC-13 C

Lab Sample ID: KUC0641-24

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:40	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.2**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**19.5**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-14 A

Lab Sample ID: KUC0641-25

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Silicon	**2.09**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Arsenic	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Barium	**1.1**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Calcium	**120**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Cobalt	**0.069**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Iron	**53**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Lead	**1.5**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Magnesium	**7.3**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Manganese	**2.8**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Sodium	**8.7**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:57	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:57	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:42	1.00

Client Sample ID: P-ANC-14 A

Lab Sample ID: KUC0641-25

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.28	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	20.0		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-14 B

Lab Sample ID: KUC0641-26

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Silicon	9.34	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.00
Antimony	1.2	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Arsenic	0.22	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Barium	0.68	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Calcium	160	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Iron	0.27	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Lead	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Magnesium	8.5	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Sodium	8.4	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 11:59	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 11:59	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.45	L1, L2, MNR1, C8	1.00		ug/l		04/07/11 10:46	04/08/11 11:44	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.38	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-14 B

Lab Sample ID: KUC0641-26

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	19.7		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-14 C

Lab Sample ID: KUC0641-27

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Silicon	4.63	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.00
Antimony	1.0	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Arsenic	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Barium	0.65	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Cadmium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Calcium	190	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Cobalt	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Iron	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Lead	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Magnesium	9.6	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Manganese	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Nickel	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Sodium	10	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:02	1.0
Zinc	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:02	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:45	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.67	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	20.0		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-15 A

Lab Sample ID: KUC0641-28

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Silicon	**9.25**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.00
Antimony	**0.16**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Arsenic	**0.31**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Barium	**1.7**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Cadmium	**0.019**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Calcium	**200**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Cobalt	**0.16**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Iron	**69**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Lead	**6.6**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Magnesium	**14**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Manganese	**5.6**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Nickel	**0.95**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Sodium	**11**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:04	1.0
Zinc	**2.4**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:04	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1, C, L, L2	1.00		ug/l		04/07/11 10:46	04/08/11 11:51	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.42**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**20.1**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-15 B

Lab Sample ID: KUC0641-29

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Silicon	**7.32**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Arsenic	**0.23**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Barium	**1.7**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:06	1.0

Client Sample ID: P-ANC-15 B

Lab Sample ID: KUC0641-29

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Cadmium	**0.019**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Calcium	**190**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Cobalt	**0.11**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Iron	**64**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Lead	**5.7**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Magnesium	**14**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Manganese	**5.2**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Nickel	**0.67**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Sodium	**11**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:06	1.0
Zinc	**1.8**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:06	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:52	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.23**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**20.3**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-15 C

Lab Sample ID: KUC0641-30

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Silicon	**11.2**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.00
Antimony	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Arsenic	**0.40**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Barium	**2.2**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Cadmium	**0.033**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Calcium	**170**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Cobalt	**0.12**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:08	1.0

Client Sample ID: P-ANC-15 C

Lab Sample ID: KUC0641-30

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Iron	**95**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Lead	**27**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Magnesium	**15**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Manganese	**5.3**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Nickel	**0.83**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Sodium	**13**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:08	1.0
Zinc	**3.2**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:08	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:54	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.80**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**19.6**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-16 A

Lab Sample ID: KUC0641-31

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.1**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Silicon	**31.4**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.00
Antimony	**0.26**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Arsenic	**1.4**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Barium	**3.9**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Cadmium	**0.036**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Calcium	**280**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Cobalt	**0.14**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Iron	**160**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Magnesium	**25**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Manganese	**11**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Nickel	**0.90**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0

Client Sample ID: P-ANC-16 A

Lab Sample ID: KUC0641-31

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Sodium	**19**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:10	1.0
Zinc	**3.9**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:10	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**110**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:46	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:56	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.43**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**19.9**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-16 B

Lab Sample ID: KUC0641-32

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.83**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Silicon	**29.3**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.00
Antimony	**0.27**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Arsenic	**1.4**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Barium	**3.8**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Cadmium	**0.042**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Calcium	**260**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Cobalt	**0.17**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Iron	**200**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Magnesium	**24**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Manganese	**11**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Nickel	**1.1**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:12	1.0

Client Sample ID: P-ANC-16 B

Lab Sample ID: KUC0641-32

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Sodium	**18**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:12	1.0
Zinc	**3.8**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:12	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**160**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:49	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 11:58	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.44**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**20.0**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-16 C

Lab Sample ID: KUC0641-33

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.0**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Silicon	**31.2**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.00
Antimony	**0.24**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Arsenic	**1.3**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Barium	**4.0**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Cadmium	**0.040**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Calcium	**270**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Cobalt	**0.15**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Iron	**170**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Magnesium	**24**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Manganese	**10**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Nickel	**1.0**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Sodium	**19**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:14	1.0

Client Sample ID: P-ANC-16 C

Lab Sample ID: KUC0641-33

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:14	1.0
Zinc	**3.9**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:14	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**170**	**MNR1 RL1**	2.5		mg/L		04/04/11 14:15	04/11/11 12:51	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 12:00	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.42**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**20.3**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-17 A

Lab Sample ID: KUC0641-34

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.6**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Silicon	**54.6**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.00
Antimony	**0.39**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Arsenic	**2.5**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Barium	**6.4**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Cadmium	**0.046**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Calcium	**330**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Cobalt	**0.17**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Iron	**260**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Magnesium	**36**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Manganese	**16**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Nickel	**1.1**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Sodium	**27**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0

Client Sample ID: P-ANC-17 A

Lab Sample ID: KUC0641-34

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:17	1.0
Zinc	**5.8**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:17	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**370**	**MNR1 RL1**	1.2		mg/L		04/04/11 14:15	04/11/11 12:53	5.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	MNR1, C, L, L2	1.00		ug/l		04/07/11 10:46	04/08/11 12:01	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.19**	**HFT**	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**20.0**		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-17 B

Lab Sample ID: KUC0641-35

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.3**	**MNR1**	0.50		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Silicon	**59.5**	**MNR1**	1.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.00
Antimony	**0.49**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Arsenic	**4.6**	**MNR1**	0.12		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Barium	**6.7**	**MNR1**	0.012		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Cadmium	**0.040**	**MNR1**	0.010		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Calcium	**270**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Cobalt	**0.25**	**MNR1**	0.050		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Iron	**350**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Magnesium	**34**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Manganese	**15**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Nickel	**2.3**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Sodium	**32**	**MNR1**	1.2		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:23	1.0
Zinc	**5.4**	**MNR1**	0.25		mg/L		04/04/11 14:15	04/08/11 12:23	1.0

Client Sample ID: P-ANC-17 B

Lab Sample ID: KUC0641-35

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	430	MNR1 RL1	2.5		mg/L		04/04/11 14:15	04/11/11 12:55	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 12:03	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.16	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	20.0		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-17 C

Lab Sample ID: KUC0641-36

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.50	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Silicon	74.6	MNR1	1.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.00
Antimony	0.65	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Arsenic	3.2	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Barium	9.7	MNR1	0.012		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Beryllium	ND	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Cadmium	0.030	MNR1	0.010		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Calcium	200	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Chromium	ND	MNR1	0.12		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Cobalt	0.085	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Copper	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Iron	480	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Lead	97	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Magnesium	28	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Manganese	15	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Nickel	0.57	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Potassium	ND	MNR1	25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Selenium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Silver	ND	MNR1	0.050		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Sodium	43	MNR1	1.2		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Thallium	ND	MNR1	0.50		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Tin	ND	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Vanadium	ND	MNR1	0.062		mg/L		04/04/11 14:15	04/08/11 12:25	1.0
Zinc	5.9	MNR1	0.25		mg/L		04/04/11 14:15	04/08/11 12:25	1.0

Client Sample ID: P-ANC-17 C

Lab Sample ID: KUC0641-36

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Sampler Name:

Sampler Phone Number: (610) 696-6066

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, L2, MNR1	1.00		ug/l		04/07/11 10:46	04/08/11 12:05	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.16	HFT	1.00		pH Units		04/01/11 09:00	04/01/11 10:10	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	20.2		0.00		°C		04/01/11 09:00	04/01/11 10:10	1.00

Client Sample ID: P-ANC-1 A

Lab Sample ID: KUC0641-01

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:29	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 10:50	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 10:50	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 11:52	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-1 B

Lab Sample ID: KUC0641-02

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:31	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 10:53	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 10:53	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 11:54	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-1 C

Lab Sample ID: KUC0641-03

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia

Client Sample ID: P-ANC-1 C
Lab Sample ID: KUC0641-03
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:33	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 10:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 10:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	1.0	U000689	04/11/11 11:57	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-2 A
Lab Sample ID: KUC0641-04
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:34	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 10:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 10:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 11:59	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-2 B
Lab Sample ID: KUC0641-05
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:36	MR	TestAmerica King Of Prussia

Client Sample ID: P-ANC-2 B

Lab Sample ID: KUC0641-05
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:01	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-2 C

Lab Sample ID: KUC0641-06
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:38	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:03	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-3 A

Lab Sample ID: KUC0641-07
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:39	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia

Client Sample ID: P-ANC-3 A

Lab Sample ID: KUC0641-07
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-3 B

Lab Sample ID: KUC0641-08
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:41	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-3 C

Lab Sample ID: KUC0641-09
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:47	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia

Client Sample ID: P-ANC-3 C
Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Lab Sample ID: KUC0641-09
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-4 A
Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Lab Sample ID: KUC0641-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0116_P	04/06/11 08:37	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000664	04/07/11 12:48	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:15	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:15	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:05	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-4 B
Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Lab Sample ID: KUC0641-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:28	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:07	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-4 B
Lab Sample ID: KUC0641-11
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-4 C
Lab Sample ID: KUC0641-12
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:30	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:19	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:19	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:10	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-6 A
Lab Sample ID: KUC0641-13
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:32	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:21	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:12	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:12	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-6 A

Lab Sample ID: KUC0641-13
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-6 B

Lab Sample ID: KUC0641-14
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:34	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:18	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:18	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-6 C

Lab Sample ID: KUC0641-15
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:35	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:30	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:20	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-6 C
Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Lab Sample ID: KUC0641-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-7 A
Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Lab Sample ID: KUC0641-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:37	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:32	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:23	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-7 B
Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Lab Sample ID: KUC0641-17
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:39	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:34	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:25	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-7 C
Lab Sample ID: KUC0641-18
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:40	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:37	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:27	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:27	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0013_P	04/01/11 08:59	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0013	04/01/11 09:06	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-10 A
Lab Sample ID: KUC0641-19
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:46	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:39	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 17:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20.0	11D0069	04/11/11 17:26	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-10 B
Lab Sample ID: KUC0641-20
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0117_P	04/06/11 08:39	PAM	TestAmerica King Of Prussia

Client Sample ID: P-ANC-10 B

Lab Sample ID: KUC0641-20
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 7470A		1.00	U000665	04/07/11 14:47	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:41	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:31	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20.0	11D0069	04/11/11 16:19	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-10 C

Lab Sample ID: KUC0641-21
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0223_P	04/11/11 06:44	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000690	04/11/11 14:52	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:33	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	11D0069	04/11/11 12:33	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-13 A

Lab Sample ID: KUC0641-22
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:37	MR	TestAmerica King Of Prussia

Client Sample ID: P-ANC-13 A

Lab Sample ID: KUC0641-22
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:46	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:46	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000689	04/11/11 12:36	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-13 B

Lab Sample ID: KUC0641-23
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:38	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:48	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:48	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000689	04/11/11 12:38	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-13 C

Lab Sample ID: KUC0641-24
Matrix: Water

Date Collected: 03/30/11 16:00
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:40	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia

Client Sample ID: P-ANC-13 C
Lab Sample ID: KUC0641-24

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:51	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:51	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000689	04/11/11 12:44	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-14 A
Lab Sample ID: KUC0641-25

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:42	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-14 B
Lab Sample ID: KUC0641-26

Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:44	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 11:59	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 11:59	MKR	TestAmerica King Of Prussia

Client Sample ID: P-ANC-14 B

Lab Sample ID: KUC0641-26

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-14 C

Lab Sample ID: KUC0641-27

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:45	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-15 A

Lab Sample ID: KUC0641-28

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:51	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-15 B

Lab Sample ID: KUC0641-29
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:52	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-15 C

Lab Sample ID: KUC0641-30
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:54	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-16 A

Lab Sample ID: KUC0641-31
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:56	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia

Client Sample ID: P-ANC-16 A

Lab Sample ID: KUC0641-31

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:46	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-16 B

Lab Sample ID: KUC0641-32

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 11:58	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:12	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:12	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:49	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-16 C

Lab Sample ID: KUC0641-33

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 12:00	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:14	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:14	MKR	TestAmerica King Of Prussia

Client Sample ID: P-ANC-16 C
Lab Sample ID: KUC0641-33
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:51	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-17 A
Lab Sample ID: KUC0641-34
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 12:01	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000689	04/11/11 12:53	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-17 B
Lab Sample ID: KUC0641-35
Date Collected: 03/30/11 16:00
Matrix: Water
Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 12:03	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia

Client Sample ID: P-ANC-17 B

Lab Sample ID: KUC0641-35

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water	RE1	2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000689	04/11/11 12:55	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Client Sample ID: P-ANC-17 C

Lab Sample ID: KUC0641-36

Date Collected: 03/30/11 16:00

Matrix: Water

Date Received: 03/31/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0154_P	04/07/11 10:46	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000673	04/08/11 12:05	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	MR	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000662	04/08/11 12:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.50	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000662	04/08/11 12:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		2.5	11D0069_P	04/04/11 14:15	PAM	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0014_P	04/01/11 09:00	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0014	04/01/11 10:10	TYH	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: 10615032

TestAmerica Job ID: KUC0641

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin, Si)	pH					Preservation
P-ANC-1 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x		KUC0641		-01	None
P-ANC-1 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-02	None
P-ANC-1 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-03	None
P-ANC-2 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-04	None
~~P-ANC-2 B~~	~~ANC Leachate~~	~~3/30/2011~~	~~4pm~~	~~Liquid~~	~~1~~	~~Plastic bottle~~	~~x~~	~~x~~				-05	None
P-ANC-2 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-06	None
P-ANC-3 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-07	None
P-ANC-3 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-08	None
P-ANC-3 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-09	None
P-ANC-4 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-10	None
P-ANC-4 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-11	None
P-ANC-4 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-12	None

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla [signature]	Fed Ex	
Relinquished By: (Print & Sign) Fed Ex	Received By: Nick Fedotto	Date/Time 3/31/11 10:00
Relinquished By: (Print & Sign)	Received By:	Date/Time

TAT: 7 days 0°

Method of Shipment: FEDEX

Iced: Yes No

1 of 3

Track # 8748 4862 1704

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin, Si)	pH					Preservation
P-ANC-6 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x		KUC0641		-13	None
P-ANC-6 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-14	None
P-ANC-6 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-15	None
P-ANC-7 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-16	None
P-ANC-7 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-17	None
P-ANC-7 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-18	None
P-ANC-10 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-19	None
P-ANC-10 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-20	None
P-ANC-10 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-21	None
P-ANC-13 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-22	None
P-ANC-13 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-23	None
P-ANC-13 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-24	None

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	Fed Ex	
Relinquished By: (Print & Sign) Fed Ex	Received By: Nick Fedeth	Date/Time 3/31/11 10:00
Relinquished By: (Print & Sign)	Received By:	Date/Time

TAT 7 days

Method of Shipment: FEDEX

Iced: Yes No

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin, Si)	pH					Preservation
P-ANC-14 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x	KUC0641			-25	None
P-ANC-14 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-26	None
P-ANC-14 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-27	None
P-ANC-15 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-28	None
P-ANC-15 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-29	None
P-ANC-15 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-30	None
P-ANC-16 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-31	None
P-ANC-16 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-32	None
P-ANC-16 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-33	None
P-ANC-17 A	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-34	None
P-ANC-17 B	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-35	None
P-ANC-17 C	ANC Leachate	3/30/2011	4pm	Liquid	1	Plastic bottle	x	x				-36	None

Relinquished By: (Print & Sign) Santhi Jagupilli
Santhi Jagupilla

Received By: Nick Fiedetti 3/31/11 Date/Time 10:00

Relinquished By: (Print & Sign)

Received By: Date/Time

TAT 7 days 0°C

Relinquished By: (Print & Sign)

Received By: Date/Time

Method of Shipment: FEDEX

Iced: Yes No

Cooler Receipt Form

WORK ORDER #: KUC0641

Client: Anabel Engineering Project: Raritan NJ

Temperature Upon Receipt by IR: 0

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**
Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? **Y N**
All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**
All Sample Containers received: **Y N** All Container labels match COC: **Y N**
List Discrepancies below if indicated:

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: Alexandra P Schaffle **Date/Time:** 3-31-11 11:26

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUD0092
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/18/2011 10:08:20 AM
Crystal Pollock
Lab Director
crystal.pollock@testamericainc.com

Designee for

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

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Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0092

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUD0092-01	PM-ANC-1A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-02	PM-ANC-1B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-03	PM-ANC-1C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-04	PM-ANC-2A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-05	PM-ANC-2B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-06	PM-ANC-2C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-07	PM-ANC-3A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-08	PM-ANC-3B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-09	PM-ANC-3C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-10	PM-ANC-4A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-11	PM-ANC-4B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-12	PM-ANC-4C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-13	PM-ANC-5A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-14	PM-ANC-5B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-15	PM-ANC-5C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-16	PM-ANC-6A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-17	PM-ANC-6B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-18	PM-ANC-6C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-19	PM-ANC-7A	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-20	PM-ANC-7B	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-21	PM-ANC-7C	Water	03/29/11 16:00	04/04/11 13:00
KUD0092-22	PM-ANC-8A	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-23	PM-ANC-8B	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-24	PM-ANC-8C	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-25	PM-ANC-9A	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-26	PM-ANC-9B	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-27	PM-ANC-9C	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-28	PM-ANC-10A	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-29	PM-ANC-10B	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-30	PM-ANC-10C	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-31	PM-ANC-11A	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-32	PM-ANC-11B	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-33	PM-ANC-11C	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-34	PM-ANC-12A	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-35	PM-ANC-12B	Water	04/01/11 16:00	04/04/11 13:00
KUD0092-36	PM-ANC-12C	Water	04/01/11 16:00	04/04/11 13:00

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0092

Qualifiers

Metals

Qualifier	Qualifier Description
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8	Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
L1	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above acceptance limits.
MNR1	There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate.
RL1	Reporting limit raised due to sample matrix effects.
RL7	Sample required dilution due to high concentrations of target analyte.

Wet Chem

Qualifier	Qualifier Description
HFT	The holding time for this test is immediate. It was analyzed in the laboratory as soon as possible after receipt

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0092

Client Sample ID: PM-ANC-1A

Lab Sample ID: KUD0092-01

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Arsenic	**0.43**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Barium	**1.0**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:20	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:20	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11**	**MNR1 RL1**	2.0		mg/L		04/11/11 06:06	04/14/11 12:20	10
Silicon	ND	MNR1 C8, RL1	5.00		mg/L		04/11/11 06:06	04/14/11 12:20	10.0
Calcium	**24**	**MNR1 RL1**	1.0		mg/L		04/11/11 06:06	04/14/11 12:20	10
Cobalt	ND	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:20	10
Copper	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:20	10
Magnesium	ND	MNR1 RL1	5.0		mg/L		04/11/11 06:06	04/14/11 12:20	10
Manganese	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:20	10
Potassium	ND	MNR1 RL1	100		mg/L		04/11/11 06:06	04/14/11 12:20	10
Silver	ND	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:20	10
Sodium	**1800**	**MNR1 RL7**	5.0		mg/L		04/11/11 06:06	04/14/11 12:20	10
Vanadium	ND	MNR1 RL1	0.25		mg/L		04/11/11 06:06	04/14/11 12:20	10
Zinc	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:20	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**520**	**MNR1 RL7**	2.0		mg/L		04/11/11 06:06	04/15/11 10:44	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:43	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.9**	**HFT**	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**17.1**		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-1B

Lab Sample ID: KUD0092-02

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5.1	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Silicon	0.645	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:22	1.00
Antimony	0.078	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Arsenic	0.99	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Barium	0.52	MNR1	0.0050		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Calcium	11	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Cobalt	0.030	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Iron	0.24	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:22	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:22	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	300	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:26	10
Sodium	880	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/14/11 12:26	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.66	C8, L1, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:45	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	12.9	HFT	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	17.7		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-1C

Lab Sample ID: KUD0092-03

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	0.900	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:24	1.00
Antimony	0.13	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:24	1.0

Client Sample ID: PM-ANC-1C

Lab Sample ID: KUD0092-03

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.7	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Barium	1.1	MNR1	0.0050		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:24	1.0
Tin	0.11	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:24	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	10	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:28	10
Calcium	24	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:28	10
Cobalt	ND	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:28	10
Copper	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:28	10
Magnesium	ND	MNR1 RL1	5.0		mg/L		04/11/11 06:06	04/14/11 12:28	10
Manganese	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:28	10
Potassium	ND	MNR1 RL1	100		mg/L		04/11/11 06:06	04/14/11 12:28	10
Silver	ND	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:28	10
Sodium	1700	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/14/11 12:28	10
Vanadium	ND	MNR1 RL1	0.25		mg/L		04/11/11 06:06	04/14/11 12:28	10
Zinc	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:28	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	590	MNR1	2.0		mg/L		04/11/11 06:06	04/15/11 10:47	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:46	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	12.9	HFT	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	17.6		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-2A

Lab Sample ID: KUD0092-04

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8.3	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Silicon	0.539	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:26	1.00

Client Sample ID: PM-ANC-2A

Lab Sample ID: KUD0092-04

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Arsenic	**0.15**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Barium	**0.98**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Calcium	**39**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Silver	**0.025**	**MNR1**	0.020		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:26	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:26	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**210**	**MNR1 RL7**	1.0		mg/L		04/11/11 06:06	04/14/11 12:31	10
Sodium	**490**	**MNR1 RL7**	5.0		mg/L		04/11/11 06:06	04/14/11 12:31	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:48	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.4**	**HFT**	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**17.6**		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-2B

Lab Sample ID: KUD0092-05

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8.8**	**MNR1**	0.20		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Silicon	ND	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:29	1.00
Antimony	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Arsenic	**0.14**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Barium	**1.0**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:29	1.0

Client Sample ID: PM-ANC-2B

Lab Sample ID: KUD0092-05

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Calcium	**42**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Silver	**0.026**	**MNR1**	0.020		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:29	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:29	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**200**	**MNR1 RL7**	1.0		mg/L		04/11/11 06:06	04/14/11 12:33	10
Sodium	**500**	**MNR1 RL7**	5.0		mg/L		04/11/11 06:06	04/14/11 12:33	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:50	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.4**	**HFT**	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**16.9**		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-2C

Lab Sample ID: KUD0092-06

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8.6**	**MNR1**	0.20		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Silicon	ND	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:31	1.00
Antimony	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Arsenic	**0.15**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Barium	**1.0**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Calcium	**40**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0

Client Sample ID: PM-ANC-2C

Lab Sample ID: KUD0092-06

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Silver	**0.024**	**MNR1**	0.020		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:31	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:31	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**220**	**MNR1 RL7**	1.0		mg/L		04/11/11 06:06	04/14/11 12:35	10
Sodium	**500**	**MNR1 RL7**	5.0		mg/L		04/11/11 06:06	04/14/11 12:35	10

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:51	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.3**	**HFT**	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**17.2**		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-3A

Lab Sample ID: KUD0092-07

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.8**	**MNR1**	0.20		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Silicon	**0.634**	**MNR1 C8**	0.500		mg/L		04/11/11 06:06	04/13/11 12:33	1.00
Antimony	**0.13**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Arsenic	**0.054**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Barium	**0.75**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Calcium	**140**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0

Client Sample ID: PM-ANC-3A

Lab Sample ID: KUD0092-07

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Lead	**2.3**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Sodium	**12**	**MNR1**	0.50		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:33	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:33	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:57	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.1**	**HFT**	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.5**		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-3B

Lab Sample ID: KUD0092-08

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.3**	**MNR1**	0.20		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Silicon	**0.621**	**MNR1 C8**	0.500		mg/L		04/11/11 06:06	04/13/11 12:40	1.00
Antimony	**0.15**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Arsenic	**0.058**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Barium	**0.76**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Calcium	**140**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Lead	**1.5**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0

Client Sample ID: PM-ANC-3B

Lab Sample ID: KUD0092-08

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Sodium	**10**	**MNR1**	0.50		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:40	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:40	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 15:58	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.2**	**HFT**	1.00		pH Units		04/07/11 11:00	04/07/11 11:30	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.1**		0.00		°C		04/07/11 11:00	04/07/11 11:30	1.00

Client Sample ID: PM-ANC-3C

Lab Sample ID: KUD0092-09

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.5**	**MNR1**	0.20		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Silicon	**0.562**	**MNR1 C8**	0.500		mg/L		04/11/11 06:06	04/13/11 12:42	1.00
Antimony	**0.16**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Arsenic	**0.059**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Barium	**0.81**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Calcium	**150**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Iron	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Lead	**1.3**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Sodium	**11**	**MNR1**	0.50		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:42	1.0

Client Sample ID: PM-ANC-3C

Lab Sample ID: KUD0092-09

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:42	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:42	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:00	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.8**	**HFT**	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**12.2**		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-4A

Lab Sample ID: KUD0092-10

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Silicon	**40.5**	**MNR1 C8**	0.500		mg/L		04/11/11 06:06	04/13/11 12:44	1.00
Antimony	**0.68**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Arsenic	**1.6**	**MNR1**	0.050		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Barium	**2.1**	**MNR1**	0.0050		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Cadmium	**0.010**	**MNR1**	0.0040		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Calcium	**410**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Cobalt	**0.18**	**MNR1**	0.020		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Lead	**3.7**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Magnesium	**39**	**MNR1**	0.50		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Manganese	**18**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Nickel	**1.3**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Sodium	**28**	**MNR1**	0.50		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:44	1.0
Zinc	**4.5**	**MNR1**	0.10		mg/L		04/11/11 06:06	04/13/11 12:44	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**500**	**MNR1 RL7**	0.50		mg/L		04/11/11 06:06	04/14/11 12:37	5.0

Client Sample ID: PM-ANC-4A

Lab Sample ID: KUD0092-10

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.19	C8, L1, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:02	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.71	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	12.3		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-4B

Lab Sample ID: KUD0092-11

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Silicon	42.4	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:46	1.00
Antimony	0.74	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Barium	2.2	MNR1	0.0050		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Calcium	420	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Cobalt	0.18	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Lead	2.3	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Magnesium	40	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Manganese	19	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Nickel	1.4	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Sodium	27	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:46	1.0
Zinc	4.8	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:46	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.4	MNR1 RL1	0.25		mg/L		04/11/11 06:06	04/14/11 12:39	5.0
Cadmium	ND	MNR1 RL1	0.020		mg/L		04/11/11 06:06	04/14/11 12:39	5.0
Iron	550	MNR1 RL7	0.50		mg/L		04/11/11 06:06	04/14/11 12:39	5.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:04	1.00

Client Sample ID: PM-ANC-4B

Lab Sample ID: KUD0092-11

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.14	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	13.1		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-4C

Lab Sample ID: KUD0092-12

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Silicon	42.0	MNR1 C8	0.500		mg/L		04/11/11 06:06	04/13/11 12:49	1.00
Antimony	0.70	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Arsenic	1.7	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Barium	2.2	MNR1	0.0050		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Calcium	420	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Cobalt	0.18	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Lead	1.5	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Magnesium	40	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Manganese	19	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Nickel	1.4	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Sodium	27	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:49	1.0
Zinc	4.8	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:49	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND	MNR1 RL1	0.020		mg/L		04/11/11 06:06	04/14/11 12:42	5.0
Iron	510	MNR1 RL7	0.50		mg/L		04/11/11 06:06	04/14/11 12:42	5.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:05	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	4.65	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-4C

Lab Sample ID: KUD0092-12

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	13.4		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-5A

Lab Sample ID: KUD0092-13

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.41	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Arsenic	3.4	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Beryllium	0.0054	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Calcium	520	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Magnesium	73	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Manganese	37	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Nickel	1.7	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Potassium	15	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Silver	0.035	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Sodium	64	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:51	1.0
Zinc	12	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:51	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:44	10
Silicon	125	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 12:44	10.0
Barium	17	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 12:44	10
Cadmium	0.084	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 12:44	10
Cobalt	0.26	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:44	10
Iron	990	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:44	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	490	MNR1 RL7	2.0		mg/L		04/11/11 06:06	04/15/11 10:49	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:07	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	4.00	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-5A

Lab Sample ID: KUD0092-13

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	13.1		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-5B

Lab Sample ID: KUD0092-14

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.46	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Arsenic	3.5	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Beryllium	0.0055	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Calcium	520	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Magnesium	74	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Manganese	37	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Nickel	1.7	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Potassium	15	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Silver	0.033	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Sodium	67	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:53	1.0
Zinc	12	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:53	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:46	10
Silicon	124	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 12:46	10.0
Barium	18	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 12:46	10
Cadmium	0.084	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 12:46	10
Cobalt	0.25	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:46	10
Iron	970	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:46	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	520	MNR1 RL7	2.0		mg/L		04/11/11 06:06	04/15/11 10:51	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:09	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.89	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-5B

Lab Sample ID: KUD0092-14

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	12.6		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-5C

Lab Sample ID: KUD0092-15

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.45	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Arsenic	3.6	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Beryllium	0.0056	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Calcium	530	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Magnesium	74	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Manganese	38	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Nickel	1.7	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Potassium	16	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Silver	0.033	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Sodium	68	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:55	1.0
Zinc	13	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:55	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:52	10
Silicon	123	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 12:52	10.0
Barium	18	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 12:52	10
Cadmium	0.089	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 12:52	10
Cobalt	0.26	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:52	10
Iron	960	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:52	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	540	MNR1 RL7	2.0		mg/L		04/11/11 06:06	04/15/11 10:53	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/11/11 07:01	04/11/11 16:10	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.63	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-5C

Lab Sample ID: KUD0092-15

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	13.2		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-6A

Lab Sample ID: KUD0092-16

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.93	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Arsenic	8.8	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Beryllium	0.012	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Calcium	580	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Magnesium	89	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Manganese	47	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Nickel	1.6	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Potassium	26	MNR1	10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Silver	0.047	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Sodium	110	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Vanadium	0.17	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 12:58	1.0
Zinc	17	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 12:58	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	20	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:55	10
Silicon	216	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 12:55	10.0
Barium	29	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 12:55	10
Cadmium	0.095	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 12:55	10
Cobalt	0.25	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:55	10
Iron	1400	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:55	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	880	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/15/11 10:55	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:37	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.65	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-6A

Lab Sample ID: KUD0092-16

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.0		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-6B

Lab Sample ID: KUD0092-17

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.0	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Arsenic	8.9	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Beryllium	0.012	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Calcium	570	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Magnesium	90	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Manganese	47	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Nickel	1.6	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Potassium	27	MNR1	10		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Silver	0.046	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Sodium	110	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Vanadium	0.17	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 13:00	1.0
Zinc	17	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:00	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	20	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:57	10
Silicon	220	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 12:57	10.0
Barium	30	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 12:57	10
Cadmium	0.10	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 12:57	10
Cobalt	0.25	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:57	10
Copper	ND	MNR1 RL1	1.0		mg/L		04/11/11 06:06	04/14/11 12:57	10
Iron	1500	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:57	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	990	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/15/11 10:57	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:38	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.69	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-6B

Lab Sample ID: KUD0092-17

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.0		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-6C

Lab Sample ID: KUD0092-18

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.0	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Arsenic	9.1	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Beryllium	0.012	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Calcium	580	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Magnesium	91	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Manganese	48	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Nickel	1.7	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Potassium	27	MNR1	10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Silver	0.046	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Sodium	120	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Vanadium	0.15	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 13:07	1.0
Zinc	17	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:07	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 12:59	10
Silicon	224	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 12:59	10.0
Barium	30	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 12:59	10
Cadmium	0.10	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 12:59	10
Cobalt	0.25	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 12:59	10
Iron	1500	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 12:59	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	850	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/15/11 11:00	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:40	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.73	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-6C

Lab Sample ID: KUD0092-18

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.8		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-7A

Lab Sample ID: KUD0092-19

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.86	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Beryllium	0.018	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Calcium	630	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Magnesium	110	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Manganese	63	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Nickel	1.6	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Potassium	47	MNR1	10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Silver	0.054	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Sodium	200	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Vanadium	0.55	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 13:09	1.0
Zinc	26	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:09	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	59	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 13:01	10
Silicon	236	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 13:01	10.0
Arsenic	14	MNR1 RL1	0.50		mg/L		04/11/11 06:06	04/14/11 13:01	10
Barium	47	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 13:01	10
Cadmium	0.14	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 13:01	10
Chromium	ND	MNR1 RL1	0.50		mg/L		04/11/11 06:06	04/14/11 13:01	10
Cobalt	0.20	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 13:01	10
Iron	2600	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 13:01	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1100	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/15/11 11:02	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:42	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.46	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-7A

Lab Sample ID: KUD0092-19

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.2		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-7B

Lab Sample ID: KUD0092-20

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.86	MNR1	0.050		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Beryllium	0.017	MNR1	0.0040		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Calcium	610	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Magnesium	110	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Manganese	61	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Nickel	1.6	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Potassium	45	MNR1	10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Selenium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Silver	0.051	MNR1	0.020		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Sodium	190	MNR1	0.50		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Vanadium	0.53	MNR1	0.025		mg/L		04/11/11 06:06	04/13/11 13:12	1.0
Zinc	25	MNR1	0.10		mg/L		04/11/11 06:06	04/13/11 13:12	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	54	MNR1 RL1	2.0		mg/L		04/11/11 06:06	04/14/11 13:03	10
Silicon	234	MNR1 C8, RL7	5.00		mg/L		04/11/11 06:06	04/14/11 13:03	10.0
Arsenic	13	MNR1 RL1	0.50		mg/L		04/11/11 06:06	04/14/11 13:03	10
Barium	46	MNR1 RL1	0.050		mg/L		04/11/11 06:06	04/14/11 13:03	10
Cadmium	0.16	MNR1 RL1	0.040		mg/L		04/11/11 06:06	04/14/11 13:03	10
Chromium	0.60	MNR1 RL1	0.50		mg/L		04/11/11 06:06	04/14/11 13:03	10
Cobalt	0.22	MNR1 RL1	0.20		mg/L		04/11/11 06:06	04/14/11 13:03	10
Iron	2500	MNR1 RL7	1.0		mg/L		04/11/11 06:06	04/14/11 13:03	10

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1100	MNR1 RL7	5.0		mg/L		04/11/11 06:06	04/15/11 11:04	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:44	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.48	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-7B

Lab Sample ID: KUD0092-20

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.4		0.00		°C		04/08/11 13:40	04/08/11 14:20	1.00

Client Sample ID: PM-ANC-7C

Lab Sample ID: KUD0092-21

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.87	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Beryllium	0.018	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Calcium	640	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Magnesium	110	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Manganese	63	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Nickel	1.7	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Potassium	46	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Silver	0.059	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Sodium	200	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Vanadium	0.53	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:18	1.0
Zinc	26	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:18	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	54	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:00	20
Silicon	240	MNR1 C8, RL7	10.0		mg/L		04/11/11 07:29	04/14/11 14:00	20.0
Arsenic	13	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:00	20
Barium	49	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:00	20
Cadmium	0.14	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:00	20
Chromium	ND	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:00	20
Cobalt	ND	MNR1 RL1	0.40		mg/L		04/11/11 07:29	04/14/11 14:00	20
Iron	2600	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:00	20

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1200	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:10	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:46	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.50	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-7C

Lab Sample ID: KUD0092-21

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	16.2		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-8A

Lab Sample ID: KUD0092-22

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.2	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Beryllium	0.024	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Calcium	600	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Magnesium	130	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Manganese	81	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Nickel	1.5	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Potassium	63	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Silver	0.057	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Sodium	250	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Vanadium	0.65	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:21	1.0
Zinc	36	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:21	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	180	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:03	20
Silicon	310	MNR1 C8, RL7	10.0		mg/L		04/11/11 07:29	04/14/11 14:03	20.0
Arsenic	8.8	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:03	20
Barium	55	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:03	20
Cadmium	0.11	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:03	20
Chromium	ND	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:03	20
Iron	3900	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:03	20
Lead	700	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:03	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	2.64	C8, L1, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:51	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.17	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-8A

Lab Sample ID: KUD0092-22

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.4		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-8B

Lab Sample ID: KUD0092-23

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	2.0	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Beryllium	0.027	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Calcium	630	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Magnesium	140	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Nickel	1.8	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Potassium	80	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Silver	0.082	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Sodium	310	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Tin	0.11	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Vanadium	0.74	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:23	1.0
Zinc	38	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:23	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	300	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:05	20
Silicon	503	MNR1 C8, RL7	10.0		mg/L		04/11/11 07:29	04/14/11 14:05	20.0
Arsenic	15	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:05	20
Barium	84	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:05	20
Cadmium	0.18	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:05	20
Chromium	ND	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:05	20
Iron	5300	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:05	20
Manganese	170	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:05	20
Thallium	ND	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:05	20

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1100	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:13	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	5.53	C8, L1, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:52	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.09	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-8B

Lab Sample ID: KUD0092-23

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.2		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-8C

Lab Sample ID: KUD0092-24

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.4	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Beryllium	0.028	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Calcium	660	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Magnesium	150	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Nickel	1.6	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Potassium	77	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Silver	0.083	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Sodium	300	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Tin	0.11	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Vanadium	0.74	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:26	1.0
Zinc	39	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:26	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	250	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:07	20
Silicon	426	MNR1 C8, RL7	10.0		mg/L		04/11/11 07:29	04/14/11 14:07	20.0
Arsenic	13	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:07	20
Barium	72	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:07	20
Cadmium	0.19	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:07	20
Chromium	ND	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:07	20
Iron	5600	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:07	20
Manganese	180	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:07	20
Thallium	ND	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:07	20

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	970	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:15	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:54	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	3.16	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-8C

Lab Sample ID: KUD0092-24

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.1		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-9A

Lab Sample ID: KUD0092-25

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	11	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Beryllium	0.031	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Calcium	650	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Magnesium	150	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Nickel	1.5	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Potassium	81	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Silver	0.092	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Sodium	310	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Tin	3.8	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Vanadium	0.88	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:28	1.0
Zinc	39	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:28	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	610	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:13	20
Arsenic	11	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:13	20
Barium	92	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:13	20
Cadmium	0.24	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:13	20
Chromium	1.8	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:13	20
Iron	6400	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:13	20
Manganese	200	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:13	20

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	2130	MNR1 C8, RL7	25.0		mg/L		04/11/11 07:29	04/15/11 11:17	50.0
Lead	1000	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:17	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	2.91	C8, L1, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:56	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	2.85	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-9A

Lab Sample ID: KUD0092-25

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	14.4		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-9B

Lab Sample ID: KUD0092-26

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	11	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Beryllium	0.031	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Calcium	640	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Magnesium	150	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Nickel	1.5	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Potassium	82	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Silver	0.089	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Sodium	300	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Tin	3.6	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Vanadium	0.90	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:31	1.0
Zinc	38	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:31	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	630	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:15	20
Arsenic	10	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:15	20
Barium	96	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:15	20
Cadmium	0.29	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:15	20
Chromium	1.9	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:15	20
Iron	6400	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:15	20
Manganese	200	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:15	20
Thallium	ND	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:15	20

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1100	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:19	50

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	2410	MNR1 C8, RL7	50.0		mg/L		04/11/11 07:29	04/15/11 14:14	100

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.97	C8, L1, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:58	1.00

Client Sample ID: PM-ANC-9B

Lab Sample ID: KUD0092-26

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	2.89	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.2		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-9C

Lab Sample ID: KUD0092-27

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	9.9	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Beryllium	0.032	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Calcium	670	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Magnesium	160	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Nickel	1.5	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Potassium	81	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Silver	0.094	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Sodium	300	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Tin	3.6	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Vanadium	0.87	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:33	1.0
Zinc	40	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:33	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	620	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:18	20
Arsenic	11	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:18	20
Barium	100	MNR1 RL1	0.10		mg/L		04/11/11 07:29	04/14/11 14:18	20
Cadmium	0.25	MNR1 RL1	0.080		mg/L		04/11/11 07:29	04/14/11 14:18	20
Chromium	1.8	MNR1 RL1	1.0		mg/L		04/11/11 07:29	04/14/11 14:18	20
Manganese	210	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:18	20
Thallium	ND	MNR1 RL1	4.0		mg/L		04/11/11 07:29	04/14/11 14:18	20

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	2220	MNR1 C8, RL7	25.0		mg/L		04/11/11 07:29	04/15/11 11:21	50.0
Iron	7300	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:21	50
Lead	1000	MNR1 RL7	5.0		mg/L		04/11/11 07:29	04/15/11 11:21	50

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	6.38	C8, L1, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 10:59	1.00

Client Sample ID: PM-ANC-9C

Lab Sample ID: KUD0092-27

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	2.99	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.4		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-10A

Lab Sample ID: KUD0092-28

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7.0	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Silicon	5.94	MNR1	0.500		mg/L		04/11/11 07:29	04/14/11 13:35	1.00
Antimony	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Arsenic	0.075	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Barium	0.77	MNR1	0.0050		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Calcium	28	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Iron	11	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Manganese	0.31	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Sodium	290	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:35	1.0
Zinc	0.17	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:35	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	120	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:20	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:01	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.68	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-10A

Lab Sample ID: KUD0092-28

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.6		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-10B

Lab Sample ID: KUD0092-29

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9.6	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Silicon	0.709	MNR1	0.500		mg/L		04/11/11 07:29	04/14/11 13:38	1.00
Antimony	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Arsenic	0.11	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Barium	1.0	MNR1	0.0050		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Calcium	43	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Iron	0.70	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:38	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:38	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	210	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:22	20
Sodium	480	MNR1 RL7	10		mg/L		04/11/11 07:29	04/14/11 14:22	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:03	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	12.5	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.8		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-10C

Lab Sample ID: KUD0092-30

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9.6	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Silicon	0.554	MNR1	0.500		mg/L		04/11/11 07:29	04/14/11 13:40	1.00
Antimony	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Arsenic	0.12	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Barium	1.1	MNR1	0.0050		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Calcium	44	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Iron	0.36	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Magnesium	ND	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:40	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:40	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	200	MNR1 RL7	2.0		mg/L		04/11/11 07:29	04/14/11 14:24	20
Sodium	480	MNR1 RL7	10		mg/L		04/11/11 07:29	04/14/11 14:24	20

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:04	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	12.6	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	15.8		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-11A

Lab Sample ID: KUD0092-31

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.30	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Silicon	0.962	MNR1 C8	0.500		mg/L		04/11/11 07:29	04/14/11 13:47	1.00
Antimony	0.51	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:47	1.0

Client Sample ID: PM-ANC-11A

Lab Sample ID: KUD0092-31

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.092	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Barium	0.91	MNR1	0.0050		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Calcium	220	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Iron	0.33	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Lead	0.92	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Magnesium	10	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Manganese	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Sodium	16	MNR1	0.50		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:47	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:47	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:06	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	10.8	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	16.4		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-11B

Lab Sample ID: KUD0092-32

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.31	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Silicon	1.03	MNR1	0.500		mg/L		04/11/11 07:29	04/14/11 13:49	1.00
Antimony	0.51	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Arsenic	0.10	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Barium	0.89	MNR1	0.0050		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Calcium	220	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0

Client Sample ID: PM-ANC-11B

Lab Sample ID: KUD0092-32

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Iron	**0.30**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Lead	**0.14**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Magnesium	**10**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Manganese	**0.11**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Sodium	**14**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:49	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:49	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:11	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.1**	**HFT**	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**16.6**		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-11C

Lab Sample ID: KUD0092-33

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.35**	**MNR1**	0.20		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Silicon	**1.27**	**MNR1**	0.500		mg/L		04/11/11 07:29	04/14/11 13:51	1.00
Antimony	**0.52**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Arsenic	**0.11**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Barium	**0.95**	**MNR1**	0.0050		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Calcium	**230**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Iron	**0.47**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Lead	**0.11**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0

Client Sample ID: PM-ANC-11C

Lab Sample ID: KUD0092-33

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	**11**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Manganese	**0.10**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Sodium	**14**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:51	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:51	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:13	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**9.69**	**HFT**	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.9**		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-12A

Lab Sample ID: KUD0092-34

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Silicon	**5.00**	**MNR1**	0.500		mg/L		04/11/11 07:29	04/14/11 13:53	1.00
Antimony	**0.18**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Arsenic	**0.29**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Barium	**1.4**	**MNR1**	0.0050		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Calcium	**270**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Iron	**35**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Lead	**0.38**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Magnesium	**16**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Manganese	**5.7**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:53	1.0

Client Sample ID: PM-ANC-12A

Lab Sample ID: KUD0092-34

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Sodium	**16**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:53	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:53	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:15	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.33**	**HFT**	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**15.6**		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-12B

Lab Sample ID: KUD0092-35

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Silicon	**4.44**	**MNR1**	0.500		mg/L		04/11/11 07:29	04/14/11 13:56	1.00
Antimony	**0.16**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Arsenic	**0.22**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Barium	**1.3**	**MNR1**	0.0050		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Calcium	**280**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Cobalt	**0.022**	**MNR1**	0.020		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Iron	**30**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Lead	**0.24**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Magnesium	**17**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Manganese	**6.1**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Sodium	**15**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:56	1.0

Client Sample ID: PM-ANC-12B

Lab Sample ID: KUD0092-35

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:56	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L, MNR1	1.00		ug/l		04/13/11 06:16	04/13/11 11:17	1.00

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.12**	**HFT**	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**16.5**		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Client Sample ID: PM-ANC-12C

Lab Sample ID: KUD0092-36

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Silicon	**4.66**	**MNR1**	0.500		mg/L		04/11/11 07:29	04/14/11 13:58	1.00
Antimony	**0.16**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Arsenic	**0.24**	**MNR1**	0.050		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Barium	**1.4**	**MNR1**	0.0050		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Beryllium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Cadmium	ND	MNR1	0.0040		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Calcium	**280**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Chromium	ND	MNR1	0.050		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Cobalt	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Copper	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Iron	**28**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Lead	**0.22**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Magnesium	**16**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Manganese	**5.7**	**MNR1**	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Nickel	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Potassium	ND	MNR1	10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Selenium	ND	MNR1 L	0.20		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Silver	ND	MNR1	0.020		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Sodium	**15**	**MNR1**	0.50		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Thallium	ND	MNR1	0.20		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Tin	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Vanadium	ND	MNR1	0.025		mg/L		04/11/11 07:29	04/14/11 13:58	1.0
Zinc	ND	MNR1	0.10		mg/L		04/11/11 07:29	04/14/11 13:58	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**5.10**	**C8, L1**	1.00		ug/l		04/13/11 06:29	04/13/11 14:11	1.00

Client Sample ID: PM-ANC-12C

Lab Sample ID: KUD0092-36

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: SM 4500-H - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.02	HFT	1.00		pH Units		04/08/11 13:40	04/08/11 13:50	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	16.3		0.00		°C		04/08/11 13:40	04/08/11 13:50	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0092

Client Sample ID: PM-ANC-1A

Lab Sample ID: KUD0092-01
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:43	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20	U000732	04/15/11 10:44	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-1B

Lab Sample ID: KUD0092-02
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:45	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:22	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:22	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:26	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-1C

Lab Sample ID: KUD0092-03
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:46	MR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-1C
Lab Sample ID: KUD0092-03

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:24	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:24	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:28	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20	U000732	04/15/11 10:47	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-2A
Lab Sample ID: KUD0092-04

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:48	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:31	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-2B
Lab Sample ID: KUD0092-05

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:50	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-2B
Date Collected: 03/29/11 16:00
Date Received: 04/04/11 13:00

Lab Sample ID: KUD0092-05
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:29	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:29	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:33	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-2C
Date Collected: 03/29/11 16:00
Date Received: 04/04/11 13:00

Lab Sample ID: KUD0092-06
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:51	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:31	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:31	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:35	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-3A
Date Collected: 03/29/11 16:00
Date Received: 04/04/11 13:00

Lab Sample ID: KUD0092-07
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:57	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:33	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:33	MKR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-3A — Lab Sample ID: KUD0092-07

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-3B — Lab Sample ID: KUD0092-08

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 15:58	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:40	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:40	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0159_P	04/07/11 11:00	DRH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0159	04/07/11 11:30	DRH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-3C — Lab Sample ID: KUD0092-09

Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:00	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:42	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:42	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-4A
Lab Sample ID: KUD0092-10
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:02	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000722	04/14/11 12:37	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-4B
Lab Sample ID: KUD0092-11
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:04	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:46	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:46	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000722	04/14/11 12:39	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-4C
Lab Sample ID: KUD0092-12
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:05	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:49	MKR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-4C

Lab Sample ID: KUD0092-12

Date Collected: 03/29/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000717	04/13/11 12:49	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	5.0	U000722	04/14/11 12:42	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-5A

Lab Sample ID: KUD0092-13

Date Collected: 03/29/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:07	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:51	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20	U000732	04/15/11 10:49	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-5B

Lab Sample ID: KUD0092-14

Date Collected: 03/29/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:09	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:53	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-5B — Lab Sample ID: KUD0092-14

Date Collected: 03/29/11 16:00 — **Matrix: Water**

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:46	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:46	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20	U000732	04/15/11 10:51	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-5C — Lab Sample ID: KUD0092-15

Date Collected: 03/29/11 16:00 — **Matrix: Water**

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0224_P	04/11/11 07:01	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000691	04/11/11 16:10	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:52	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:52	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	20	U000732	04/15/11 10:53	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-6A — Lab Sample ID: KUD0092-16

Date Collected: 03/29/11 16:00 — **Matrix: Water**

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:37	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 12:58	MKR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-6A

Lab Sample ID: KUD0092-16
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 10:55	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-6B

Lab Sample ID: KUD0092-17
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:38	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 13:00	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 10:57	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-6C

Lab Sample ID: KUD0092-18
Date Collected: 03/29/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:40	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-6C
Date Collected: 03/29/11 16:00
Date Received: 04/04/11 13:00

Lab Sample ID: KUD0092-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 13:07	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 12:59	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 12:59	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:00	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-7A
Date Collected: 03/29/11 16:00
Date Received: 04/04/11 13:00

Lab Sample ID: KUD0092-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:42	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 13:09	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 13:01	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 13:01	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:02	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-7B
Date Collected: 03/29/11 16:00
Date Received: 04/04/11 13:00

Lab Sample ID: KUD0092-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:44	MR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-7B — Lab Sample ID: KUD0092-20

Date Collected: 03/29/11 16:00 — **Matrix: Water**

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000717	04/13/11 13:12	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10	U000722	04/14/11 13:03	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	10.0	U000722	04/14/11 13:03	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0215_P	04/11/11 06:06	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:04	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 14:20	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-7C — Lab Sample ID: KUD0092-21

Date Collected: 03/29/11 16:00 — **Matrix: Water**

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:46	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:18	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:00	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20.0	U000722	04/14/11 14:00	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:10	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-8A — Lab Sample ID: KUD0092-22

Date Collected: 04/01/11 16:00 — **Matrix: Water**

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-8A

Lab Sample ID: KUD0092-22
Matrix: Water

Date Collected: 04/01/11 16:00
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:51	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.3	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:21	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.3	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:03	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.25	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20.0	U000722	04/14/11 14:03	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-8B

Lab Sample ID: KUD0092-23
Matrix: Water

Date Collected: 04/01/11 16:00
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:52	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:05	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20.0	U000722	04/14/11 14:05	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:13	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-8C

Lab Sample ID: KUD0092-24
Matrix: Water

Date Collected: 04/01/11 16:00
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:54	MR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-8C
Lab Sample ID: KUD0092-24

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:07	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20.0	U000722	04/14/11 14:07	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:15	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-9A
Lab Sample ID: KUD0092-25

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:56	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:28	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50.0	U000732	04/15/11 11:17	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-9B
Lab Sample ID: KUD0092-26

Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-9B

Lab Sample ID: KUD0092-26

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:58	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:31	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:15	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:19	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE3	1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE3	100	11D0227	04/15/11 14:14	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-9C

Lab Sample ID: KUD0092-27

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 10:59	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:33	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:18	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50	U000732	04/15/11 11:21	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE2	1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE2	50.0	U000732	04/15/11 11:21	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-10A
Lab Sample ID: KUD0092-28
Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:01	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:35	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:35	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:20	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-10B
Lab Sample ID: KUD0092-29
Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:03	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:38	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:38	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:22	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-10C
Lab Sample ID: KUD0092-30
Date Collected: 04/01/11 16:00
Matrix: Water
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:04	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:40	MKR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-10C

Lab Sample ID: KUD0092-30

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:40	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	20	U000722	04/14/11 14:24	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-11A

Lab Sample ID: KUD0092-31

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:06	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:47	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:47	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-11B

Lab Sample ID: KUD0092-32

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:11	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:49	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:49	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-11B — Lab Sample ID: KUD0092-32

Date Collected: 04/01/11 16:00 — **Matrix: Water**
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-11C — Lab Sample ID: KUD0092-33

Date Collected: 04/01/11 16:00 — **Matrix: Water**
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:13	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:51	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:51	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-12A — Lab Sample ID: KUD0092-34

Date Collected: 04/01/11 16:00 — **Matrix: Water**
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:15	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:53	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:53	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-12B — Lab Sample ID: KUD0092-35

Date Collected: 04/01/11 16:00 — **Matrix: Water**
Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0286_P	04/13/11 06:16	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000711	04/13/11 11:17	MR	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-12B

Lab Sample ID: KUD0092-35

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:56	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:56	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Client Sample ID: PM-ANC-12C

Lab Sample ID: KUD0092-36

Date Collected: 04/01/11 16:00

Matrix: Water

Date Received: 04/04/11 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0287_P	04/13/11 06:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000712	04/13/11 14:11	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000722	04/14/11 13:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0227_P	04/11/11 07:29	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000722	04/14/11 13:58	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	SM 4500-H		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11D0207_P	04/08/11 13:40	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11D0207	04/08/11 13:50	TYH	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0092

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin, Si)	pH					Preservation
													3°C
PM-ANC-1 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x		KUDC092-01			None
PM-ANC-1 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-02	None
PM-ANC-1 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-03	None
PM-ANC-2 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-04	None
PM-ANC-2 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-05	None
PM-ANC-2 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-06	None
PM-ANC-3 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-07	None
PM-ANC-3 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-08	None
PM-ANC-3 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-09	None
PM-ANC-4 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-10	None
PM-ANC-4 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-11	None
PM-ANC-4 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				-12	None

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	Fed Ex	
Relinquished By: (Print & Sign) Fed Ex	Received By:	Date/Time 4/1/11
Relinquished By: (Print & Sign)	Received By:	Date/Time

TAT - 7 days

Method of Shipment: FEDEX

Iced: Yes No

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin, Si)	pH					3° C Preservation
PM-ANC-5 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x		KUD0092-		13	None
PM-ANC-5 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				14	None
PM-ANC-5 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				15	None
PM-ANC-6 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				16	None
PM-ANC-6 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				17	None
PM-ANC-6 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				18	None
PM-ANC-7 A	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				19	None
PM-ANC-7 B	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				20	None
PM-ANC-7 C	ANC Leachate	3/29/2011	4pm	Liquid	1	Plastic bottle	x	x				21	None
PM-ANC-8 A	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				22	None
PM-ANC-8 B	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				23	None
PM-ANC-8 C	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				24	None

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	Fed Ex	
Fed Ex		1/4/11 1300
Relinquished By: (Print & Sign)	Received By:	Date/Time

TAT - 7 days

Method of Shipment: FEDEX

Iced: Yes No

04/18/2011

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin, Si)	pH					Preservation
P-ANC-9 A	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x		KUD0092-		25	None
P-ANC-9 B	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-26	None
P-ANC-9 C	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-27	None
P-ANC-10 A	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-28	None
P-ANC-10 B	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-29	None
P-ANC-10 C	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-30	None
P-ANC-11 A	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-31	None
P-ANC-11 B	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-32	None
P-ANC-11 C	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-33	None
P-ANC-12 A	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-34	None
P-ANC-12 B	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-35	None
P-ANC-12 C	ANC Leachate	4/1/2011	4pm	Liquid	1	Plastic bottle	x	x				-36	None

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	Fed Ex	
Relinquished By: (Print & Sign) Fed Ex	Received By:	Date/Time 4/4/11
Relinquished By: (Print & Sign)	Received By:	Date/Time

TAT - 7 days

Method of Shipment: FEDEX

Iced: Yes No

04/18/2011

Cooler Receipt Form

WORK ORDER #: KYD0092

Client: Sonnabel Project: Raritan NJ

Temperature Upon Receipt by IR: 3

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**
Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? **Y N**
All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**
All Sample Containers received: **Y N** All Container labels match COC: **Y N**
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature Cassandra Schaffer **Date/Time:** 4/5/11 10:45

ELEMENT ONE REPORTS

Schnabel Engineering

510 East Gay Street
West Chester, PA 19380

Project ID: Raritan Bay Slag Superfund Site

Silicon as Si

EPA Method 3052/6020A Analysis

Analytical Report
16313

Element One, Inc.
5022-C Wrightsville Av., Wilmington, NC 28403
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 16313
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

Daphne Woodman, Chemist
March 24, 2011

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
March 24, 2011

SUMMARY OF RESULTS

Summary of Analysis

As Received - Summary of Method 3052/6020A Analysis

Element	S-4 16313-1 µg/g	S-5 16313-2 µg/g	S-6 16313-3 µg/g
Silicon as Si	334815	270562	275072
Silicon as Si Replicate	390750	332833	274778
% Solids	99.8%	99.7%	99.7%

Dry Basis - Summary of Method 3052/6020A Analysis

Element	S-4 16313-1 µg/g	S-5 16313-2 µg/g	S-6 16313-3 µg/g
Silicon as Si	335486	271376	275899
Silicon as Si Replicate	391533	333835	275605

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	Schnabel Engineering	Element One #:	16313
Client ID:	Raritan Bay Slag Superfund Site	Analyst:	KMS & VJ
Method:	EPA Method 3052/6020A	Dates Received:	03/15/11
Analytes:	Silicon as Si	Dates Analyzed:	03/21-22/11

Summary of Analysis

The solid samples were microwave digested according to EPA Method 3052 using a PerkinElmer Anton Paar Multiwave 3000 Reaction System. After digestion the samples were brought to a final volume of 50mL with DI water. The samples were analyzed for metals according to EPA Method 6020A protocol using a PerkinElmer ELAN 6100 ICP-MS.

Detection Limits

The ICP-MS instrument reporting limit was 100µg/L for Silicon as Si.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD) and second source calibration verification data are summarized in the Quality Control Section.
*Ref page 8: The duplicate analysis for sample S-5 was outside of the <20% laboratory guidelines with 20.6%.
All other QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Metals Duplicate Analysis RPD

(QC limits: < 20% for RPD.)

Element	S-4 16313-1 RPD	S-5 16313-2 RPD	S-6 16313-3 RPD
Silicon as Si	15.4%	*20.6%	0.1%

*See Analytical Narrative, page 6.

Second Source Calibration Check Recoveries

(QC limits: ±10% for Second Source Continuing Check Standard)*

Element	100 ppb	*500 ppb	1000 ppb
Silicon as Si	153%	110%	101%

SAMPLE CUSTODY

CHAIN OF CUSTODY FORM

ELEMENT ONE, INC.
5022-c Wrightsville Ave
Wilmington, NC 28403
910-793-0128 OR FAX 910-792-6853

16313

Reference No:	Collected By: (Please Print)
10615032	Santhi Jagupilla, Stevens Institute of Technology
Project: Raritan Bay Slag Superfund Site	Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals (EPA Method 3052) and Si (EPA Method 6020A)						Preservation
S - 4	Soil	3/14/2011	4pm	Solid	1	Plastic	x						None
S - 5	Soil	3/14/2011	4pm	Solid	1	Plastic	x						None
S - 6	Soil	3/14/2011	4pm	Solid	1	Plastic	x						None

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla	Lisa Breton	3-15-11 1015
Relinquished By: (Print & Sign)	Received By:	Date/Time
Relinquished By: (Print & Sign)	Received By:	Date/Time

Method of Shipment:	Iced
FEDEX	Yes No

ANALYTICAL DATA

Analytical Calculations

Total Metals-

$$\textbf{Metals (µg/g)} = \frac{\textbf{ICP Results (µg/L)*Dilution*Final Volume (L)}}{\textbf{Sample weight (g)}}$$

Where-

ICP Results = Raw sample concentration (ppb)--*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$--*ICP-MS Run Sheet*

Final Volume= Prepared Volume (FV) --*ICP-MS Digestion Worksheet*

Sample Weight = Aliquot (Used)--*ICP-MS Digestion Worksheet*

Duplicate Analysis RPD-

$$\textbf{RPD (\%)} = \frac{\textbf{(Duplicate Result (µg/L) - Sample Result (µg/L))}}{\textbf{Average (µg/L)}} \textbf{ X100}$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (ppb)--*ICP-Data Sheet*

Average=$\frac{\textit{(Duplicate + Sample Results)}}{2}$

elementOne **Industrial Sample Submission Form** **Lab ID 16313**

Analysis	Due Date	03.23.11
QA/QC/Report	Due Date	03.25.11

Client:	Schnabel Engineering
Project No:	10615032

Date Rec:	03.15.11
Time Rec:	1015

Ref. Method
3052 / 6020A

Sample Identification

1	S-4						
2	S-5						
	S-5 Duplicate						
3	S-6						
	S-6 Spike						

Analyses Requested	Samples 1-3 Si

Run/FB/RB	Total Sample Weight			NOTES
1				
2.D				
3.S				

Lab Communications

SS Page 1 of 1
SS by LLB
3/15/2011 1:23:36 PM

Prep By / Date EMS 3/21/11
Prep By / Date EMS 3/22/11
ID Verification By /Date EMS 3/21/11

elementOne

Client SchEng, CFPUA

Balance checks Date: 3/23/11 2g=1.9999g 50mg=0.0502g DBW
Date: 3/24/11 2g=2.0001g 50mg=0.0500g NCF
Date:

Drying Temp, °C105

Reference Method

Sample ID #	Container ID	Date 3/23/11 Time 12:30 Initals VJ	Date 3/23/11 Time 12:30 Initals VJ		Date 3/24/11 Time 10:35 Initals VJ	Date Time Initals	Final Sample Weight After Drying, g	Solids, %
		Container Tare, g	Container + Sample, g		1st wt. after drying, g	2nd wt. after drying, g		
16313-1	19	1.1001	5.0052	-	6.0935	6.0935	4.9934	99.8%
16313-2.d	5	1.0966	5.0036	-	6.0873	6.0873	4.9907	99.7%
16313-3.s	13	1.1019	5.0025	-	6.0907	6.0907	4.9888	99.7%
16344	10	1.0798	4.7918	-	1.1444	1.1444	0.0646	1.3%
16344 dup	28	1.1002	5.1428	-	1.1647	1.1647	0.0645	1.3%

Element One, Inc. Form 142 - Revision 0.0

3/24/11

elementOne

Method 29 Microwave Worksheet

Lab ID # e 16303, 16313

Client: ESS, Sch Eng

Date Digested: 3.21.11 Initials: ESM Worksheet Prepared by: ESM

Auto Sample Loc.	Sample Lab ID	Sample Weight (g)	# of filters digested	Spike	Prep Volume (ml)	Weight In Micro / Weight Out Micro	Units
1	LRB				100		
2	LRB +				100		
3	16303-4		1		100		
4	-5		1		100		
5	-6		1		100		
6	-10		1		100		
7	-11		1		100		
8	-12		1		100		
9	16313-LRB				50		
* 10	LRB+						
11	-1	0.2522 ~~0.2527~~					
12	-1 dup	0.2656					
13	-2	0.2546					
14	-2 dup	0.2658					
15	-3	0.2713					
16	-3 dup.	0.2537					

6mls HNO_3 Lot # 1110070

2mls HF Lot # 5109120

* 16313 LRB spk = 2mLs of std 4F-5i @ 99ug/g Lot # 1012501

Element One, Inc. Form 104 - Revision 1.0

elementOne

Method 29 Microwave Worksheet

Lab ID # e 16313

Client: Sch Eng

Date Digested: 3.22.11 Initials: ESm Worksheet Prepared by: ESm

Auto Sample Loc.	Sample Lab ID	Sample Weight (g)	# of filters digested	Spike	Prep Volume (ml)	Weight In Micro / Weight Out Micro	Units
1	LRB				50		
* 2	LRB+						
3	16313-1	0.2343					
4	313-1 dup	0.2072					
5	313-2	0.2033					
6	313-2 dup	0.2528					
7	313-3	0.2456					
8	313-3 dup	0.2467					
9	Blank						
10							
11							
12							

6 mls HNO_3 1110070

2 mls HF 5

* spike = 2 mls SI std @ 997 ug
LOT # 1012501

Element One, Inc. Form 104 - Revision 1.0

Sample/Batch Report

User Name: icp
Computer Name: D8D4DWD1
Sample File: C:\elandata_icp\Sample\x8.sam
Report Date/Time: Wednesday, March 23, 2011 09:27:19

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
1		Blank	Schanbel	Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
8		1000ppb	Schanbel	Sample					
1		Blank	Schanbel	Sample					
14	x250	LRB	Schanbel	Sample					
15	x250+160p	LRB	Schanbel	Sample					
16	x250	16313-1	Schanbel	Sample					
17	x250d	16313-1	Schanbel	Sample					
18	x250	16313-2	Schanbel	Sample					
19	x250d	16313-2	Schanbel	Sample					
20	x250	16313-3	Schanbel	Sample					
21	x250d	16313-3	Schanbel	Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
1		Blank	Schanbel	Sample					
22	x10x250	16313-1	Schanbel	Sample					
23	x10x250d	16313-1	Schanbel	Sample					
24	x10x250	16313-2	Schanbel	Sample					
25	x10x250d	16313-2	Schanbel	Sample					
26	x10x250	16313-3	Schanbel	Sample					
27	x10x250d	16313-3	Schanbel	Sample					
1		Blank	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
28	x500	LRB	Schanbel	Sample					
29	x500+80	LRB	Schanbel	Sample					
1		Blank	Schanbel	Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
8		1000ppb	Schanbel	Sample					
28	x500	LRB	Schanbel	Sample					
29	x500+80	LRB	Schanbel	Sample					
22	x10x250	16313-1	Schanbel	Sample					
23	x10x250d	16313-1	Schanbel	Sample					
24	x10x250	16313-2	Schanbel	Sample					
25	x10x250d	16313-2	Schanbel	Sample					
26	x10x250	16313-3	Schanbel	Sample					
27	x10x250d	16313-3	Schanbel	Sample					
1		Blank	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
1		Blank	Schanbel	Sample					
38	x500	un blank		Sample					
39		blk		Sample					
40	x500	un blk		Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					

Page 1

7		500ppb	Schanbel	Sample
8		1000ppb	Schanbel	Sample
1		Blank	Schanbel	Sample
43	x10x250	16313-1	Schanbel	Sample
44	x10x250d	16313-1	Schanbel	Sample
45	x10x250	16313-2	Schanbel	Sample
46	x10x250d	16313-2	Schanbel	Sample
47	x10x250	16313-3	Schanbel	Sample
48	x10x250d	16313-3	Schanbel	Sample
49	x250	LRB	Schanbel	Sample
50	x250+160	LRB	Schanbel	Sample
1		Blank	Schanbel	Sample
7		500ppb	Schanbel	Sample

Dataset Report

User Name: icp
Computer Name: D8D4DWD1
Dataset File Path: C:\elandata_icp\DataSet\032111-4\
Report Date/Time: Wednesday, March 23, 2011 09:27:05

Autosampler Position: 7

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Aliquot. Vol.	Diluted V
17:32:57 Mon 21-Mar-11	Blank		Blank					
17:34:25 Mon 21-Mar-11	Standard 1		Standard #1					
17:35:54 Mon 21-Mar-11	Standard 2		Standard #2					
17:37:24 Mon 21-Mar-11	Standard 3		Standard #3					
17:38:54 Mon 21-Mar-11	Blank		Sample	Schanbel				
17:40:22 Mon 21-Mar-11	Blank		Sample	Schanbel				
17:41:50 Mon 21-Mar-11	100ppb		Sample	Schanbel				
17:43:18 Mon 21-Mar-11	500ppb		Sample	Schanbel				
17:44:47 Mon 21-Mar-11	1000ppb		Sample	Schanbel				
17:46:16 Mon 21-Mar-11	Blank		Sample	Schanbel				
17:47:44 Mon 21-Mar-11	LRB	x250	Sample	Schanbel				
17:49:12 Mon 21-Mar-11	LRB	x250+160ppl	Sample	Schanbel				
17:50:41 Mon 21-Mar-11	16313-1	x250	Sample	Schanbel				
17:52:10 Mon 21-Mar-11	16313-1	x250d	Sample	Schanbel				
17:53:38 Mon 21-Mar-11	16313-2	x250	Sample	Schanbel				
17:55:07 Mon 21-Mar-11	16313-2	x250d	Sample	Schanbel				
17:56:37 Mon 21-Mar-11	16313-3	x250	Sample	Schanbel				
17:58:06 Mon 21-Mar-11	16313-3	x250d	Sample	Schanbel				
17:59:35 Mon 21-Mar-11	Blank		Sample	Schanbel				
18:01:03 Mon 21-Mar-11	100ppb		Sample	Schanbel				
18:02:31 Mon 21-Mar-11	500ppb		Sample	Schanbel				
18:07:51 Mon 21-Mar-11	Blank		Blank					
18:09:19 Mon 21-Mar-11	Standard 1		Standard #1					
18:10:49 Mon 21-Mar-11	Standard 2		Standard #2					
18:12:19 Mon 21-Mar-11	Standard 3		Standard #3					
18:13:48 Mon 21-Mar-11	Blank		Sample	Schanbel				
18:18:15 Mon 21-Mar-11	16313-1	x10x250	Sample	Schanbel				
18:19:45 Mon 21-Mar-11	16313-1	x10x250d	Sample	Schanbel				
18:21:16 Mon 21-Mar-11	16313-2	x10x250	Sample	Schanbel				
18:22:47 Mon 21-Mar-11	16313-2	x10x250d	Sample	Schanbel				
18:24:17 Mon 21-Mar-11	16313-3	x10x250	Sample	Schanbel				
18:25:46 Mon 21-Mar-11	16313-3	x10x250d	Sample	Schanbel				
18:27:15 Mon 21-Mar-11	Blank		Sample	Schanbel				
18:28:43 Mon 21-Mar-11	500ppb		Sample	Schanbel				
19:06:49 Mon 21-Mar-11	LRB	x500	Sample	Schanbel				
19:08:18 Mon 21-Mar-11	LRB	x500+80	Sample	Schanbel				
13:53:59 Tue 22-Mar-11	Blank		Blank					
13:55:27 Tue 22-Mar-11	Standard 1		Standard #1					
13:56:56 Tue 22-Mar-11	Standard 2		Standard #2					
13:58:26 Tue 22-Mar-11	Standard 3		Standard #3					
13:59:56 Tue 22-Mar-11	Blank		Sample	Schanbel				
14:01:24 Tue 22-Mar-11	Blank		Sample	Schanbel				
14:02:52 Tue 22-Mar-11	100ppb		Sample	Schanbel				

14:04:20 Tue 22-Mar-11	500ppb		Sample	Schanbel
14:05:49 Tue 22-Mar-11	1000ppb		Sample	Schanbel
14:07:18 Tue 22-Mar-11	LRB	x500	Sample	Schanbel
14:08:48 Tue 22-Mar-11	LRB	x500+80	Sample	Schanbel
14:10:17 Tue 22-Mar-11	16313-1	x10x250	Sample	Schanbel
14:11:47 Tue 22-Mar-11	16313-1	x10x250d	Sample	Schanbel
14:13:17 Tue 22-Mar-11	16313-2	x10x250	Sample	Schanbel
14:14:47 Tue 22-Mar-11	16313-2	x10x250d	Sample	Schanbel
14:16:17 Tue 22-Mar-11	16313-3	x10x250	Sample	Schanbel
14:17:48 Tue 22-Mar-11	16313-3	x10x250d	Sample	Schanbel
14:19:17 Tue 22-Mar-11	Blank		Sample	Schanbel
14:20:46 Tue 22-Mar-11	500ppb		Sample	Schanbel
14:24:46 Tue 22-Mar-11	LRB	x250	Sample	Schanbel
14:26:17 Tue 22-Mar-11	LRB	x250+160	Sample	Schanbel
14:28:24 Tue 22-Mar-11	LRB	x250	Sample	Schanbel
14:29:55 Tue 22-Mar-11	LRB	x250+160	Sample	Schanbel
14:34:46 Tue 22-Mar-11	Blank		Blank	
14:36:14 Tue 22-Mar-11	Standard 1		Standard #1	
14:37:43 Tue 22-Mar-11	Standard 2		Standard #2	
14:39:13 Tue 22-Mar-11	Standard 3		Standard #3	
14:40:43 Tue 22-Mar-11	Blank		Sample	Schanbel
14:42:10 Tue 22-Mar-11	100ppb		Sample	Schanbel
14:43:39 Tue 22-Mar-11	500ppb		Sample	Schanbel
14:45:08 Tue 22-Mar-11	1000ppb		Sample	Schanbel
14:46:36 Tue 22-Mar-11	Blank		Sample	Schanbel
14:48:05 Tue 22-Mar-11	16313-1	x10x250	Sample	Schanbel
14:49:35 Tue 22-Mar-11	16313-1	x10x250d	Sample	Schanbel
14:51:04 Tue 22-Mar-11	16313-2	x10x250	Sample	Schanbel
14:52:34 Tue 22-Mar-11	16313-2	x10x250d	Sample	Schanbel
14:54:05 Tue 22-Mar-11	16313-3	x10x250	Sample	Schanbel
14:55:36 Tue 22-Mar-11	16313-3	x10x250d	Sample	Schanbel
14:57:07 Tue 22-Mar-11	LRB	x250	Sample	Schanbel
14:58:37 Tue 22-Mar-11	LRB	x250+160	Sample	Schanbel
15:00:06 Tue 22-Mar-11	Blank		Sample	Schanbel
15:01:35 Tue 22-Mar-11	500ppb		Sample	Schanbel

elementOne
Analyst:--KMS--

ICP-MS RUN SHEET
3/23/2011

Job Number:

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
1		Blank	Schanbel	Sample		
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
8		1000ppb	Schanbel	Sample		
1		Blank	Schanbel	Sample		
14	x250	LRB	Schanbel	Sample		50
15		LRB	Schanbel	Sample		50
16	x250	16313-1	Schanbel	Sample	0.2522	50
17	x250d	16313-1	Schanbel	Sample	0.2656	50
18	x250	16313-2	Schanbel	Sample	0.2546	50
19	x250d	16313-2	Schanbel	Sample	0.2658	50
20	x250	16313-3	Schanbel	Sample	0.2713	50
21	x250d	16313-3	Schanbel	Sample	0.2537	50
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
1		Blank	Schanbel	Sample		
22	x10x250	16313-1	Schanbel	Sample	0.2522	50
23	x10x250d	16313-1	Schanbel	Sample	0.2656	50
24	x10x250	16313-2	Schanbel	Sample	0.2546	50
25	x10x250d	16313-2	Schanbel	Sample	0.2658	50
26	x10x250	16313-3	Schanbel	Sample	0.2713	50
27	x10x250d	16313-3	Schanbel	Sample	0.2537	50
1		Blank	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
28	x500	LRB	Schanbel	Sample		
29	x500+80	LRB	Schanbel	Sample		
1		Blank	Schanbel	Sample		
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
8		1000ppb	Schanbel	Sample		
28	x500	LRB	Schanbel	Sample		50
29	x500+80	LRB	Schanbel	Sample		50
22	x10x250	16313-1	Schanbel	Sample	0.2343	50
23	x10x250d	16313-1	Schanbel	Sample	0.2072	50
24	x10x250	16313-2	Schanbel	Sample	0.2033	50
25	x10x250d	16313-2	Schanbel	Sample	0.2528	50
26	x10x250	16313-3	Schanbel	Sample	0.2456	50
27	x10x250d	16313-3	Schanbel	Sample	0.2467	50
1		Blank	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
1		Blank	Schanbel	Sample		
38	x500	un blank		Sample		
39		blk		Sample		
40	x500	un blk		Sample		
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
8		1000ppb	Schanbel	Sample		
1		Blank	Schanbel	Sample		
43	x10x250	16313-1	Schanbel	Sample	0.2343	50

250+160pp

elementOne
Analyst:--KMS--

ICP-MS RUN SHEET
3/23/2011

Job Number:

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
44	x10x250d	16313-1	Schanbel	Sample	0.2072	50
45	x10x250	16313-2	Schanbel	Sample	0.2033	50
46	x10x250d	16313-2	Schanbel	Sample	0.2528	50
47	x10x250	16313-3	Schanbel	Sample	0.2456	50
48	x10x250d	16313-3	Schanbel	Sample	0.2467	50
49	x250	LRB	Schanbel	Sample		50
50	x250+160	LRB	Schanbel	Sample		50
1		Blank	Schanbel	Sample		
7		500ppb	Schanbel	Sample		

Spikes are post at 0.02mL of 25ppm spiking solutions lot 021410-ABCD & F in a final volume of 10mL

Submitted for QC by:	Date/Time:		QC Review By:	Date/Time:	
KMS	3/23/11 9:31		DBW	3/23/11 1000	
Re-Test Required:	No: ✓	Yes:	Comments:		
Resubmitted for QC by:	Date/Time:		QC Review:	By:	Date/Time:

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Tuesday, March 22, 2011 14:34:46
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	70596.7		ppb
|	Si	28	2002577.6		ppb
|	Si	29	131249.9		ppb
|	Si	30	1466574.6		ppb
|>	Sc	45	303937.5		ppb
|>	Rh	103	725951.5		ppb
|-	Cs	133	29		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 1
Sample Dat Tuesday, March 22, 2011 14:36:14
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	71128.9		ppb
|	Si	28	2369557	106.406	ppb
|	Si	29	154362.9	117.59719	ppb
|	Si	30	1494976.7	108.54497	ppb
|>	Sc	45	306454.9		ppb
|>	Rh	103	729610.4		ppb
|-	Cs	133	33.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 2
Sample Dat Tuesday, March 22, 2011 14:37:43
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	71929.8		ppb
|	Si	28	3796679	507.79277	ppb
|	Si	29	235725.7	514.56045	ppb
|	Si	30	1542736.4	165.67777	ppb
|>	Sc	45	315224.4		ppb
|>	Rh	103	734788.8		ppb
|-	Cs	133	30		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 3
Sample Dat Tuesday, March 22, 2011 14:39:13
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	71513.9		ppb
|	Si	28	5552747.4	996.90736	ppb
|	Si	29	336738.3	995.20975	ppb
|	Si	30	1699075.7	1164.8257	ppb
|>	Sc	45	319898.1		ppb
|>	Rh	103	730116.6		ppb
|-	Cs	133	36.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Tuesday, March 22, 2011 14:40:43
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	69816.1		ppb
|	Si	28	2236869.6	69.58347	ppb
|	Si	29	147073.2	81.45807	ppb
|	Si	30	1516733.6	360.98967	ppb
|>	Sc	45	304786		ppb
|>	Rh	103	718995.5		ppb
|-	Cs	133	24.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 100ppb
Sample Dat Tuesday, March 22, 2011 14:42:10
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	71792.7		ppb
|	Si	28	2522860	153.05148	ppb
|	Si	29	161145.5	151.70967	ppb
|	Si	30	1507714.3	240.90684	ppb
|>	Sc	45	306095.7		ppb
|>	Rh	103	729653.2		ppb
|-	Cs	133	28.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 500ppb
Sample Dat Tuesday, March 22, 2011 14:43:39
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	70803		ppb
|	Si	28	3758924.7	549.01225	ppb
|	Si	29	233070.9	552.11711	ppb
|	Si	30	1551578.9	816.78926	ppb
|>	Sc	45	300259.3		ppb
|>	Rh	103	710768.4		ppb
|-	Cs	133	37		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 1000ppb
Sample Dat Tuesday, March 22, 2011 14:45:08
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	70947.4		ppb
|	Si	28	5376203.1	1008.6948	ppb
|	Si	29	329516.9	1025.7138	ppb
|	Si	30	1673766.1	1481.8798	ppb
|>	Sc	45	307468.1		ppb
|>	Rh	103	708096.1		ppb
|-	Cs	133	43.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Tuesday, March 22, 2011 14:46:36
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	72744.2		ppb
|	Si	28	2279029.5	77.57667	ppb
|	Si	29	147917.1	80.45883	ppb
|	Si	30	1499026.2	143.78155	ppb
|>	Sc	45	306859		ppb
|>	Rh	103	715758.7		ppb
|-	Cs	133	26.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16313-1
Sample Dat Tuesday, March 22, 2011 14:48:05
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	73261		ppb
|	Si	28	4029136.3	627.5774	ppb
|	Si	29	250649.1	640.80679	ppb
|	Si	30	1689935.7	1869.9804	ppb
|>	Sc	45	301428.9		ppb
|>	Rh	103	712723.8		ppb
|-	Cs	133	41.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16313-1
Sample Dat Tuesday, March 22, 2011 14:49:35
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	72595.1		ppb
|	Si	28	4105769.8	647.70657	ppb
|	Si	29	253553.4	652.76148	ppb
|	Si	30	1683618.9	1787.5092	ppb
|>	Sc	45	302200.2		ppb
|>	Rh	103	700295.4		ppb
|-	Cs	133	45.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16313-2
Sample Dat Tuesday, March 22, 2011 14:51:04
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	70123.2		ppb
|	Si	28	3376412	440.04149	ppb
|	Si	29	214251.2	461.482	ppb
|	Si	30	1570790.5	1081.88	ppb
|>	Sc	45	297673.2		ppb
|>	Rh	103	700222.7		ppb
|-	Cs	133	51		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16313-2
Sample Dat Tuesday, March 22, 2011 14:52:34
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	72331.1		ppb
|	Si	28	4116280.8	673.12165	ppb
|	Si	29	252325.9	669.73196	ppb
|	Si	30	1624519.1	1545.1753	ppb
|>	Sc	45	296987.1		ppb
|>	Rh	103	697072		ppb
|-	Cs	133	51		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16313-3
Sample Dat Tuesday, March 22, 2011 14:54:05
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	72799.3		ppb
|	Si	28	3746412.7	540.46077	ppb
|	Si	29	234177.5	552.8735	ppb
|	Si	30	1671044	1715.746	ppb
|>	Sc	45	301542.8		ppb
|>	Rh	103	705701.1		ppb
|-	Cs	133	36		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16313-3
Sample Dat Tuesday, March 22, 2011 14:55:36
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	73256.7		ppb
|	Si	28	3765768	542.30151	ppb
|	Si	29	234535.8	550.4854	ppb
|	Si	30	1639122.9	1423.1907	ppb
|>	Sc	45	302485.9		ppb
|>	Rh	103	709398		ppb
|-	Cs	133	68.3		ppb

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report
Sample ID: LRB
Sample Dat Tuesday, March 22, 2011 14:57:07
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	73870.9		ppb
|	Si	28	1828272.4	-50.79892	ppb
|	Si	29	122813.9	-41.84632	ppb
|	Si	30	1553571.4	732.74183	ppb
|>	Sc	45	302771.8		ppb
|>	Rh	103	707337.4		ppb
|-	Cs	133	29		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: LRB
Sample Dat Tuesday, March 22, 2011 14:58:37
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	73675		ppb
|	Si	28	2717316.9	192.58981	ppb
|	Si	29	174094.2	198.10932	ppb
|	Si	30	1683750.8	1309.0465	ppb
|>	Sc	45	313454.4		ppb
|>	Rh	103	712026.5		ppb
|-	Cs	133	26.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Tuesday, March 22, 2011 15:00:06
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	72579.6		ppb
|	Si	28	2178715.2	48.84139	ppb
|	Si	29	142765	55.28181	ppb
|	Si	30	1503760.3	208.83509	ppb
|>	Sc	45	306139		ppb
|>	Rh	103	714559.8		ppb
|-	Cs	133	27.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 500ppb
Sample Dat Tuesday, March 22, 2011 15:01:35
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	71919.4		ppb
|	Si	28	3690635.2	501.37889	ppb
|	Si	29	232269.3	518.9181	ppb
|	Si	30	1542262.1	458.3423	ppb
|>	Sc	45	307433		ppb
|>	Rh	103	707498.7		ppb
|-	Cs	133	27		ppb

Schnabel Engineering

510 East Gay Street
West Chester, PA 19380

Project ID: Raritan Bay Slag Superfund Site

Silicon as Si

EPA Method 3052/6020A Analysis

Analytical Report
16360

Element One, Inc.
5022-C Wrightsville Av., Wilmington, NC 28403
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 16360
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

Daphne Woodman, Chemist
March 30, 2011

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
March 30, 2011

SUMMARY OF RESULTS

Summary of Analysis

As Received - Summary of Method 3052/6020A Analysis

Element	P-4 16360-1 µg/g	P-5 16360-2 µg/g	P-6 16360-3 µg/g
Silicon as Si	54170	58079	48503
Silicon as Si Replicate	58228	52718	55592
% Solids	99.7%	99.5%	99.5%

Dry Basis - Summary of Method 3052/6020A Analysis

Element	P-4 16360-1 µg/g	P-5 16360-2 µg/g	P-6 16360-3 µg/g
Silicon as Si	54333	58371	48747
Silicon as Si Replicate	58403	52983	55871

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	Schnabel Engineering	Element One #:	16360
Client ID:	Raritan Bay Slag Superfund Site	Analyst:	DBW
Method:	EPA Method 3052/6020A	Dates Received:	03/23/11
Analytes:	Silicon as Si	Dates Analyzed:	03/25-28/11

Summary of Analysis

The solid samples were microwave digested according to EPA Method 3052 using a PerkinElmer Anton Paar Multiwave 3000 Reaction System. After digestion the samples were brought to a final volume of 50mL with DI water. The samples were analyzed for metals according to EPA Method 6020A protocol using a PerkinElmer ELAN 6100 ICP-MS.

Detection Limits

The ICP-MS instrument reporting limit was 100µg/L for Silicon as Si.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD) and second source calibration verification data are summarized in the Quality Control Section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Metals Duplicate Analysis RPD

(QC limits: < 20% for RPD.)

Element	P-4 16360-1 RPD	P-5 16360-2 RPD	P-6 16360-3 RPD
Silicon as Si	7.2%	9.7%	13.6%

Second Source Calibration Check Recoveries

(QC limits: ±10% for Second Source Continuing Check Standard)*

Element	100 ppb	*500 ppb	1000 ppb
Silicon as Si	95%	103%	100%

SAMPLE CUSTODY

CHAIN OF CUSTODY FORM

ELEMENT ONE, INC.
5022-c Wrightsville Ave
Wilmington, NC 28403
910-793-0128 OR FAX 910-792-6853

16360

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals (EPA Method 3052) and Si (EPA Method 6020A)						Preservation
P - 4	Slag	3/22/2011	4pm	Solid	1	Plastic	x						None
P - 5	Slag	3/22/2011	4pm	Solid	1	Plastic	x						None
P - 6	Slag	3/22/2011	4pm	Solid	1	Plastic	x						None

Relinquished By: (Print & Sign) Santhi Jagupilla	Received By:	Date/Time
Relinquished By: (Print & Sign)	Received By:	Date/Time
Relinquished By: (Print & Sign)	Received By: Lisa Bratton	Date/Time 3-23-11 1010

Method of Shipment: FEDEX

Iced: Yes No

ANALYTICAL DATA

Analytical Calculations

Total Metals-

$$\textbf{Metals (µg/g)} = \frac{\textbf{ICP Results (µg/L)*Dilution*Final Volume (L)}}{\textbf{Sample weight (g)}}$$

Where-

ICP Results = Raw sample concentration (ppb)--*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$--*ICP-MS Run Sheet*

Final Volume= Prepared Volume (FV) --*ICP-MS Digestion Worksheet*

Sample Weight = Aliquot (Used)--*ICP-MS Digestion Worksheet*

Duplicate Analysis RPD-

$$\textbf{RPD (\%)} = \frac{\textbf{(Duplicate Result (µg/L) - Sample Result (µg/L))}}{\textbf{Average (µg/L)}} \textbf{ X100}$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (ppb)--*ICP-Data Sheet*

Average=$\frac{\textit{(Duplicate + Sample Results)}}{2}$

elementOne **Industrial Sample Submission Form** **Lab ID 16360**

Analysis	Due Date	03.31.11
QA/QC/Report	Due Date	04.04.11

Client:	Schnabel Engineering
Project No:	10615032

Date Rec:	03.23.11
Time Rec:	1010

Ref. Method
3052 / 6020

Sample Identification

1	P-4						
2	P-5						
	P-5 Duplicate						
3	P-6						
	P-6 Spike						

Analyses Requested	Samples 1-3 Si

Run/FB/RB	Total Sample Weight			NOTES
1				
2.D				
3.S				

Lab Communications

SS Page 1 of 1
SS by LKB
3/23/2011 11:26:53 AM

Prep By / Date DBL 3/25/11
Prep By / Date
ID Verification By /Date DBL 3/25/11

elementOne

Client Sch Eng

Balance checks Date: 3-25-11
Date:
Date:

Page 1 of 1

Drying Temp, °C105

Reference Method

Sample ID #	Container ID	Date Time Initals / Container Tare, g	Date Time Initals / Container + Sample, g	Sample Weight, g 6.4553 6.44	Date 3.29.11 Time 931 Initals MCJ / 1st wt. after drying, g	Date Time Initals / 2nd wt. after drying, g	Final Sample Weight After Drying, g 6.4350	Solids, %	
16360-1	29	1.0743	7.5296	0.0000	7.5093		~~0.0000~~	#DIV/0!	99.7%
16360-2.D	14	1.0841	5.6134	4.5293	5.5918		4.5077		99.5%
16360-3.S	3	1.0886	4.8736	3.7850	4.8562		3.7676		99.5%

Element One, Inc. Form 142 - Revision 0.0

elementOne **EPA Method 3052 Microwave Worksheet** **Lab ID # e** 16360

Client:

Date Digested: 3/25/11 Initials: DBW Worksheet Prepared by: DBW

Rotator Position	Element One Sample ID	Matrix	Weight Digested (g)	Spike (ug)	Final Volume (ml)	Aliquot for analysis (ml)	Adjusted weight (g)
2	LRB	HNO_3 + HF	—		50		
16	LRB +		—				*
3	16360-1		0.2885 38 DBW 3/25/11				Si
4	-1D		0.3081				
5	-2		0.4464				
6	-2D		0.2962				
7	-3		0.2171				
8	-3D		0.2013				
9	LRB	HNO_3 HCl	—		40		
10	LRB +		—				**
11	16338-1.1		0.5456				Cd Pb
12	-1.2		0.2749				
13	16345-1		0.2257				CdCrPbSe
14	16349-1		0.3489				Big List
15	16350-1		0.2004				
18	wt blk	HNO_3	—				

Notes:

HNO3	Lot #: 1110070	mls: 6	H2O2 Lot #:	mls:
HF	Lot #: 5109120	mls: 2		
HCL	Lot #: 4109050	mls: 2		

Element One, Inc. Form 104 - Revision

* Spiked w/ 2mL of 97.1ppm Si Lot 1012501 FV 50mL

** Spiked w/ 0.8mL of 25ppm Lot 02411-A,B,C. FV 40mL DI

Sample/Batch Report

User Name: icp
Computer Name: D8D4DWD1
Sample File: C:\elandata_icp\Sample\x18.sam
Report Date/Time: Monday, March 28, 2011 10:50:24

3/28/11

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
1		Blank	Schanbel	Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
8		1000ppb	Schanbel	Sample					
5		Blank	Schanbel	Sample					
9	x200	LRB	Schanbel	Sample					
10	x200+200p	LRB	Schanbel	Sample					
23	x50x10	16360-1	Schanbel	Sample					
24	x50x10d	16360-1	Schanbel	Sample					
25	x50x10	16360-2	Schanbel	Sample					
26	x50x10d	16360-2	Schanbel	Sample					
27	x50x10	16360-3	Schanbel	Sample					
28	x50x10d	16360-3	Schanbel	Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					
7		500ppb	Schanbel	Sample					
29	x1000	16360-1	Schanbel	Sample					
30	x1000d	16360-1	Schanbel	Sample					
31	x1000	16360-2	Schanbel	Sample					
32	x1000d	16360-2	Schanbel	Sample					
33	x1000	16360-3	Schanbel	Sample					
34	x1000d	16360-3	Schanbel	Sample					
1		Blank	Schanbel	Sample					
6		100ppb	Schanbel	Sample					
7		500ppb	Schanbel	Sample					

Dataset Report

User Name: icp
Computer Name: D8D4DWD1
Dataset File Path: C:\elandata_icp\Dataset\032811-1\
Report Date/Time: Monday, March 28, 2011 10:50:03

3/28/11

Autosampler Position: 7

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Aliquot. Vol.	Diluted V
10:03:05 Mon 28-Mar-11	Blank		Blank					
10:04:34 Mon 28-Mar-11	Standard 1		Standard #1					
10:06:03 Mon 28-Mar-11	Standard 2		Standard #2					
10:07:33 Mon 28-Mar-11	Standard 3		Standard #3					
10:09:02 Mon 28-Mar-11	Blank		Sample	Schanbel				
10:10:30 Mon 28-Mar-11	Blank		Sample	Schanbel				
10:11:58 Mon 28-Mar-11	100ppb		Sample	Schanbel				
10:13:27 Mon 28-Mar-11	500ppb		Sample	Schanbel				
10:14:56 Mon 28-Mar-11	1000ppb		Sample	Schanbel				
10:16:26 Mon 28-Mar-11	Blank		Sample	Schanbel				
10:17:56 Mon 28-Mar-11	LRB	x200	Sample	Schanbel				
10:19:26 Mon 28-Mar-11	LRB	x200+200ppl	Sample	Schanbel				
10:20:57 Mon 28-Mar-11	16360-1	x50x10	Sample	Schanbel				
10:22:28 Mon 28-Mar-11	16360-1	x50x10d	Sample	Schanbel				
10:23:59 Mon 28-Mar-11	16360-2	x50x10	Sample	Schanbel				
10:25:29 Mon 28-Mar-11	16360-2	x50x10d	Sample	Schanbel				
10:26:58 Mon 28-Mar-11	16360-3	x50x10	Sample	Schanbel				
10:28:27 Mon 28-Mar-11	16360-3	x50x10d	Sample	Schanbel				
10:29:55 Mon 28-Mar-11	Blank		Sample	Schanbel				
10:31:23 Mon 28-Mar-11	100ppb		Sample	Schanbel				
10:32:52 Mon 28-Mar-11	500ppb		Sample	Schanbel				
10:37:13 Mon 28-Mar-11	16360-1	x1000	Sample	Schanbel				
10:38:42 Mon 28-Mar-11	16360-1	x1000d	Sample	Schanbel				
10:40:11 Mon 28-Mar-11	16360-2	x1000	Sample	Schanbel				
10:41:40 Mon 28-Mar-11	16360-2	x1000d	Sample	Schanbel				
10:43:10 Mon 28-Mar-11	16360-3	x1000	Sample	Schanbel				
10:44:40 Mon 28-Mar-11	16360-3	x1000d	Sample	Schanbel				
10:46:09 Mon 28-Mar-11	Blank		Sample	Schanbel				
10:47:37 Mon 28-Mar-11	100ppb		Sample	Schanbel				
10:49:06 Mon 28-Mar-11	500ppb		Sample	Schanbel				

elementOne
Analyst:--DBW--

ICP-MS RUN SHEET
3/28/2011

Job Number:

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
1		Blank	Schanbel	Sample		
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
8		1000ppb	Schanbel	Sample		
5		Blank	Schanbel	Sample		
9	x200	LRB	Schanbel	Sample		50
10		LRB	Schanbel	Sample		50
23	x50x10	16360-1	Schanbel	Sample	0.2838	50
24	x50x10d	16360-1	Schanbel	Sample	0.3081	50
25	x50x10	16360-2	Schanbel	Sample	0.4464	50
26	x50x10d	16360-2	Schanbel	Sample	0.2962	50
27	x50x10	16360-3	Schanbel	Sample	0.2171	50
28	x50x10d	16360-3	Schanbel	Sample	0.2013	50
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		
29	x1000	16360-1	Schanbel	Sample	0.2838	50
30	x1000d	16360-1	Schanbel	Sample	0.3081	50
31	x1000	16360-2	Schanbel	Sample	0.4464	50
32	x1000d	16360-2	Schanbel	Sample	0.2962	50
33	x1000	16360-3	Schanbel	Sample	0.2171	50
34	x1000d	16360-3	Schanbel	Sample	0.2013	50
1		Blank	Schanbel	Sample		
6		100ppb	Schanbel	Sample		
7		500ppb	Schanbel	Sample		

200+200pp

Spikes are post at 0.02mL of 25ppm spiking solutions lot 021410-ABCD & F in a final volume of 10mL

Submitted for QC by:	Date/Time:		QC Review By:	Date/Time:	
DBW	3/28/11 10:55		DBW	3/30/11 1225	
Re-Test Required:	No: ✓	Yes:	Comments:		
Resubmitted for QC by:	Date/Time:		QC Review:	By:	Date/Time:

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Monday, March 28, 2011 10:03:05
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	76299.5		ppb
|	Si	28	1596989.9		ppb
|	Si	29	113599.6		ppb
|	Si	30	1844734.4		ppb
|>	Sc	45	304205		ppb
|>	Rh	103	672266.4		ppb
|-	Cs	133	34.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 1
Sample Dat Monday, March 28, 2011 10:04:34
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	76043.7		ppb
|	Si	28	2085938.9	136.24742	ppb
|	Si	29	137794.4	125.09603	ppb
|	Si	30	1891924.4	412.72497	ppb
|>	Sc	45	302649.5		ppb
|>	Rh	103	665883.8		ppb
|-	Cs	133	32.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 2
Sample Dat Monday, March 28, 2011 10:06:03
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	74958.8		ppb
|	Si	28	3430920.8	518.3199	ppb
|	Si	29	211908.1	514.68993	ppb
|	Si	30	1884689.9	560.80389	ppb
|>	Sc	45	298166.3		ppb
|>	Rh	103	651093.1		ppb
|-	Cs	133	24		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 3
Sample Dat Monday, March 28, 2011 10:07:33
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75259.6		ppb
|	Si	28	5134542.2	987.21531	ppb
|	Si	29	305765.4	990.14543	ppb
|	Si	30	1941729.9	938.32556	ppb
|>	Sc	45	299111.5		ppb
|>	Rh	103	655010		ppb
|-	Cs	133	31		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Monday, March 28, 2011 10:09:02
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75757.3		ppb
|	Si	28	1771032.3	55.4102	ppb
|	Si	29	122822	56.48273	ppb
|	Si	30	1738413.8	-556.5802	ppb
|>	Sc	45	299232.5		ppb
|>	Rh	103	659395.2		ppb
|-	Cs	133	28		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Monday, March 28, 2011 10:10:30
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75971.5		ppb
|	Si	28	1772453.8	54.99763	ppb
|	Si	29	123092.1	56.90757	ppb
|	Si	30	1806229.8	-79.34327	ppb
|>	Sc	45	299695.6		ppb
|>	Rh	103	654758.2		ppb
|-	Cs	133	35		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 100ppb
Sample Dat Monday, March 28, 2011 10:11:58
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	77271.7		ppb
|	Si	28	2161302.9	151.41036	ppb
|	Si	29	140599.2	132.72623	ppb
|	Si	30	1819214.3	-232.6366	ppb
|>	Sc	45	305330.5		ppb
|>	Rh	103	672387.2		ppb
|-	Cs	133	32		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 500ppb
Sample Dat Monday, March 28, 2011 10:13:27
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	77420.9		ppb
|	Si	28	3537290.7	512.85925	ppb
|	Si	29	216154.7	497.0537	ppb
|	Si	30	1858552.4	-108.5043	ppb
|>	Sc	45	309114.3		ppb
|>	Rh	103	672427.3		ppb
|-	Cs	133	53.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 1000ppb
Sample Dat Monday, March 28, 2011 10:14:56
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75888.1		ppb
|	Si	28	5263473.5	997.03486	ppb
|	Si	29	310786.1	987.843	ppb
|	Si	30	1933847.1	630.16012	ppb
|>	Sc	45	304454.4		ppb
|>	Rh	103	657651.5		ppb
|-	Cs	133	52.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Monday, March 28, 2011 10:16:26
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	77140.2		ppb
|	Si	28	1172970.8	-119.5018	ppb
|	Si	29	88048.8	-133.7439	ppb
|	Si	30	1785791.8	-588.06	ppb
|>	Sc	45	308127.6		ppb
|>	Rh	103	682106		ppb
|-	Cs	133	13.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: LRB
Sample Dat Monday, March 28, 2011 10:17:56
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	78118.2		ppb
|	Si	28	1534139.7	-28.7483	ppb
|	Si	29	109452.8	-36.08004	ppb
|	Si	30	1820561.3	-538.5622	ppb
|>	Sc	45	312885.7		ppb
|>	Rh	103	685559.3		ppb
|-	Cs	133	40.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: LRB
Sample Dat Monday, March 28, 2011 10:19:26
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75667.6		ppb
|	Si	28	2338330.9	200.70862	ppb
|	Si	29	150437.8	183.42598	ppb
|	Si	30	1891871.1	314.96268	ppb
|>	Sc	45	304751.6		ppb
|>	Rh	103	661631		ppb
|-	Cs	133	27		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16360-1
Sample Dat Monday, March 28, 2011 10:22:28
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	77289.9		ppb
|	Si	28	4256756.7	717.60277	ppb
|	Si	29	255013.1	702.08498	ppb
|	Si	30	1909486	389.53106	ppb
|>	Sc	45	305896.3		ppb
|>	Rh	103	668053.4		ppb
|-	Cs	133	99		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16360-3
Sample Dat Monday, March 28, 2011 10:28:27
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	76995		ppb
|	Si	28	3253953.6	447.62496	ppb
|	Si	29	200582.3	432.21357	ppb
|	Si	30	1920017.9	491.76814	ppb
|>	Sc	45	305426.3		ppb
|>	Rh	103	668171.4		ppb
|-	Cs	133	104		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Monday, March 28, 2011 10:29:55
Sample Des Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75970.5		ppb
|	Si	28	1591205	2.89416	ppb
|	Si	29	111973.6	-2.32403	ppb
|	Si	30	1808702.1	-125.9133	ppb
|>	Sc	45	301063.3		ppb
|>	Rh	103	659989.9		ppb
|-	Cs	133	29.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 100ppb
Sample Dat Monday, March 28, 2011 10:31:23
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	77545.3		ppb
|	Si	28	1971665.9	95.34809	ppb
|	Si	29	131719.2	82.75171	ppb
|	Si	30	1800266.5	-478.9709	ppb
|>	Sc	45	307964.5		ppb
|>	Rh	103	677583.9		ppb
|-	Cs	133	35		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 500ppb
Sample Dat Monday, March 28, 2011 10:32:52
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	78354.6		ppb
|	Si	28	3505998.3	492.54904	ppb
|	Si	29	211322.2	459.90314	ppb
|	Si	30	1878659.3	-138.8741	ppb
|>	Sc	45	313105.1		ppb
|>	Rh	103	682305.7		ppb
|-	Cs	133	49.3		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16360-1
Sample Dat Monday, March 28, 2011 10:37:13
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	73789.3		ppb
|	Si	28	2614031.5	307.46823	ppb
|	Si	29	162325.1	279.35859	ppb
|	Si	30	1866317.4	733.98642	ppb
|>	Sc	45	291656.3		ppb
|>	Rh	103	642783		ppb
|-	Cs	133	62.7		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16360-2
Sample Dat Monday, March 28, 2011 10:40:11
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	74815.9		ppb
|	Si	28	3371868.2	518.53076	ppb
|	Si	29	204071.6	493.07446	ppb
|	Si	30	1871436	710.9578	ppb
|>	Sc	45	292990.6		ppb
|>	Rh	103	645367.4		ppb
|-	Cs	133	74		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16360-2
Sample Dat Monday, March 28, 2011 10:41:40
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	75218.6		ppb
|	Si	28	2659383.7	312.30056	ppb
|	Si	29	165976.3	289.28649	ppb
|	Si	30	1809614.1	164.41738	ppb
|>	Sc	45	294782.2		ppb
|>	Rh	103	649022.5		ppb
|-	Cs	133	53.7		ppb

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report
Sample ID: 16360-3
Sample Dat Monday, March 28, 2011 10:43:10
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	74516.5		ppb
|	Si	28	2283296.9	210.59968	ppb
|	Si	29	146723.9	194.31347	ppb
|	Si	30	1864319.3	661.91426	ppb
|>	Sc	45	292935.6		ppb
|>	Rh	103	644235.8		ppb
|-	Cs	133	63		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Dat Monday, March 28, 2011 10:46:09
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	76302.9		ppb
|	Si	28	1499672.9	-25.50607	ppb
|	Si	29	106455.7	-34.52081	ppb
|	Si	30	1814264.1	-186.6669	ppb
|>	Sc	45	303456.3		ppb
|>	Rh	103	657171.6		ppb
|-	Cs	133	29		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 100ppb
Sample Dat Monday, March 28, 2011 10:47:37
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	77118.8		ppb
|	Si	28	1894986.8	76.90664	ppb
|	Si	29	128968.6	71.82456	ppb
|	Si	30	1831121.3	-203.2507	ppb
|>	Sc	45	306661		ppb
|>	Rh	103	667090.1		ppb
|-	Cs	133	28		ppb

Method 6020 & 200.8 Metals Summary Report
Sample ID: 500ppb
Sample Dat Monday, March 28, 2011 10:49:06
Sample De: Schanbel
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
|-	Li	6	78192.2		ppb
|	Si	28	3437261.1	477.0322	ppb
|	Si	29	208922.1	451.18033	ppb
|	Si	30	1896086.1	20.92045	ppb
|>	Sc	45	312195.5		ppb
|>	Rh	103	676925		ppb
|-	Cs	133	49		ppb

APPENDIX C

ACID-NEUTRALIZING CAPACITY

ANC Result Tables

Table C-1: ANC Results for Crushed Slag Particles P-ANC-1, P-ANC-2, P-ANC-13
Table C-2: ANC Results for Crushed Slag Particles P-ANC-3, P-ANC-4, P-ANC-6
Table C-3: ANC Results for Crushed Slag Particles P-ANC-7, P-ANC-10, P-ANC-14
Table C-4: ANC Results for Crushed Slag Particles P-ANC-15, P-ANC-16, P-ANC-17
Table C-5: ANC Results for Milled Slag Particles PM-ANC-10, PM-ANC-2, PM-ANC-1
Table C-6: ANC Results for Milled Slag Particles PM-ANC-3, PM-ANC-11, PM-ANC-12
Table C-7: ANC Results for Milled Slag Particles PM-ANC-4, PM-ANC-5, PM-ANC-6
Table C-8: ANC Results for Milled Slag Particles PM-ANC-7, PM-ANC-8, PM-ANC-9

Table C-1
ANC Concentrations of
Crushed and Homogenized Slag Particles Samples P-ANC-1, P-ANC-2, P-ANC-13

	P-ANC-1						P-ANC-2						P-ANC-13					
	Equilivants of NaOH per kg of Sample:						Equilivants of NaOH per kg of Sample:						Equilivants of NaOH per kg of Sample:					
	2.0						1.0						0.5					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	8.2		5.3		0.68		8.5		5.0		4.4		5.8		5.5		5.8	
Antimony	0.61		0.51		< 0.12		< 0.12		0.12		< 0.12		< 0.12		< 0.12		< 0.12	
Arsenic	4.0		4.5		0.35		1.9		1.8		1.4		0.20		0.26		0.31	
Barium	0.52		0.58		0.53		0.46		0.53		0.59		0.55		0.59		0.56	
Beryllium	< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Cadmium	< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Calcium	15		18		15		17		20		15		27		26		25	
Chromium	< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12	
Cobalt	< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		0.92		< 0.050		< 0.050		< 0.050	
Copper	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Iron	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		2.2		0.49		< 0.25	
Lead	520	RE1, RL1	480	RE1, RL1	13	RE1, RL1	260	RE1, RL1	270	RE1, RL1	250	RE1, RL1	130	RE1, RL1	140	RE1, RL1	130	RE1, RL1
Magnesium	< 1.2		< 1.2		< 1.2		< 1.2		< 1.2		< 1.2		< 1.2		< 1.2		< 1.2	
Manganese	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Mercury	< 0.00100	C	< 0.00100	C	< 0.00100	C	< 0.00100	C	< 0.00100	C	< 0.00100	C	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2
Nickel	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Potassium	< 25		< 25		< 25		< 25		< 25		< 25		< 25		< 25		< 25	
Selenium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Silicon	1.80		1.76		1.47		< 1.25		< 1.25		< 1.25		< 1.25		< 1.25		< 1.25	
Silver	< 0.050		0.050		< 0.050		< 0.050		< 0.050		0.097		< 0.050		< 0.050		< 0.050	
Sodium	1,800	RE1, RL1	1,800	RE1, RL1	200	RE1, RL1	910		900		920		430		480.0		470	
Thallium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Tin	0.80		0.50		< 0.25		0.46		0.27		0.40		< 0.25		< 0.25		< 0.25	
Vanadium	< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062	
Zinc	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L2: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-2
ANC Concentrations
Crushed and Homogenized Slag Particles Samples P-ANC-3, P-ANC-14, P-ANC-15

	P-ANC-3						P-ANC-14						P-ANC-15					
	Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:					
	0.0						0.125						0.25					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	0.64		1.1		0.92		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Antimony	0.38		0.16		0.19		< 0.12		1.2		1.0		0.16		< 0.12		< 0.12	
Arsenic	0.12		< 0.12		< 0.12		< 0.12		0.22		< 0.12		0.31		0.23		0.40	
Barium	0.47		0.72		0.52		1.1		0.68		0.65		1.7		1.7		2.2	
Beryllium	< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Cadmium	< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		0.019		0.019		0.033	
Calcium	76		90		110		120		160		190		200		190		170	
Chromium	< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12	
Cobalt	< 0.050		< 0.050		< 0.050		0.069		< 0.050		< 0.050		0.16		0.11		0.12	
Copper	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Iron	< 0.25		< 0.25		< 0.25		53		0.27		< 0.25		69		64		95	
Lead	0.48		1.5		1.1		1.5	RE1, RL1	< 0.25	RE1, RL1	< 0.25		6.6		5.7		27	
Magnesium	< 1.2		< 1.2		< 1.2		7.3		8.5		9.6		14		14		15	
Manganese	< 0.25		< 0.25		< 0.25		2.8		< 0.25		< 0.25		5.6		5.2		5.3	
Mercury	< 0.00100	C	0.00345	C8	< 0.00100	C	< 0.00100	C, L, L2	0.00145	C8, L1, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2
Nickel	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		0.95		0.67		0.83	
Potassium	< 25		< 25		< 25		< 25		< 25		< 25		< 25		< 25		< 25	
Selenium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Silicon	2.53		1.79		1.61		2.09		9.34		4.63		9.25		7.32		11.2	
Silver	< 0.050		< 0.050		0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050	
Sodium	18		6.8		< 8.1		8.7		8.4		10		11		11		13	
Thallium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Tin	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Vanadium	< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062	
Zinc	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		2.4		1.8		3.2	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L2: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-3
ANC Concentrations
Crushed and Homogenized Slag Particles Samples P-ANC-16, P-ANC-17, P-ANC-4

	P-ANC-16						P-ANC-17						P-ANC-4					
	Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:					
	0.50						0.75						1.0					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	1.1		0.83		1.0		1.6		1.3		0.50		7.0		9.3		3.7	
Antimony	0.26		0.27		0.24		0.39		0.49		0.65		1.2		1.4		1.8	
Arsenic	1.4		1.4		1.3		2.5		4.6		3.2		5.9		7.7		7.2	
Barium	3.9		3.8		4.0		6.4		6.7		9.7		9.8		9.2		8.9	
Beryllium	< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Cadmium	0.036		0.042		0.040		0.046		0.040		0.030		0.034		0.045		0.049	
Calcium	280		260		270		330		270		200		240		290		330	
Chromium	< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12	
Cobalt	0.14		0.17		0.15		0.17		0.25		0.085		0.14		0.23		0.35	
Copper	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Iron	160		200		170		260		350		480		510		420		380	
Lead	110	RE1, RL1	160	RE1, RL1	170	RE1, RL1	370	RE1, RL1	430	RE1, RL1	97		380	RE1, RL1	800	RE1, RL1	520	RE1, RL1
Magnesium	25		24		24		36		34		28		35		40		42	
Manganese	11		11		10		16		15		15		18		19		19	
Mercury	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C, L, L2	< 0.00100	C	< 0.00100		< 0.00100	
Nickel	0.90		1.1		1.0		1.1		2.3		0.57		1.1		1.5		1.8	
Potassium	< 25		< 25		< 25		< 25		< 25		< 25		< 25		< 25		< 25	
Selenium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Silicon	31.4		29.3		31.2		54.6		59.5		74.6		98.6		95.5		80.6	
Silver	< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		0.053		< 0.050	
Sodium	19		18		19		27		32		43		48		46		42	
Thallium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Tin	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Vanadium	< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062		< 0.062	
Zinc	3.9		3.8		3.9		5.8		5.4		5.9		7.2		7.5		6.4	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L2: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-4
ANC Concentrations
Crushed and Homogenized Slag Particles Samples P-ANC-6, P-ANC-7, P-ANC-10

	P-ANC-6						P-ANC-7						P-ANC-10					
	Equivants of HNO3 per kg of Sample:						Equivants of HNO3 per kg of Sample:						Equivants of HNO3 per kg of Sample:					
	3.0						5.0						10.0					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	72		92		83		49		130		36		510	RE1, RL1	550	RE1, RL1	100	
Antimony	1.6		1.8		1.7		1.0		1.8		0.49		1.3		7.7		0.18	
Arsenic	13		15		15		8.1		12		5.4		< 1.2	RE1, RL1	12.0	RE1, RL1	< 1.2	RE1, RL1
Barium	25		30	RE1, RL1	19		9.9		44	RE1, RL1	8.8	RE1, RL1	13	RE1, RL1	64	RE1, RL1	16	RE1, RL1
Beryllium	0.013		0.014		0.016		0.018		0.024		0.016		0.040		0.046		0.029	
Cadmium	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1	< 0.10	RE1, RL1
Calcium	500		540		660		640		760		650		750		870		950	
Chromium	< 1.2	RE1, RL1	< 1.2	RE1, RL1	< 1.2	RE1, RL1	< 1.2	RE1, RL1	< 1.2	RE1, RL1	< 1.2	RE1, RL1	< 1.2	RE1, RL1	1.6		< 1.2	RE1, RL1
Cobalt	< 0.50	RE1, RL1	< 0.50	RE1, RL1	< 0.50	RE1, RL1	< 0.50	RE1, RL1	< 0.05		< 0.50	RE1, RL1	< 0.050		< 0.050		< 0.050	
Copper	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	
Iron	1,300	RE1, RL1	1,400	RE1, RL1	1,100	RE1, RL1	3,700	RE1, RL1	3,700	RE1, RL1	3,500	RE1, RL1	7,000	RE1, RL1	6,800	RE1, RL1	7,500	RE1, RL1
Lead	500	RE1, RL1	510	RE1, RL1	520	RE1, RL1	13		170	RE1, RL1	5.3	RE1, RL1	5.1	RE1, RL1	280	RE1, RL1	< 2.5	RE1, RL1
Magnesium	94		100		120		130		150		150		170		210		230	
Manganese	49		56		67		80		90		91		120		140		140	
Mercury	< 0.00100		< 0.00100		< 0.00100		< 0.00100		< 0.00100		< 0.00100		< 0.00100		< 0.00100		0.00189	C8, L1
Nickel	1.5		1.4		1.6		2.1		1.7		1.4		0.46		2.2		< 0.25	
Potassium	32		34		27		53		58		54		110		87		85	
Selenium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Silicon	266	RE1, RL7	312	RE1, RL1	257	RE1, C8, RL7	460	RE1, C8, RL7	600	RE1, C8, RL7	400	RE1, C8, RL7	1,900	RE2, C8, RL7	1,940	RE2, C8, RL7	282	RE1, C8
Silver	< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		0.057		0.066		0.070	
Sodium	140		140		120		210		240		230		340		340		360	
Thallium	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Tin	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		< 0.25		0.30		3.0		< 0.25	
Vanadium	0.42		0.52		0.42		0.53		0.79		0.63		0.92		1.3		0.38	
Zinc	19		20		16		32		37		32		1.7		61		0.62	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L2: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-5
ANC Concentrations of
Crushed, Homogenized and Milled Slag Particles Samples PM-ANC-1, PM-ANC-2, PM-ANC-10

	PM-ANC-1						PM-ANC-2						PM-ANC-10					
	Equilivants of NaOH per kg of Sample:						Equilivants of NaOH per kg of Sample:						Equilivants of NaOH per kg of Sample:					
	2.0						1.0						0.5					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	11	RE1, RL1	5.1		10	RE1, RL1	8.3		8.8		8.6		7.0		9.6		9.6	
Antimony	< 0.050		0.078		0.13		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050	
Arsenic	0.43		0.99		1.7		0.15		0.14		0.15		0.075		0.11		0.12	
Barium	1.0		0.52		1.1		0.98		1.0		1.0		0.77		1.0		1.1	
Beryllium	< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040	
Cadmium	< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040	
Calcium	24	RE1, RL1	11		24	RE1, RL1	39		42		40		28		43		44	
Chromium	< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050	
Cobalt	< 0.20	RE1, RL1	0.030		< 0.20	RE1, RL1	< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020	
Copper	< 1.0	RE1, RL1	< 0.10		< 1.0	RE1, RL1	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Iron	< 0.10		0.24		< 0.10		< 0.10		< 0.10		< 0.10		11		0.70		0.36	
Lead	520	RE2, RL7	300	RE1, RL7	590	RE2	210	RE1, RL7	200	RE1, RL7	220	RE1, RL7	120	RE1, RL7	210	RE1, RL7	200	RE1, RL7
Magnesium	< 5.0	RE1, RL1	< 0.50		< 5.0	RE1, RL1	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50		< 0.50	
Manganese	< 1.0	RE1, RL1	< 0.10		< 1.0	RE1, RL1	< 0.10		< 0.10		< 0.10		0.31		< 0.10		< 0.10	
Mercury	< 0.00100	C, L	0.00166	C8, L1	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L
Nickel	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Potassium	< 100	RE1, RL1	< 10		< 100	RE1, RL1	< 10		< 10		< 10		< 10		< 10		< 10	
Selenium	< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	L	< 0.20	L	< 0.20	L
Silicon	< 5.00	RE1, C8, RL1	0.645	C8	0.900	C8	0.539	C8	< 0.500	C8	< 0.500	C8	5.94		0.709		0.554	
Silver	< 0.20	RE1, RL1	< 0.020		< 0.20	RE1, RL1	0.025		0.026		0.024		< 0.020		< 0.020		< 0.020	
Sodium	1,800	RE1, RL7	880	RE1, RL7	1,700	RE1, RL7	490	RE1, RL7	500	RE1, RL7	500	RE1, RL7	290		480	RE1, RL7	480	RE1, RL7
Thallium	< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Tin	< 0.10		< 0.10		0.11		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Vanadium	< 0.25	RE1, RL1	< 0.025		< 0.25	RE1, RL1	< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		< 0.025	
Zinc	< 1.0	RE1, RL1	< 0.10		< 1.0	RE1, RL1	< 0.10		< 0.10		< 0.10		0.17		< 0.10		< 0.10	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L1: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-6
ANC Concentrations
Crushed, Homogenized and Milled Slag Particles Samples PM-ANC-3, PM-ANC-11, PM-ANC-12

	PM-ANC-3						PM-ANC-11						PM-ANC-12					
	Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:					
	0.0						0.125						0.25					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	3.8		4.3		4.5		0.30		0.31		0.35		< 0.20		< 0.20		< 0.20	
Antimony	0.13		0.15		0.16		0.51		0.51		0.52		0.18		0.16		0.16	
Arsenic	0.054		0.058		0.059		0.092		0.10		0.11		0.29		0.22		0.24	
Barium	0.75		0.76		0.81		0.91		0.89		0.95		1.4		1.3		1.4	
Beryllium	< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040	
Cadmium	< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040		< 0.0040	
Calcium	140		140		150		220		220		230		270		280		280	
Chromium	< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050	
Cobalt	< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		0.022		< 0.020	
Copper	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Iron	< 0.10		< 0.10		< 0.10		0.33		0.30		0.47		35		30		28	
Lead	2.3		1.5		1.3		0.92		0.14		0.11		0.38		0.24		0.22	
Magnesium	< 0.50		< 0.50		< 0.50		10		10		11		16		17		16	
Manganese	< 0.10		< 0.10		< 0.10		< 0.10		0.11		0.10		5.7		6.1		5.7	
Mercury	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	0.00510	C8, L1
Nickel	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Potassium	< 10		< 10		< 10		< 10		< 10		< 10		< 10		< 10		< 10	
Selenium	< 0.20		< 0.20		< 0.20		< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L
Silicon	0.634	C8	0.621	C8	0.562	C8	0.962	C8	1.03		1.27		5.00		4.44		4.66	
Silver	< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020	
Sodium	12		10		11		16		14		14		16		15		15	
Thallium	< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Tin	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Vanadium	< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		< 0.025	
Zinc	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L1: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-7
ANC Concentrations
Crushed, Homogenized and Milled Slag Particles Samples PM-ANC-4, PM-ANC-5, PM-ANC-6

	PM-ANC-4						PM-ANC-5						PM-ANC-6					
	Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:					
	1.0						2.0						3.0					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	< 0.20		< 0.20		< 0.20		2.0	RE1, RL1	2.0	RE1, RL1	< 2.0	RE1, RL1	20	RE1, RL1	20	RE1, RL1	21	RE1, RL1
Antimony	0.68		0.74		0.70		0.41		0.46		0.45		0.93		1.0		1.0	
Arsenic	1.6		1.4	RE1, RL1	1.7		3.4		3.5		3.6		8.8		8.9		9.1	
Barium	2.1		2.2		2.2		17	RE1, RL1	18	RE1, RL1	18	RE1, RL1	29	RE1, RL1	30	RE1, RL1	30	RE1, RL1
Beryllium	< 0.0040		< 0.0040		< 0.0040		0.0054		0.0055		0.0056		0.012		0.012		0.012	
Cadmium	0.010		< 0.020	RE1, RL1	< 0.020	RE1, RL1	0.084	RE1, RL1	0.084	RE1, RL1	0.089	RE1, RL1	0.095	RE1, RL1	0.10	RE1, RL1	0.10	RE1, RL1
Calcium	410		420		420		520		520		530		580		570		580	
Chromium	< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050		< 0.050	
Cobalt	0.18		0.18		0.18		0.26	RE1, RL1	0.25	RE1, RL1	0.26	RE1, RL1	0.25	RE1, RL1	0.25	RE1, RL1	0.25	RE1, RL1
Copper	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 1.0	RE1, RL1	< 0.10	
Iron	500	RE1, RL7	550	RE1, RL7	510	RE1, RL7	990	RE1, RL7	970	RE1, RL7	960	RE1, RL7	1,400	RE1, RL7	1,500	RE1, RL7	1,500	RE1, RL7
Lead	3.7		2.3		1.5		490	RE2, RL7	520	RE2, RL7	540	RE2, RL7	880	RE2, RL7	990	RE2, RL7	850	RE2, RL7
Magnesium	39		40		40		73		74		74		89		90		91	
Manganese	18		19		19		37		37		38		47		47		48	
Mercury	0.00119	C8, L1	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L
Nickel	1.3		1.4		1.4		1.7		1.7		1.7		1.6		1.6		1.7	
Potassium	< 10		< 10		< 10		15		15		16		26		27		27	
Selenium	< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Silicon	40.5	C8	42.4	C8	42.0	C8	125	RE1, C8, RL7	124	RE1, C8, RL7	123	RE1, C8, RL7	216	RE1, C8, RL7	220	RE1, C8, RL7	224	RE1, C8, RL7
Silver	< 0.020		< 0.020		< 0.020		0.035		0.033		0.033		0.047		0.046		0.046	
Sodium	28		27		27		64		67		68		110		110		120	
Thallium	< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20		< 0.20	
Tin	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Vanadium	< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		< 0.025		0.17		0.17		0.15	
Zinc	4.5		4.8		4.8		12		12		13		17		17		17	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L1: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

Table C-8
ANC Concentrations
Crushed, Homogenized and Milled Slag Particles Samples PM-ANC-7, PM-ANC-8, PM-ANC-9

	PM-ANC-7						PM-ANC-8						PM-ANC-9					
	Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:						Equilivants of HNO3 per kg of Sample:					
	5.0						8.0						10.0					
	A		B		C		A		B		C		A		B		C	
Metal	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes	Concentration (mg/L)	Notes
Aluminum	59	RE1, RL1	54	RE1, RL1	54	RE1, RL1	180	RE1, RL1	300	RE1, RL1	250	RE1, RL1	610	RE1, RL1	630	RE1, RL1	620	RE1, RL1
Antimony	0.86		0.86		0.87		1.2		2.0		1.4		11		11		9.9	
Arsenic	14	RE1, RL1	13	RE1, RL1	13	RE1, RL1	8.8	RE1, RL1	15	RE1, RL1	13	RE1, RL1	11	RE1, RL1	10	RE1, RL1	11	RE1, RL1
Barium	47	RE1, RL1	46	RE1, RL1	49	RE1, RL1	55	RE1, RL1	84	RE1, RL1	72	RE1, RL1	92	RE1, RL1	96	RE1, RL1	100	RE1, RL1
Beryllium	0.018		0.017		0.018		0.024		0.027		0.028		0.031		0.031		0.032	
Cadmium	0.14	RE1, RL1	0.16	RE1, RL1	0.14	RE1, RL1	0.11	RE1, RL1	0.18	RE1, RL1	0.19	RE1, RL1	0.24	RE1, RL1	0.29	RE1, RL1	0.25	RE1, RL1
Calcium	630		610		640		600		630		660		650		640		670	
Chromium	< 0.50	RE1, RL1	0.60	RE1, RL1	< 1.0	RE1, RL1	< 1.0	RE1, RL1	< 1.0	RE1, RL1	< 1.0	RE1, RL1	1.8	RE1, RL1	1.9	RE1, RL1	1.8	RE1, RL1
Cobalt	0.20	RE1, RL1	0.22	RE1, RL1	< 0.40	RE1, RL1	< 0.020		< 0.020		< 0.020		< 0.020		< 0.020		< 0.020	
Copper	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10		< 0.10	
Iron	2,600	RE1, RL7	2,500	RE1, RL7	2,600	RE1, RL7	3,900	RE1, RL7	5,300	RE1, RL7	5,600	RE1, RL7	6,400	RE1, RL7	6,400	RE1, RL7	7,300	RE2, RL7
Lead	1,100	RE2, RL7	1,100	RE2, RL7	1,200	RE2, RL7	700	RE1, RL7	1,100	RE2, RL7	970	RE2, RL7	1,000	RE2, RL7	1,100	RE2, RL7	1,000	RE2, RL7
Magnesium	110		110		110		130		140		150		150		150		160	
Manganese	63		61		63		81		170	RE1, RL7	180	RE1, RL7	200	RE1, RL7	200	RE1, RL7	210	RE1, RL7
Mercury	< 0.00100	C, L	< 0.00100	C, L	< 0.00100	C, L	0.00264	C8, L1	0.00553	C8, L1	< 0.00100	C, L	0.00291	C8, L1	0.00197	C8, L1	0.00638	C8, L1
Nickel	1.6		1.6		1.7		1.5		1.8		1.6		1.5		1.5		1.5	
Potassium	47		45		46		63		80		77		81		82		81	
Selenium	< 0.20		< 0.20		< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L	< 0.20	L
Silicon	236	RE1, C8, RL7	234	RE1, C8, RL7	240	RE1, C8, RL7	310	RE1, C8, RL7	503	RE1, C8, RL7	426	RE1, C8, RL7	2,130	RE2, C8, RL7	2,410	RE3, C8, RL7	2,220	RE2, C8, RL7
Silver	0.054		0.051		0.059		0.057		0.082		0.083		0.092		0.089		0.094	
Sodium	200		190		200		250		310		300		310		300		300	
Thallium	< 0.20		< 0.20		< 0.20		< 0.20		< 4.0	RE1, RL1	< 4.0	RE1, RL1	< 0.20		< 4.0	RE1, RL1	< 4.0	RE1, RL1
Tin	< 0.10		< 0.10		< 0.10		< 0.10		0.11		0.11		3.8		3.6		3.6	
Vanadium	0.55		0.53		0.53		0.65		0.74		0.74		0.88		0.90		0.87	
Zinc	26		25		26		36		38		39				38		40	

Notes:
MNR1: There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate. This applies to all samples except P-ANC-10C Mercury.
C: Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8: Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
L: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not affected.
L1: Laboratory Control Sample and/or Labooratory Control Sample Duplicate recovery was below the acceptance limits.
RE, RE1 (etc.): Indicates a Re-extraction or Reanalysis of the sample.
RL1: Reporting limit raised due to sample matrix effects.
RL7: Sample required dilution due to high concentrations of target analyte.

APPENDIX D

ADDITIONAL CHAINS OF CUSTODY

CHAIN OF CUSTODY FORM

SCHNABEL ENGINEERING CONSULTANTS, INC
510 EAST GAY STREET
WEST CHESTER, PENNSYLVANIA
PHONE (610) 696-6066; FAX (610) 696-7771

Reference No: **10615032**

Collected By: (Please Print) Steve Penzone, Schnabel

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schanbel-eng.com

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Air Dry	Crushing for total Analysis					Preservation
WJ3-C1	Pieces of Cored Slag	2/22/2011	10:30	solid	1	Plastic bag	x	x					none
SW2-C2	Pieces of Cored Slag	2/22/2011	11:30	solid	1	Plastic bag	x	x					none
SW4-C5	Pieces of Cored Slag	2/22/2011	15:00	solid	1	Plastic bag	x	x					none

Analyses to be Performed

Relinquished By: (Print & Sign) Steve Penzone

Received By: Date/Time 3/2/11 9.30am

Relinquished By: (Print & Sign)

Received By: Date/Time

Relinquished By: (Print & Sign)

Received By: Date/Time

Comments: ~~Air dry and homogenize all 11 buckets together~~ MAP

Method of Shipment: Drop off

Iced: No

CHAIN OF CUSTODY FORM

SCHNABEL ENGINEERING CONSULTANTS, INC
510 EAST GAY STREET
WEST CHESTER, PENNSYLVANIA
PHONE (610) 696-6066; FAX (610) 696-7771

Reference No: **10615032**

Collected By: (Please Print) Mia Painter and Steve Penzone, Schnabel

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schanbel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Reduce Particle Size to minus 3/8 inch	Air Dry	Homogenization				Preservation
P	Slag Particles, > 3/8 inch size	2/14/2011	16:00	solid	6	5-gallon bucket	x	x	x				none
P	Slag Particles, < 3/8 inch size	2/14/2011	16:00	solid	11	5-gallon bucket		x	x				none

Relinquished By: (Print & Sign)	Received By:	Date/Time
Mia Painter 3/2/11	3/3/11	
Relinquished By: (Print & Sign)	Received By:	Date/Time
Relinquished By: (Print & Sign)	Received By:	Date/Time

Comments:

Method of Shipment: Drop off

Iced: Yes No

CHAIN OF CUSTODY FORM

SCHNABEL ENGINEERING CONSULTANTS, INC
510 EAST GAY STREET
WEST CHESTER, PENNSYLVANIA
PHONE (610) 696-6066; FAX (610) 696-7771

Reference No: **10615032**

Collected By: (Please Print) Mia Painter and Steve Penzone, Schnabel

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schanbel-eng.com

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Analyses to be Performed: Air Dry	Homogenization					Preservation
S	Bulk slag-impacted sand	2/14/2011	16:00	solid	11	5-gallon bucket	x	x					none

Relinquished By: (Print & Sign) Steve Penzone

Received By: Date/Time 2/14/11

Relinquished By: (Print & Sign)

Received By: Date/Time

Relinquished By: (Print & Sign)

Received By: Date/Time

Comments: Air dry and homogenize all 11 buckets together

Method of Shipment: Drop off

Iced: Yes No

CHAIN OF CUSTODY FORM

SCHNABEL ENGINEERING CONSULTANTS, INC
510 EAST GAY STREET
WEST CHESTER, PENNSYLVANIA
PHONE (610) 696-6066; FAX (610) 696-7771

Reference No: **10615032.00 Task 2.1**

Collected By: (Please Print) Mia Painter and Steve Penzone, Schnabel

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schanbel-eng.com

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Analyses to be Performed: ASTM D2974: Moisture, Ash, Organic Matter						Preservation
P - 7	Slag	3/22/2011	16:00	solid	2	8 oz glass jar	x						none

Relinquished By: (Print & Sign) Santhi Jagupilla

Received By: Date/Time 3/24/11

Relinquished By: (Print & Sign)

Received By: Date/Time

Relinquished By: (Print & Sign)

Received By: Date/Time

Comments:
Run three replicates on the material supplied.
Use Method C.

Method of Shipment: Fedex

Iced: Yes No

CHAIN OF CUSTODY FORM

SCHNABEL ENGINEERING CONSULTANTS, INC
510 EAST GAY STREET
WEST CHESTER, PENNSYLVANIA
PHONE (610) 696-6066; FAX (610) 696-7771

Reference No: **10615032.00 Task 2.1**

Collected By: (Please Print) Mia Painter and Steve Penzone, Schnabel

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schanbel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	ASTM D2974: Moisture, Ash, Organic Matter						Preservation
S - 7	Bulk slag-impacted sand	3/14/2011	16:00	solid	2	8 oz glass jar	X						none

Relinquished By: (Print & Sign)	Received By:	Date/Time
Santhi Jagupilla		3/15/11
Relinquished By: (Print & Sign)	Received By:	Date/Time
Relinquished By: (Print & Sign)	Received By:	Date/Time

Comments:
Run three replicates on the material supplied.
Use Method C.

Method of Shipment: Fedex

Iced: Yes No

APPENDIX E

CDM REPORTS

Raritan Slag SDL Report

SLAG CHARACTERIZATION AND LEACHING EVALUATION

Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, New Jersey
USACE Contract No. W912DQ-08-D-0018

September 15, 2011

CDM

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Figure 5-16 - Sample SW2-C2 - ALT Modeling Results for Ni

Figure 5-17 - Sample SW4-C5 - ALT Modeling Results for Sb

Figure 5-18 - Sample SW4-C5 - ALT Modeling Results for As

Figure 5-19 - Sample SW4-C5 - ALT Modeling Results for Ba

Figure 5-20 - Sample SW4-C5 - ALT Modeling Results for Ca

Figure 5-21 - Sample SW4-C5 - ALT Modeling Results for Co

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Attachment 2: Semi-Dynamic Leach (SDL) Test Results (Test America)

Attachment 3: Semi-Dynamic Leach (SDL) Test Methodology and Observations (Kemron Letter Report)

List of Acronyms

ALT	Accelerated Leach Test
ANC	Acid Neutralizing Characterization
As	Arsenic
ASTM	American Society for Testing and Materials
AVS	Acid Volatile Sulfides
Ba	Barium
Ca	Calcium
Co	Cobalt
CPM	Counts Per Minute
DIW	De-ionized water
EDS	Energy Dispersive Spectrometer
Fe	Iron
HNO_3	Nitric Acid
ICP-AES	Inductively Coupled Plasma – Atomic Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma – Mass Spectrometer
LCS	Laboratory Control Samples
Mg	Magnesium
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NaOH	Sodium Hydroxide
Ni	Nickel
Pb	Lead
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
Sb	Antimony
SDL	Semi-dynamic leaching
SEM	Scanning Electron Microprobe
SPLP	Synthetic Precipitation Leaching Procedure
S/S	Solidification/Stabilization
TA	Test America
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
WDS	Wave Dispersive Spectrometer
XRPD	X-Ray Powdered Diffraction

1.0 Introduction

The semi-dynamic leach (SDL) testing was performed on slag core samples to measure the leach rates of elements (mostly metals) from the solid slag matrix. The evaluation on the slag cores was performed in order to provide a baseline for comparison to various solidification/stabilization (S/S) formulations and any subsequent SDL tests (currently no additional tests are planned). The modeling and evaluations, used in combination with the characterization studies performed on the slag, also provide information on the leaching processes occurring and the relative importance of each under different geochemical conditions. In addition to assist in understanding the test results, the concentrations resulting from the SDL and other leaching tests (Toxicity Characteristic Leaching Procedure [TCLP] and De-Ionized Water (DIW]) were compared to various regulatory levels.

This document is an Appendix to the main report, *Characterization Report for the Development of Stabilization Approaches (Schnabel 2011)*, hereafter referred to as the Characterization Report. Specifically this document evaluates the results of the SDL tests on three slag core samples. Additional tests were also performed on the three slag core samples and are also provided and discussed in this document. Some additional tests on composite slag samples are discussed in the Characterization Report (referred to as "crushed and homogenized slag particles") and referenced as appropriate in this document.

2.0 Sample Collection and Preparation

Sampling and preparation techniques are described in detail in the Characterization Report and will only be summarized here for convenience. In addition, discussions will focus on the slag core samples with discussion of the slag composite samples only where data were not available for the cores (e.g., x-ray powdered diffraction [XRPD], acid neutralizing characterization [ANC], and scanning electron microprobe [SEM] analyses).

Slag samples were collected in February 2011 from the Laurence Harbor Seawall and the Cheesequake Creek Inlet Western Jetty as discussed in and shown on Figures 3 and 4 of the Characterization Report.

2.1 Core Sampling

At three of the transect locations (two from the Seawall and one from the Jetty, SW2, SW4, and WJ3), large pieces of slag were collected for subsequent coring. Coring was conducted using a drill press with an appropriate mounting system to secure the samples. The core diameter was 1.75 inches (4.4 cm), and the resulting cores approximately 4.5 inches (11.4 cm) long. The ends of each core were trimmed to produce uniform cylinders for SDL testing. The trimmed pieces were retained and crushed for analysis of total metals and standard leaching tests (DIW and TCLP).

2.2 Composite Slag Sampling

The composite samples were obtained from 11 transect locations, 5 from the seawall (SW-1 through SW-5) and 6 from the jetty (WJ-1 through WJ-6). Subsamples (P-1 through P-3) of composite material of 1 to 8 inch diameter slag were collected, crushed and homogenized for use in a variety of tests including ANC, XRPD, SEM and standard leaching tests (DIW, Synthetic Precipitation Leaching Procedure [SPLP] and TCLP). Results of the composite samples and associated evaluations are provided in the Characterization Report.

3.0 Methodology

3.1 Crushed Core Analysis

The crushed and homogenized slag samples from the slag core samples were submitted to Test America (TA) for analysis of total metals by SW-846 method 6010 as described in section 4.2.2 of the Characterization Report. The samples from the slag core were also subject to various leaching tests (SDL, TCLP and DIW tests). Tests on the composite slag samples included:

- Acid neutralizing characterization (ANC) as described in section 4.2.3 of the Characterization Report.
- X-ray powdered diffraction (XRPD) as described in the section 4.3.1 of the Characterization Report.
- Scanning electron microprobe (SEM) as described in the section 4.3.2 of the Characterization Report.
- SPLP, TCLP and DIW tests as described in section 4.2.2 of the Characterization Report.

ANC, XRPD, SEM and SPLP were not performed on actual samples of the three cores. A brief discussion of each of these methods is provided in the following sections.

3.2 Leaching Tests

SDL tests (ASTM C1308-08) were performed on three core samples (WJ3-C1, SW2-C2, SW4-C5). Sample collection and preparation of the cores are described above in section 2. Leachate was collected at 13 pre-determined intervals (total cumulative times of 2-hour, 7-hours, and days 1, 2, 3, 4, 5, 6, 7, 14, 21, 47 and 90). Analysis of the leachate from the SDL tests was performed by TA for the 13 time intervals that samples were collected. The leachate samples were filtered, preserved and submitted to TA under chain-of-custody.

Specific deviations to ASTM C1308 included leachate collection volumes (~2.0 L instead of 3.0 L), collection intervals (times) and the absence of the acid strip step at the end of the test periods. The collection volumes and intervals were discussed in the approved Project Quality Plan (Schnabel Engineering Consultants Inc., February 2011). The acid strip test was not discussed in the Project Quality Plan. The deviations did not affect data usability. **Table 3-1** summarizes the modifications to the leachate collection times. The leachate samples were analyzed for TAL metals by methods EPA 200.7 (ICP-AES), 200.8 (ICP-MS) and EPA 7040 (mercury).

Table 3-1 Summary of Standard Times and Modified Times for the SDL Testing

Standard Times1		Modified Times[2]	
Interval (days)	Since Start of Test (Cumulative Time)	Interval	Since Start of Test (Cumulative Time)
0.083 (2 hrs)	0.083 (2 hrs)	0.083 (2 hrs)	0.083 (2 hrs)
0.208 (5 hrs)	0.291 (7 hrs)	0.208 (5 hrs)	0.292 (7 hrs)
0.708 (17 hrs)	1.0 (24 hrs)	0.708 (17 hrs)	1.0 (24 hrs)
1.0 (24 hrs)	2.0	1.0	2.0
1.0	3.0	1.0	3.0
1.0	4.0	1.0	4.0
1.0	5.0	1.0	5.0
1.0	6.0	1.0	6.0
1.0	7.0	1.0	7.0
1.0	8.0	7.0	14
1.0	9.0	7.0	21
1.0	10.0	26	47
1.0	11.0	43	90
1.0	12.0	-	-

1. *Times specified in ASTM Method C1308-08*
2. *Times used by Kemron for the slag core samples.*

Toxicity characteristic leaching procedure (TCLP) method 1311 and de-ionized water (DIW) leach (using SPLP method 1312) were performed by TA on three crushed and homogenized slag core samples (WJ3-C1, SW2-C2, SW4-C5) as described in section 4.2 of the Characterization Report. These samples were prepared from the end pieces of the trimmed core samples prepared for the SDL test. The leachate for the individual procedures were analyzed for total metals by EPA 6010B and for mercury by EPA 7040A. **Table 3-2** summarizes the differences in the various leaching procedures.

Table 3-2 Summary of Leach Test Methods

Leaching Test	Solid:Solution Ratio (g/mL)	Leach Solution Type	Reaction Time (hrs)
TCLP (USEPA 1311)	1:20	Acetic acid to pH 2.88[1]	18
SPLP (USEPA 1312)	1:20	Synthetic rain water[2]	18
DIW (USEPA 1312 – modified)	1:20	DIW3	18
ANC	1:20	$NaOH/HNO_3$	18
ASTM Semi-Dynamic (ASTM C1308-08)	1:2.17 – 1:2.36	DIW	Varied from 2 hrs to 43 days

1. *Extraction Fluid No. 2 for basic waste.*
2. *60%/40% sulfuric/nitric acid mixture (by mass) added to DIW until a pH of 4.2 is attained (Solution #1 to simulate Eastern US precipitation).*
3. *USEPA method 1312, using DIW instead of synthetic rain water (referred to as "EPA 6010B ASTM Leachate" in Test America Laboratory Report)*

4.0 ALT Modeling and Data Analysis

The SDL data were evaluated using the ASTM diffusion/attenuation model ALT, which stands for "accelerated leaching test" (Fuhrmann at al., 1990). The ALT model was developed specifically to evaluate SDL data and was obtained from ASTM. The ALT model is based on Fick's Second Law, which is as follows:

$$\partial C/\partial t = - D_e \Delta^2 C \qquad (4\text{-}1)$$

Where,

C	=	the concentration of the species of interest
t	=	time
D_e	=	the effective diffusion coefficient
$\Delta^2 C$	=	the spatial rate of change in the direction of the concentration gradient

In effect, the model is based on the fact that the diffusion rate is proportional to the concentration gradient.

Integration of equation 4-1, assuming a semi-infinite solid with a constant diffusion coefficient, yields the following:

$$CFL = \Sigma_i a_n / {}_iA_o = 2\ S/V\ (D_e t/\pi)^{1/2} \qquad (4\text{-}2)$$

Where,

CFL	=	Cumulative fraction leached
S	=	waste form surface area
V	=	waste form volume
D_e	=	effective diffusion coefficient
${}_ia_n$	=	the quantity of species i measured in the leachate from the nth test interval
${}_iA_o$	=	the quantity of species i in the specimen at the beginning of the test

The ALT program uses the semi-infinite solid model when CFL is less than 0.20, which was the case for all of the simulations.

The ALT model calculates the Incremental Fraction Leached (IFL) from the semi-dynamic leaching test data, which is defined as follows:

$$IFL_j = {}_ia_n / {}_iA_o \qquad (4\text{-}3)$$

In addition, the cumulative fraction leached (CFL) is calculated as follows:

$$CFL_j = \Sigma_i a_n / {}_iA_o = \Sigma IFL_j \qquad (4\text{-}4)$$

For diffusion, a plot of CFL vs time yields a curve. The ALT program uses a curve fitting technique to fit the model generated diffusion curve to the data by adjusting the value of the diffusion coefficient (D_e).

The "goodness of fit" (E_r) is calculated using a sum of the residuals method and is expressed as a percentage of the CFL.

$$E_r = 100 * \Sigma(CFL_{i,\ model} - CFL_{i,\ measured})^2/CFL_{N,\ measured} \quad (4\text{-}5)$$

Values of Er of less than 0.5% must be obtained in order to assume that diffusion is the only mechanism occurring.

5.0 Results

5.1 Data Quality/Usability

A data quality review was performed on the analytical data from the nine laboratory reports provided by TA (the results of the SDL). These reports are provided in attachment 2 to this report. The data reviewed consisted of the SDL test data (39 leachate samples). The following items were reviewed for each data set:

- Laboratory Blanks
- Laboratory Control Samples (LCSs)
- Matrix Spike/Matrix Spike Duplicates (MS/MSDs)
- Holding Times
- Preservation Criteria if provided

The U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010) was the guidance used to review the data. Percent recovery (%R) is calculated for LCSs and MSs using the following formula:

$$\% R = \frac{A - X}{T} \text{ x } 100$$

Where: %R = Percent recovery
A = Measured value of analyte after the spike is added
X = Measured value of analyte concentration before the spike is added
T = Value of the spike

RPD is calculated for MSDs using the following formula:

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2) \text{ x } 0.5} \text{ x } 100$$

Where: RPD = Relative percent difference
D_1 = First sample value
D_2 = Second sample value (duplicate)

A summary of each laboratory report and any quality control (QC) issues identified during the data quality review are presented below:

Laboratory Report KUC0091

All laboratory QC parameters were within criteria except for one LCS for potassium, which had a high percent recovery of 132% (criteria 80-120%). The potassium results associated

with this LCS may be biased high and has been qualified as estimated J+. This data set consisted of the 2-hour, 7-hour and 1 day samples collected for the SDL test.

Laboratory Report KUC0194

All laboratory QC parameters were within criteria except for antimony and lead MS/MSD recoveries (criteria 75-125%). One MS/MSD pair had antimony %Rs of 69.6% and 60%, respectively. One MS/MSD pair had lead %Rs of 70.5% and 42.5%, respectively. The data are not affected from these outliers as the original sample concentrations were greater than four times the spike concentration. Validation guidance does not require any qualification of data when the original sample concentration is greater than four times the spike concentration.

One MS/MSD pair had recoveries outside of criteria for mercury at 105% and 63%, respectively. The relative percent difference (RPD) was also outside of criteria at 50% (criteria 20%). The mercury results associated with this MS/MSD pair may be estimated low and have been qualified J-. This data set consisted of the 2-day, 3-day and 4-day samples collected for the SDL test.

Laboratory Report KUC0195

All laboratory QC parameters were within criteria. This data set consisted of the 5-day and 6-day samples collected for the SDL test.

Laboratory Report KUC0218

All laboratory QC parameters were within criteria. This data set consisted of the 7-day samples collected for the SDL test.

Laboratory Report KUC0368

All laboratory QC parameters were within criteria except for one LCS for mercury, which had a high %R of 140% (criteria 85-115%). The mercury results associated with this LCS may be biased high and have been qualified J+.

One MS/MSD pair had manganese %Rs outside of criteria at 112% and 276% (criteria 70-130%). The RPD was also outside of criteria at 84.9% (criteria 20%). The manganese results associated with this MS/MSD pair may be biased high and have been qualified J+. This data set consisted of the 14-day samples collected for the SDL test.

Laboratory Report KUC0546

All laboratory QC parameters were within criteria except for nickel and zinc in one LCS, which had recoveries of 121% and 202%, respectively (criteria 85-115%). The nickel and zinc results associated with this LCS may be biased high and have been qualified J+.

One MS/MSD pair had a Lead %R outside of criteria at 5.5% for the MS sample. The data are not affected from these outliers as the original sample concentrations were greater than four times the spike concentration. Validation guidance does not require any qualification of data when the original sample concentration is greater than four times the spike concentration.

One MS/MSD pair had a manganese %R outside of criteria at 171% for the MS sample (criteria 75-125%). The RPD was also outside of the 20% criteria at 47.3%. The manganese results associated with this MS/MSD pair may be biased high and have been qualified J+. This data set consisted of the 21-day samples collected for the SDL test.

Laboratory Report KUD0427

All laboratory QC parameters were within criteria. For this set of analyses TA performed the metals analysis following method EPA 200.7 (ICP-AES) and did not use EPA 200.8 (ICP-MS) resulting in elevated reporting limits for the nondetectable elements. Therefore, these data could not be used in the evaluation of the SDL test (not comparable data sets). This laboratory report consisted of the 47-day samples collected for the SDL test.

Laboratory Report KUF0009

All laboratory QC parameters were within criteria except for antimony in one LCS, which had a recovery of 117% (criteria 85-115%). The antimony results associated with this LCS may be biased high and have been qualified J+. This data set consisted of the 90-day samples collected for the SDL test.

Summary

With the exception of the data produced for the 47-day samples, the data produced by TA are acceptable for the intended uses (SDL modeling). No significant issues were identified during the review of these data that would facilitate rejection of the data. Specific precautions regarding the biases for specific elements in the individual data sets have been identified above and do not impact the evaluation of the SDL results.

5.2 Crushed Core Analysis

The crushed core samples (WJ3-C1, SW4-C5 and SW2-C2) were analyzed for total metals, and TCLP and DIW leaching. The laboratory reports for these tests are provided in Attachment 1. Additional analyses were performed on the three composite slag subsamples (P1, P2 and P3). The additional analyses performed on the composite slag included: XRPD, SEM, ANC, and the standard leach tests (SPLP, DIW, and TCLP). The results of these tests are in the Characterization Report.

5.2.1 Total Metals

Total metals analyses were performed on both the crushed cores and the composite samples, providing a useful basis for comparing the two sample types. The results are presented side by side for comparison in **Table 5-1**.

Table 5-1 Comparison of Total Metals for the Composite Slag and Slag Core Samples (mg/kg)

Parameter	Composite Slag Samples			Core Samples		
	P1	P2	P3	WJ3-C1	SW2-C2	SW4-C5
Aluminum	20,000	19,000	20,000	<50	120	<50
Antimony	2,400	1,700	2,600	9,600	11,000	18,000
Arsenic	2,000	1,600	2,300	5,700	7,000	4,700
Barium	650	660	420	46	22	20
Beryllium	0.45	0.54	<0.40	<0.40	<0.40	<0.40
Cadmium	<50	<50	<50	<50	<50	<50

Table 5-1 Comparison of Total Metals for the Composite Slag and Slag Core Samples (mg/kg)

Parameter	Composite Slag Samples			Core Samples		
	P1	P2	P3	WJ3-C1	SW2-C2	SW4-C5
Calcium	41,000	26,000	27,000	1300	870	140
Chromium	120	88	120	<120	<120	<25
Cobalt	<2.0	<2.0	<2.0	<2.0	51	55
Copper	3,600	3,400	4,800	16,000	7,000	5,200
Iron	320,000	270,000	350,000	450,000	500,000	270,000
Lead	43,000	47,000	52,000	63,000	91,000	38,000
Magnesium	6,200	6,200	6,400	670	190	<25
Manganese	4,200	3,800	4,200	250	350	230
Mercury	<0.10	<0.10	<0.10	0.1	<0.10	<0.10
Nickel	170	140	220	320	950	930
Potassium	2,300	2,900	2,500	<1000	<1000	<1000
Selenium	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0
Silicon	54,170	58,079	48,503	-	-	-
Silver	6.6	6.8	8.2	15	16	8.3
Sodium	9,100	9,600	9,100	670	190	110
Thallium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Tin	2,300	2,500	2,700	8,400	1,600	2,500
Vanadium	90	96	110	2.6	<2.5	<2.5
Zinc	2,600	2,800	3,000	3,700	600	1,900

Shading indicates a significant difference in the concentrations between the composite and core samples.
Blue represents values below the laboratory reporting limit (RL).

In general, the composite samples had higher concentrations of aluminum, barium, calcium, magnesium, manganese, sodium, potassium, and vanadium and lower iron, antimony, and arsenic concentrations. The core samples may represent a slag from a lower position within the melt than the composite samples, or the composite samples may have been subjected to more weathering than the cores. Given these differences, the extrapolation of the data for the composite samples to the core samples is not ideal, but can still be useful in interpreting the SDL results.

5.2.2 XRPD

The XRPD analyses (performed on three composite samples, P1, P2 and P3) identified the presence of an impure form of fayalite (Fe_2SiO_4) containing magnesium, manganese, and calcium (24.8 – 26.0%), iron monosulfide (FeS) (26.0 – 28.3%), x-ray amorphous material (20.8 – 26.2%), and the balance composed of magnetite (5.6 – 5.8%), albite (5.5 to 8.6%), quartz (1.6 to 1.8%), and various iron oxide and lead phases. The lead was present as elemental lead (2.0 – 2.1%), galena (1.9 – 2.3%), and cerussite (1.3 to 1.4%). Potential reactions with these mineral phases are discussed in subsequent sections.

5.2.3 SEM

The SEM results performed on slag composite subsamples showed a close association of lead sulfide (galena) and iron sulfide (troilite). Potential reactions with these mineral phases are discussed in subsequent sections.

5.3 Leaching Tests

5.3.1 SPLP and DIW Batch Testing

SPLP, TCLP and DIW leach tests were performed on the three composite slag samples (P1 through P3), while only DIW and TCLP leach tests were performed on the crushed core samples (see Attachment 1 for the core results).

5.3.1.1 Composite Slag Samples

The only parameters that were above the reporting limits for the SPLP and DIW tests were the major cations (Ba, Ca, Mg, and Na) and aluminum, arsenic and antimony. Also, in both the SPLP and DIW leaching tests, the pH increased significantly during the tests. In the SPLP tests, the pH increased from about 8 su to around 10 su, despite the fact that the initial pH of the SPLP leach solution was 4.2 (leach solution #1). Similar pH increases were observed for the DIW tests.

One possible explanation is the degassing of carbon dioxide during the tests. Degassing of carbon dioxide results in an increase in pH via the following reaction:

$$CO_2\ (aq) \rightarrow CO_2\ (g) \qquad (5\text{-}1)$$

$$H_2CO_3\ (aq) \rightarrow CO_2\ (aq) + H_2O\ (l) \qquad (5\text{-}2)$$

$$HCO_3^- + H^+\ (aq) \rightarrow H_2CO_3\ (aq) \qquad (5\text{-}3)$$

The carbon dioxide released in reaction 5-1 drives reaction 5-2 and 5-3 to the right, resulting in consumption of hydrogen ions and an increase in the pH. The process would have been limited because the bottles were sealed and gas exchange with the atmosphere would have been negligible.

A more likely explanation is the dissolution of iron-calcium-magnesium silicate minerals such as fayalite (identified in the XRPD analyses). The reaction would occur as follows:

$$Fe_2SiO_4\ (\text{stoichimetric fayalite}) + 4H^+\ (aq) \rightarrow H_4SiO_4\ (aq) + 2Fe^{+2}\ (aq) \qquad (5\text{-}4)$$

The iron liberated by reaction 5-4 would be oxidized by the oxygen within the leach solution and re-precipitated as follows:

$$2Fe^{+2}\ (aq) + \tfrac{1}{2}\ O_2\ (aq) + 2H^+\ (aq) \rightarrow 2Fe^{+3}\ (aq) + H_2O\ (l) \qquad (5\text{-}5)$$

$$2Fe^{+3}\ (aq) + 6H_2O\ (l) \rightarrow 2Fe(OH)_3\ (s) + 6H^+\ (aq) \qquad (5\text{-}6)$$

Of course the oxidation and precipitation of iron would negate the pH increase afforded by reaction 5-4, suggesting that other silicates (calcium and magnesium) may also have dissolved.

The fact that the metals were below the reporting limits is likely due to the high solution to solid ratio used (20:1), the high pH attained during the tests, and the limited oxygen present within the solution. Any oxygen present would have been consumed by the ferrous iron produced by reaction 5-4 and would not have been available to oxidize sulfide minerals such as galena (PbS).

5.3.1.2 Core Samples

A summary of selected DIW results for the crushed core samples is provided in **Table 5-2** while the complete data set is provided in Attachment 1. In contrast to the composite slag samples, the cores had additional parameters in which the concentrations were above the RL.

Table 5-2 – Summary of Selected DIW Results for the Slag Core Samples (mg/L)

Parameter	WJ3-C1	SW2-C2	SW4-C5
Antimony	<0.05	2.0	0.22
Arsenic	<0.05	0.29	0.063
Cadmium	<0.004	0.0044	<0.004
Cobalt	0.089	0.26	0.15
Iron	1.7	68	2.7
Nickel	0.22	1.0	0.31
Lead	23	170	30

Blue indicates results below the laboratory RL.

The DIW leachate concentrations appear to be roughly proportional to the total metals (**Table 5-1**). The lead concentration of 170 mg/L for sample SW2-C2 corresponds to the highest lead concentration out of the six samples analyzed (three composite samples and three core samples). SW2-C2 also had the highest iron in the slag and within the DIW leachate. The correspondence between the total metals and the DIW leachate metals is not consistent with a solid phase, because a solid would dissolve to a constant concentration (the solubility) provided enough was present to reach saturation. The correlation suggests either desorption or diffusion control. The lower concentrations for the composite samples may also be due to the smaller grain size and higher degree or weathering compared to the cores which were collected from relatively deep within the slag in fresh material.

5.3.2 TCLP

TCLP testing was performed on both the crushed core samples and composite slag samples. The TCLP test specifies two different leach solutions; #1 consisting of a mixture of acetic acid and sodium hydroxide (pH = 4.93) and #2 consisting of only acetic acid (pH=2.88). The choice of solution is determined by a preliminary test in which the pH of the waste is measured. Wastes with pH>5 are tested using extraction fluid #2. The slag samples were subjected to the low pH solution #2.

As mentioned in the Characterization Report, the pH of the solutions for the composite slag samples decreased by nearly 4 pH units (from ~9 to ~5) during the TCLP tests. In contrast for the core samples, the pH increased slightly from ~5.5 to ~6 su. The low pH would have favored not only the dissolution of fayalite and other silicates, but also the dissolution of iron monosulfides. The OSU Slag Characterization report (Ohio State, 2009) identified the iron sulfide mineral as troilite, which is an iron monosulfide (as opposed to pyrite which is an iron disulfide). Iron monosulfides are unstable at pH values less than about 6, forming ferrous iron and hydrogen sulfide gas. These are the so-called acid volatile sulfides (AVS). Dissolution of these phases requires no oxygen, only a pH value below about 6. The importance of the dissolution of iron sulfides is the common presence of trace metals (Cu, Ni, Zn, Co, etc.) as well as antimony and arsenic within these phases. The SEM instrument employed (see the Characterization Report for details) was not equipped with a wave dispersive spectrometer (WDS) but only an energy dispersive spectrometer (EDS), making quantification of trace elements such as arsenic difficult (the energy peaks for arsenic and magnesium overlap). The final pH of the TCLP tests for the cores (~6 su) suggests that equilibrium with troilite may have been achieved.

The low pH would also dissolve lead carbonates and the acetate ion has the capacity to complex lead and other metal cations, resulting in an increased solubility of the solid phases.

5.3.3 ANC Testing

The ANC results, which were only performed on the composite slag samples, showed that the release of metals from the crushed and milled slag was inversely proportional to the pH of the leach solution. This was true for iron, lead and other trace elements. Aluminum was an exception, exhibiting a decrease in concentration with a lowering of the pH followed by an increase. Such a trend for aluminum is typical "amphoteric" behavior resulting from the formation of aqueous aluminum hydroxide complexes at high pH. The MINTEQ modeling performed in the Characterization Report under-predicted the solubility of the lead phases, likely due to the presence of amorphous forms of lead in the slag which tend to be more soluble than the crystalline phases contained within the thermodynamic database of the model.

5.3.4 ASTM SDL Test Results and Modeling

5.3.4.1 Input Data

The input to the ALT model are provided in **Tables 5-3** and **5-4a** through **5-4c** and in **Attachments 1, 2 and 3**.

Table 5-3 ALT Input - General Parameters

Parameter	SW2-C2	SW4-C5	WJ3-C1
Number of Data Points	9		
Number of Species	8		
Concentration or CPM[1]?	Concentration		
Leachate Volume (L)	2.0		
Default Times?	No		
Sampling times (days)	0.083, 0.292, 1, 2, 3, 4, 5, 6, 7, 14, 21, 90		
Units	mg/L		
Sample height (cm)	10.87	11.79	10.74
Sample diameter (cm)	4.42	4.42	4.42
Soil Mass Used (kg)	0.8506	0.9207	0.8474

1. *Counts per Minute*

The chemical parameters used in the modeling were selected based on the number of detections. Parameters which had fewer than two detections out of the 13 sampling times were not modeled. This resulted in evaluation of antimony, arsenic, barium, calcium, cobalt, iron, lead and nickel. Values which were less than the analytical reporting limit (RL) were entered into the model as 1/2 of the RL. The samples analyzed on day 47 had an RL which was one to two orders of magnitude greater than for the other samples. In order to not introduce bias into the results, day 47 sample results were eliminated from the modeling.

The SDL leachate concentrations (mg/L) are provided in **Tables 5-4a** through **5-4c.** The source term (mg, first row) was calculated by multiplying the source concentration (mg/kg as reported in **Table 5-1**) by the soil mass used (**Table 5-3**). For example, the antimony mass for sample WJ3-C1 was 8,135 mg (0.8474 kg * 9,600 mg/kg = 8,135 mg).

Table 5-4a - Sample WJ3-C1 - Chemical Parameters (mg/L unless noted otherwise)

Parameter		Antimony	Arsenic	Barium	Calcium	Cobalt	Iron	Lead	Nickel
Source [Ao](mg)[1]		8135	4237	39.0	1102	1.7	381330	53386	271
Time (days)	**0.083**	0.08	0.0017	0.011	0.159	0.00024	0.65	0.24	0.0019
	0.292	0.13	0.003	0.014	0.1	0.00036	1.1	0.28	0.0025
	1	0.09	0.0039	0.017	0.148	0.00078	2.9	0.46	0.0031
	2	0.057	0.0017	0.019	<0.1	0.0004	2	0.36	0.0019
	3	0.041	0.0016	0.015	<0.1	<0.00018	1.4	0.23	0.001
	4	0.025	0.0013	0.015	<0.1	<0.00018	1.1	0.2	<0.00097
	5	0.021	0.001	0.014	<0.1	<0.00018	0.96	0.22	<0.00097
	6	0.017	0.001	0.015	<0.1	<0.00018	0.77	0.19	0.0032
	7	0.019	0.0013	0.024	<0.1	<0.00018	0.76	0.089	0.0023
	14	<0.001	0.001	0.023	0.137	0.00056	5.3	0.57	0.0012
	21	<0.001	<0.001	0.025	0.13	0.00022	3	0.39	<0.00097J+
	47[2]	<0.05	<0.05	0.029	0.18	<0.02	9.1	0.24	<0.1
	90	<0.001	<0.001	0.031	0.155	<0.00018	4.4	0.17	<0.00097

1. *The source was the product of the soil mass in kg and the soil concentration in mg/kg.*
2. *Not used in modeling.*

Blue indicates samples which were less than the laboratory reporting limit.

Table 5-4b - Sample SW2-C2 - Chemical Parameters (mg/L unless noted otherwise)

Parameter		Antimony	Arsenic	Barium	Calcium	Cobalt	Iron	Lead	Nickel
Source [A_o](mg)[1]		9357	5954	19	740	43	425300	77405	808
Time (days)	**0.083**	0.011	<0.001	0.015	0.177	0.00038	1.6	0.16	0.0032
	0.292	0.011	<0.001	0.012	<0.1	<0.00018	1.2	0.094	0.003
	1	0.011	<0.001	0.018	0.122	0.00034	1.9	0.066	<0.00097
	2	0.011	0.0012	0.013	<0.1	<0.00018	1.2	0.0028	<0.00097
	3	0.011	0.0017	0.013	<0.1	<0.00018	0.72	<0.00096	<0.00097
	4	0.0079	0.0012	0.011	<0.1	<0.00018	0.52	<0.00096	<0.00097
	5	0.0067	0.0011	0.01	<0.1	<0.00018	0.38	<0.00096	<0.00097
	6	0.007	0.0011	0.0091	<0.1	<0.00018	0.33	<0.00096	0.0017
	7	0.0079	0.0013	0.012	<0.1	<0.00018	0.32	0.01	<0.00097
	14	0.0019	0.0011	0.018	0.188	<0.00018	0.71	<0.00096	<0.00097
	21	0.002	0.0012	0.015	<0.1	<0.00018	0.36	<0.00096	<0.00097J+
	47[2]	<0.05	<0.05	0.012	<0.1	<0.02	<0.1	<0.1	<0.1
	90	-	0.001	0.015	0.169	<0.00018	<0.1	<0.00096	<0.00097

1. *The source was the product of the soil mass in kg and the soil concentration in mg/kg.*
2. *Not used in modeling.*

Blue indicates samples which were less than the laboratory reporting limit.

Table 5-4c - Sample SW4-C5 - Chemical Parameters (mg/L unless noted otherwise)

Parameter		Antimony	Arsenic	Barium	Calcium	Cobalt	Iron	Lead	Nickel
Source [A_o](mg)[1]		16573	4327	18	129	51	248589	34987	856
Time (days)	**0.083**	0.0067	0.0012	0.011	0.209	0.00046	3	<0.00096	0.0017
	0.292	0.0055	0.0015	0.014	<0.1	0.00038	5	0.0019	0.0021
	1	0.0065	0.0027	0.016	0.106	0.00044	5.7	0.008	<0.00097
	2	0.0043	0.002	0.016	0.1	0.0002	2.1	0.0023	<0.00097
	3	0.0043	0.0014	0.015	<0.1	<0.00018	1.2	<0.00096	<0.00097
	4	0.0037	0.0012	0.01	<0.1	<0.00018	0.72	<0.00096	<0.00097
	5	0.0033	<0.001	0.01	<0.1	<0.00018	0.56	<0.00096	<0.00097
	6	0.0033	<0.001	0.011	<0.1	<0.00018	0.43	<0.00096	0.0015
	7	0.0035	<0.001	0.012	0.117	<0.00018	0.41	0.0012	0.0021
	14	0.0011	0.001	0.016	0.267	<0.00018	0.001	0.0036	<0.00097
	21	<0.001	<0.001	0.017	0.238	<0.00018	0.17	<0.00096	<0.00097J+
	47[2]	<0.05	<0.05	0.021	0.53	<0.02	<0.1	<0.1	<0.1
	90	-	0.0031	0.027	0.784	0.00024	<0.1	<0.00096	0.002

1. The source was the product of the soil mass in kg and the soil concentration in mg/kg.
2. Not used in modeling.
Blue indicates samples which were less than the laboratory reporting limit.

Initial results indicated that the fit of the data to the diffusion model was very poor, with goodness of fit (E_r) values often exceeding 20%. However, the first 9 data points (through day 7) appeared to form a nice curve for many of the parameters. Therefore, additional modeling was performed only on the first 9 data points, because a different process appeared to be dominant for longer sampling intervals (>1 day intervals after the total time of 7 days).

5.3.4.2 ALT Modeling Results

The results of the ALT modeling through day 7 are presented in **Table 5-5** and in **Figures 5-1 through 5-24**.

Table 5-5 ALT Modeling – Effective Diffusion Coefficients (De) and Relative Percent Error (Er)

Parameter	WJ3-C1 (m/s)	SW2-C2 (m/s)	SW4-C5 (m/s)
Antimony	1.07×10^{-14} (4.53%)[1]	3.16×10^{-16} (0.20%)	2.19×10^{-17} (0.26%)
Arsenic	5.75×10^{-17} (1.76%)	1.12×10^{-17} (4.29%)	3.28×10^{-17} (1.82%)
Barium	5.52×10^{-11} (1.66%)	1.36×10^{-10} (0.24%)	1.74×10^{-10} (0.26%)
Calcium	1.15×10^{-12} (1.03%)	2.06×10^{-12} (0.34%)	9.46×10^{-11} (0.72%)
Cobalt	6.81×10^{-12} (7.82%)	2.59×10^{-15} (0.99%)	3.81×10^{-15} (3.52%)
Iron	4.64×10^{-15} (0.63%)	1.25×10^{-15} (2.42%)	1.95×10^{-14} (9.20%)
Lead	7.90×10^{-15} (0.34%)	1.46×10^{-17} (8.94%)	9.58×10^{-19} (14.19%)
Nickel	1.22×10^{-14} (3.06%)	3.08×10^{-16} (3.78%)	2.88×10^{-16} (6.08%)

1. Parenthetic values represent the relative percent error of fit for the diffusion model.
Shading indicates that E_r is greater than the goodness of fit criteria of <0.5%

Only 6 of the 24 simulations met the strict criteria required for the diffusion model (un-shaded cells in **Table 5-5**). The ALT model calculates a partition factor (P) to correct the data for desorption reactions when necessary. However for all simulations, the model indicated that the best fit to the data was the diffusion model. For some parameters, such as antimony and arsenic, there was a sharp "break" after the day 7 samples. However, for other parameters, such as lead for sample SW2-C2, the break occurred earlier (after the 7 hr sample). The variations in the location of the "break point" between the diffusion process and other processes (likely co-precipitation as discussed below), likely explains the less than ideal fit of the data.

5.3.4.3 Interpretation of Results

The concentration of each parameter within the solution is limited by the slowest release process. In order for a metal to enter the solution (aqueous) phase it must first be released from the solid through either dissolution of a mineral or desorption from the surface of the slag into the pore fluid. The metal must then diffuse through the cylinder of slag into the bulk solution. When diffusion is the limiting process, the desorption or dissolution of the metal is faster than the diffusion through the slag cylinder. Diffusion appears to have been the dominant process initially, but over longer periods of time other processes have time to occur. The other processes include the following:

- Gas exchange between the bulk solution and the atmosphere and between the bulk solution and the pore water.
- Oxidation of sulfides within the slag
- Oxidation of metals within the bulk solution and precipitation of metals

Gas Exchange

The ASTM method C1308-08 specifies that "The top of the container shall fit tightly to minimize evaporation". Under such conditions, gas exchange would not be expected. However, the degree of oxidation which occurred appears to be more than would be expected for the oxygen dissolved within the leach solution. The Kemron Letter Report (Attachment 3) states that for the longer sampling intervals (14, 21, 47, and 90 days) the water and sample were "very orange/rust color". The shorter time interval samples were described as "sample turning orange/rust color" (but not the water). Over longer time periods (weeks as opposed to days), exchange of gases such as carbon dioxide and oxygen between the bulk solution and the atmosphere had time to occur. Apparently, some degree of leakage through the sample lid took place. In cases where carbon dioxide is diffusing from the core samples at a rate where the carbon dioxide concentration within the solution exceeds the value for equilibrium with the atmosphere, then degassing of carbon dioxide would occur. As mentioned previously, carbon dioxide degassing results in an increase in pH.

Another important gas subject to exchange between the atmosphere and the bulk solution is oxygen. Given the presence of sulfides within the slag, the slag pore water is likely anoxic (low oxygen levels) because any oxygen present would be consumed by oxidizing the sulfide minerals. Therefore, a concentration gradient would be present between the pore

water and the bulk solution. While metals would diffuse from the pore water to the solution, oxygen would diffuse in the opposite direction. There is likely significant pore space within the slag, based on the photographs of the cores provided in the characterization report. However, the water content of the cores was reported as zero (see attachment 3). Slag typically has pores created by gases exsolving from the melt. Upon solidification, the gas pockets form pores which can either be isolated or in communication with other pockets or the edge of the sample through fractures. Water contained within these pores is what is referred to as "pore water".

Oxidation of Sulfides within the Slag

Diffusion of oxygen from the atmosphere to the solution and from the bulk solution to the pore water takes time and would not likely occur to as great an extent over a one day time period compared to a week or more. Once oxygen reaches the pore water, dissolution of iron and lead sulfides could then occur, resulting in release of iron and lead into solution.

Oxidation of Metals within the Bulk Solution and Precipitation of Metals

Dissolved metals such as ferrous iron are subject to oxidation within the bulk solution (via reaction 5-5) and subsequent precipitation (via reaction 5-6). Other metals tend to be incorporated into the iron hydroxide phase as impurities (a process called "coprecipitation"). The result is that even though more metals are likely leached during the longer time intervals, the liberated metals are re-attenuated due to oxidation of iron. The re-attenuation process forms the flat portion to the right of the diffusion curves in **Figures 5-1 through 5-24** where very little change within the CFL occurs (limited net leaching). The presence of orange/rust color on the sample and within the leach solution is a strong indication that this process occurred.

The flattening of the barium curve may have resulted from the increased oxidation of sulfide minerals and subsequent increase in sulfate concentrations within the bulk solution. As barium concentrations are often controlled by the mineral barite ($BaSO_4$), an increase in sulfate would result in a decrease in barium concentrations.

Flattening of the calcium curve is likely the result of an increase in the pH caused by degassing of carbon dioxide, or dissolution of silicate minerals. The mineral calcite ($CaCO_3$) is less soluble at higher pH values and is a likely control on calcium concentrations in solution.

5.3.4.4 Comparison of Diffusion Coefficients to Literature Values

As shown in **Table 5-5** typically, the more mobile metals, such as cobalt, tend to have higher D_e values than the less mobile ones such as lead. Part of the difference can be attributed to the fact that lighter elements (lower molecular mass) tend to diffuse faster than heavier elements (higher molecular mass). Lead has an atomic mass of approximately 207 g/mole vs only about 59 g/mole for cobalt. To assist in the evaluations, **Table 5-6** provides the values of distribution coefficients found in published literature.

Table 5-6 Summary of Effective Diffusion Coefficients as Reported in the Literature

Reference	Diffusion Coefficient (m2/s)	Parameter	Leaching Test Method	Material
Torras (2011)	2.6×10^{-5}	Potassium	C1308-08	Ni wastes stabilized/solidified with magnesium potassium phosphate cement.
	1.2×10^{-5}		ANS 16.1	
Moon and Dermatas(2007)	1.66×10^{-14}	Arsenic	ANS 16.1	Unstabilized Anaconda soil
	2.80×10^{-14}			Anaconda soil with 10% fly ash
	1.00×10^{-15}			Anaconda soil with 25% fly ash
	2.75×10^{-12}			Unstabilized Cataract Creek Tailings
	1.40×10^{-16}			Cataract Creek Tailings with 25% fly ash
	3.69×10^{-15}	Lead		Unstabilized Anaconda soil
	5.45×10^{-15}			Anaconda soil with 25% fly ash
	4.71×10^{-12}			Unstabilized Cataract Creek Tailings
	7.38×10^{-16}			Cataract Creek Tailings with 25% fly ash
Martens et al. (2010)	7.00×10^{-12}	Sodium	Modified Dutch Diffusion Test NEN 7345	Municipal waste incinerator ash/Portland cement

As shown in **Table 5-5,** the slag sample from the Cheesequake Creek Inlet Western Jetty (WJ3-C1) had an ALT model-predicted effective diffusion coefficient for lead on the order of 10^{-15} m^2/s. This value is of a similar order of magnitude as the unstabilized and stabilized (fly ash) Anaconda soil investigated by Moon and Dermatas (2007) (see **Table 5-6**). The 10^{-15} m^2/s diffusion coefficient for lead for WJ3-C1 is significantly lower than the unstabilized Cataract Creek tailings but slightly higher than the stabilized (fly ash) Cataract Creek tailings. The seawall samples (SW2-C2 and SW4-C5) had significantly lower lead diffusion coefficients than those of Moon and Dermatas (2007), indicating that the diffusion of lead was slower for the seawall samples. The jetty and seawall D_e values for arsenic are three to five orders of magnitude lower than for the literature values for arsenic shown in **Table 5-6.**

6.0 Comparison of Leaching Results to Regulatory Levels

To assist in understanding of the leaching test results, the measured concentrations of the metals in the leaching fluids were compared to National Drinking Water Regulation Maximum Contaminant Levels (MCL), secondary MCLs, or drinking water action level; TCLP criteria used to classify material as a RCRA hazardous waste; and the Universal Treatment Standard (UTS) for soil.

6.1 TCLP and DIW Results

A summary of the comparison of the DIW and TCLP results to the various regulatory levels is provided in **Table 6-1**. As shown, the leachate concentrations of the metals resulting from the TCLP test are significantly higher than the leachate concentrations resulting from the DIW test. For instance, lead concentrations were an order of magnitude higher in the TCLP leachate compared to the DIW leachate. As discussed in the Characterization Report, the lower pH and the presence of acetate ion to complex lead, likely contributed to the higher lead concentrations in the TCLP leachate.

In **Table 6-1**, the shaded values, which include the DIW leachates for lead, arsenic, antimony and iron, and the TCLP leachate for these same metals as well as cadmium exceeded the primary MCL, secondary MCL or the drinking water action level for lead. In addition, selected TCLP arsenic values and all the TCLP lead values exceeded the TCLP criteria used to classify material as RCRA hazardous waste. The TCLP lead values and selected TCLP antimony and arsenic values also exceeded the UTS for soil.

Table 6-1 Comparison of TCLP and DIW Leach Test Results to Regulatory Levels for the Core Samples (mg/L)

Parameter	WJ3-C1		SW2-C2		SW4-C5		MCL (mg/L)	TCLP Criteria (mg/L)	UTS for Soil (mg/L)
	TCLP	DIW	TCLP	DIW	TCLP	DIW			
Aluminum	<0.80	<0.20	0.98	<0.20	<0.20	<0.20	0.05-0.2[1]	NR	NR
Antimony	1.6	<0.05	2.0	2.0	2.2	0.22	0.006	NR	1.15
Arsenic	4.5	<0.05	4.8	0.29	6.5	0.29	0.010	5.0	5.0
Barium	0.28	0.35	0.097	0.087	0.20	0.12	2	100	21
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	NR	1.22
Cadmium	0.028	<0.004	0.023	0.0044	0.05	<0.004	0.005	1.0	0.11
Calcium	12	20	2.6	5.1	3.9	5.2	NR	NR	NR
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	5.0	0.6
Cobalt	0.16	0.089	0.18	0.26	0.32	0.15	NR	NR	NR
Copper	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10	1.3[2]	NR	NR
Iron	380	1.7	370	68	310	2.7	0.3[1]	NR	NR

Table 6-1 Comparison of TCLP and DIW Leach Test Results to Regulatory Levels for the Core Samples (mg/L)

Parameter	WJ3-C1		SW2-C2		SW4-C5		MCL (mg/L)	TCLP Criteria (mg/L)	UTS for Soil (mg/L)
	TCLP	DIW	TCLP	DIW	TCLP	DIW			
Lead	650	23	1,200	170	700	30	0.015[2]	5.0	0.75
Magnesium	6.4	9.7	0.96	1.3	0.85	0.80	NR	NR	NR
Manganese	0.18	<0.10	0.20	<0.10	0.11	<0.10	0.05[1]	NR	NR
Nickel	0.52	0.22	1.0	1.0	1.4	0.31	NR	NR	11
Potassium	<40	<10	<10	<10	<10	<10	NR	NR	NR
Selenium	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.05	1.0	5.7
Silver	<0.08	<0.02	0.056	<0.02	0.034	<0.02	0.10[1]	5.0	0.14
Sodium	1,300	28	1,100	13	1,200	13	NR	NR	NR
Thallium	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.002	NR	0.2
Tin	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NR	NR	NR
Vanadium	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NR	NR	1.6
Zinc	2.4	0.14	0.39	<0.10	1.5	<0.10	5[1]	NR	4.3

NR = not regulated
Blue represents values below the laboratory reporting limit (RL).
Dark Shading indicates that the primary standard was exceeded.
Light Shading indicates that the secondary standard was exceeded.

1. *Secondary Standard*
2. *Action Level*

6.2 Comparison of Semi-Dynamic Leach Test Results to Regulatory Levels (MCLs)

The maximum SDL result for each slag core sample, along with the MCL and Action Level is presented in **Table 6-2**. A complete set of the SDL concentrations is provided in **Tables 5-4a, b and c.**

Table 6-2 Maximum SDL Results for Each of the Core Samples Compared to MCLs

Parameter	Maximum SDL Result (mg/L)			MCL (mg/L)
	WJ3-C1	SW2-C2	SW4-C5	
Antimony	0.13	0.011	0.0067	0.006
Arsenic	0.0039	0.0017	0.0031	0.010
Barium	0.031	0.018	0.027	2
Calcium	0.18	0.188	0.784	NR
Cobalt	0.00078	0.00038	0.00046	NR
Iron	9.1	1.9	5.7	0.3[2]
Lead	0.57	0.16	0.008	0.015[1]
Nickel	0.0032	0.0032	0.0021	NR

Shading indicates that the MCL or Action Level was exceeded

1. *Action Level*
2. *Secondary Standard*

The only concentrations that exceeded the primary MCL or Action Level were for antimony and lead. In general, the concentrations were much lower than for the DIW and TCLP test despite the lower solution to soil ratio used (see **Table 6-1**). The lead concentrations measured in the SDL leachate from sample WJ3-C1 remained high (compared to the Action Level) and relatively constant during all sampling times. The concentrations of lead ranged from a low of 0.17 mg/L at 90 total days to a high of 0.57 mg/L at 14 total days. The concentrations of lead in the SDL leachate from sample SW2-C2 were only high (compared to the Action Level) during the first few samples (up to one day total time). As shown, the concentrations of lead in the SDL leachate from sample SW4-C5 were relatively low and below the action level.

6.3 Differences Among the Leach Tests and Actual Field Conditions

The differences among the TCLP, DIW, and SDL leach test conditions and those in the field (either saltwater or rain water) include differences in the leach solutions, particle size of the slag, the type of system (closed vs. open) and the quantity of leach solution.

6.3.1 Leach Solution

The differences in the leach solutions used in the TCLP, DIW and SDL tests compared to the seawater or rain water present under field conditions are significant and include:

- pH: The pH of seawater is approximately 8 su (Hem 1971), and the pH of the rain water on the east coast varies from 3.8-4.8 su (inland source) to 5.0-5.6 su, if from the Atlantic

Ocean. The pH of the leaching solution used in the TCLP test is 2.88 su but is near-neutral to slightly acidic in the DIW and SDL tests.

The differences in pH have a significant impact on the leachability of the lead phases present within the slag. Under low pH conditions, the mineral cerussite ($PbCO_3$) present in the slag dissolves to form lead and bicarbonate ions:

$$PbCO_3\ (s) + H^+ \rightarrow HCO_3^-\ (aq) + Pb^{+2}\ (aq) \qquad (6\text{-}1)$$

Therefore reaction 6-1 is more likely to occur in TCLP test conditions and less likely to occur with seawater, SDL and DIW testing conditions.

- Salinity: The salinity (and ionic strength) of seawater is significantly higher than the TCLP, DIW, SDL and rain water leaching solutions. The high salinity of seawater (i.e., increased ionic strength, decreased activity coefficient) increases the solubility of minerals such as cerussite compared to low salinity solutions such as TCLP, DIW and SDL leaching solutions. The effect, however, is negligible compared to the effect of pH described above. The high concentration of chloride ions could complex with metal ions such as lead, which would increase the solubility of minerals. One possible reaction is:

$$PbCO_3\ (s) + Cl^-\ (aq) + H^+\ (aq) \rightarrow HCO_3^-\ (aq) + PbCl^+\ (aq) \qquad (6\text{-}2)$$

Even stronger metal ion complexes occur between lead and acetates in the TCLP tests. One example of a lead acetate complex is:

$$PbCO_3\ (s) + CH_3CH_2OOH^0\ (aq) \rightarrow HCO_3^-\ (aq) + PbCH_3CH_2COO^+\ (aq) \qquad (6\text{-}3)$$

- Concentration of organic acid: The concentrations of organic acids (i.e. acetic acid) are much lower in seawater, rain water, DIW and SDL test solutions than in the TCLP solutions.

The TCLP test uses a 0.1 mole/L acetic acid solution to simulate the organic acids present in landfill leachate. Due to the strong metal-acetate complexes formed (see equation 6-3), the solubility of metal-bearing minerals such as cerussite can be greatly increased as a result. In order to quantify the effect of pH, complexing and other differences between the leach solutions, the USGS program PHREEQC (Parkhurst and Appelo, 1999) was used to equilibrate each leach solution with an unlimited supply of cerrusite. The differences in the total lead concentrations of the equilibrated solutions was dramatic, with a lead concentration of 136,268 mg/L for the TCLP solution, compared to 1.66 mg/L for the DIW and 6.60 mg/L for the seawater. Rain water would be similar to the DIW. The simulations can be viewed as only approximate, because the dissolution of other minerals such as fayalite from the slag into the leachate solution was not considered. In reality, several minerals dissolve from the slag simultaneous, but in order to simply the simulations only cerrusite was considered. Therefore, the results should not be viewed as absolute concentrations, but only as a means of comparing the effect of different solutions on the solubility of a single lead mineral. In addition to the total lead concentrations, the speciation of lead within the different solutions was also determined. Nearly 100% of the lead in the TCLP solution exists as the different lead-acetate complexes, illustrating the huge effect of acetate on cerussite solubility. The lead concentration within seawater is slightly higher than for DIW, illustrating the complexing of lead with chloride ion and to some

extent the ionic strength effects. Approximately 74% of the 6.60 mg/L lead exists as chloride complexes.

6.3.2 Particle Size

The slag used in the DIW and TCLP tests was crushed and consequently had a much smaller particle size and larger surface area compared to the slag within the seawall and jetty. As previously discussed, the SDL tests used core samples that were not crushed and therefore are more representative of the slag within the seawall and jetty. The crushing increased the surface area available for reactions to take place compared to the in-place slag at the site. Minerals which are completely encased within the bulk slag and unavailable for reaction at the site would be exposed to the TCLP and DIW leach solution during the TCLP and DIW batch tests because of the crushing of the slag samples.

6.3.3 Open vs. Closed System

The DIW and TCLP tests were conducted in closed systems in which the crushed slag is allowed to react with a fixed volume of solution. Reactants are not added to the system and products are not removed (with the possible exception of some gas transfer). The SDL test is also conducted in a closed system; however as previously discussed, the leaching solution (DIW) was replaced 13 times during the test. As discussed in section 5.3.4.2, some gas transfer between the leaching solution and the atmosphere did occur during the SDL tests. The field conditions and slag at the site represent both open and semi-closed systems. An open system would be present at the surface of the slag in the seawalls and jetty where an essentially infinite supply of seawater is present to supply reactants and carry away products. Likewise an open system would be present for slag on the ground surface in other areas of the site where it is exposed to rain water. Therefore, equilibrium conditions are not likely at the outside surfaces of the slag in these locations. Equilibrium conditions are much more likely within the pores and fractures within the slag. Therefore, the rate of release of lead and other metals from the slag would primarily be a function of the rate of diffusion of the metals from the slag into the sea and rain water. As previously discussed, the SDL tests better simulate diffusion processes.

6.3.4 Quantity of Leach Solution

As summarized in **Table 3-2**, the ratio of solid to leach solution (slag to water in terms of g/mL) for the TCLP and DIW was 1:20 and for the SDL ranged from 1:2.17 to 1:2.36. However, the amount of leaching solution (water) in the environment will vary from very small in the case of leaching of soil by groundwater to large in the case of leaching in a open system by seawater or rain water. Depending upon the release mechanism (e.g., diffusion or equilibrium dissolution), the concentrations in the water (leach solution) may be similar or very different depending upon the amount of water (leach solution).

6.3.5 Applicability of Leaching Tests to Field Conditions

The TCLP test is a regulatory classification test and was developed to simulate testing in landfills (low pH and organic acids). Therefore the TCLP results are not representative of conditions or metal concentrations anticipated at the Raritan Bay Slag site. Leaching with DIW is more representative of rain water or sea water. However, the DIW leaching test

used a crushed slag sample. The freshly exposed surfaces and high surface area in the DIW test do not represent conditions at the site. Due to these laboratory conditions, the metal concentrations from the DIW tests would typically be higher than those observed at the site. With the use of core (vs. crushed) samples, the SDL tests using DIW probably most closely simulate actual site conditions. However, conditions at the site typically represent an open system and the orange/rust colored precipitate observed during the SDL tests would not typically be present at the site. As previously discussed, the high chloride content of the seawater will also potentially increase lead concentrations when compared to DIW or rain water. In all cases, the variable amounts of leaching solution at the site (seawater or rain water) compared to the fixed amounts used in the laboratory leaching tests will also affect metal concentrations.

7.0 Summary and Conclusions

Major conclusions as a result of the tests conducted on the core samples include the following:

- Evaluation of the SDL test results provide baseline diffusion coefficients for major metals of concern (e.g., lead) for the slag. These values can be compared to any subsequent measured diffusion coefficients from SDL tests conducted on various S/S formulations and therefore can be used to evaluate the effectiveness of the S/S.
- The concentrations measured during the SDL tests of the metals in the leachate were much lower than the concentrations of metals measured from the TCLP and DIW tests. The concentrations measured in the SDL leachate are more representative of potential interaction of rain water with intact slag (vs. crushed slag used in the DIW tests). However, concentrations above the lead action level (0.015 mg/L) and antimony MCL (0.006 mg/L) were measured in the SDL leachate during the tests for some of the core samples.

The ALT modeling and evaluations also provided some additional insights to those provided in the Characterization Report. A summary of these findings include the following:

- The change in pH (e.g., increase of pH) of leachate in contact with the slag during the leach tests appears to be controlled by dissolution of fayalite and other silicate minerals.
- At low pH (<~6), dissolution of lead carbonates and iron monosulfides (with associated trace metals) occurs. This dissolution results in elevated concentrations of lead.
- Aqueous concentrations of metals, arsenic, and antimony are limited by diffusion for time intervals of a day or less.
- Over time intervals greater than a day, gas transfer, oxidation, and precipitation reactions have time to occur. Although the amount of metal released to the leachate is likely greater than for the diffusion controlled samples, the metals are re-attenuated, resulting in low net leaching.

8.0 References

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Figures

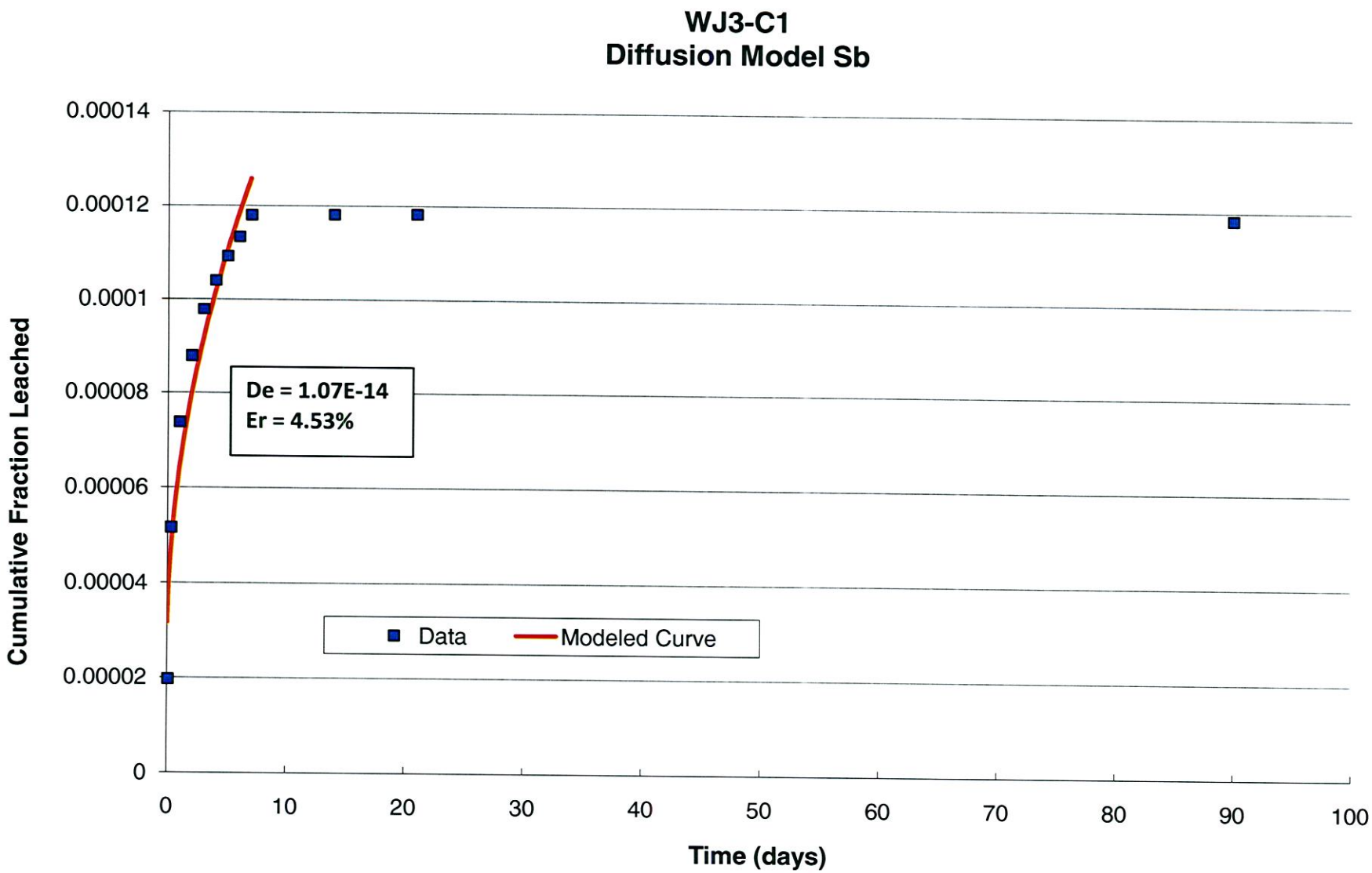

Figure 5-1 - Sample WJ3-C1 - ALT Modeling Results for Sb

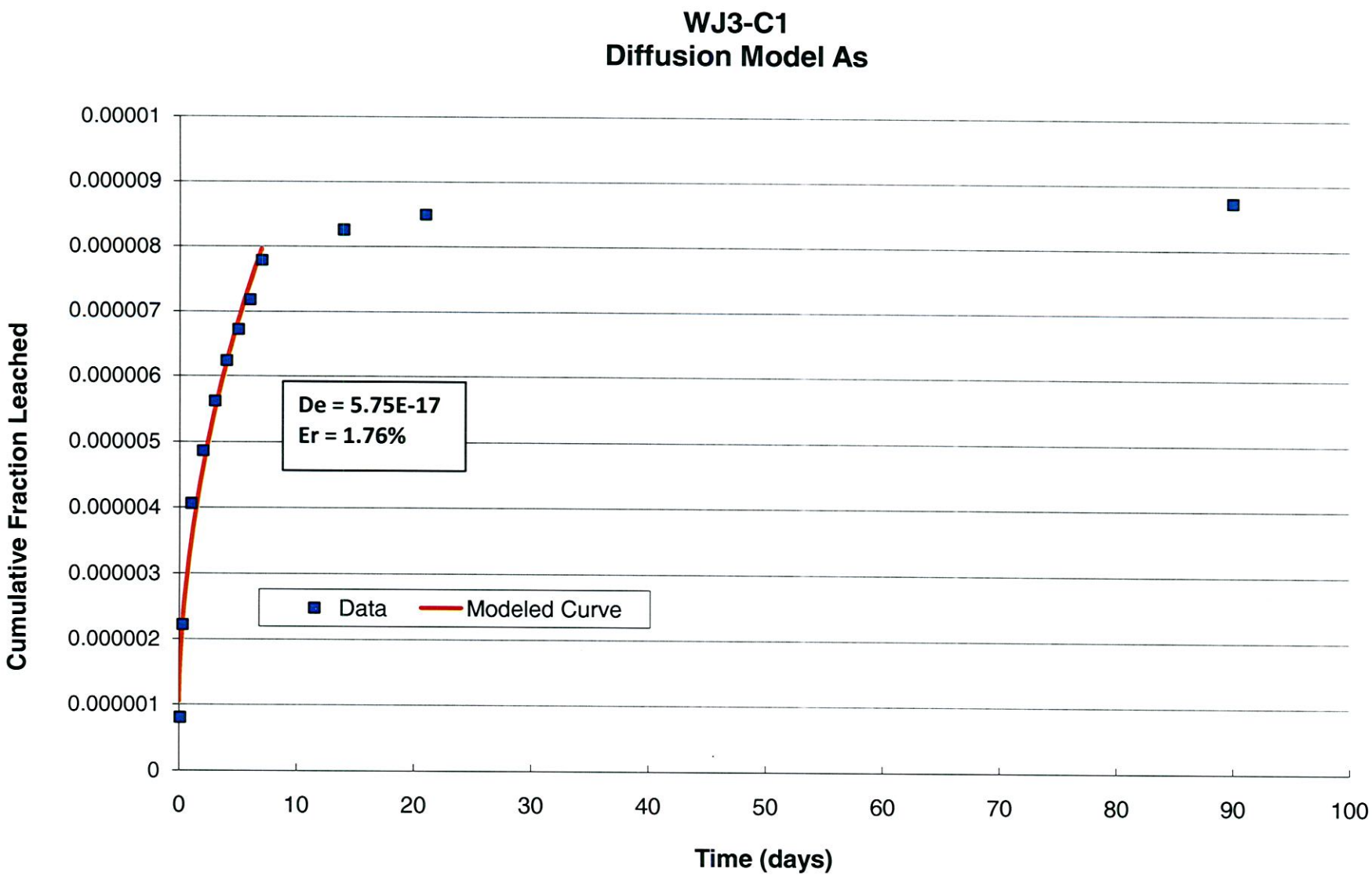

Figure 5-2 - Sample WJ3-C1 - ALT Modeling Results for As

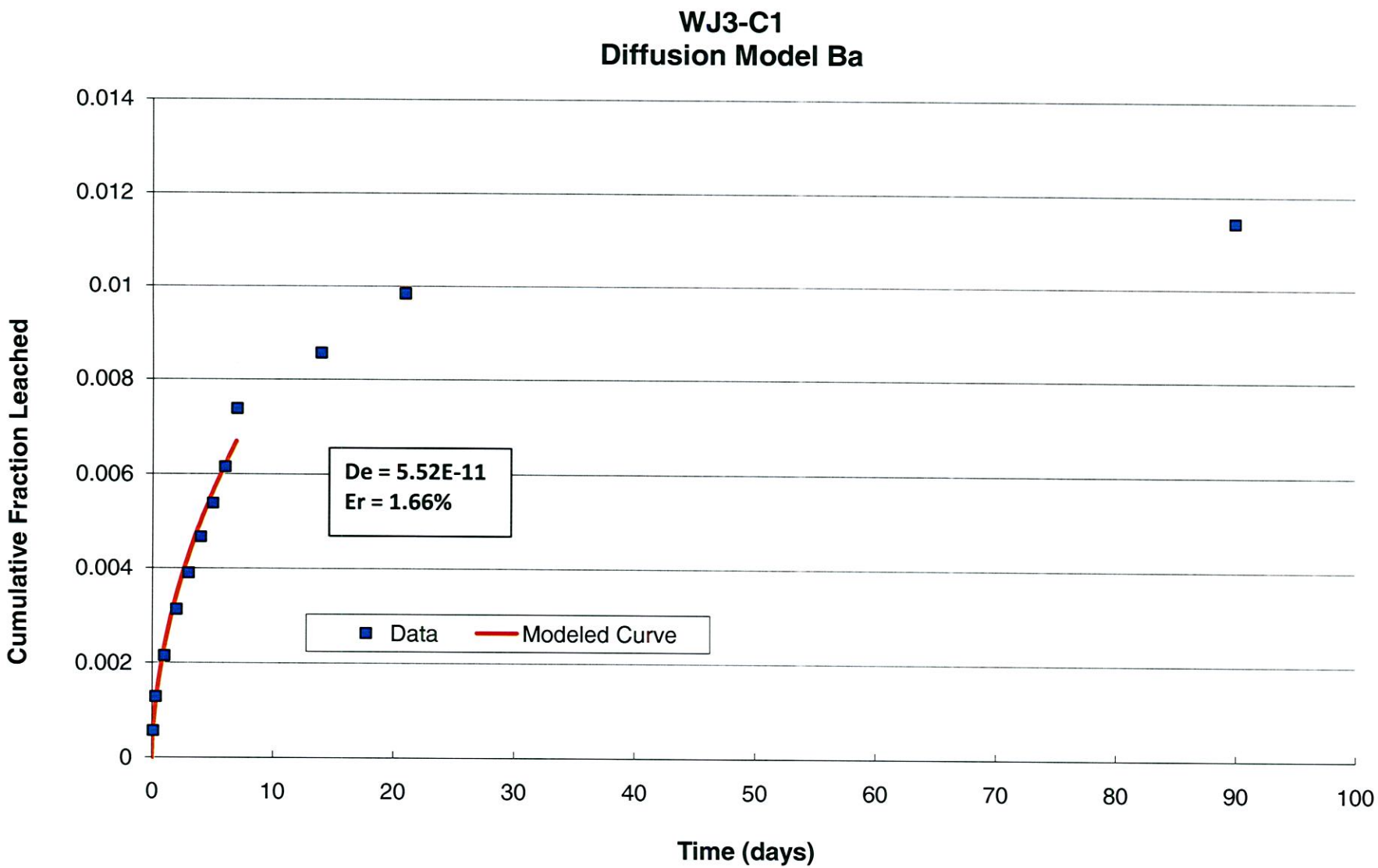

Figure 5-3 - Sample WJ3-C1 - ALT Modeling Results for Ba

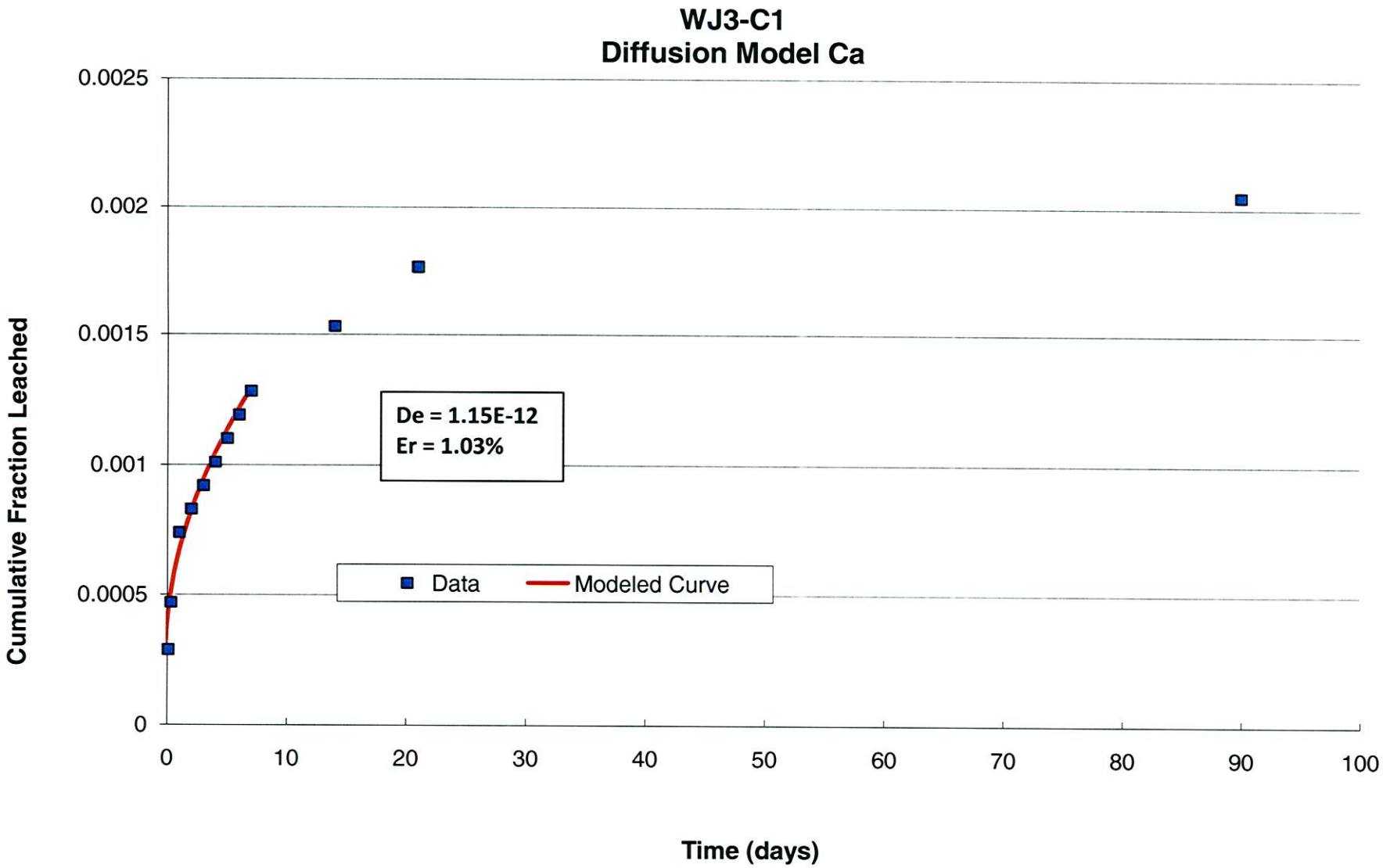

Figure 5-4 - Sample WJ3-C1 - ALT Modeling Results for Ca

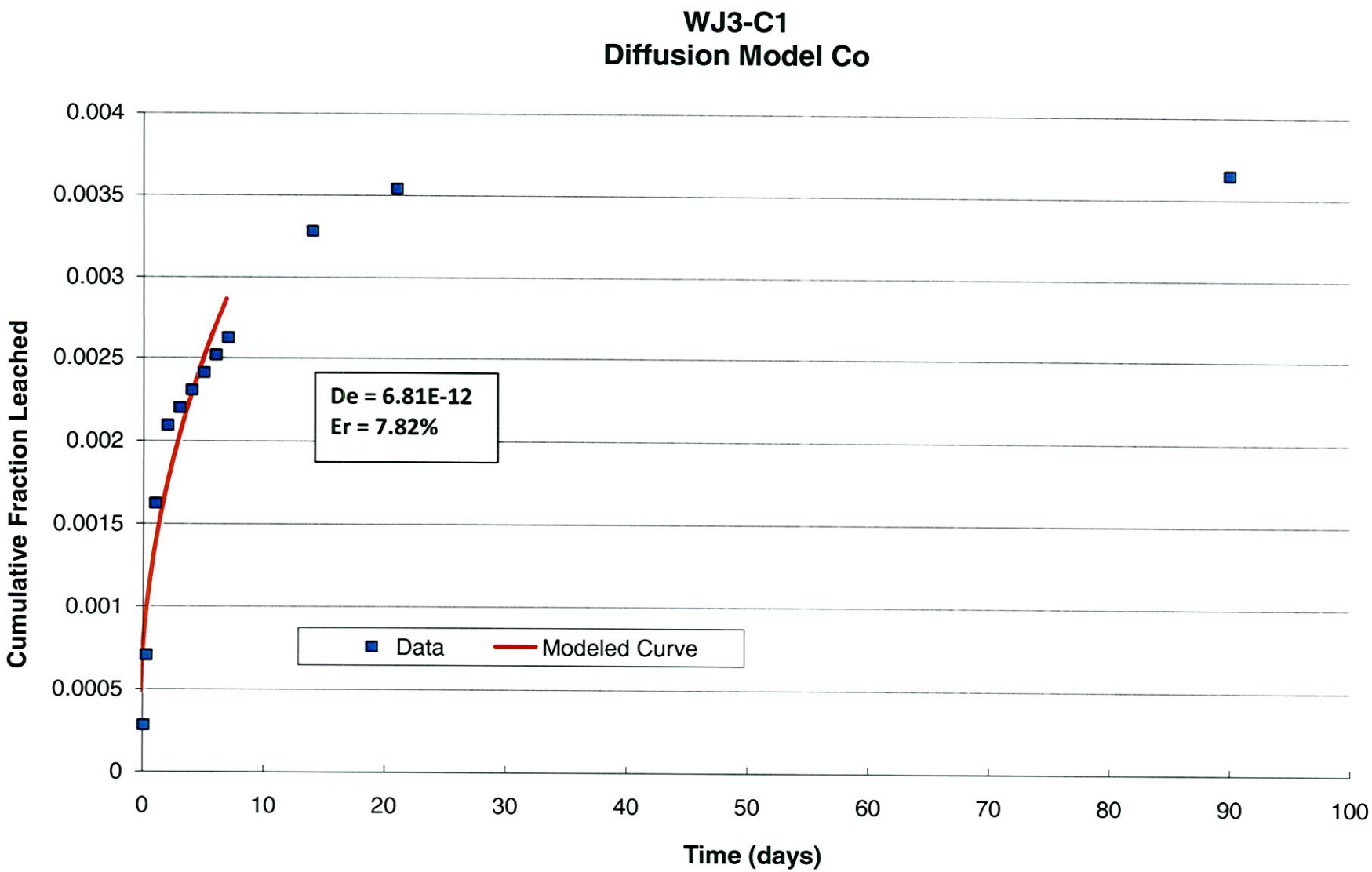

Figure 5-5 - Sample WJ3-C1 - ALT Modeling Results for Co

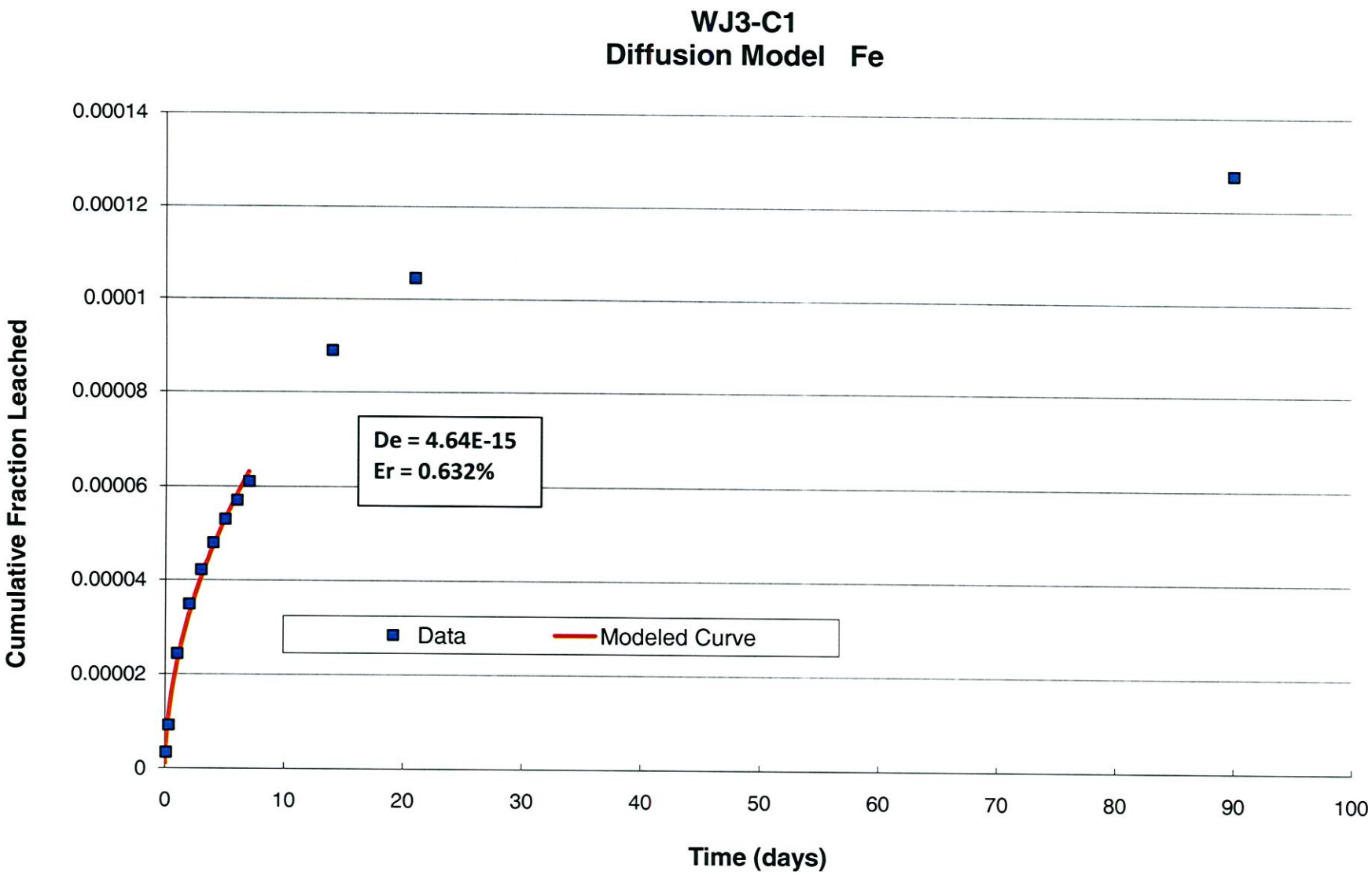

Figure 5-6 - Sample WJ3-C1 - ALT Modeling Results for Fe

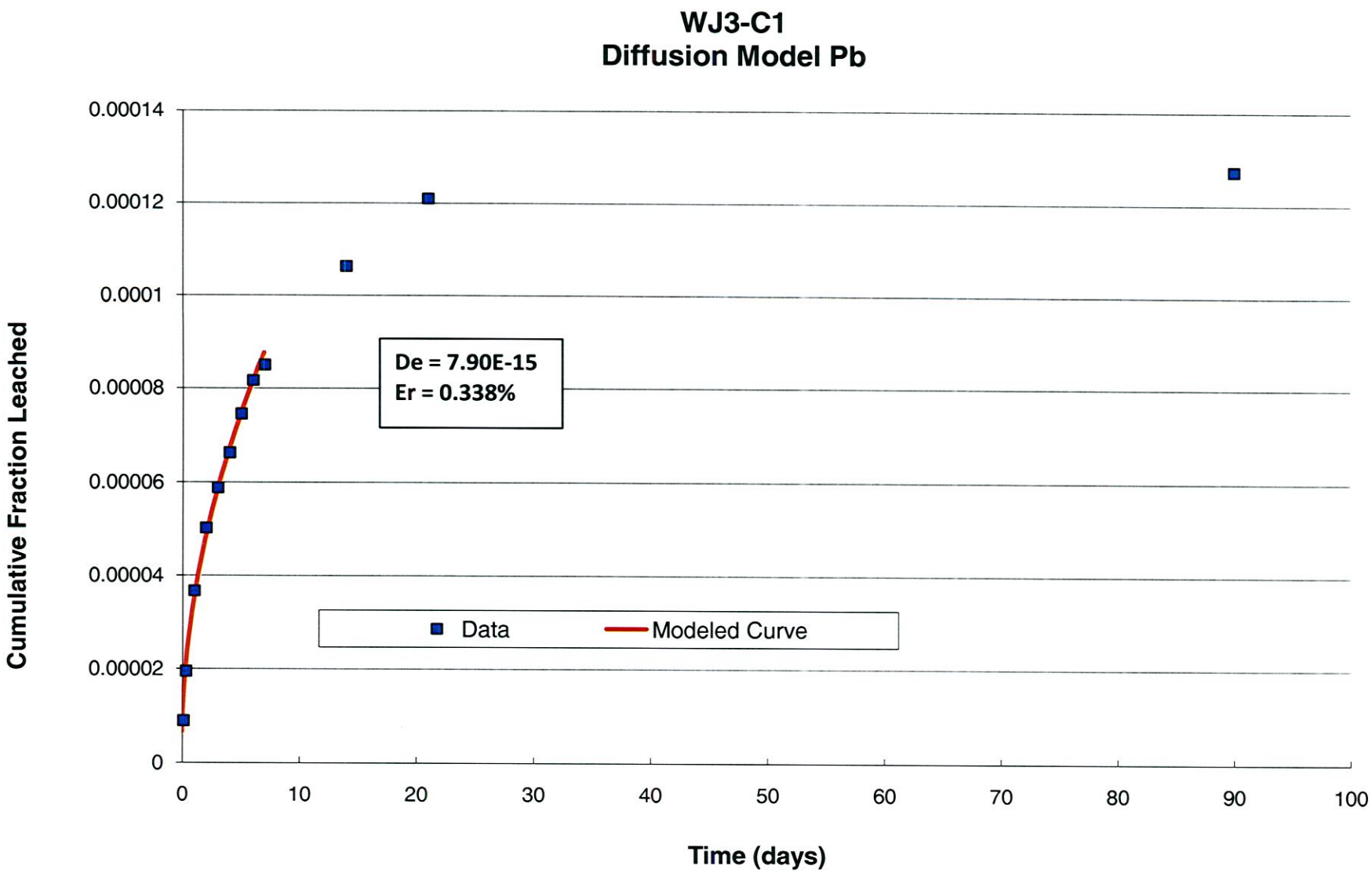

Figure 5-7 - Sample WJ3-C1 - ALT Modeling Results for Pb

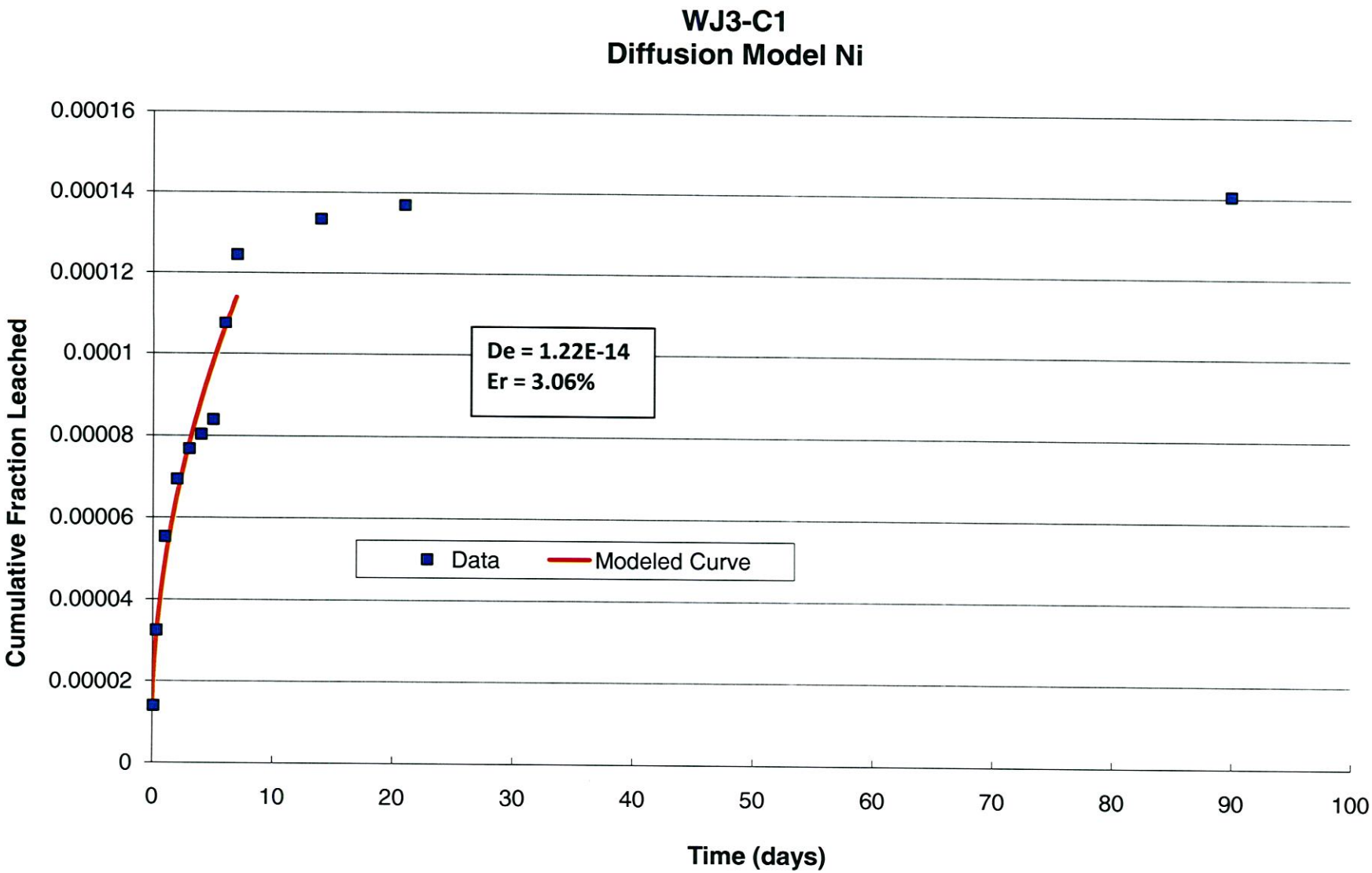

Figure 5-8 - Sample WJ3-C1 - ALT Modeling Results for Ni

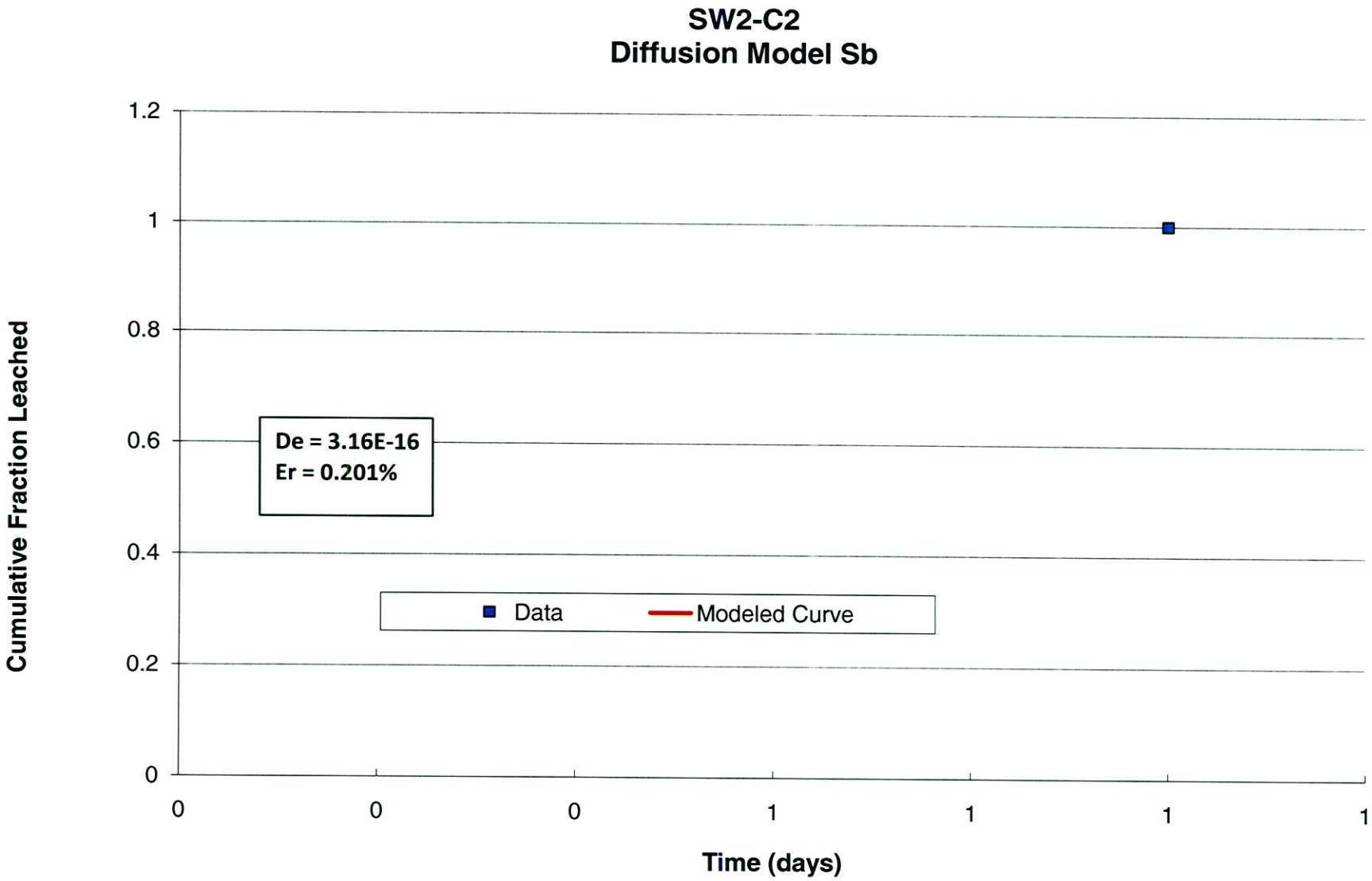

Figure 5-9 - Sample SW2-C2 - ALT Modeling Results for Sb

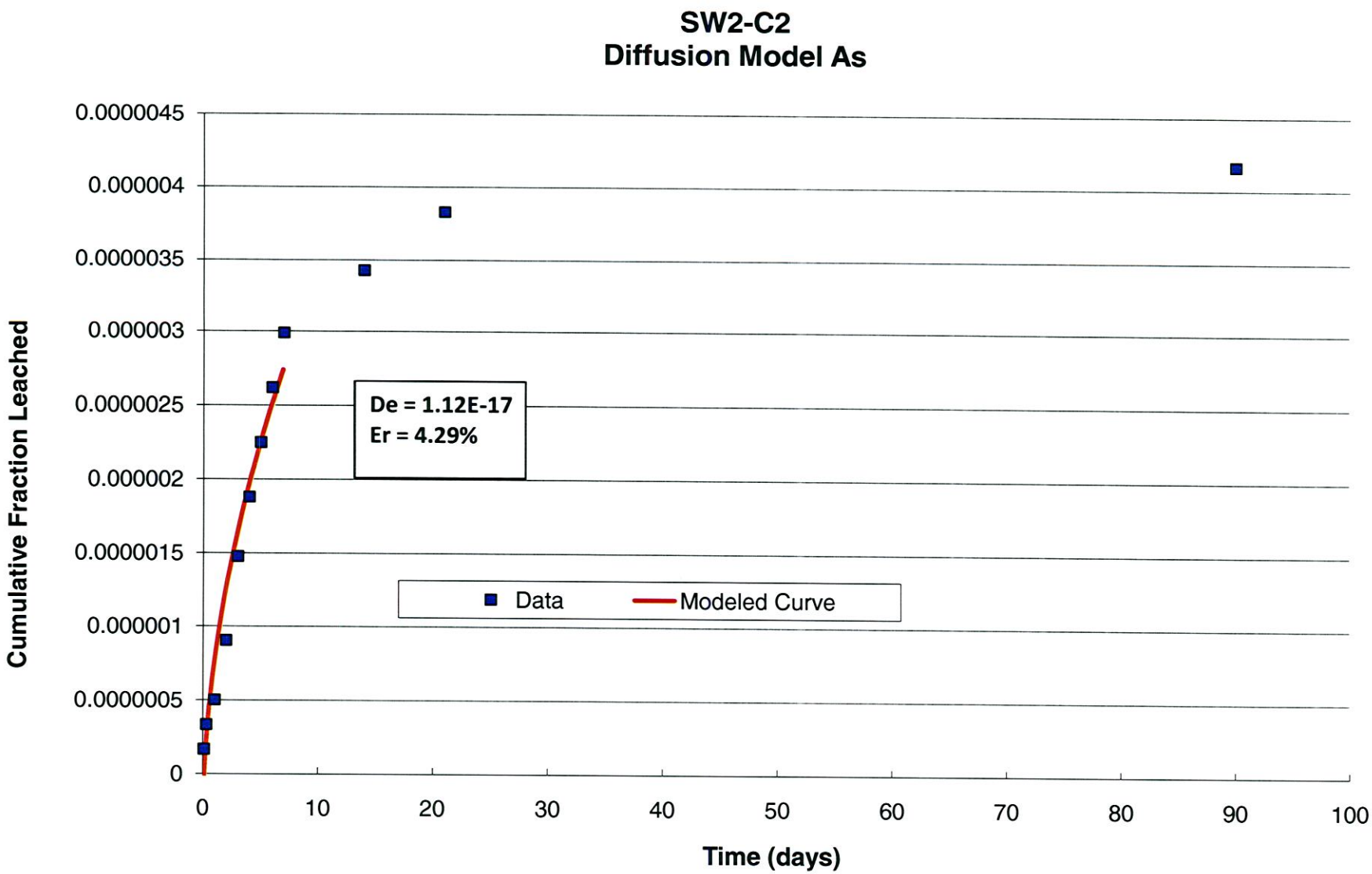

Figure 5-10 - Sample SW2-C2 - ALT Modeling Results for As

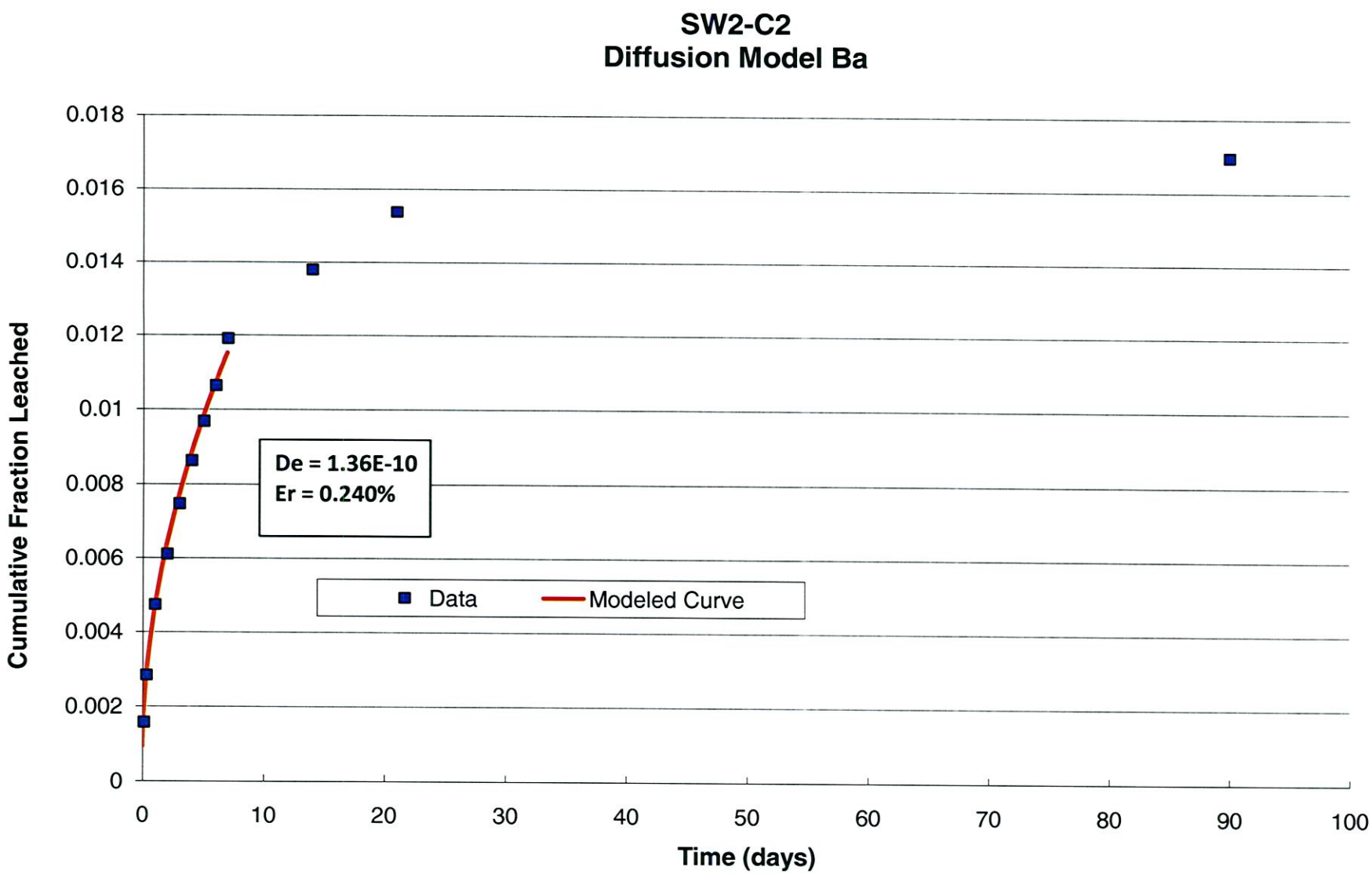

Figure 5-11 - Sample SW2-C2 - ALT Modeling Results for Ba

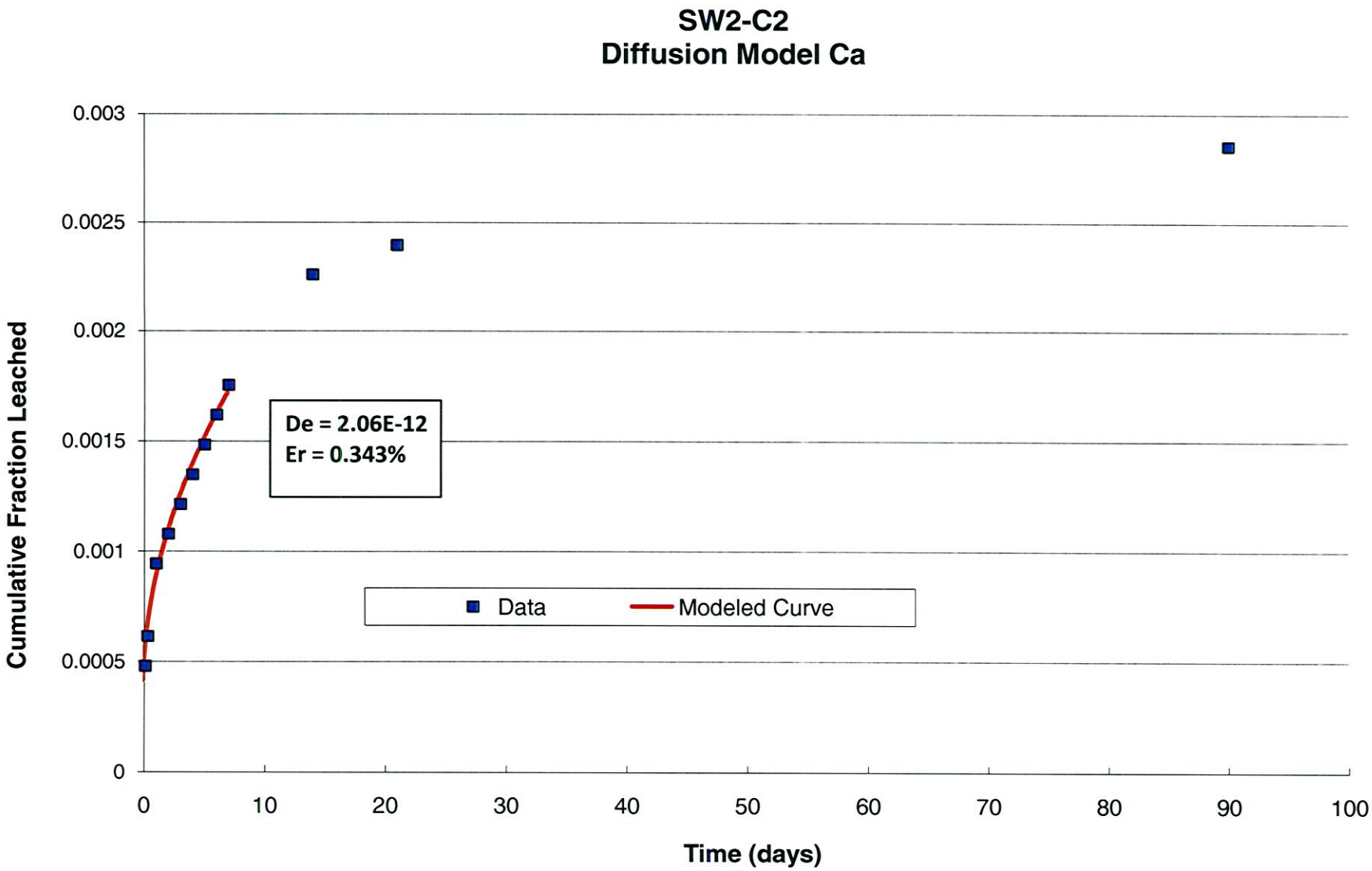

Figure 5-12 - Sample SW2-C2 - ALT Modeling Results for Ba

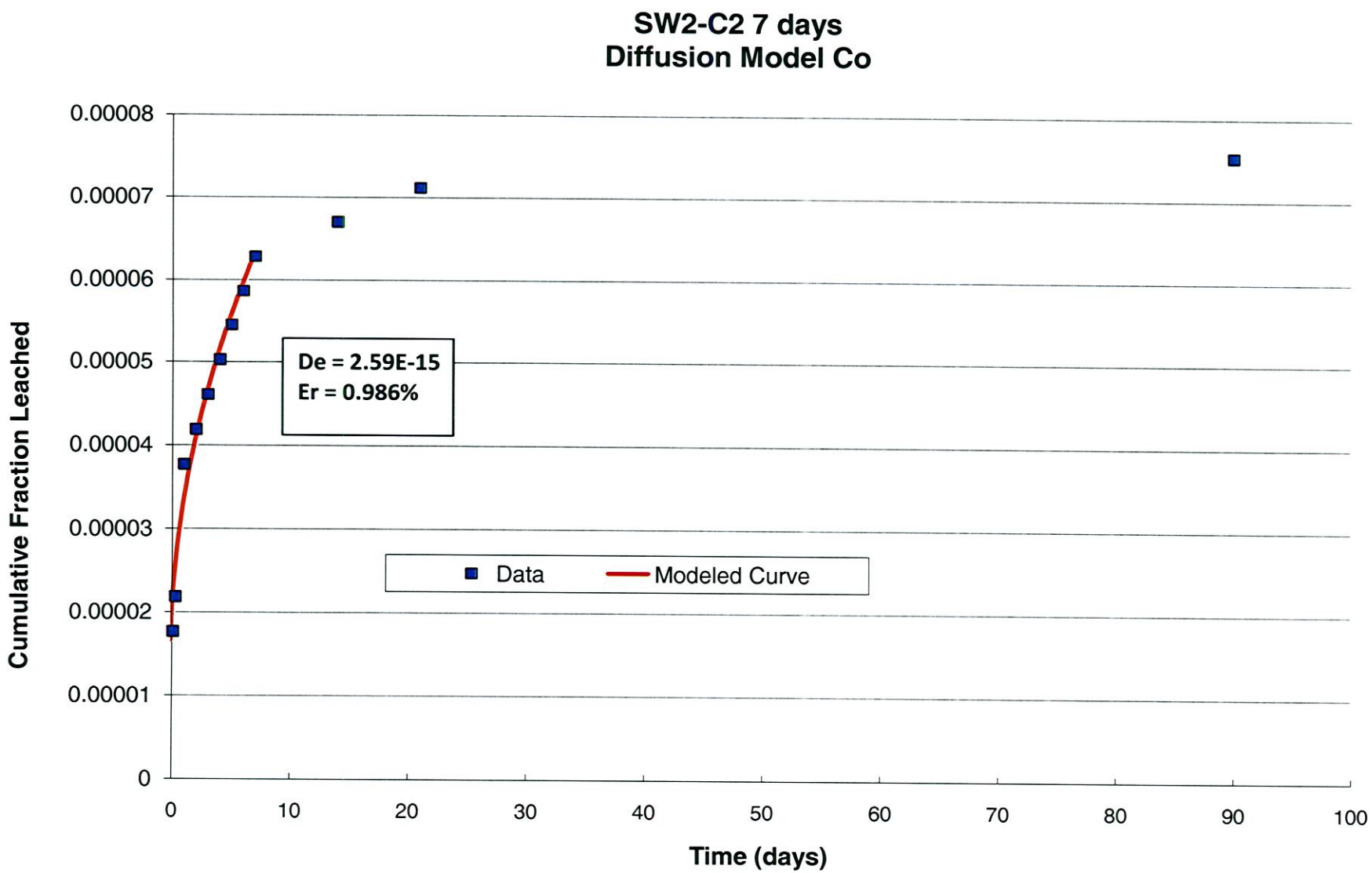

Figure 5-13 - Sample SW2-C2 - ALT Modeling Results for Co

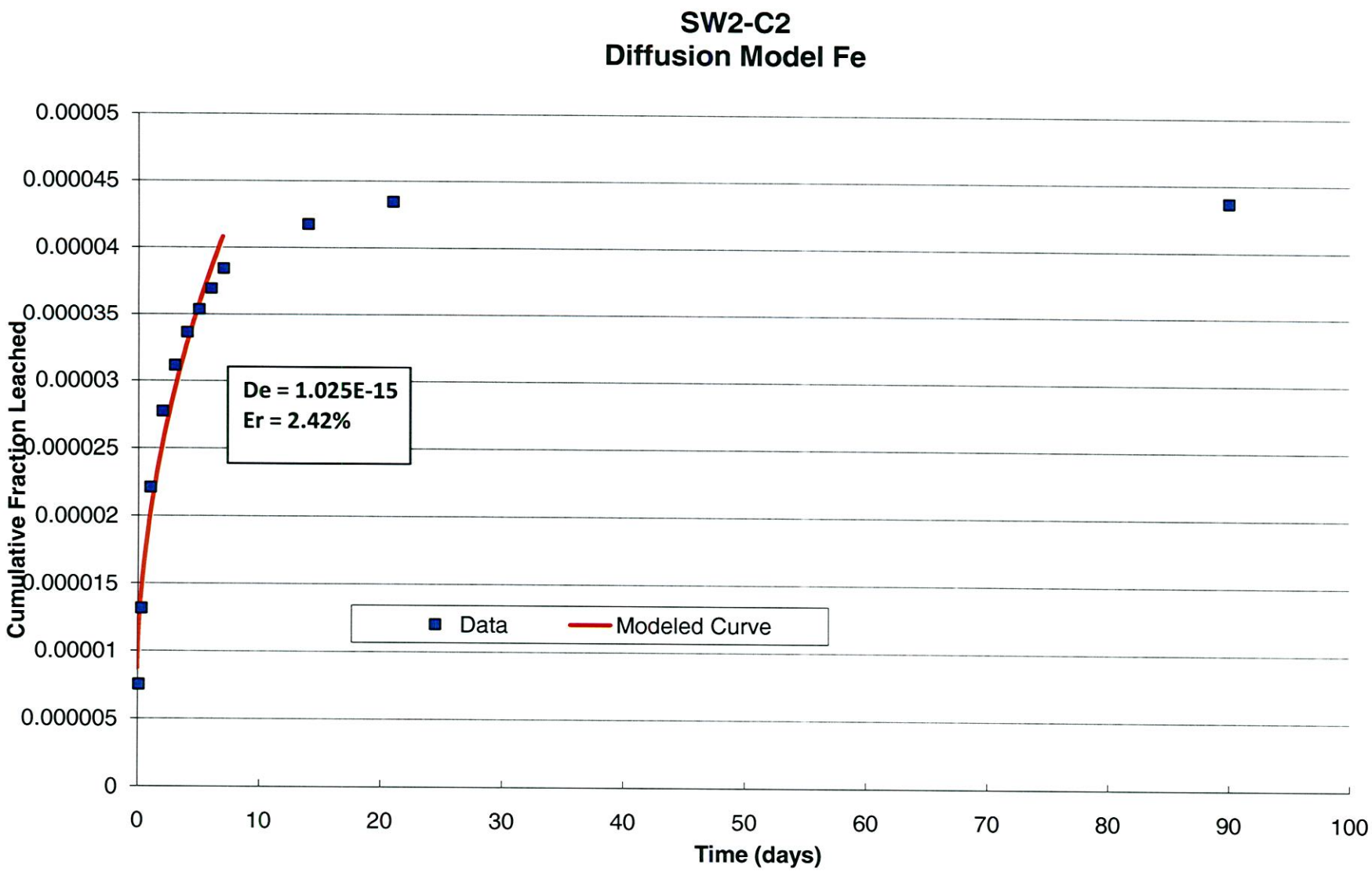

Figure 5-14 - Sample SW2-C2 - ALT Modeling Results for Fe

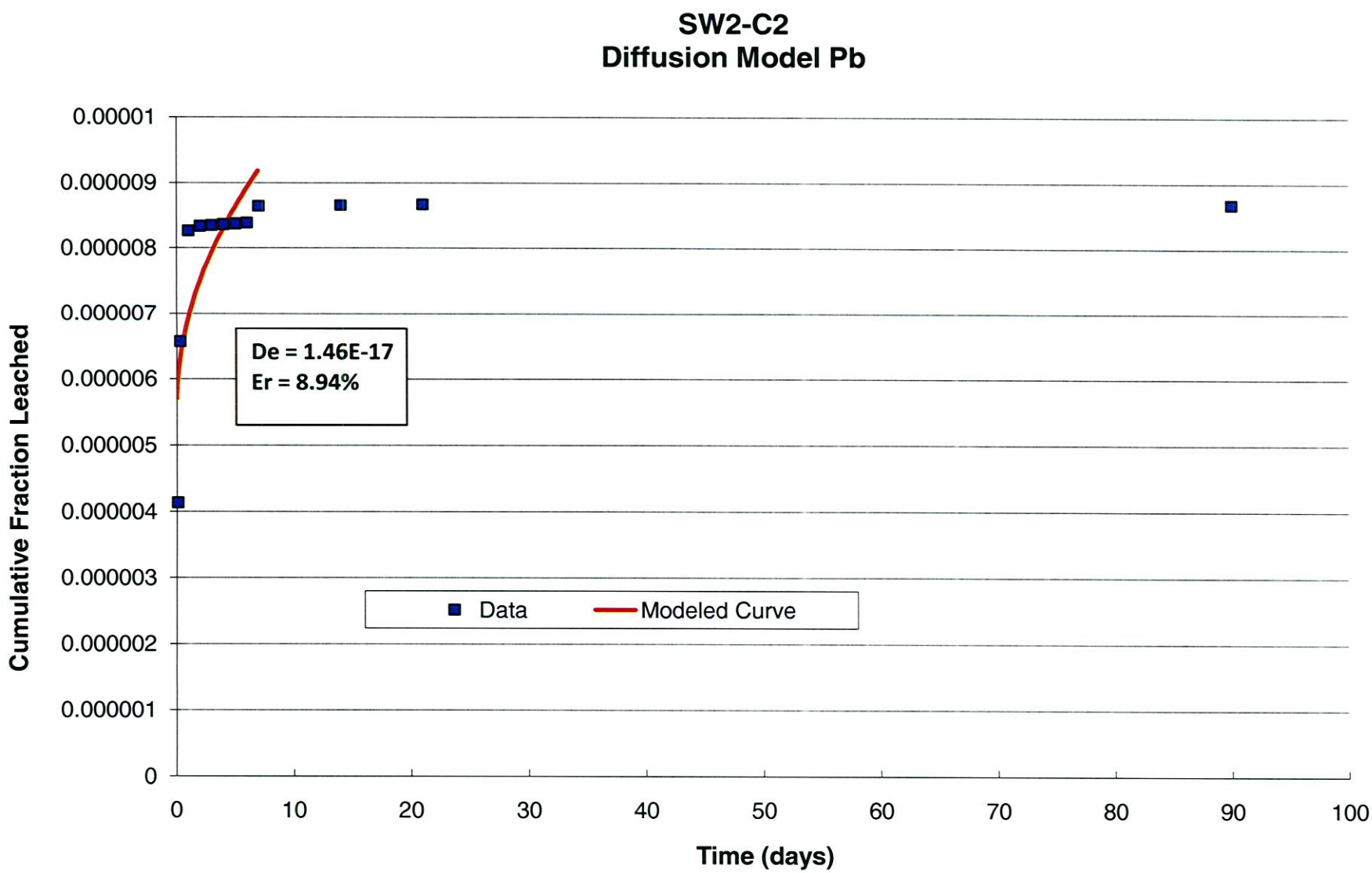

Figure 5-15 - Sample SW2-C2 - ALT Modeling Results for Pb

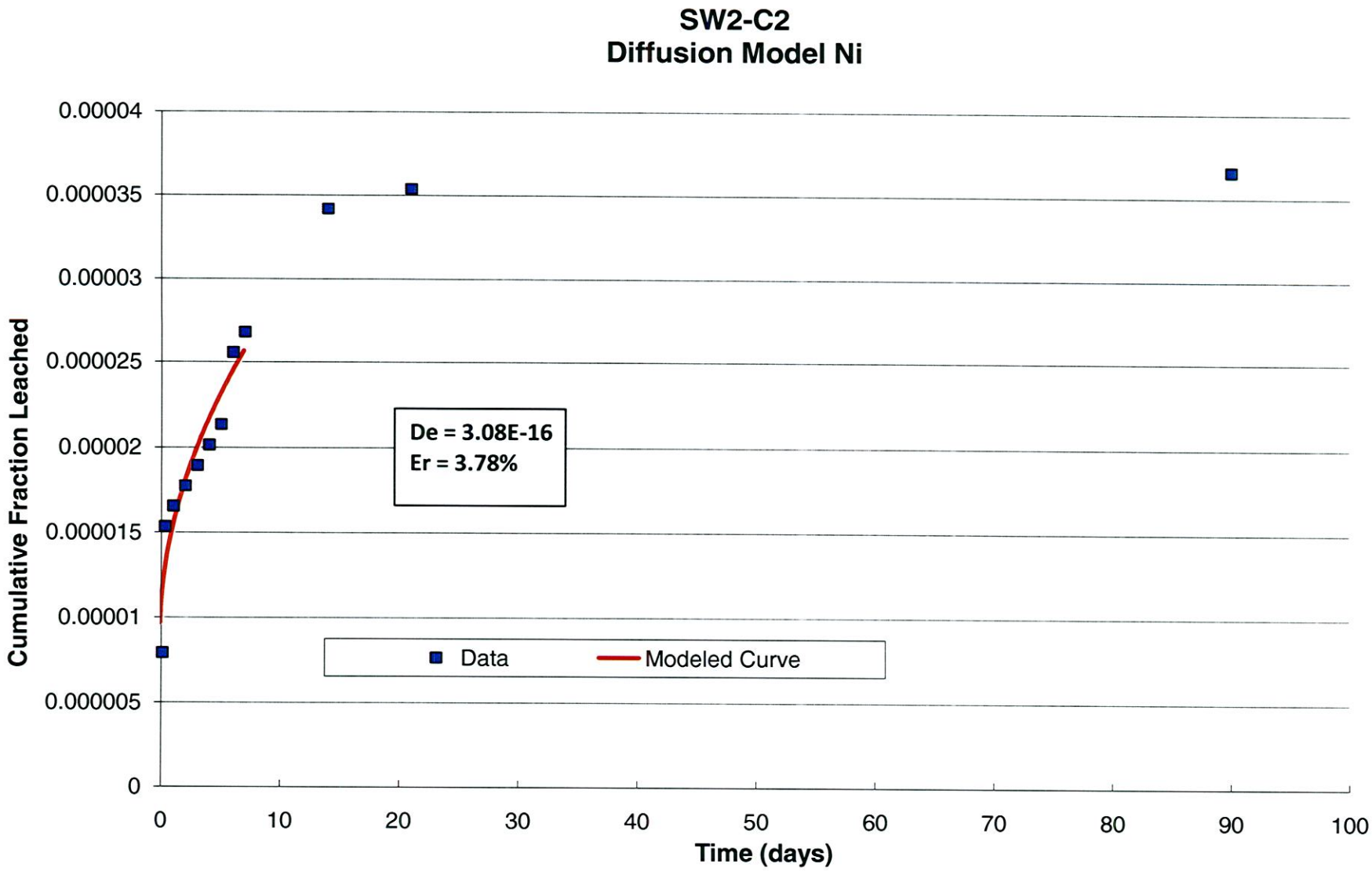

Figure 5-16 - Sample SW2-C2 - ALT Modeling Results for Ni

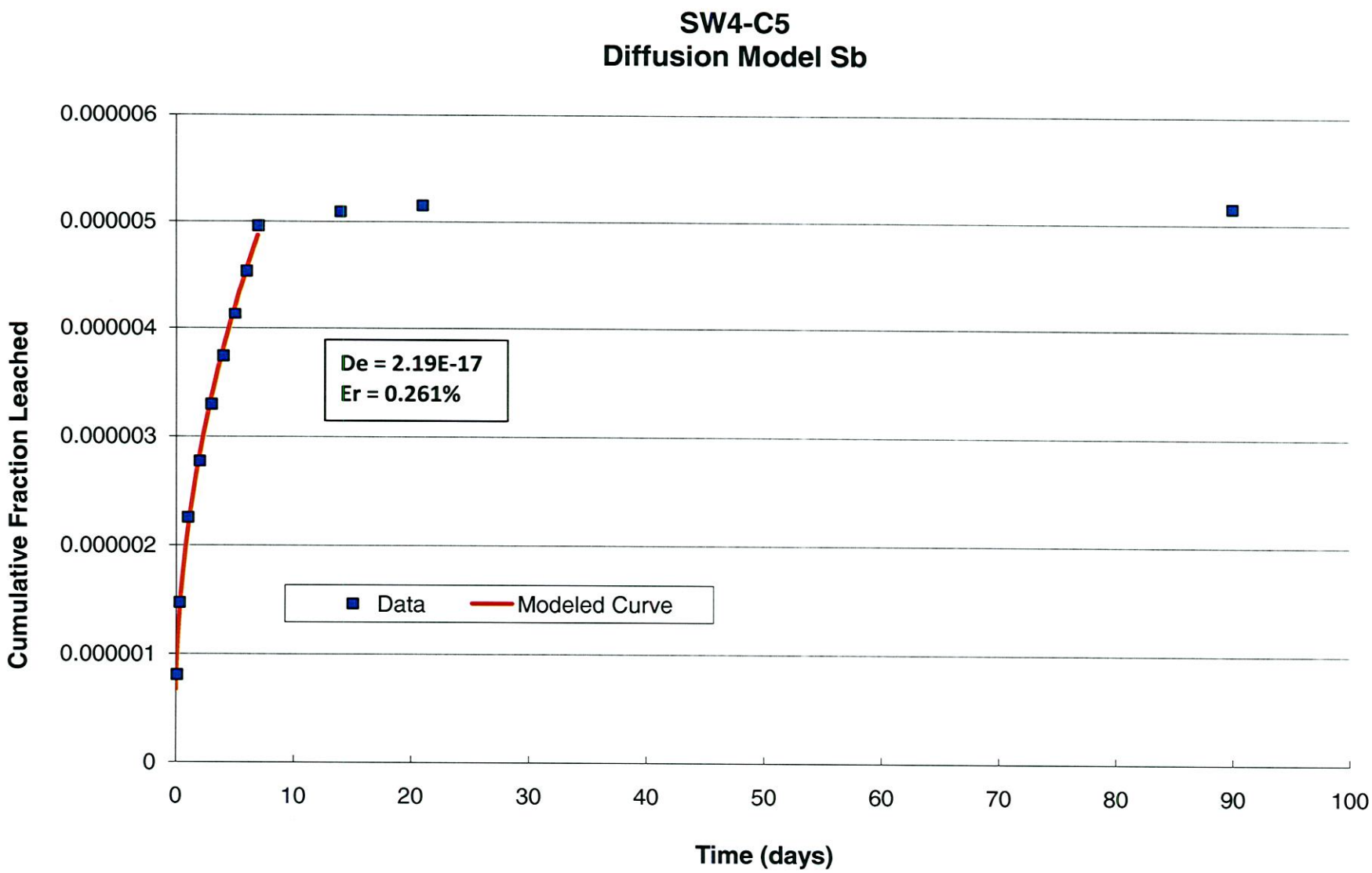

Figure 5-17 - Sample SW4-C5 - ALT Modeling Results for Sb

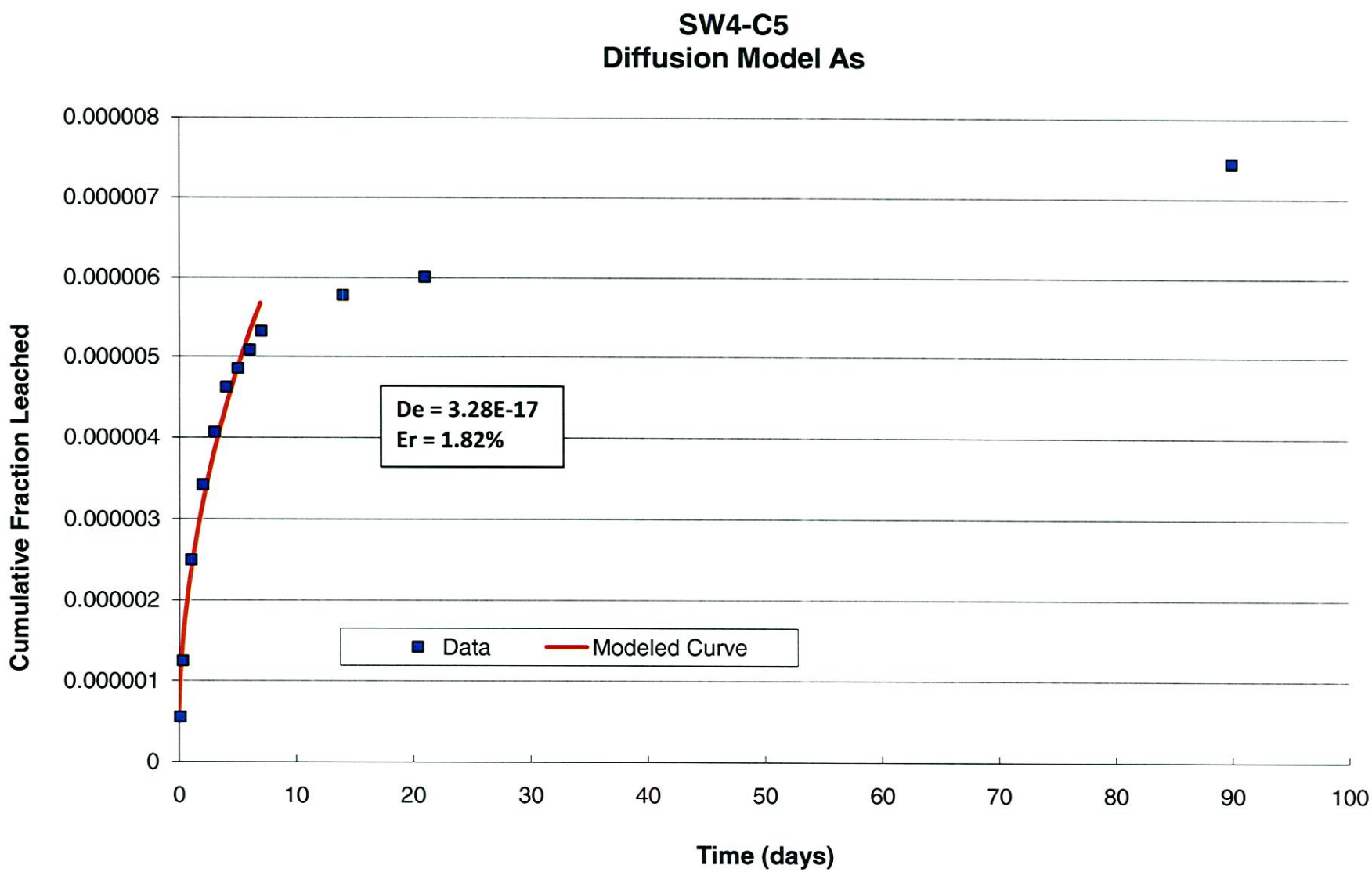

Figure 5-18 - Sample SW4-C5 - ALT Modeling Results for As

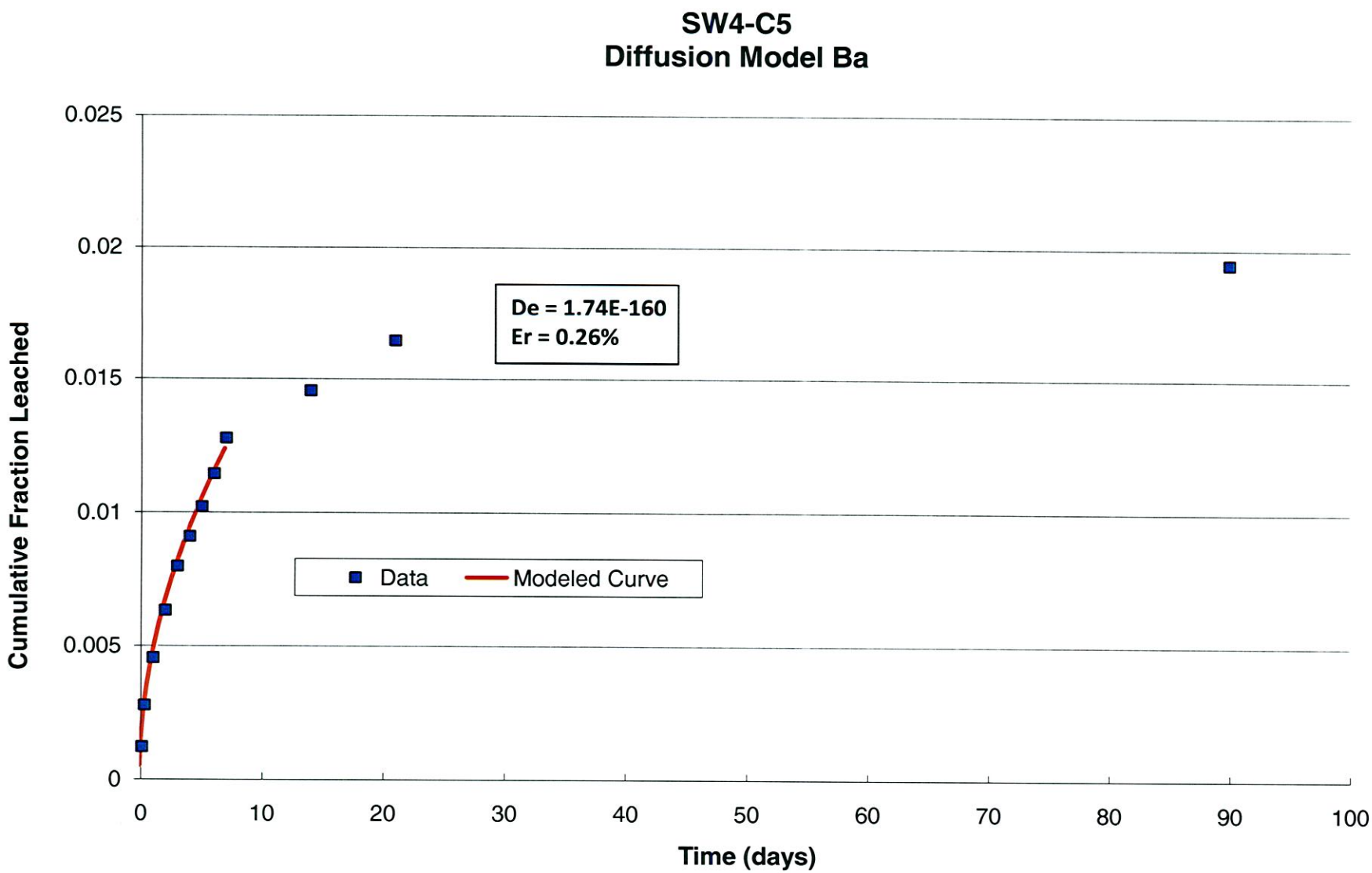

Figure 5-19 - Sample SW4-C5 - ALT Modeling Results for Ba

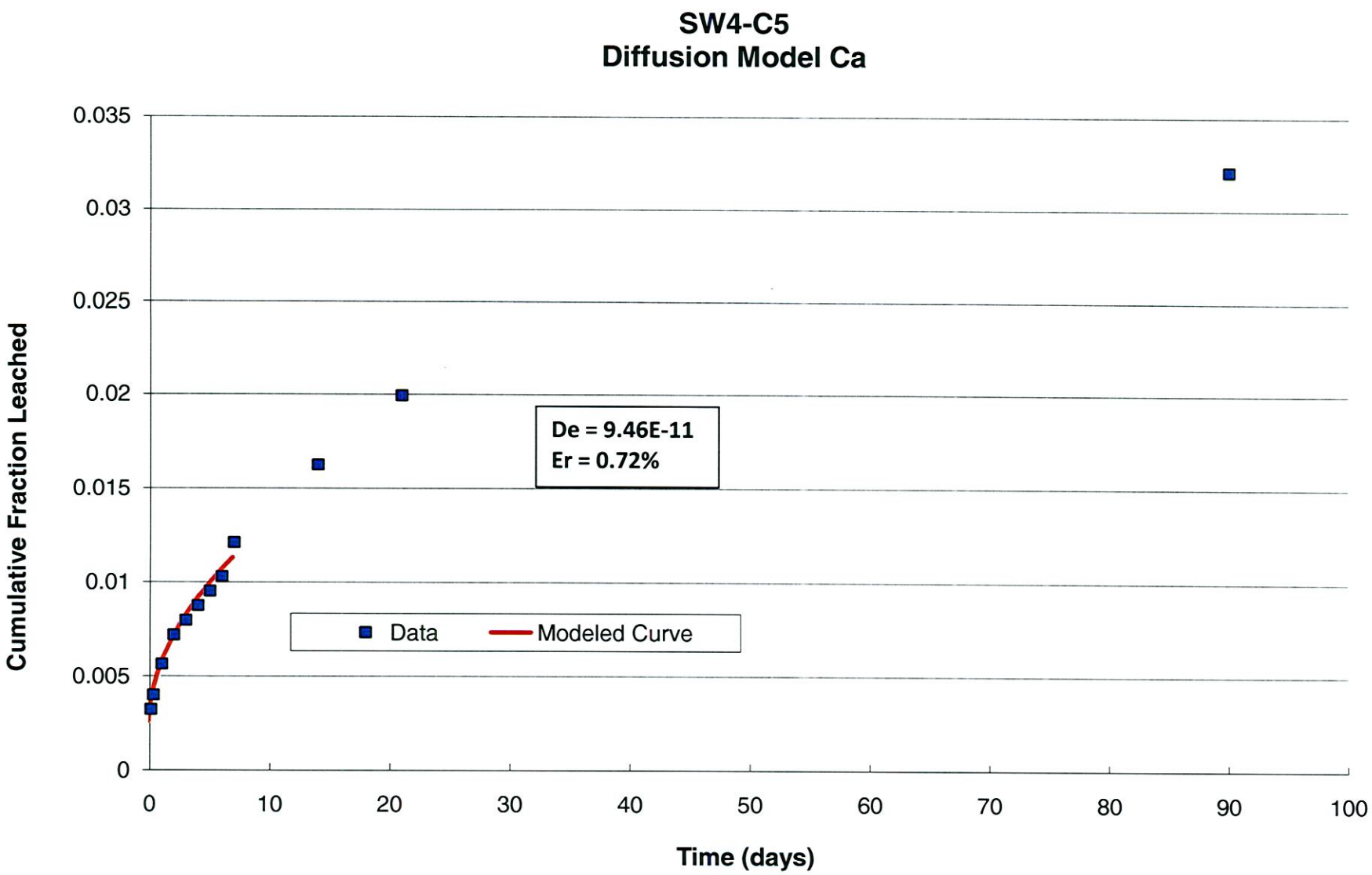

Figure 5-20 - Sample SW4-C5 - ALT Modeling Results for Ca

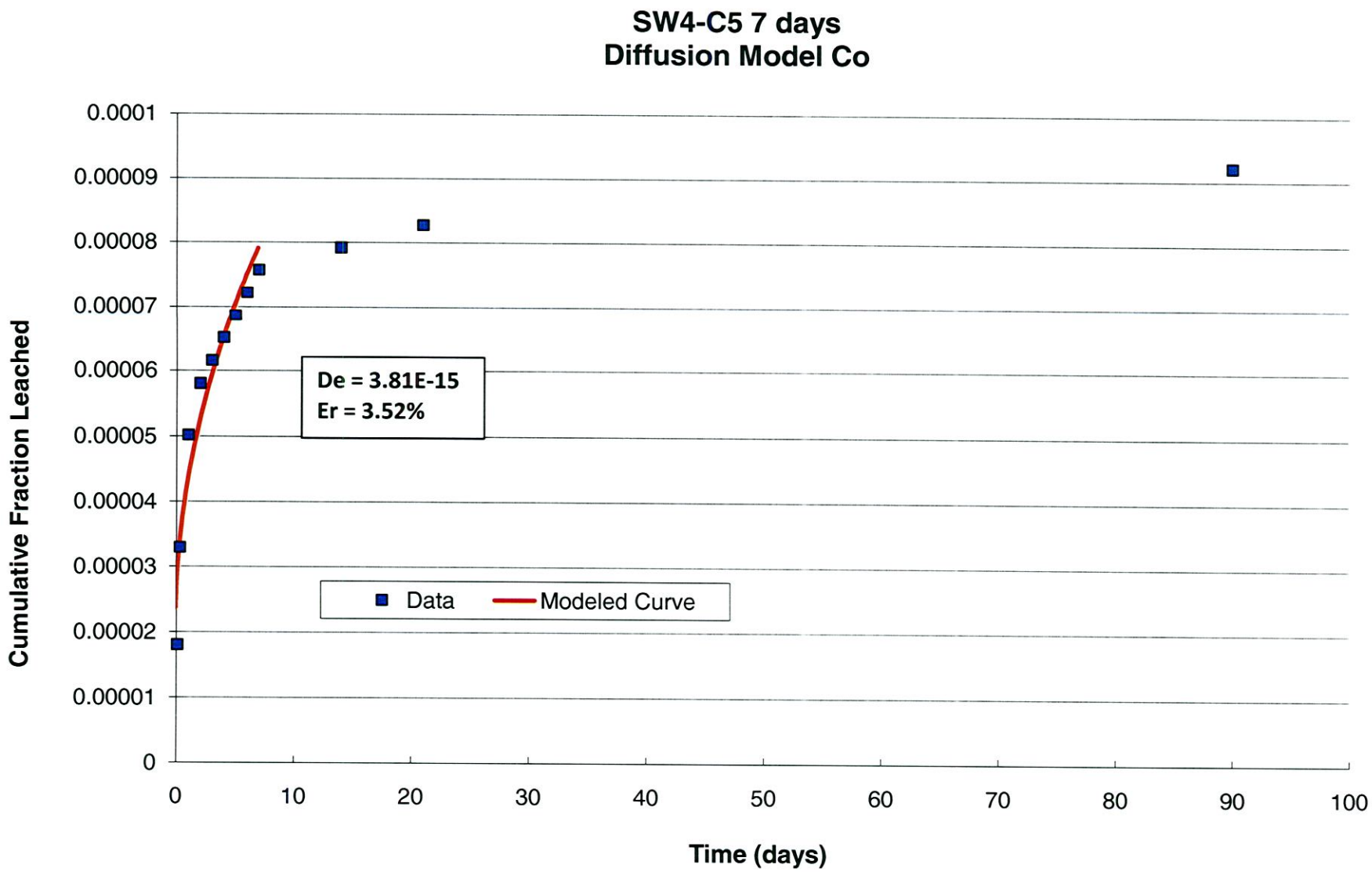

Figure 5-21 - Sample SW4-C5 - ALT Modeling Results for Co

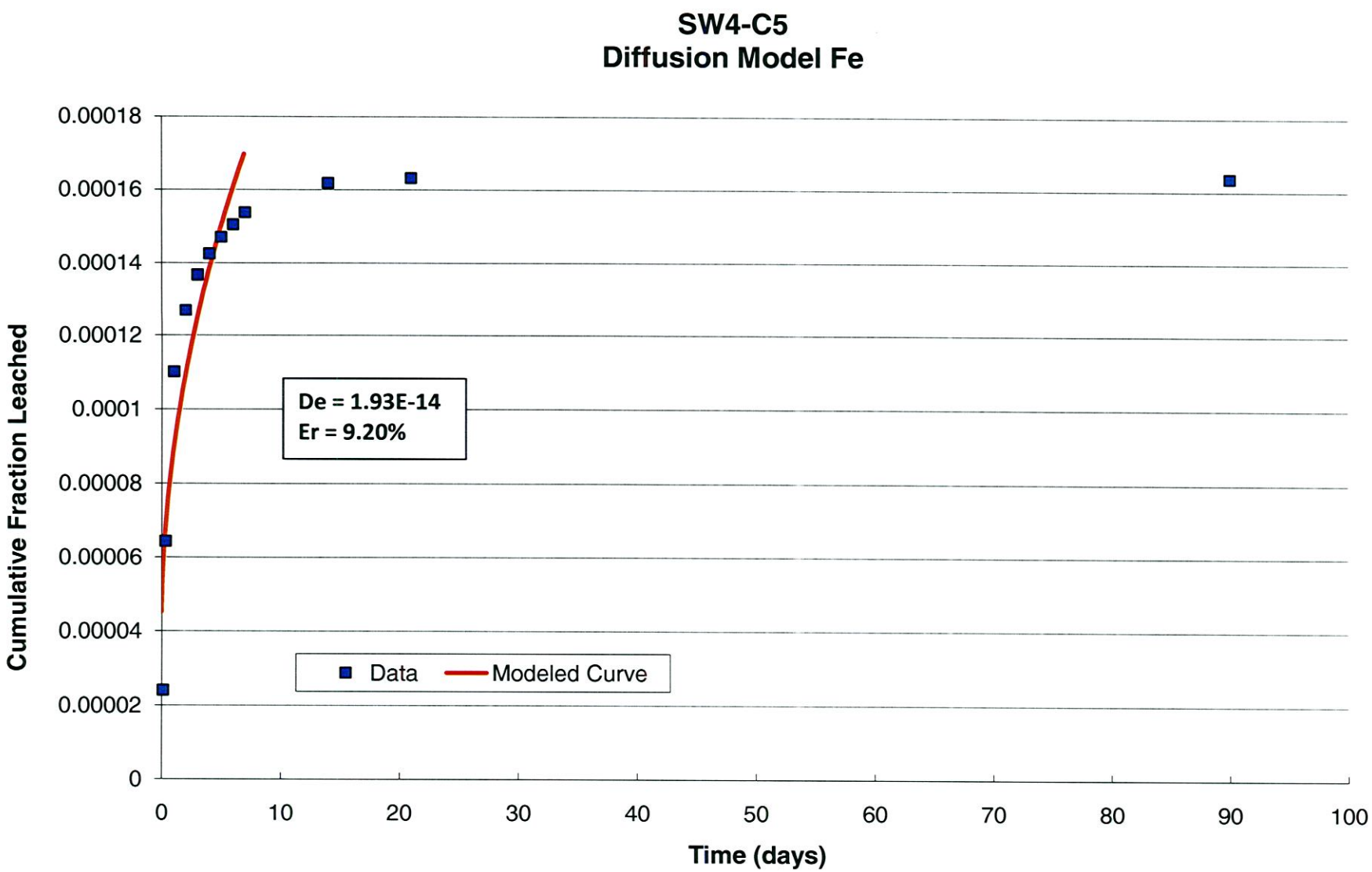

Figure 5-22 - Sample SW4-C5 - ALT Modeling Results for Fe

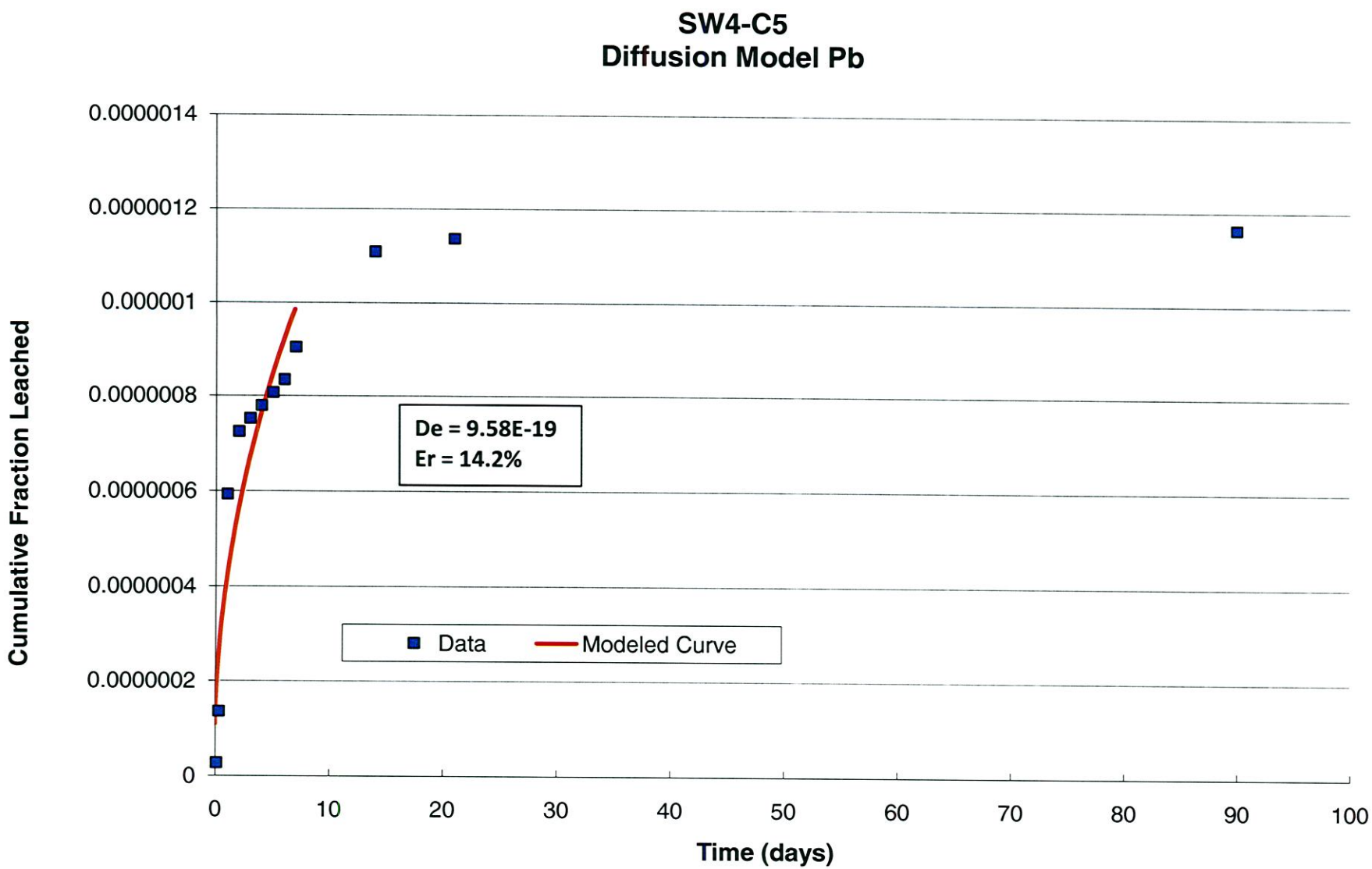

Figure 5-23 - Sample SW4-C5 - ALT Modeling Results for Pb

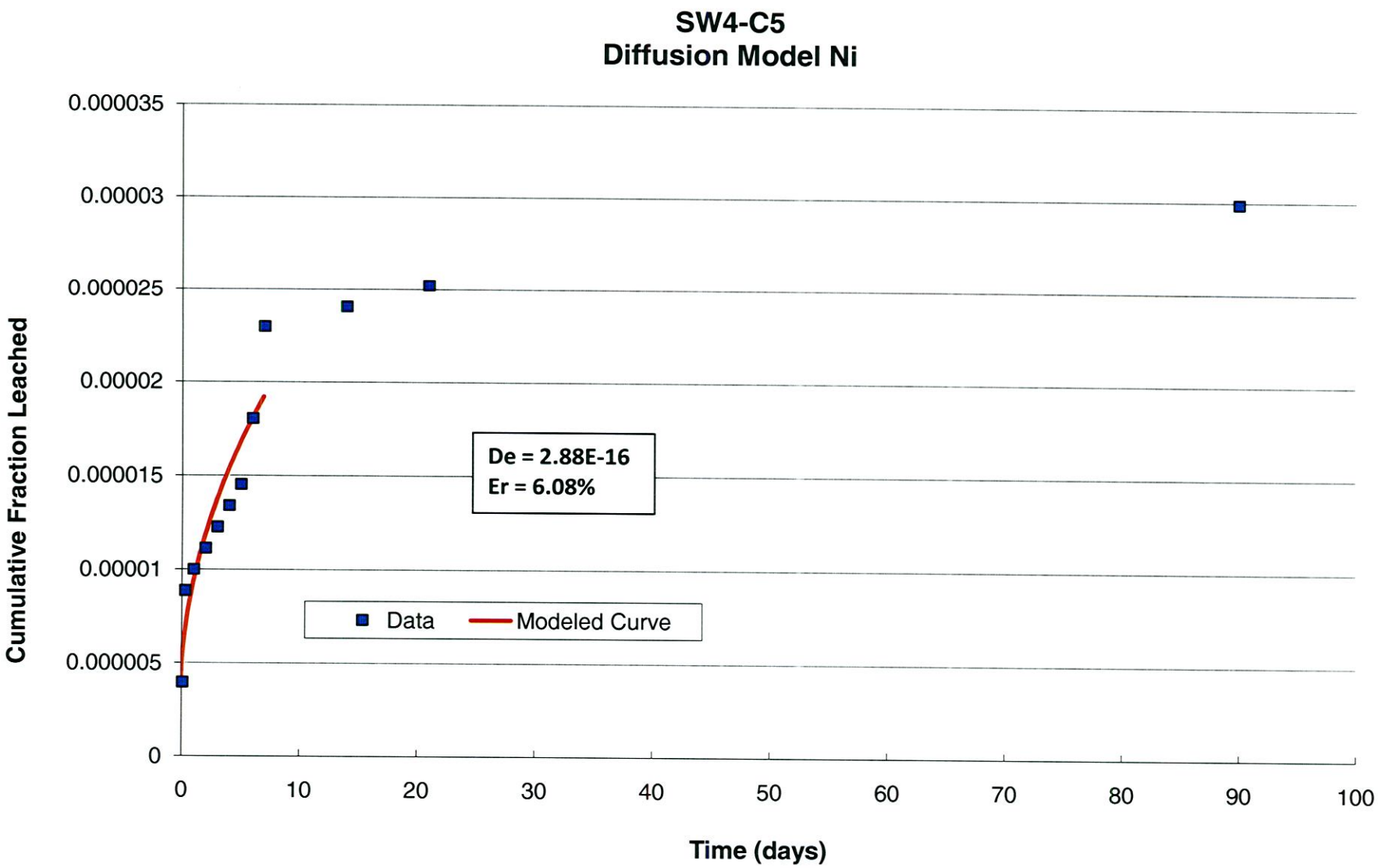

Figure 5-24 - Sample SW4-C5 - ALT Modeling Results for Ni

Attachment 1

Total Metals and Standard Leach Test Results (Test America)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0128
Client Project/Site: [none]
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
03/30/2011 03:06:11 PM
Crystal Pollock
Lab Director
crystal.pollock@testamericainc.com

Designee for

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0128-01	S-1	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-02	S-2	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-03	S-3	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-04	WJ3-C1	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-05	SW2-C2	Solid	03/03/11 16:00	03/04/11 11:20
KUC0128-06	SW4-C5	Solid	03/03/11 16:00	03/04/11 11:20

Case Narrative

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Job ID: KUC0128

Laboratory: TestAmerica King Of Prussia

Narrative

This report was revised to correct the tin results due to a reporting error.

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Qualifiers

Metals

Qualifier	Qualifier Description
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
M8	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
RL7	Sample required dilution due to high concentrations of target analyte.
T5	Less than the prescribed sample amount was available to perform the leachate extraction. The volume of extraction fluid was adjusted proportionately based on the method prescribed ratio of extraction fluid to sample weight.

Wet Chem

Qualifier	Qualifier Description
HFT	The holding time for this test is immediate. It was analyzed in the laboratory as soon as possible after receipt

WetChem

Qualifier	Qualifier Description
H3	Sample was received and analyzed past holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.72**		0.20		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Barium	**0.0084**		0.0050		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Calcium	**6.7**		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Iron	**2.5**		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Lead	**0.27**		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Magnesium	**1.8**		0.50		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Potassium	ND	M7	10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Sodium	**24**	**MHA**	0.50		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 14:52	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:52	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.11**		0.050		mg/L		03/18/11 14:45	03/21/11 14:12	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:12	1.00

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.27**		0.20		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Barium	**0.030**		0.0050		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Copper	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Iron	**1.0**	**M7, M8**	0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Lead	**0.16**		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Magnesium	**2.3**		0.50		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Potassium	ND		10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Silver	ND	M8	0.020		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Sodium	**16**	**MHA**	0.50		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Tin	ND	M8	0.200		mg/L		03/16/11 10:11	03/18/11 14:02	1.00
Vanadium	ND		0.025		mg/L		03/16/11 10:11	03/18/11 14:02	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:02	1.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.13**		0.050		mg/L		03/16/11 10:11	03/22/11 12:56	1.0
Calcium	**12**		0.10		mg/L		03/16/11 10:11	03/22/11 12:56	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:11	03/22/11 12:56	1.0

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:47	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**0.14**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Cadmium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Calcium	**290**		0.10		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Cobalt	**0.029**		0.020		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Iron	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Nickel	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:49	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:49	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Antimony	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Arsenic	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Beryllium	ND	RL1	0.016		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Chromium	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Lead	**8.9**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Magnesium	**7.2**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Manganese	**0.48**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Sodium	**1200**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Thallium	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Vanadium	ND	RL1	0.10		mg/L		03/14/11 12:21	03/15/11 15:36	4.0
Zinc	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:36	4.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1200**	**MHA**	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Antimony	**130**	**M8**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Arsenic	**110**	**M8**	2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Barium	**30**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Cadmium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Calcium	**5300**	**MHA**	25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Chromium	**9.1**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Copper	**35**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Iron	**16000**	**MHA**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Lead	**1400**	**MHA**	2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	340	MHA	25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Manganese	53	M7	1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Nickel	ND		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Silver	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Sodium	470	MHA	80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Tin	44	M8	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Vanadium	16		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0
Zinc	59		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:35	2.0

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/16/11 09:56	03/17/11 08:01	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 09:52	03/16/11 14:50	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 14:49	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:28	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.900	HFT	0.01000		pH Units		03/16/11 07:19	03/16/11 08:45	1.000

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	5.4		1.0		pH Units		03/07/11 10:38	03/09/11 08:25	1.0
TCLP pH pre-leach	9.4		1.0		pH Units		03/07/11 10:38	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.00	HFT	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.2		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.1**		0.20		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Barium	**0.010**		0.0050		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Calcium	**6.1**		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Iron	**4.2**		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Lead	**0.43**		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Magnesium	**1.9**		0.50		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Sodium	**52**		0.50		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 14:58	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 14:58	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.088**		0.050		mg/L		03/18/11 14:45	03/21/11 14:18	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:18	1.00

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.44**		0.20		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Barium	**0.015**		0.0050		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Copper	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Iron	**3.9**		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Lead	**0.46**		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Magnesium	**2.7**		0.50		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Potassium	ND		10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Silver	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Sodium	**29**		0.50		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Tin	ND		0.200		mg/L		03/16/11 10:11	03/18/11 14:08	1.00
Vanadium	ND		0.025		mg/L		03/16/11 10:11	03/18/11 14:08	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:08	1.0

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.066**		0.050		mg/L		03/16/11 10:11	03/22/11 13:02	1.0
Calcium	**9.9**		0.10		mg/L		03/16/11 10:11	03/22/11 13:02	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:11	03/22/11 13:02	1.0

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:54	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.11**		0.050		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Arsenic	ND		0.050		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Barium	**0.18**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Cadmium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Calcium	**220**		0.10		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Cobalt	**0.030**		0.020		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Iron	**0.18**		0.10		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Nickel	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:51	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:51	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Beryllium	ND	RL1	0.016		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Chromium	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Lead	**11**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Magnesium	**6.8**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Manganese	**0.57**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Sodium	**1200**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Thallium	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Vanadium	ND	RL1	0.10		mg/L		03/14/11 12:21	03/15/11 15:38	4.0
Zinc	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:38	4.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1000**		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Antimony	**25**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Arsenic	**19**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Barium	**6.7**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Cadmium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Calcium	**2900**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Chromium	**8.8**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Copper	**19**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Iron	**13000**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Lead	**650**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-02

Matrix: Solid
Percent Solids: 99.6
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	**600**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Manganese	**49**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Nickel	ND		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Silver	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Sodium	**430**		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Tin	**16**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Vanadium	**17**		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0
Zinc	**38**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:41	2.0

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/16/11 09:56	03/17/11 08:08	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 09:52	03/16/11 14:57	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	M7	0.00100		mg/L		03/09/11 10:58	03/10/11 14:56	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:29	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**9.230**	**HFT**	0.01000		pH Units		03/16/11 07:19	03/16/11 08:45	1.000

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.2**		1.0		pH Units		03/07/11 10:38	03/09/11 08:25	1.0
TCLP pH pre-leach	**9.0**		1.0		pH Units		03/07/11 10:38	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**8.21**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.1**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.90**		0.20		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Barium	**0.025**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Calcium	**8.5**		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Iron	**2.9**		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Lead	**0.27**		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Magnesium	**2.1**		0.50		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Sodium	**28**		0.50		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:00	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:00	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.075**		0.050		mg/L		03/18/11 14:45	03/21/11 14:20	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:20	1.00

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.81**		0.20		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Barium	**0.013**		0.0050		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Cobalt	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Copper	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Iron	**7.8**		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Lead	**0.78**		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Magnesium	**2.6**		0.50		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Nickel	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Potassium	ND		10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Silver	ND		0.020		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Sodium	**29**		0.50		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Tin	ND		0.200		mg/L		03/16/11 10:11	03/18/11 14:10	1.00
Vanadium	ND		0.025		mg/L		03/16/11 10:11	03/18/11 14:10	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:11	03/18/11 14:10	1.0

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.074**		0.050		mg/L		03/16/11 10:11	03/22/11 13:04	1.0
Calcium	**8.3**		0.10		mg/L		03/16/11 10:11	03/22/11 13:04	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:11	03/22/11 13:04	1.0

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:56	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.090**		0.050		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Barium	**0.19**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Cadmium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Calcium	**520**		0.10		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Cobalt	**0.036**		0.020		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Iron	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Nickel	ND		0.10		mg/L		03/14/11 12:21	03/15/11 14:53	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:53	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Arsenic	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Beryllium	**0.051**	**RL1**	0.016		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Chromium	ND	RL1	0.20		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Lead	**5.4**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Magnesium	**7.5**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Manganese	**0.56**	**RL1**	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Sodium	**1300**	**RL1**	2.0		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Thallium	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Vanadium	ND	RL1	0.10		mg/L		03/14/11 12:21	03/15/11 15:41	4.0
Zinc	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:41	4.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**800**		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Antimony	**48**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Arsenic	**40**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Barium	**8.1**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Cadmium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Calcium	**1800**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Chromium	**8.2**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Copper	**55**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Iron	**12000**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Lead	**980**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	310		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Manganese	39		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Nickel	ND		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Silver	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Sodium	370		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Tin	37		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Vanadium	13		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0
Zinc	36		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:44	2.0

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/16/11 09:56	03/17/11 08:09	1.00

Method: EPA 7470A - SPLP Metals by EPA 1312/6000/7000 Series Methods - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 09:52	03/16/11 14:59	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 14:58	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:31	1.00

Method: 9040B - SPLP Extraction by EPA 1312 - SPLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.290	HFT	0.01000		pH Units		03/16/11 07:19	03/16/11 08:45	1.000

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	5.7		1.0		pH Units		03/07/11 10:38	03/09/11 08:25	1.0
TCLP pH pre-leach	9.9		1.0		pH Units		03/07/11 10:38	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.28	HFT	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	18.2		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-04

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Arsenic	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Barium	**0.35**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Calcium	**20**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Cobalt	**0.089**		0.020		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Iron	**1.7**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Lead	**23**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Magnesium	**9.7**		0.50		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Nickel	**0.22**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Sodium	**28**		0.50		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:06	1.0
Zinc	**0.14**		0.10		mg/L		03/16/11 10:21	03/16/11 15:06	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050		mg/L		03/18/11 14:45	03/21/11 14:22	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:22	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 09:58	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**1.6**		0.050		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Barium	**0.28**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Beryllium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Calcium	**12**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Chromium	ND		0.050		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Magnesium	**6.4**		0.50		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Manganese	**0.18**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Nickel	**0.52**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Thallium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Vanadium	ND		0.025		mg/L		03/14/11 12:21	03/15/11 14:55	1.0
Zinc	**2.4**		0.10		mg/L		03/14/11 12:21	03/15/11 14:55	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	0.80		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Arsenic	**4.5**	**RL1**	0.20		mg/L		03/14/11 12:21	03/15/11 15:43	4.0

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-04

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.028	RL1	0.016		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Cobalt	0.16	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Copper	ND	RL1	0.40		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Iron	380	RL7	0.40		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Potassium	ND	RL1	40		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Silver	ND	RL1	0.080		mg/L		03/14/11 12:21	03/15/11 15:43	4.0
Sodium	1300	RL1	2.0		mg/L		03/14/11 12:21	03/15/11 15:43	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	650	RL7	2.0		mg/L		03/14/11 12:21	03/16/11 14:35	20

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Calcium	1300		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Cobalt	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Magnesium	670		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Manganese	250		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Nickel	320		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Silver	15		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Sodium	670		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Vanadium	2.6		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0
Zinc	3700		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:46	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		250		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Antimony	9600	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Arsenic	5700	RL1	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Barium	46	RL1	5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10
Tin	8400	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:02	10

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5000	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Chromium	ND	RL1	120		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Copper	16000	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Iron	450000	RL7	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50
Lead	63000	RL7	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:57	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	T5	0.00100		mg/L		03/16/11 09:56	03/17/11 08:11	1.00

Client Sample ID: WJ3-C1

Lab Sample ID: KUC0128-04

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 15:00	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.100**		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:33	1.00

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.4**		1.0		pH Units		03/09/11 08:00	03/09/11 08:25	1.0
TCLP pH pre-leach	**5.6**		1.0		pH Units		03/08/11 09:59	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.23**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.4**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Method: EPA 300.0 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	**0.274**		0.100		mg/L		03/17/11 13:05	03/17/11 20:47	1.00
Nitrate as N	**0.235**	**H3**	0.100		mg/L		03/17/11 13:05	03/17/11 20:47	1.00
Nitrite as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 20:47	1.00
Sulfate	**1.70**		1.00		mg/L		03/17/11 13:05	03/17/11 20:47	1.00

Method: EPA 300.1 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**1.02**		1.00		mg/L		03/17/11 13:05	03/17/11 20:47	1.00

Client Sample ID: SW2-C2

Lab Sample ID: KUC0128-05

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Arsenic	**0.29**		0.050		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Barium	**0.087**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Cadmium	**0.0044**		0.0040		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Calcium	**5.1**		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Cobalt	**0.26**		0.020		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Iron	**68**		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Magnesium	**1.3**		0.50		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Nickel	**1.0**		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Sodium	**13**		0.50		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:08	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:08	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**2.0**		0.050		mg/L		03/18/11 14:45	03/21/11 14:24	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:24	1.00

Method: EPA 6010B - ASTM Leachate - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**170**	**RL7**	1.0		mg/L		03/16/11 10:21	03/22/11 13:06	10

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 10:04	1.00

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**2.0**		0.050		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Barium	**0.097**		0.0050		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Beryllium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Calcium	**2.6**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Chromium	ND		0.050		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Copper	ND	M8	0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Magnesium	**0.96**		0.50		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Manganese	**0.20**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Nickel	**1.0**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Potassium	ND		10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Silver	**0.056**		0.020		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Thallium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Vanadium	ND		0.025		mg/L		03/14/11 12:21	03/15/11 14:57	1.0
Zinc	**0.39**		0.10		mg/L		03/14/11 12:21	03/15/11 14:57	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.98**	**RL1**	0.80		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Arsenic	**4.8**	**RL1**	0.20		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Cadmium	**0.023**	**RL1**	0.016		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Cobalt	**0.18**	**RL1**	0.080		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Iron	**370**	**RL7**	0.40		mg/L		03/14/11 12:21	03/15/11 15:45	4.0
Sodium	**1100**	**RL7**	2.0		mg/L		03/14/11 12:21	03/15/11 15:45	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**1200**	**RL7**	5.0		mg/L		03/14/11 12:21	03/15/11 15:50	50

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**120**		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Calcium	**870**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Magnesium	**190**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Manganese	**350**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Nickel	**950**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Silver	**16**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Sodium	**190**		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Tin	**1600**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Vanadium	ND		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0
Zinc	**600**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:52	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	RL1	250		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10
Antimony	**11000**	**RL7**	50		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10
Barium	**22**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10
Copper	**7000**	**RL7**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:04	10

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**7000**	**RL1**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Chromium	ND	RL1	120		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Cobalt	**51**	**RL1**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Iron	**500000**	**RL7**	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50
Lead	**91000**	**RL7**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 10:59	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	T5	0.00100		mg/L		03/16/11 09:56	03/17/11 08:13	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 15:01	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:34	1.00

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.5**		1.0		pH Units		03/09/11 08:00	03/09/11 08:25	1.0
TCLP pH pre-leach	**5.9**		1.0		pH Units		03/08/11 09:59	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.14**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Client Sample ID: SW2-C2

Lab Sample ID: KUC0128-05

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.6**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Method: EPA 300.0 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100		mg/L		03/17/11 13:05	03/17/11 21:27	1.00
Nitrate as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:27	1.00
Nitrite as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:27	1.00
Sulfate	**1.45**		1.00		mg/L		03/17/11 13:05	03/17/11 21:27	1.00

Method: EPA 300.1 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**1.33**		1.00		mg/L		03/17/11 13:05	03/17/11 21:27	1.00

Client Sample ID: SW4-C5

Lab Sample ID: KUC0128-06

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Arsenic	**0.063**		0.050		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Barium	**0.12**		0.0050		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Beryllium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Cadmium	ND		0.0040		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Calcium	**5.2**		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Chromium	ND		0.050		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Cobalt	**0.15**		0.020		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Copper	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Iron	**2.7**		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Lead	**30**		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Magnesium	**0.80**		0.50		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Manganese	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Nickel	**0.31**		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Potassium	ND		10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Selenium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Silver	ND		0.020		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Sodium	**13**		0.50		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Thallium	ND		0.20		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Vanadium	ND		0.025		mg/L		03/16/11 10:21	03/16/11 15:11	1.0
Zinc	ND		0.10		mg/L		03/16/11 10:21	03/16/11 15:11	1.0

Method: EPA 6010B - ASTM Leachate - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.22**		0.050		mg/L		03/18/11 14:45	03/21/11 14:26	1.0
Tin	ND		0.200		mg/L		03/18/11 14:45	03/21/11 14:26	1.00

Method: EPA 6010B - TCLP Metals by EPA 1311/6000/7000 Series Methods - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	ND		0.200		mg/L		03/09/11 11:27	03/11/11 10:07	1.00

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Antimony	**2.2**		0.050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Arsenic	**6.5**		0.050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Barium	**0.20**		0.0050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Beryllium	ND		0.0040		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Cadmium	**0.050**		0.0040		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Calcium	**3.9**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Chromium	ND		0.050		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Cobalt	**0.32**		0.020		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Copper	ND		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Iron	**310**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Magnesium	**0.85**		0.50		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Manganese	**0.11**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Nickel	**1.4**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Potassium	ND		10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Selenium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Silver	**0.034**		0.020		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Thallium	ND		0.20		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Vanadium	ND		0.025		mg/L		03/14/11 12:21	03/15/11 15:08	1.0
Zinc	**1.5**		0.10		mg/L		03/14/11 12:21	03/15/11 15:08	1.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	**1200**		2.0		mg/L		03/14/11 12:21	03/15/11 15:47	4.0

Method: EPA 6010B - TCLP Metals by EPA 6000/7000 Series Methods - TCLP - RE4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**700**	**RL7**	5.0		mg/L		03/14/11 12:21	03/15/11 15:52	50

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Beryllium	ND		0.40		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Calcium	**140**		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Cobalt	**55**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Magnesium	ND		25		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Manganese	**230**		1.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Nickel	**930**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Potassium	ND		1000		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Selenium	ND		8.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Silver	**8.3**		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Sodium	**110**		80		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Thallium	ND		2.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Tin	**2500**		10		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Vanadium	ND		2.5		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0
Zinc	**1900**		5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 13:54	2.0

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**20**	**RL1**	5.0		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20
Sampler Name:

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8
Sampler Phone Number: (610) 696-6066

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE1 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND	RL1	25		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10
Cobalt	**74**	**RL1**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10
Copper	**5200**	**RL7**	10		mg/kg dry	☼	03/09/11 05:51	03/15/11 14:06	10

Method: EPA 6010B - Total Metals by EPA 6000/7000 Series Methods - RE2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**18000**	**RL7**	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Arsenic	**4700**	**RL1**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Cadmium	ND	RL1	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Iron	**270000**	**RL7**	250		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50
Lead	**38000**	**RL7**	50		mg/kg dry	☼	03/09/11 05:51	03/16/11 11:01	50

Method: EPA 7470A - ASTM Leachate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	T5	0.00100		mg/L		03/16/11 09:56	03/17/11 08:19	1.00

Method: EPA 7470A - TCLP Metals Extraction by EPA 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00100		mg/L		03/09/11 10:58	03/10/11 15:07	1.00

Method: EPA 7471A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.100		mg/kg dry	☼	03/14/11 09:25	03/15/11 11:36	1.00

Method: EPA 9040 - General Chemistry, TCLP Extraction 1311 - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TCLP pH post-leach	**5.4**		1.0		pH Units		03/09/11 08:00	03/09/11 08:25	1.0
TCLP pH pre-leach	**6.1**		1.0		pH Units		03/08/11 09:59	03/08/11 16:19	1.0

Method: EPA 9045B - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.82**	**HFT**	0.100		pH Units		03/11/11 08:41	03/11/11 10:25	1.00

Method: Temperature - General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature at time of pH analysis	**18.7**		0.00		°C		03/11/11 08:41	03/11/11 10:25	1.00

Method: EPA 300.0 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	**0.133**		0.100		mg/L		03/17/11 13:05	03/17/11 21:47	1.00
Nitrate as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:47	1.00
Nitrite as N	ND	H3	0.100		mg/L		03/17/11 13:05	03/17/11 21:47	1.00
Sulfate	ND		1.00		mg/L		03/17/11 13:05	03/17/11 21:47	1.00

Method: EPA 300.1 - General Chemistry Parameters

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		1.00		mg/L		03/17/11 13:05	03/17/11 21:47	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-01

Matrix: Solid
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:01	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:28	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0374_P	03/16/11 09:52	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000501	03/16/11 14:50	SPC	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 14:49	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 14:52	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000522	03/18/11 14:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:35	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction		1.00	11C0353	03/15/11 15:11	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.00	11C0376_P	03/16/11 10:11	JGS	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.00	U000522	03/18/11 14:02	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:47	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:35	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:12	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000544	03/22/11 12:56	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:12	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:49	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:36	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11C0364_P	03/16/11 07:19	SPC	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11C0364	03/16/11 08:45	SPC	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0195_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0195	03/09/11 08:25	DRH	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: S-1

Lab Sample ID: KUC0128-01
Date Collected: 03/03/11 16:00
Matrix: Solid
Date Received: 03/04/11 11:20
Percent Solids: 99.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Prep	General Prep WC		1.0	11C0194_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0194	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia

Client Sample ID: S-2

Lab Sample ID: KUC0128-02
Date Collected: 03/03/11 16:00
Matrix: Solid
Date Received: 03/04/11 11:20
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:08	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:29	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0374_P	03/16/11 09:52	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000501	03/16/11 14:57	SPC	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 14:56	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 14:58	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000522	03/18/11 14:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.91	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:41	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction		1.00	11C0353	03/15/11 15:11	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.00	11C0376_P	03/16/11 10:11	JGS	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.00	U000522	03/18/11 14:08	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:54	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:41	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:18	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000544	03/22/11 13:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:18	MKR	TestAmerica King Of Prussia

Client Sample ID: S-2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-02
Matrix: Solid
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:51	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:38	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11C0364_P	03/16/11 07:19	SPC	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11C0364	03/16/11 08:45	SPC	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0195_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0195	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0194_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0194	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-03
Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:09	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:31	MR	TestAmerica King Of Prussia
SPLP	Prep	EPA 7470A TCLP		1.00	11C0374_P	03/16/11 09:52	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 7470A		1.00	U000501	03/16/11 14:59	SPC	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 14:58	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:00	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B		1.0	U000522	03/18/11 14:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.0	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:44	MKR	TestAmerica King Of Prussia
SPLP	Leach	TCLP Extraction		1.00	11C0353	03/15/11 15:11	RW	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP		1.00	11C0376_P	03/16/11 10:11	JGS	TestAmerica King Of Prussia

Client Sample ID: S-3

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-03

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
SPLP	Analysis	EPA 6010B		1.00	U000522	03/18/11 14:10	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:56	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:44	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:20	MKR	TestAmerica King Of Prussia
SPLP	Prep	EPA 200.7 SPLP	RE1	1.0	11C0376_P	03/16/11 10:11	PAM	TestAmerica King Of Prussia
SPLP	Analysis	EPA 6010B	RE1	1.0	U000544	03/22/11 13:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:20	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:53	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:41	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
SPLP	Prep	General Prep WC			11C0364_P	03/16/11 07:19	SPC	TestAmerica King Of Prussia
SPLP	Analysis	9040B		1.000	11C0364	03/16/11 08:45	SPC	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0195_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0195	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0194_P	03/07/11 10:38	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0194	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-04

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:11	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:33	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: WJ3-C1

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-04

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 15:00	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		0.96	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:46	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 09:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:22	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	0.96	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	U000483	03/15/11 14:02	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:22	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	11C0185	03/15/11 14:02	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:55	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	0.96	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	50	U000496	03/16/11 10:57	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:43	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE4	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE4	20	U000496	03/16/11 14:35	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0304_P	03/09/11 08:00	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0304	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0302_P	03/08/11 09:59	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0302	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
total	Prep	NO PREP		1.00	11C4136_P	03/17/11 13:05	amc	TestAmerica Nashville
total	Analysis	EPA 300.1		1.00	U004443	03/17/11 20:47	JMR2	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U004443	03/17/11 20:47	JMR2	TestAmerica Nashville

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:13	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:34	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 15:01	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	SPC	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:52	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 10:04	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:52	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	SPC	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:24	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	U000483	03/15/11 14:04	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:24	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 14:57	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	1.1	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	50	U000496	03/16/11 10:59	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE3	1.0	11C0377_P	03/16/11 10:21	SPC	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE3	10	U000544	03/22/11 13:06	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:45	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE4	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE4	50	11C0310	03/15/11 15:50	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0304_P	03/09/11 08:00	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0304	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0302_P	03/08/11 09:59	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0302	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia

Client Sample ID: SW2-C2

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-05

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
total	Prep	NO PREP		1.00	11C4136_P	03/17/11 13:05	amc	TestAmerica Nashville
total	Analysis	EPA 300.1		1.00	U004443	03/17/11 21:27	JMR2	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U004443	03/17/11 21:27	JMR2	TestAmerica Nashville

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A TCLP		1.00	11C0375_P	03/16/11 09:56	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000502	03/17/11 08:19	SPC	TestAmerica King Of Prussia
total	Prep	EPA 7471A		1.00	11C0301_P	03/14/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7471A		1.00	U000480	03/15/11 11:36	MR	TestAmerica King Of Prussia
TCLP	Leach	TCLP Extraction		1.00	11C0175	03/08/11 14:40	RW	TestAmerica King Of Prussia
TCLP	Prep	EPA 7470A TCLP		1.00	11C0196_P	03/09/11 10:58	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 7470A		1.00	U000450	03/10/11 15:07	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP		1.0	11C0377_P	03/16/11 10:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		1.0	U000496	03/16/11 15:11	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil		1.2	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000483	03/15/11 13:54	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP		1.00	11C0200_P	03/09/11 11:27	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B		1.00	U000461	03/11/11 10:07	MKR	TestAmerica King Of Prussia
total	Analysis	EPA 6010B		2.0	U000461	03/15/11 13:54	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.0	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.0	U000531	03/21/11 14:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE1	1.2	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	10	U000483	03/15/11 14:06	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 TCLP	RE1	1.00	11C0444_P	03/18/11 14:45	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE1	1.00	U000531	03/21/11 14:26	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE2	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE2	1.0	U000483	03/15/11 15:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 3050B Soil	RE2	1.2	11C0185_P	03/09/11 05:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 6010B	RE2	50	U000496	03/16/11 11:01	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE3	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE3	4.0	11C0310	03/15/11 15:47	MKR	TestAmerica King Of Prussia
TCLP	Prep	EPA 200.7 TCLP	RE4	1.0	11C0310_P	03/14/11 12:21	PAM	TestAmerica King Of Prussia
TCLP	Analysis	EPA 6010B	RE4	50	11C0310	03/15/11 15:52	MKR	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Client Sample ID: SW4-C5

Date Collected: 03/03/11 16:00
Date Received: 03/04/11 11:20

Lab Sample ID: KUC0128-06

Matrix: Solid
Percent Solids: 99.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Analysis	EPA 9045B		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0304_P	03/09/11 08:00	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0304	03/09/11 08:25	DRH	TestAmerica King Of Prussia
TCLP	Prep	General Prep WC		1.0	11C0302_P	03/08/11 09:59	DRH	TestAmerica King Of Prussia
TCLP	Analysis	EPA 9040		1.0	11C0302	03/08/11 16:19	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC		1.00	11C0180_P	03/08/11 16:59	DRH	TestAmerica King Of Prussia
total	Analysis	EPA 160.3		1.00	11C0180	03/08/11 17:25	DRH	TestAmerica King Of Prussia
total	Prep	General Prep WC			11C0250_P	03/11/11 08:41	TYH	TestAmerica King Of Prussia
total	Analysis	Temperature		1.00	11C0250	03/11/11 10:25	TYH	TestAmerica King Of Prussia
total	Prep	NO PREP		1.00	11C4136_P	03/17/11 13:05	amc	TestAmerica Nashville
total	Analysis	EPA 300.1		1.00	U004443	03/17/11 21:47	JMR2	TestAmerica Nashville
total	Analysis	EPA 300.0		1.00	U004443	03/17/11 21:47	JMR2	TestAmerica Nashville

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: [none]

TestAmerica Job ID: KUC0128

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505
TestAmerica Nashville		AIHA		100790
TestAmerica Nashville		USDA		S-48469
TestAmerica Nashville	A2LA	A2LA	0	0453.07
TestAmerica Nashville	A2LA	WY UST	0	453.07
TestAmerica Nashville	Alabama	State Program	4	41150
TestAmerica Nashville	Alaska	Alaska UST	10	UST-087
TestAmerica Nashville	Arizona	State Program	9	AZ0473
TestAmerica Nashville	Arkansas	State Program	6	88-0737
TestAmerica Nashville	CALA	CALA	0	3744
TestAmerica Nashville	California	NELAC	9	1168CA
TestAmerica Nashville	Colorado	State Program	8	N/A
TestAmerica Nashville	Connecticut	State Program	1	PH-0220
TestAmerica Nashville	Florida	NELAC	4	E87358
TestAmerica Nashville	Illinois	NELAC	5	200010
TestAmerica Nashville	Iowa	State Program	7	131
TestAmerica Nashville	Kansas	NELAC	7	E-10229
TestAmerica Nashville	Kentucky	Kentucky UST	4	19
TestAmerica Nashville	Kentucky	State Program	4	90038
TestAmerica Nashville	Louisiana	NELAC	6	LA100011
TestAmerica Nashville	Louisiana	NELAC	6	30613
TestAmerica Nashville	Massachusetts	State Program	1	M-TN032
TestAmerica Nashville	Minnesota	NELAC	5	047-999-345
TestAmerica Nashville	Mississippi	State Program	4	N/A
TestAmerica Nashville	Montana	MT DEQ UST	8	NA
TestAmerica Nashville	Nevada	State Program	9	TN00032
TestAmerica Nashville	New Hampshire	NELAC	1	2963
TestAmerica Nashville	New Jersey	NELAC	2	TN965
TestAmerica Nashville	New York	NELAC	2	11342
TestAmerica Nashville	North Carolina	North Carolina DENR	4	387
TestAmerica Nashville	North Dakota	State Program	8	R-146
TestAmerica Nashville	Ohio	OVAP	5	CL0033
TestAmerica Nashville	Oklahoma	State Program	6	9412
TestAmerica Nashville	Oregon	NELAC	10	TN200001
TestAmerica Nashville	Pennsylvania	NELAC	3	68-00585
TestAmerica Nashville	Rhode Island	State Program	1	LAO00268
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	Tennessee	State Program	4	2008
TestAmerica Nashville	Texas	NELAC	6	T104704077-09-TX
TestAmerica Nashville	Utah	NELAC	8	TAN
TestAmerica Nashville	Virginia	State Program	3	00323
TestAmerica Nashville	Washington	State Program	10	C789
TestAmerica Nashville	West Virginia	West Virginia DEP	3	219
TestAmerica Nashville	Wisconsin	State Program	5	998020430

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

Reference No: 10615032

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Analyses to be Performed

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin)	TCLP EPA Method 1311 (TAL metals, Tin)	SPLP EPA Method 1312 (TAL metals, Tin)	DI Water EPA Method 1312 (TAL metals, Tin)	pH	Anions (from DI Extraction)	Preservation
S - 1	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None
S - 2	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None
S - 3	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None
WJ3-C1	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x	x	x	None
SW2-C2	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x	x	x	None
SW4-C5	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x	x	x	None

Relinquished By: (Print & Sign) Santhi Jagupilla — Received By: — Date/Time

Comments: For WJ3-C1, use lesser sample for TCLP and DI Water analyses.
For total digestion, use the samples in plastic bottles as labelled

Relinquished By: (Print & Sign) — Received By: — Date/Time

Please report pH for all the analyses.

Relinquished By: (Print & Sign) — Received By: — Date/Time

Method of Shipment: FEDEX

Iced: Yes No

all pre and post extraction pH!

CHAIN OF CUSTODY FORM

TEST AMERICA, INC.
1008 W.Ninth Avenue
King of Prussia, PA 19406
610-337-9992 OR FAX 610-337-9939

6°C

Reference No: **10615032**

Collected By: (Please Print) Santhi Jagupilla, Stevens Institute of Technology

Project: Raritan Bay Slag Superfund Site

Report to: Mia Painter, mpainter@schnabel-eng.com

Sample Number	Site/Sample Description	Date of Collection	Time of Collection	Matrix	Number of Containers	Container Type	Totals, 6010B (TAL metals, Tin)	TCLP EPA Method 1311 (TAL metals, Tin)	SPLP EPA Method 1312 (TAL metals, Tin)	DI Water EPA Method 1312 (TAL metals, Tin)	pH		Preservation
S - 1	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x	KVC0128	None 01
S - 2	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None 02
S - 3	Soil	3/3/2011	4pm	Solid	3	Glass/plastic botte	x	x	x	x	x		None 03
WJ3-C1	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x			None 04
SW2-C2	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x			None 05
SW4-C5	Cored Slag	3/3/2011	4pm	Solid	2	Glass/plastic botte	x	x		x			None 06

Analyses to be Performed

Relinquished By: (Print & Sign) Santhi Jagupilla
Received By: Fed Ex Date/Time

Relinquished By: (Print & Sign) Fed Ex
Received By: Nick Fudetti 3/4 Date/Time 11:20

Relinquished By: (Print & Sign)
Received By: Date/Time

Comments: For WJ3-C1, use lesser sample for TCLP and DI Water analyses.
For total digestion, use the samples in plastic bottles as labelled

Please report pH for all the analyses.

Method of Shipment: FEDEX

Iced: Yes No

Track # 8746 2100 6268

Lohr, Linda

From: Lohr, Linda
Sent: Wednesday, March 09, 2011 10:53 AM
To: 'Mia Painter'
Cc: Pollock, Crystal; Jeff Keehn
Subject: RE: my contact info

Mia--we do have these samples. They are our sample ID # KUC0128. This COC contains both soil (3 samples) and cored slag (3 samples). It is the core slag that is being discussed.

The 3 core slag samples are to be logged in for:
1) Total metals (TAL + Sn) by EPA method 6010B
2) TCLP leach EPA method 1311 for TAL metals + Sn
3) DI water leach for TAL metals + Sn
4) DI water leach--anion scan EPA method 300
5) pH for pre/post extraction

If any revisions need to be made to the information above, please let me know . I have copied this email to our login dept and to Crystal clarify what the analytical instructions are.
Linda

From: Mia Painter [mailto:mpainter@schnabel-eng.com]
Sent: Wednesday, March 09, 2011 10:32 AM
To: Lohr, Linda
Subject: my contact info

[illegible] Geologist
Schnabel ENGINEERING
[illegible] 610-696-7771 http://www.schnabel-eng.com
[illegible] West Chester, PA / 19380

[illegible] Firm List / CE News, Best Civil Engineering Firms To Work For 2010

This e-mail including attached files is confidential. Its transmission is solely as an accommodation for the benefit of the recipient. The recipient bears the responsibility for checking its accuracy against corresponding originally signed documents provided by Schnabel Engineering. If you received this e-mail in error, its use is prohibited. Please destroy it and immediately notify postmaster@schnabel-eng.com.

3/9/2011

Cooler Receipt Form

Client: Stevens Institute of Technology Schnabel **WORK ORDER #:** KUC0128

Project: Raritan Bay Slag Superfund Site

Temperature Upon Receipt by IR: 6°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:

Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**

Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:

ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**

Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**

Sufficient volume for all analyses? **Y N**

All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**

All Sample Containers received: **Y N** All Container labels match COC: **Y N**

List Discrepancies below if indicated:

Sample S-1 one 32oz Jar received broken

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature: Nick Fiedetti **Date/Time:** 3/7/11

Attachment 2

Semi-Dynamic Leach (SDL) Test Results
(Test America)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0091
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
03/15/2011 03:26:59 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0091

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0091-01	SW2-C2 (2 Hr)	Water	03/02/11 16:29	03/04/11 14:42
KUC0091-02	WJ3-C1 (2 Hr)	Water	03/02/11 16:25	03/04/11 14:42
KUC0091-03	SW4-C5 (2 Hr)	Water	03/02/11 16:21	03/04/11 14:42
KUC0091-04	SW2-C2 (7 Hr)	Water	03/02/11 17:50	03/04/11 14:42
KUC0091-05	WJ3-C1 (7 Hr)	Water	03/02/11 17:55	03/04/11 14:42
KUC0091-06	SW4-C5 (7 Hr)	Water	03/02/11 17:59	03/04/11 14:42
KUC0091-07	SW2-C2 (Day 1)	Water	03/03/11 10:23	03/04/11 14:42
KUC0091-08	WJ3-C1 (Day 1)	Water	03/03/11 10:28	03/04/11 14:42
KUC0091-09	SW4-C5 (Day 1)	Water	03/03/11 10:34	03/04/11 14:42

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0091

Qualifiers

Metals

Qualifier	Qualifier Description
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
M8	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).

Glossary

Glossary	Glossary Description
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.

Client Sample ID: SW2-C2 (2 Hr)

Lab Sample ID: KUC0091-01

Date Collected: 03/02/11 16:29
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:07	1.00
Calcium	**0.177**		0.100		mg/L		03/08/11 04:57	03/08/11 15:07	1.00
Iron	**1.6**		0.10		mg/L		03/08/11 04:57	03/08/11 15:07	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:07	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:07	1.0
Sodium	**0.83**		0.50		mg/L		03/08/11 04:57	03/08/11 15:07	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:07	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Antimony	**11**		1.0		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Barium	**15**		0.96		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Cobalt	**0.38**		0.18		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Lead	**160**		0.96		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Nickel	**3.2**		0.97		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Silver	**0.66**		0.40		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 14:20	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:20	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 11:33	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:26	1.00

Client Sample ID: WJ3-C1 (2 Hr)

Lab Sample ID: KUC0091-02

Date Collected: 03/02/11 16:25
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:13	1.00
Calcium	**0.159**		0.100		mg/L		03/08/11 04:57	03/08/11 15:13	1.00
Iron	**0.65**		0.10		mg/L		03/08/11 04:57	03/08/11 15:13	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:13	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:13	1.0
Sodium	**1.9**		0.50		mg/L		03/08/11 04:57	03/08/11 15:13	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:13	1.0

Client Sample ID: WJ3-C1 (2 Hr)

Lab Sample ID: KUC0091-02

Date Collected: 03/02/11 16:25
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Antimony	**80**		1.0		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Arsenic	**1.7**		1.0		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Barium	**11**		0.96		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Cobalt	**0.24**		0.18		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Lead	**240**		0.96		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Nickel	**1.9**		0.97		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 14:25	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:25	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 11:38	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:28	1.00

Client Sample ID: SW4-C5 (2 Hr)

Lab Sample ID: KUC0091-03

Date Collected: 03/02/11 16:21
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:15	1.00
Calcium	**0.209**		0.100		mg/L		03/08/11 04:57	03/08/11 15:15	1.00
Iron	**3.0**		0.10		mg/L		03/08/11 04:57	03/08/11 15:15	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:15	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:15	1.0
Sodium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:15	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:15	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Antimony	**6.7**		1.0		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Arsenic	**1.2**		1.0		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Barium	**11**		0.96		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Cobalt	**0.46**		0.18		ug/l		03/08/11 04:52	03/08/11 14:30	2.0

Client Sample ID: SW4-C5 (2 Hr)

Lab Sample ID: KUC0091-03

Date Collected: 03/02/11 16:21
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	**1.2**		1.0		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Lead	ND		0.96		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Nickel	**1.7**		0.97		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 14:30	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:30	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 11:43	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:29	1.00

Client Sample ID: SW2-C2 (7 Hr)

Lab Sample ID: KUC0091-04

Date Collected: 03/02/11 17:50
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:17	1.00
Calcium	ND		0.100		mg/L		03/08/11 04:57	03/08/11 15:17	1.00
Iron	**1.2**		0.10		mg/L		03/08/11 04:57	03/08/11 15:17	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:17	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:17	1.0
Sodium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:17	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:17	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Antimony	**11**		1.0		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Barium	**12**		0.96		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Cobalt	ND		0.18		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Lead	**94**		0.96		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Nickel	**3.0**		0.97		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 14:35	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:35	2.0

Client Sample ID: SW2-C2 (7 Hr)

Lab Sample ID: KUC0091-04

Date Collected: 03/02/11 17:50
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 11:48	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:31	1.00

Client Sample ID: WJ3-C1 (7 Hr)

Lab Sample ID: KUC0091-05

Date Collected: 03/02/11 17:55
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:20	1.00
Calcium	**0.100**		0.100		mg/L		03/08/11 04:57	03/08/11 15:20	1.00
Iron	**1.1**		0.10		mg/L		03/08/11 04:57	03/08/11 15:20	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:20	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:20	1.0
Sodium	**1.3**		0.50		mg/L		03/08/11 04:57	03/08/11 15:20	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:20	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Antimony	**130**		1.0		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Arsenic	**3.0**		1.0		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Barium	**14**		0.96		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Cobalt	**0.36**		0.18		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Lead	**280**		0.96		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Nickel	**2.5**		0.97		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 14:50	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:50	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 11:53	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:33	1.00

Client Sample ID: SW4-C5 (7 Hr)

Lab Sample ID: KUC0091-06

Date Collected: 03/02/11 17:59
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:22	1.00
Calcium	ND		0.100		mg/L		03/08/11 04:57	03/08/11 15:22	1.00
Iron	**5.0**		0.10		mg/L		03/08/11 04:57	03/08/11 15:22	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:22	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:22	1.0
Sodium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:22	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:22	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Antimony	**5.5**		1.0		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Arsenic	**1.5**		1.0		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Barium	**14**		0.96		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Cobalt	**0.38**		0.18		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Lead	**1.9**		0.96		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Nickel	**2.1**		0.97		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 14:55	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 14:55	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**11**		10		ug/l		03/08/11 04:52	03/14/11 11:58	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:35	1.00

Client Sample ID: SW2-C2 (Day 1)

Lab Sample ID: KUC0091-07

Date Collected: 03/03/11 10:23
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:24	1.00
Calcium	**0.122**		0.100		mg/L		03/08/11 04:57	03/08/11 15:24	1.00
Iron	**1.9**		0.10		mg/L		03/08/11 04:57	03/08/11 15:24	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:24	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:24	1.0
Sodium	**0.58**		0.50		mg/L		03/08/11 04:57	03/08/11 15:24	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:24	1.0

Client Sample ID: SW2-C2 (Day 1)

Lab Sample ID: KUC0091-07

Date Collected: 03/03/11 10:23
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Antimony	**11**		1.0		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Arsenic	ND		1.0		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Barium	**18**		0.96		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Cobalt	**0.34**		0.18		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Lead	**66**		0.96		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Nickel	ND		0.97		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 15:00	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 15:00	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 12:03	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:37	1.00

Client Sample ID: WJ3-C1 (Day 1)

Lab Sample ID: KUC0091-08

Date Collected: 03/03/11 10:28
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:26	1.00
Calcium	**0.148**		0.100		mg/L		03/08/11 04:57	03/08/11 15:26	1.00
Iron	**2.9**		0.10		mg/L		03/08/11 04:57	03/08/11 15:26	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:26	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:26	1.0
Sodium	**2.2**		0.50		mg/L		03/08/11 04:57	03/08/11 15:26	1.0
Tin	ND		0.10		mg/L		03/08/11 04:57	03/08/11 15:26	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Antimony	**90**		1.0		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Arsenic	**3.9**		1.0		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Barium	**17**		0.96		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Cobalt	**0.78**		0.18		ug/l		03/08/11 04:52	03/08/11 15:05	2.0

Client Sample ID: WJ3-C1 (Day 1)

Lab Sample ID: KUC0091-08

Date Collected: 03/03/11 10:28
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Lead	**460**		0.96		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Nickel	**3.1**		0.97		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 15:05	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 15:05	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		10		ug/l		03/08/11 04:52	03/14/11 12:08	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:38	1.00

Client Sample ID: SW4-C5 (Day 1)

Lab Sample ID: KUC0091-09

Date Collected: 03/03/11 10:34
Matrix: Water
Date Received: 03/04/11 14:42
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/08/11 04:57	03/08/11 15:28	1.00
Calcium	**0.106**		0.100		mg/L		03/08/11 04:57	03/08/11 15:28	1.00
Iron	**5.7**		0.10		mg/L		03/08/11 04:57	03/08/11 15:28	1.0
Magnesium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:28	1.0
Potassium	ND	L	10		mg/L		03/08/11 04:57	03/08/11 15:28	1.0
Sodium	ND		0.50		mg/L		03/08/11 04:57	03/08/11 15:28	1.0
Tin	ND	M8	0.10		mg/L		03/08/11 04:57	03/08/11 15:28	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Antimony	**6.5**		1.0		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Arsenic	**2.7**		1.0		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Barium	**16**		0.96		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Beryllium	ND		0.56		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Cadmium	ND		0.43		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Chromium	ND		1.4		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Cobalt	**0.44**		0.18		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Copper	ND		1.0		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Lead	**8.0**		0.96		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Nickel	ND		0.97		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Selenium	ND		3.6		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Silver	ND		0.40		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Thallium	ND		0.40		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Vanadium	ND		0.51		ug/l		03/08/11 04:52	03/08/11 15:10	2.0
Zinc	ND		20		ug/l		03/08/11 04:52	03/08/11 15:10	2.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0091

Client Sample ID: SW4-C5 (Day 1)

Lab Sample ID: KUC0091-09

Date Collected: 03/03/11 10:34

Matrix: Water

Date Received: 03/04/11 14:42

Sampler Name:

Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**26**		10		ug/l		03/08/11 04:52	03/14/11 12:13	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/10/11 07:59	03/11/11 12:40	1.00

Client Sample ID: SW2-C2 (2 Hr)
Date Collected: 03/02/11 16:29
Date Received: 03/04/11 14:42

Lab Sample ID: KUC0091-01
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:07	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:07	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:26	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 14:20	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 11:33	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (2 Hr)
Date Collected: 03/02/11 16:25
Date Received: 03/04/11 14:42

Lab Sample ID: KUC0091-02
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:28	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 14:25	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 11:38	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (2 Hr)
Date Collected: 03/02/11 16:21
Date Received: 03/04/11 14:42

Lab Sample ID: KUC0091-03
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:15	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:15	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:29	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 14:30	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (2 Hr)

Lab Sample ID: KUC0091-03
Date Collected: 03/02/11 16:21
Matrix: Water
Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 11:43	RW	TestAmerica King Of Prussia

Client Sample ID: SW2-C2 (7 Hr)

Lab Sample ID: KUC0091-04
Date Collected: 03/02/11 17:50
Matrix: Water
Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:17	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:31	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 14:35	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 11:48	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (7 Hr)

Lab Sample ID: KUC0091-05
Date Collected: 03/02/11 17:55
Matrix: Water
Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:20	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:33	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 14:50	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 11:53	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (7 Hr)

Lab Sample ID: KUC0091-06

Date Collected: 03/02/11 17:59

Matrix: Water

Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:22	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:22	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:35	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 14:55	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 11:58	RW	TestAmerica King Of Prussia

Client Sample ID: SW2-C2 (Day 1)

Lab Sample ID: KUC0091-07

Date Collected: 03/03/11 10:23

Matrix: Water

Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:24	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:24	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:37	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 15:00	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 12:03	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 1)

Lab Sample ID: KUC0091-08

Date Collected: 03/03/11 10:28

Matrix: Water

Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:38	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 15:05	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0091

Client Sample ID: WJ3-C1 (Day 1)

Lab Sample ID: KUC0091-08

Date Collected: 03/03/11 10:28

Matrix: Water

Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 12:08	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 1)

Lab Sample ID: KUC0091-09

Date Collected: 03/03/11 10:34

Matrix: Water

Date Received: 03/04/11 14:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000431	03/08/11 15:28	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0146_P	03/08/11 04:57	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000431	03/08/11 15:28	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0219_P	03/10/11 07:59	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000465	03/11/11 12:40	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0145	03/08/11 15:10	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0145_P	03/08/11 04:52	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0145	03/14/11 12:13	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0091

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

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CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

03/15/2011

TAT per Schnabel Engineering

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com Phone #: (610) 696-6066
E-mail: mpainter@schnabel-eng.com Fax #: (610) 696-7771
Project Name: Raritan Bay
Project #/PO#: SE-0380(Kemron) /
Sampler: Stephen E. McClanahan

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 0°C

	Date Collected	Time Collected	Sample Matrix	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	Total # of Bottles	Samples Field Filtered ☐ YES ☐ NO	6010B TAL metals + Tin + Silicon	Cracked-Broken	Improperly Sealed	Laboratory ID Number
1 SW2-C2 (2Hr) PID:	3/2/11	16:29	W				1				1		X			KUC0091-01
2 WJ3-C1 (2Hr) PID:	3/2/11	16:25	W				1				1		X			-02
3 SW4-C5 (2Hr) PID:	3/2/11	16:21	W				1				1		X			-03
4 SW2-C2 (7Hr) PID:	3/2/11	17:50	W				1				1		X			-04
5 WJ3-C1 (7Hr) PID:	3/2/11	17:55	W				1				1		X			-05
6 SW4-C5 (7Hr) PID:	3/2/11	17:59	W				1				1		X			-06
7 SW2-C2 (Day 1) PID:	3/3/11	10:23	W				1				1		X			-07
8 WJ3-C1 (Day 1) PID:	3/3/11	10:28	W				1				1		X			-08
9 SW4-C5 (Day 1) PID:	3/3/11	10:34	W				1				1		X			-09
10 PID:																

Relinquished	Date	Time	Received	Date	Time	Relinquished	Date	Time	Received	Date	Time
[signature]	3/4/11	1300	FedEx			FedEx			Nick Fodette	3/4/11	11:20

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel
Custody Seal intact
Track # 8704 1733 3141

PAGE 1 OF 1

TAL-4124-450 (0509)

Cooler Receipt Form

WORK ORDER #: KUC0090

Client: Arnabel Project: Raritan Bay

Temperature Upon Receipt by IR: 0°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**
Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? **Y N**
All Sample Containers Intact? **Y N** All Sample Containers labeled: **Y N**
All Sample Containers received: **Y N** All Container labels match COC: **Y N**
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: Nick Fedetta **Date/Time:** 3/4/11

TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0194
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
03/18/2011 03:50:13 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

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Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0194-01	SW2-C2 (Day 2)	Water	03/04/11 10:53	03/09/11 11:10
KUC0194-02	WJ3-C1 (Day 2)	Water	03/04/11 10:58	03/09/11 11:10
KUC0194-03	SW4-C5 (Day 2)	Water	03/04/11 11:04	03/09/11 11:10
KUC0194-04	SW2-C2 (Day 3)	Water	03/04/11 10:27	03/09/11 11:10
KUC0194-05	WJ3-C1 (Day 3)	Water	03/04/11 10:33	03/09/11 11:10
KUC0194-06	SW4-C5 (Day 3)	Water	03/04/11 10:39	03/09/11 11:10
KUC0194-07	SW2-C2 (Day 4)	Water	03/04/11 10:41	03/09/11 11:10
KUC0194-08	WJ3-C1 (day 4)	Water	03/04/11 10:57	03/09/11 11:10
KUC0194-09	SW4-C5 (Day 4)	Water	03/04/11 11:02	03/09/11 11:10

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Qualifiers

Metals

Qualifier	Qualifier Description
M8	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: SW2-C2 (Day 2)

Lab Sample ID: KUC0194-01

Date Collected: 03/04/11 10:53
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 09:58	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 09:58	1.00
Iron	**1.2**		0.10		mg/L		03/11/11 05:19	03/18/11 09:58	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 09:58	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 09:58	1.0
Sodium	**0.52**		0.50		mg/L		03/11/11 05:19	03/18/11 09:58	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 09:58	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Antimony	**11**		1.0		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Arsenic	**1.2**		1.0		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Barium	**13**		0.96		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Lead	**2.8**		0.96		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 12:38	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 12:38	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/17/11 13:05	03/18/11 07:34	1.00

Client Sample ID: WJ3-C1 (Day 2)

Lab Sample ID: KUC0194-02

Date Collected: 03/04/11 10:58
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:08	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:08	1.00
Iron	**2.0**		0.10		mg/L		03/11/11 05:19	03/18/11 10:08	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:08	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:08	1.0
Sodium	**1.7**		0.50		mg/L		03/11/11 05:19	03/18/11 10:08	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:08	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 12:53	2.0

Client Sample ID: WJ3-C1 (Day 2)

Lab Sample ID: KUC0194-02

Date Collected: 03/04/11 10:58
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**57**	**MHA**	1.0		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Arsenic	**1.7**		1.0		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Barium	**19**		0.96		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Cobalt	**0.40**		0.18		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Lead	**360**	**MHA**	0.96		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Nickel	**1.9**		0.97		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 12:53	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 12:53	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/17/11 13:05	03/18/11 07:36	1.00

Client Sample ID: SW4-C5 (Day 2)

Lab Sample ID: KUC0194-03

Date Collected: 03/04/11 11:04
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:10	1.00
Calcium	**0.100**		0.100		mg/L		03/11/11 05:19	03/18/11 10:10	1.00
Iron	**2.1**		0.10		mg/L		03/11/11 05:19	03/18/11 10:10	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:10	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:10	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:10	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:10	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Antimony	**4.3**		1.0		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Arsenic	**2.0**		1.0		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Barium	**16**		0.96		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Cobalt	**0.20**		0.18		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Lead	**2.3**		0.96		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:08	2.0

Client Sample ID: SW4-C5 (Day 2)

Lab Sample ID: KUC0194-03

Date Collected: 03/04/11 11:04
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:08	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:08	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/17/11 13:05	03/18/11 07:38	1.00

Client Sample ID: SW2-C2 (Day 3)

Lab Sample ID: KUC0194-04

Date Collected: 03/04/11 10:27
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:12	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:12	1.00
Iron	**0.72**		0.10		mg/L		03/11/11 05:19	03/18/11 10:12	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:12	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:12	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:12	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:12	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Antimony	**11**		1.0		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Arsenic	**1.7**		1.0		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Barium	**13**		0.96		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:13	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:13	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	M8	1.00		ug/l		03/16/11 06:50	03/16/11 13:24	1.00

Client Sample ID: WJ3-C1 (Day 3)

Lab Sample ID: KUC0194-05

Date Collected: 03/04/11 10:33
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:14	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:14	1.00
Iron	**1.4**		0.10		mg/L		03/11/11 05:19	03/18/11 10:14	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:14	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:14	1.0
Sodium	**1.4**		0.50		mg/L		03/11/11 05:19	03/18/11 10:14	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:14	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Antimony	**41**		1.0		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Arsenic	**1.6**		1.0		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Barium	**15**		0.96		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Lead	**230**		0.96		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Nickel	**1.0**		0.97		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:18	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:18	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:35	1.00

Client Sample ID: SW4-C5 (Day 3)

Lab Sample ID: KUC0194-06

Date Collected: 03/04/11 10:39
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:16	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:16	1.00
Iron	**1.2**		0.10		mg/L		03/11/11 05:19	03/18/11 10:16	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:16	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:16	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:16	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:16	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:33	2.0

Client Sample ID: SW4-C5 (Day 3)

Lab Sample ID: KUC0194-06

Date Collected: 03/04/11 10:39
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**4.3**		1.0		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Arsenic	**1.4**		1.0		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Barium	**15**		0.96		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Copper	**1.0**		1.0		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:33	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:33	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:37	1.00

Client Sample ID: SW2-C2 (Day 4)

Lab Sample ID: KUC0194-07

Date Collected: 03/04/11 10:41
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:19	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:19	1.00
Iron	**0.52**		0.10		mg/L		03/11/11 05:19	03/18/11 10:19	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:19	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:19	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:19	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:19	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Antimony	**7.9**		1.0		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Arsenic	**1.2**		1.0		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Barium	**11**		0.96		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:38	2.0

Client Sample ID: SW2-C2 (Day 4)

Lab Sample ID: KUC0194-07

Date Collected: 03/04/11 10:41
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:38	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:38	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:38	1.00

Client Sample ID: WJ3-C1 (day 4)

Lab Sample ID: KUC0194-08

Date Collected: 03/04/11 10:57
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:21	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:21	1.00
Iron	**1.1**		0.10		mg/L		03/11/11 05:19	03/18/11 10:21	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:21	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:21	1.0
Sodium	**1.4**		0.50		mg/L		03/11/11 05:19	03/18/11 10:21	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:21	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Antimony	**25**		1.0		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Arsenic	**1.3**		1.0		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Barium	**15**		0.96		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Lead	**200**		0.96		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:43	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:43	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:40	1.00

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Client Sample ID: SW4-C5 (Day 4)

Lab Sample ID: KUC0194-09

Date Collected: 03/04/11 11:02
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:23	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:23	1.00
Iron	**0.72**		0.10		mg/L		03/11/11 05:19	03/18/11 10:23	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:23	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:23	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:23	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:23	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Antimony	**3.7**		1.0		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Arsenic	**1.2**		1.0		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Barium	**10**		0.96		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:48	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:48	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:42	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Client Sample ID: SW2-C2 (Day 2)

Lab Sample ID: KUC0194-01
Date Collected: 03/04/11 10:53
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 09:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 09:58	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0414_P	03/17/11 13:05	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000513	03/18/11 07:34	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 12:38	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 2)

Lab Sample ID: KUC0194-02
Date Collected: 03/04/11 10:58
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:08	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0414_P	03/17/11 13:05	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000513	03/18/11 07:36	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 12:53	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 2)

Lab Sample ID: KUC0194-03
Date Collected: 03/04/11 11:04
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:10	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0414_P	03/17/11 13:05	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000513	03/18/11 07:38	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:08	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Client Sample ID: SW2-C2 (Day 3)

Lab Sample ID: KUC0194-04
Matrix: Water

Date Collected: 03/04/11 10:27
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:12	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:12	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:24	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:13	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 3)

Lab Sample ID: KUC0194-05
Matrix: Water

Date Collected: 03/04/11 10:33
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:14	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:14	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:35	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:18	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 3)

Lab Sample ID: KUC0194-06
Matrix: Water

Date Collected: 03/04/11 10:39
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:16	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:16	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:37	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:33	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Client Sample ID: SW2-C2 (Day 4)

Lab Sample ID: KUC0194-07
Date Collected: 03/04/11 10:41
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:19	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:19	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:38	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:38	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (day 4)

Lab Sample ID: KUC0194-08
Date Collected: 03/04/11 10:57
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:21	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:21	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:40	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:43	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 4)

Lab Sample ID: KUC0194-09
Date Collected: 03/04/11 11:02
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:42	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:48	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0194

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

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THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

03/18/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com
E-mail: mpainter@schnabel-eng.com
Phone #: (610) 696-6066
Fax #: (610) 696-7771

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 0°C

Project Name: Raritan Bay
Project #/PO#: SE-0380(KEMRON)
Sampler: Stephen E. McLanahan

FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	6010B TAL metals + Tin + Si (total)	CRACKED-BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1 SW2-C2 (Day 2) PID:	3/4/11	10:53	W				1				1		X			KUC0194-01
2 WJ3-C1 (Day 2) PID:	3/4/11	10:58	W				1				1		X			-02
3 SW4-C5 (Day 2) PID:	3/4/11	11:04	W				1				1		X			-03
4 SW2-C2 (Day 3) PID:	3/5/11	10:27	W				1				1		X			-04
5 WJ3-C1 (Day 3) PID:	3/5/11	10:33	W				1				1		X			-05
6 SW4-C5 (Day 3) PID:	3/5/11	10:39	W				1				1		X			-06
7 SW2-C2 (Day 4) PID:	3/6/11	10:41	W				1				1		X			-07
8 WJ3-C1 (Day 4) PID:	3/6/11	10:57	W				1				1		X			-08
9 SW4-C5 (Day 4) PID:	3/6/11	11:02	W				1				1		X			-09
10 PID:																

ANALYSIS TYPE

SAMPLE CONTROL

RELINQUISHED	DATE	TIME	RECEIVED	DATE	TIME	RELINQUISHED	DATE	TIME	RECEIVED	DATE	TIME
Stephen McLanahan	3/9/11	14:15	Fed Ex			Fed Ex			Nick Fiedetti	3/9	11:10
RELINQUISHED	DATE	TIME	RECEIVED	DATE	TIME	RELINQUISHED	DATE	TIME	RECEIVED	DATE	TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel

PAGE OF

TAL-4124-450 (0509)

Track # 8704 1733 3152

Cooler Receipt Form

WORK ORDER #: KUC0194

Client [illegible] Project: Raritan Bay

Temperature Upon Receipt by IR: 0°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: 1 2 3+ Custody Seals Intact? Y N
Ice Present? Y N N/A Melted Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? Y N
All Sample Containers Intact: Y N All Sample Containers labeled: Y N
All Sample Containers received: Y N All Container labels match COC: Y N
List Discrepancies below if indicated:

_____

_____

_____

_____

_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature:_____ **Date/Time:** 3/9/11

Property of TestAmerica King of Prussia

TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0195
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
03/18/2011 03:54:36 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0195

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0195-01	SW2-C2 (Day 5)	Water	03/07/11 13:57	03/09/11 11:10
KUC0195-02	WJ3-C1 (Day 5)	Water	03/07/11 14:16	03/09/11 11:10
KUC0195-03	SW4-C5 (Day 5)	Water	03/07/11 16:23	03/09/11 11:10
KUC0195-04	SW2-C2 (Day 6)	Water	03/07/11 11:50	03/09/11 11:10
KUC0195-05	WJ3-C1 (Day 6)	Water	03/07/11 11:55	03/09/11 11:10
KUC0195-06	SW4-C5 (Day 6)	Water	03/07/11 12:00	03/09/11 11:10

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: SW2-C2 (Day 5)

Lab Sample ID: KUC0195-01

Date Collected: 03/07/11 13:57
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:25	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:25	1.00
Iron	**0.38**		0.10		mg/L		03/11/11 05:19	03/18/11 10:25	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:25	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:25	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:25	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:25	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Antimony	**6.7**		1.0		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Arsenic	**1.1**		1.0		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Barium	**10**		0.96		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:53	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:53	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:44	1.00

Client Sample ID: WJ3-C1 (Day 5)

Lab Sample ID: KUC0195-02

Date Collected: 03/07/11 14:16
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:27	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:27	1.00
Iron	**0.96**		0.10		mg/L		03/11/11 05:19	03/18/11 10:27	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:27	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:27	1.0
Sodium	**1.0**		0.50		mg/L		03/11/11 05:19	03/18/11 10:27	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:27	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 13:58	2.0

Client Sample ID: WJ3-C1 (Day 5)

Lab Sample ID: KUC0195-02

Date Collected: 03/07/11 14:16
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**21**		1.0		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Arsenic	**1.0**		1.0		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Barium	**14**		0.96		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Lead	**220**		0.96		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 13:58	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 13:58	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:45	1.00

Client Sample ID: SW4-C5 (Day 5)

Lab Sample ID: KUC0195-03

Date Collected: 03/07/11 16:23
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:33	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:33	1.00
Iron	**0.56**		0.10		mg/L		03/11/11 05:19	03/18/11 10:33	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:33	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:33	1.0
Sodium	**0.73**		0.50		mg/L		03/11/11 05:19	03/18/11 10:33	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:33	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Antimony	**3.3**		1.0		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Arsenic	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Barium	**10**		0.96		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 14:03	2.0

Client Sample ID: SW4-C5 (Day 5)

Lab Sample ID: KUC0195-03

Date Collected: 03/07/11 16:23
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:03	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:03	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:51	1.00

Client Sample ID: SW2-C2 (Day 6)

Lab Sample ID: KUC0195-04

Date Collected: 03/07/11 11:50
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:36	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:36	1.00
Iron	**0.33**		0.10		mg/L		03/11/11 05:19	03/18/11 10:36	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:36	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:36	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:36	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:36	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Antimony	**7.0**		1.0		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Arsenic	**1.1**		1.0		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Barium	**9.1**		0.96		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Nickel	**1.7**		0.97		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:08	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:08	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:52	1.00

Client Sample ID: WJ3-C1 (Day 6)

Lab Sample ID: KUC0195-05

Date Collected: 03/07/11 11:55
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:38	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:38	1.00
Iron	**0.77**		0.10		mg/L		03/11/11 05:19	03/18/11 10:38	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:38	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:38	1.0
Sodium	**1.1**		0.50		mg/L		03/11/11 05:19	03/18/11 10:38	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:38	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Antimony	**17**		1.0		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Arsenic	**1.0**		1.0		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Barium	**15**		0.96		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Lead	**190**		0.96		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Nickel	**3.2**		0.97		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:13	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:13	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:54	1.00

Client Sample ID: SW4-C5 (Day 6)

Lab Sample ID: KUC0195-06

Date Collected: 03/07/11 12:00
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 05:19	03/18/11 10:40	1.00
Calcium	ND		0.100		mg/L		03/11/11 05:19	03/18/11 10:40	1.00
Iron	**0.43**		0.10		mg/L		03/11/11 05:19	03/18/11 10:40	1.0
Magnesium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:40	1.0
Potassium	ND		10		mg/L		03/11/11 05:19	03/18/11 10:40	1.0
Sodium	ND		0.50		mg/L		03/11/11 05:19	03/18/11 10:40	1.0
Tin	ND		0.10		mg/L		03/11/11 05:19	03/18/11 10:40	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:18	2.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0195

Client Sample ID: SW4-C5 (Day 6)

Lab Sample ID: KUC0195-06

Date Collected: 03/07/11 12:00
Matrix: Water
Date Received: 03/09/11 11:10
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**3.3**		1.0		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Arsenic	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Barium	**11**		0.96		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Lead	ND		0.96		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Nickel	**1.5**		0.97		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:18	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:18	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/16/11 06:50	03/16/11 13:56	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0195

Client Sample ID: SW2-C2 (Day 5)

Lab Sample ID: KUC0195-01
Date Collected: 03/07/11 13:57
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:44	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:53	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 5)

Lab Sample ID: KUC0195-02
Date Collected: 03/07/11 14:16
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:27	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:27	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:45	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 13:58	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 5)

Lab Sample ID: KUC0195-03
Date Collected: 03/07/11 16:23
Matrix: Water
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:33	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:33	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:51	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:03	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0195

Client Sample ID: SW2-C2 (Day 6)

Lab Sample ID: KUC0195-04
Matrix: Water

Date Collected: 03/07/11 11:50
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:36	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:36	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:52	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:08	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 6)

Lab Sample ID: KUC0195-05
Matrix: Water

Date Collected: 03/07/11 11:55
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:38	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:38	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:54	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:13	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 6)

Lab Sample ID: KUC0195-06
Matrix: Water

Date Collected: 03/07/11 12:00
Date Received: 03/09/11 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0245	03/18/11 10:40	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0245_P	03/11/11 05:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0245	03/18/11 10:40	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0358_P	03/16/11 06:50	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000493	03/16/11 13:56	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:18	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0195

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

03/18/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com Phone #: (610) 696-6066
E-mail: mpainter@schnabel-eng.com Fax #: (610) 696-7771

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 0°C

Project Name: Raritan Bay
Project #/PO#: SE-8380 (Kemron)
Sampler: Stephen E. McLanahan

	FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	6010B Tot. metals + Total Si (total)	CRACKED-BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1	SW2-C2 (Day 5) PID:	3/7/11	1357					1				1		X			KUC0195-01
2	WJ3-C1 (Day 5) PID:	3/7/11	1416					1				1		X			-02
3	SW4-C5 (Day 5) PID:	3/7/11	1623					1				1		X			-03
4	SW2-C2 (Day 6) PID:	3/8/11	1150					1				1		X			-04
5	WJ3-C1 (Day 6) PID:	3/8/11	1155					1				1		X			-05
6	SW4-C5 (Day 6) PID:	3/8/11	1200					1				1		X			-06
7	PID:																
8	PID:																
9	PID:																
10	PID:																

ANALYSIS TYPE

SAMPLE CONTROL

RELINQUISHED	RECEIVED	RELINQUISHED	RECEIVED
Stephen E. McLanahan DATE 3/9/11 TIME 14:15	Fed Ex DATE TIME	Fed Ex DATE TIME	Nick Fredette DATE 3/9 TIME 11:10
RELINQUISHED DATE TIME	RECEIVED DATE TIME	RELINQUISHED DATE TIME	RECEIVED DATE TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel

Custody seal intact. JR 3/9/11

PAGE OF

TAL-4124-450 (0509)

Track # 8704 1733 3152

Cooler Receipt Form

WORK ORDER #: KUC0195

Client: Schnabel Project: Raritan Bay

Temperature Upon Receipt by IR: 0°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:

Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**

Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:

ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**

Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**

Sufficient volume for all analyses? **Y N**

All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**

All Sample Containers received: **Y N** All Container labels match COC: **Y N**

List Discrepancies below if indicated:

_____

_____

_____

_____

_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: _____ **Date/Time:** 3/9/11

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0218
Client Project/Site: SE-0380 (Kemron)
Client Project Description: do not use

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Jill Miller

Authorized for release by:
03/18/2011 04:03:28 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0218

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0218-01	SW2-C2 (Day 7)	Water	03/09/11 11:45	03/10/11 10:30
KUC0218-02	WJ3-C1 (Day 7)	Water	03/09/11 11:30	03/10/11 10:30
KUC0218-03	SW4-C5 (Day 7)	Water	03/09/11 11:35	03/10/11 10:30

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: SW2-C2 (Day 7)

Lab Sample ID: KUC0218-01

Date Collected: 03/09/11 11:45
Matrix: Water
Date Received: 03/10/11 10:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 04:43	03/18/11 09:43	1.00
Calcium	ND		0.100		mg/L		03/11/11 04:43	03/18/11 09:43	1.00
Iron	**0.32**		0.10		mg/L		03/11/11 04:43	03/18/11 09:43	1.0
Magnesium	ND		0.50		mg/L		03/11/11 04:43	03/18/11 09:43	1.0
Potassium	ND		10		mg/L		03/11/11 04:43	03/18/11 09:43	1.0
Sodium	ND		0.50		mg/L		03/11/11 04:43	03/18/11 09:43	1.0
Tin	ND		0.10		mg/L		03/11/11 04:43	03/18/11 09:43	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Antimony	**7.9**		1.0		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Arsenic	**1.3**		1.0		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Barium	**12**		0.96		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Lead	**10**		0.96		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Nickel	ND		0.97		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:33	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:33	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/17/11 13:05	03/18/11 07:40	1.00

Client Sample ID: WJ3-C1 (Day 7)

Lab Sample ID: KUC0218-02

Date Collected: 03/09/11 11:30
Matrix: Water
Date Received: 03/10/11 10:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 04:43	03/18/11 09:45	1.00
Calcium	ND		0.100		mg/L		03/11/11 04:43	03/18/11 09:45	1.00
Iron	**0.76**		0.10		mg/L		03/11/11 04:43	03/18/11 09:45	1.0
Magnesium	ND		0.50		mg/L		03/11/11 04:43	03/18/11 09:45	1.0
Potassium	ND		10		mg/L		03/11/11 04:43	03/18/11 09:45	1.0
Sodium	**1.2**		0.50		mg/L		03/11/11 04:43	03/18/11 09:45	1.0
Tin	ND		0.10		mg/L		03/11/11 04:43	03/18/11 09:45	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:38	2.0

Client Sample ID: WJ3-C1 (Day 7)

Lab Sample ID: KUC0218-02

Date Collected: 03/09/11 11:30
Matrix: Water
Date Received: 03/10/11 10:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**19**		1.0		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Arsenic	**1.3**		1.0		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Barium	**24**		0.96		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Lead	**89**		0.96		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Nickel	**2.3**		0.97		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:38	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:38	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/17/11 13:05	03/18/11 07:41	1.00

Client Sample ID: SW4-C5 (Day 7)

Lab Sample ID: KUC0218-03

Date Collected: 03/09/11 11:35
Matrix: Water
Date Received: 03/10/11 10:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/11/11 04:43	03/18/11 09:47	1.00
Calcium	**0.117**		0.100		mg/L		03/11/11 04:43	03/18/11 09:47	1.00
Iron	**0.41**		0.10		mg/L		03/11/11 04:43	03/18/11 09:47	1.0
Magnesium	ND		0.50		mg/L		03/11/11 04:43	03/18/11 09:47	1.0
Potassium	ND		10		mg/L		03/11/11 04:43	03/18/11 09:47	1.0
Sodium	ND		0.50		mg/L		03/11/11 04:43	03/18/11 09:47	1.0
Tin	ND		0.10		mg/L		03/11/11 04:43	03/18/11 09:47	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Antimony	**3.5**		1.0		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Arsenic	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Barium	**12**		0.96		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Beryllium	ND		0.56		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Cadmium	ND		0.43		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Chromium	ND		1.4		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Cobalt	ND		0.18		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Copper	ND		1.0		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Lead	**1.2**		0.96		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Manganese	ND		10		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Nickel	**2.1**		0.97		ug/l		03/11/11 04:51	03/14/11 14:43	2.0

Client Sample ID: SW4-C5 (Day 7)

Lab Sample ID: KUC0218-03

Date Collected: 03/09/11 11:35

Matrix: Water

Date Received: 03/10/11 10:30

Sampler Name:

Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		3.6		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Silver	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Thallium	ND		0.40		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Vanadium	ND		0.51		ug/l		03/11/11 04:51	03/14/11 14:43	2.0
Zinc	ND		20		ug/l		03/11/11 04:51	03/14/11 14:43	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/17/11 13:05	03/18/11 07:43	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0218

Client Sample ID: SW2-C2 (Day 7)

Lab Sample ID: KUC0218-01
Date Collected: 03/09/11 11:45
Matrix: Water
Date Received: 03/10/11 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0243_P	03/11/11 04:43	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0243	03/18/11 09:43	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0243_P	03/11/11 04:43	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0243	03/18/11 09:43	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0414_P	03/17/11 13:05	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000513	03/18/11 07:40	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:33	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 7)

Lab Sample ID: KUC0218-02
Date Collected: 03/09/11 11:30
Matrix: Water
Date Received: 03/10/11 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0243_P	03/11/11 04:43	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0243	03/18/11 09:45	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0243_P	03/11/11 04:43	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0243	03/18/11 09:45	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0414_P	03/17/11 13:05	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000513	03/18/11 07:41	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:38	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 7)

Lab Sample ID: KUC0218-03
Date Collected: 03/09/11 11:35
Matrix: Water
Date Received: 03/10/11 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0243_P	03/11/11 04:43	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	11C0243	03/18/11 09:47	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0243_P	03/11/11 04:43	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	11C0243	03/18/11 09:47	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0414_P	03/17/11 13:05	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000513	03/18/11 07:43	SPC	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0244_P	03/11/11 04:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0244	03/14/11 14:43	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0218

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

03/18/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com Phone #: (610) 696-6066
E-mail: mpainter@schnabel-eng.com Fax #: (610) 696-7711
Project Name: Raritan Bay
Project #/PO#: SE-0380 (KEMRON)
Sampler: Ashley Clayborn

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: OK

FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	6010B TAL metals + Tin (Sn)								CRACKED-BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1 SW2-C2 (Day 7) PID:	3/9/11	11:45					1				1		X										KUC0218-01
2 WJ3-C1 (Day 7) PID:	3/9/11	11:30					1				1		X										-02
3 SW4-C5 (Day 7) PID:	3/9/11	11:35					1				1		X										-03
4 PID:																							
5 PID:																							
6 PID:																							
7 PID:																							
8 PID:																							
9 PID:																							
10 PID:																							

RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME	RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME
[signature]	3/9/11 11:50	Fed Ex		Fed Ex		Nick Fiedler	3/10/11 10:30
RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME	RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel

PAGE 1 OF 1

Custody seal intact 3/10/11

TAL-4124-450 (0609)

Track # 8704 1733 3163

Cooler Receipt Form

WORK ORDER #: KUC0218

Client: Schnabel Project: Raritan

Temperature Upon Receipt by IR: 0°C

Cooler received from: **TA Courier Client (FedEx) UPS Other:** _____

For Received Shipments only:

Number of Coolers: (1) 2 3+ Custody Seals Intact? (Y) N

Ice Present? (Y) N N/A Melted Packing Material: **Bubble Wrap Other (None)**

For Subcontracted Samples only:

ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**

Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N (N/A)**

Sufficient volume for all analyses? (Y) N

All Sample Containers Intact: (Y) N All Sample Containers labeled: (Y) N

All Sample Containers received: (Y) N All Container labels match COC: (Y) N

List Discrepancies below if indicated:

_____

_____

_____

_____

_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	(Yes)	No
2. Project Name and/or Number included	(Yes)	No
3. Field Sampler Name listed	(Yes)	No
4. Field ID/Location - one sample per line	(Yes)	No
5. Date collected (for each sample)	(Yes)	No
6. Time collected (for each sample)	(Yes)	No
7. Matrix (for each sample)	Yes	(No)
8. Number & Types of bottles per sample (and preservation type)	(Yes)	No
9. Analysis Requested	(Yes)	No
10. Sign & Date in the Relinquished Box	(Yes)	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: _____ **Date/Time:** 3/10/11

TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0368
Client Project/Site: SE-0380 (Kemron)
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
03/28/2011 04:27:27 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0368

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0368-01	SW2-C2 (Day 14)	Water	03/16/11 10:33	03/17/11 12:30
KUC0368-02	WJ3-C1 (Day 14)	Water	03/16/11 10:42	03/17/11 12:30
KUC0368-03	SW4-C5 (Day 14)	Water	03/16/11 10:53	03/17/11 12:30

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0368

Qualifiers

Metals

Qualifier	Qualifier Description
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: SW2-C2 (Day 14)

Lab Sample ID: KUC0368-01

Date Collected: 03/16/11 10:33
Matrix: Water
Date Received: 03/17/11 12:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/23/11 12:21	03/25/11 09:26	1.00
Calcium	**0.188**		0.100		mg/L		03/23/11 12:21	03/25/11 09:26	1.00
Iron	**0.71**		0.10		mg/L		03/23/11 12:21	03/25/11 09:26	1.0
Magnesium	ND		0.50		mg/L		03/23/11 12:21	03/25/11 09:26	1.0
Potassium	ND		10		mg/L		03/23/11 12:21	03/25/11 09:26	1.0
Sodium	**1.5**		0.50		mg/L		03/23/11 12:21	03/25/11 09:26	1.0
Tin	ND		0.10		mg/L		03/23/11 12:21	03/25/11 09:26	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Antimony	**1.9**		1.0		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Barium	**18**		0.96		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Beryllium	ND		0.56		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Cadmium	ND		0.43		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Chromium	ND	C	1.4		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Copper	ND		1.0		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Lead	ND		0.96		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Manganese	ND	M7	10		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Nickel	ND	C	0.97		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Selenium	ND	C, L	3.6		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Silver	ND	L	0.40		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Thallium	ND		0.40		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Vanadium	ND		0.51		ug/l		03/22/11 11:19	03/24/11 12:55	2.0
Zinc	ND		20		ug/l		03/22/11 11:19	03/24/11 12:55	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.1**		1.0		ug/l		03/22/11 11:19	03/28/11 11:28	2.0
Cobalt	**0.18**		0.18		ug/l		03/22/11 11:19	03/28/11 11:28	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L	1.00		ug/l		03/23/11 13:12	03/24/11 09:46	1.00

Client Sample ID: WJ3-C1 (Day 14)

Lab Sample ID: KUC0368-02

Date Collected: 03/16/11 10:42
Matrix: Water
Date Received: 03/17/11 12:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/23/11 12:21	03/25/11 09:36	1.00
Calcium	**0.137**		0.100		mg/L		03/23/11 12:21	03/25/11 09:36	1.00
Iron	**5.3**		0.10		mg/L		03/23/11 12:21	03/25/11 09:36	1.0
Magnesium	ND		0.50		mg/L		03/23/11 12:21	03/25/11 09:36	1.0
Potassium	ND		10		mg/L		03/23/11 12:21	03/25/11 09:36	1.0
Sodium	**5.4**		0.50		mg/L		03/23/11 12:21	03/25/11 09:36	1.0
Tin	ND		0.10		mg/L		03/23/11 12:21	03/25/11 09:36	1.0

Client Sample ID: WJ3-C1 (Day 14)

Lab Sample ID: KUC0368-02

Date Collected: 03/16/11 10:42
Matrix: Water
Date Received: 03/17/11 12:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Antimony	ND		1.0		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Barium	**23**		0.96		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Beryllium	ND		0.56		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Cadmium	ND		0.43		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Chromium	ND	C	1.4		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Cobalt	**0.56**		0.18		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Copper	**1.9**		1.0		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Lead	**570**		0.96		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Manganese	ND		10		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Selenium	ND	C, L	3.6		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Silver	ND	L	0.40		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Thallium	ND		0.40		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Vanadium	ND		0.51		ug/l		03/22/11 11:19	03/24/11 13:20	2.0
Zinc	ND		20		ug/l		03/22/11 11:19	03/24/11 13:20	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.0**		1.0		ug/l		03/22/11 11:19	03/28/11 11:38	2.0
Nickel	**1.2**		0.97		ug/l		03/22/11 11:19	03/28/11 11:38	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L	1.00		ug/l		03/23/11 13:12	03/24/11 09:47	1.00

Client Sample ID: SW4-C5 (Day 14)

Lab Sample ID: KUC0368-03

Date Collected: 03/16/11 10:53
Matrix: Water
Date Received: 03/17/11 12:30
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/23/11 12:21	03/25/11 09:38	1.00
Calcium	**0.267**		0.100		mg/L		03/23/11 12:21	03/25/11 09:38	1.00
Iron	**1.0**		0.10		mg/L		03/23/11 12:21	03/25/11 09:38	1.0
Magnesium	ND		0.50		mg/L		03/23/11 12:21	03/25/11 09:38	1.0
Potassium	ND		10		mg/L		03/23/11 12:21	03/25/11 09:38	1.0
Sodium	**1.1**		0.50		mg/L		03/23/11 12:21	03/25/11 09:38	1.0
Tin	ND		0.10		mg/L		03/23/11 12:21	03/25/11 09:38	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Antimony	**1.1**		1.0		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Barium	**16**		0.96		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Beryllium	ND		0.56		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Cadmium	ND		0.43		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Chromium	ND	C	1.4		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Cobalt	ND		0.18		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Copper	ND		1.0		ug/l		03/22/11 11:19	03/24/11 13:25	2.0

Client Sample ID: SW4-C5 (Day 14)

Lab Sample ID: KUC0368-03

Date Collected: 03/16/11 10:53

Matrix: Water

Date Received: 03/17/11 12:30

Sampler Name:

Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**3.6**		0.96		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Manganese	ND		10		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Nickel	ND	C	0.97		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Selenium	ND	C, L	3.6		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Silver	ND	L	0.40		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Thallium	ND		0.40		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Vanadium	ND		0.51		ug/l		03/22/11 11:19	03/24/11 13:25	2.0
Zinc	ND		20		ug/l		03/22/11 11:19	03/24/11 13:25	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.0**		1.0		ug/l		03/22/11 11:19	03/28/11 11:43	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	C, L	1.00		ug/l		03/23/11 13:12	03/24/11 09:49	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0368

Client Sample ID: SW2-C2 (Day 14)

Lab Sample ID: KUC0368-01
Date Collected: 03/16/11 10:33
Matrix: Water
Date Received: 03/17/11 12:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0528_P	03/23/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000576	03/25/11 09:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0528_P	03/23/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000576	03/25/11 09:26	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0530_P	03/23/11 13:12	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000561	03/24/11 09:46	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0499_P	03/22/11 11:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0499	03/24/11 12:55	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0499_P	03/22/11 11:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0499	03/28/11 11:28	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 14)

Lab Sample ID: KUC0368-02
Date Collected: 03/16/11 10:42
Matrix: Water
Date Received: 03/17/11 12:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0528_P	03/23/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000576	03/25/11 09:36	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0528_P	03/23/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000576	03/25/11 09:36	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0530_P	03/23/11 13:12	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000561	03/24/11 09:47	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0499_P	03/22/11 11:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0499	03/24/11 13:20	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11C0499_P	03/22/11 11:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0499	03/28/11 11:38	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 14)

Lab Sample ID: KUC0368-03
Date Collected: 03/16/11 10:53
Matrix: Water
Date Received: 03/17/11 12:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0528_P	03/23/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000576	03/25/11 09:38	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0528_P	03/23/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000576	03/25/11 09:38	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0530_P	03/23/11 13:12	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000561	03/24/11 09:49	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0499_P	03/22/11 11:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0499	03/24/11 13:25	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0368

Client Sample ID: SW4-C5 (Day 14)

Lab Sample ID: KUC0368-03

Date Collected: 03/16/11 10:53

Matrix: Water

Date Received: 03/17/11 12:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.8 Water	RE1	1.0	11C0499_P	03/22/11 11:19	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11C0499	03/28/11 11:43	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (Kemron)

TestAmerica Job ID: KUC0368

Laboratory	Authority	Program	EPA Region	Certification ID	* Expiration Date
TestAmerica King Of Prussia		USDA		P330-10-00327	09/21/13
TestAmerica King Of Prussia	Maryland	State Program	3	253	06/30/11
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004	06/30/11
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505	06/30/11

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.
* Any expired certifications in this list are currently pending renewal and are considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

03/28/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com
E-mail: mpainter@schnabel-eng.com
Phone #: (610) 696-6066
Fax #: (610) 696-7771

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 0°C

Project Name: Raritan Bay
Project #/PO#: SE-0380 (KEMRON)
Sampler: Stephen E. McLanahan

#	FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	MeOH	DI	HCl	HNO_3	H_2SO_4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	6010B 7470 Hg 6B 4Tin + Si (Total)	ANALYSIS TYPE	CRACKED/BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1	SW2-C2 (Day 14) PID:	3/16/11	10:33					1				1		X				KUC0368-01
2	WJ3-C1 (Day 14) PID:	3/16/11	10:42					1				1		X				-02
3	SW4-C5 (Day 14) PID:	3/16/11	10:53					1				1		X				-03
4	PID:																	
5	PID:																	
6	PID:																	
7	PID:																	
8	PID:																	
9	PID:																	
10	PID:																	

RELINQUISHED	DATE	RECEIVED	DATE	RELINQUISHED	DATE	RECEIVED	DATE
[signature]	3/16/11	Fed Ex	3/16/11	Fed Ex	3/17/11	Nick Fralett	3/17
	TIME 1300		TIME		TIME		TIME 12:3
RELINQUISHED	DATE	RECEIVED	DATE	RELINQUISHED	DATE	RECEIVED	DATE
	TIME		TIME		TIME		TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel

PAGE 1 OF 1

TAL-4124-450 (0509)

Truck # 8704 1733 3174

Cooler Receipt Form

WORK ORDER #: KUL0368

Client: Schnabel Project: Raritan Bay

Temperature Upon Receipt by IR: 0°

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+** Custody Seals Intact? **Y N**
Ice Present? **Y N N/A Melted** Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? **Y N**
All Sample Containers Intact: **Y N** All Sample Containers labeled: **Y N**
All Sample Containers received: **Y N** All Container labels match COC: **Y N**
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature:_____ **Date/Time:** 3/17/11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUC0546
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/05/2011 04:20:51 PM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0546

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUC0546-01	SW2-C2 (Day 21)	Water	03/23/11 11:10	03/25/11 12:35
KUC0546-02	WJ3-C1 (Day 21)	Water	03/23/11 11:10	03/25/11 12:35
KUC0546-03	SW4-C5 (Day 21)	Water	03/23/11 11:30	03/25/11 12:35

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0546

Qualifiers

Metals

Qualifier	Qualifier Description
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
M7	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: SW2-C2 (Day 21)

Lab Sample ID: KUC0546-01

Date Collected: 03/23/11 11:10
Matrix: Water
Date Received: 03/25/11 12:35
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/30/11 06:31	03/30/11 12:13	1.00
Calcium	ND		0.100		mg/L		03/30/11 06:31	03/30/11 12:13	1.00
Iron	**0.36**		0.10		mg/L		03/30/11 06:31	03/30/11 12:13	1.0
Magnesium	ND		0.50		mg/L		03/30/11 06:31	03/30/11 12:13	1.0
Potassium	ND		10		mg/L		03/30/11 06:31	03/30/11 12:13	1.0
Sodium	**1.2**		0.50		mg/L		03/30/11 06:31	03/30/11 12:13	1.0
Tin	ND		0.10		mg/L		03/30/11 06:31	03/30/11 12:13	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Antimony	**2.0**		1.0		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Arsenic	**1.2**		1.0		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Beryllium	ND		0.56		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Cadmium	ND		0.43		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Chromium	ND		1.4		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Cobalt	ND		0.18		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Copper	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Lead	ND		0.96		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Manganese	ND		10		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Nickel	ND	L	0.97		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Selenium	ND		3.6		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Silver	ND		0.40		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Vanadium	ND		0.51		ug/l		03/30/11 07:51	03/31/11 15:12	2.0
Zinc	ND	L	20		ug/l		03/30/11 07:51	03/31/11 15:12	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**15**		0.96		ug/l		04/01/11 12:21	04/04/11 13:17	2.0
Thallium	ND		0.40		ug/l		04/01/11 12:21	04/04/11 13:17	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/29/11 13:27	03/30/11 12:13	1.00

Client Sample ID: WJ3-C1 (Day 21)

Lab Sample ID: KUC0546-02

Date Collected: 03/23/11 11:10
Matrix: Water
Date Received: 03/25/11 12:35
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/30/11 06:31	03/30/11 12:23	1.00
Calcium	**0.130**		0.100		mg/L		03/30/11 06:31	03/30/11 12:23	1.00
Iron	**3.0**		0.10		mg/L		03/30/11 06:31	03/30/11 12:23	1.0
Magnesium	ND		0.50		mg/L		03/30/11 06:31	03/30/11 12:23	1.0
Potassium	ND		10		mg/L		03/30/11 06:31	03/30/11 12:23	1.0
Sodium	**5.0**		0.50		mg/L		03/30/11 06:31	03/30/11 12:23	1.0
Tin	ND		0.10		mg/L		03/30/11 06:31	03/30/11 12:23	1.0

Client Sample ID: WJ3-C1 (Day 21)

Lab Sample ID: KUC0546-02

Date Collected: 03/23/11 11:10
Matrix: Water
Date Received: 03/25/11 12:35
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Antimony	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Arsenic	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Beryllium	ND		0.56		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Cadmium	ND		0.43		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Chromium	ND		1.4		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Cobalt	**0.22**		0.18		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Copper	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Lead	**390**	**MHA**	0.96		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Manganese	ND		10		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Nickel	ND	L	0.97		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Selenium	ND		3.6		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Silver	ND		0.40		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Vanadium	ND		0.51		ug/l		03/30/11 07:51	03/31/11 15:36	2.0
Zinc	ND	L	20		ug/l		03/30/11 07:51	03/31/11 15:36	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**25**		0.96		ug/l		04/01/11 12:21	04/04/11 13:22	2.0
Thallium	ND		0.40		ug/l		04/01/11 12:21	04/04/11 13:22	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/29/11 13:27	03/30/11 12:15	1.00

Client Sample ID: SW4-C5 (Day 21)

Lab Sample ID: KUC0546-03

Date Collected: 03/23/11 11:30
Matrix: Water
Date Received: 03/25/11 12:35
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		03/30/11 06:31	03/30/11 12:25	1.00
Calcium	**0.238**		0.100		mg/L		03/30/11 06:31	03/30/11 12:25	1.00
Iron	**0.17**		0.10		mg/L		03/30/11 06:31	03/30/11 12:25	1.0
Magnesium	ND		0.50		mg/L		03/30/11 06:31	03/30/11 12:25	1.0
Potassium	ND		10		mg/L		03/30/11 06:31	03/30/11 12:25	1.0
Sodium	**1.0**		0.50		mg/L		03/30/11 06:31	03/30/11 12:25	1.0
Tin	ND		0.10		mg/L		03/30/11 06:31	03/30/11 12:25	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Antimony	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Arsenic	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Beryllium	ND		0.56		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Cadmium	ND		0.43		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Chromium	ND		1.4		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Cobalt	ND		0.18		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Copper	ND		1.0		ug/l		03/30/11 07:51	03/31/11 15:51	2.0

Client Sample ID: SW4-C5 (Day 21)

Lab Sample ID: KUC0546-03

Date Collected: 03/23/11 11:30
Matrix: Water
Date Received: 03/25/11 12:35
Sampler Name:
Sampler Phone Number: (610) 696-6066

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.96		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Manganese	ND	M7	10		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Nickel	ND	L	0.97		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Selenium	ND		3.6		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Silver	ND		0.40		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Vanadium	ND		0.51		ug/l		03/30/11 07:51	03/31/11 15:51	2.0
Zinc	ND	L	20		ug/l		03/30/11 07:51	03/31/11 15:51	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**17**		0.96		ug/l		04/01/11 12:21	04/04/11 13:47	2.0
Thallium	ND		0.40		ug/l		04/01/11 12:21	04/04/11 13:47	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		03/29/11 13:27	03/30/11 12:17	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0546

Client Sample ID: SW2-C2 (Day 21)

Lab Sample ID: KUC0546-01
Date Collected: 03/23/11 11:10
Matrix: Water
Date Received: 03/25/11 12:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000604	03/30/11 12:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000604	03/30/11 12:13	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0655_P	03/29/11 13:27	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000603	03/30/11 12:13	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0669_P	03/30/11 07:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0669	03/31/11 15:12	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11D0029_P	04/01/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11D0029	04/04/11 13:17	RW	TestAmerica King Of Prussia

Client Sample ID: WJ3-C1 (Day 21)

Lab Sample ID: KUC0546-02
Date Collected: 03/23/11 11:10
Matrix: Water
Date Received: 03/25/11 12:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000604	03/30/11 12:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000604	03/30/11 12:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0655_P	03/29/11 13:27	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000603	03/30/11 12:15	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0669_P	03/30/11 07:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0669	03/31/11 15:36	RW	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water	RE1	1.0	11D0029_P	04/01/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11D0029	04/04/11 13:22	RW	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 21)

Lab Sample ID: KUC0546-03
Date Collected: 03/23/11 11:30
Matrix: Water
Date Received: 03/25/11 12:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.7 Water		1.00	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000604	03/30/11 12:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11C0666_P	03/30/11 06:31	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000604	03/30/11 12:25	MKR	TestAmerica King Of Prussia
total	Prep	EPA 7470A		1.00	11C0655_P	03/29/11 13:27	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000603	03/30/11 12:17	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.8 Water		1.0	11C0669_P	03/30/11 07:51	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8		2.0	11C0669	03/31/11 15:51	RW	TestAmerica King Of Prussia

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0546

Client Sample ID: SW4-C5 (Day 21)

Lab Sample ID: KUC0546-03

Date Collected: 03/23/11 11:30

Matrix: Water

Date Received: 03/25/11 12:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 200.8 Water	RE1	1.0	11D0029_P	04/01/11 12:21	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.8	RE1	2.0	11D0029	04/04/11 13:47	RW	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUC0546

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

04/05/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com Phone #: (610) 696-6066
E-mail: mpainter@schnabel-eng.com Fax #: (610) 696-7771

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: (STD.) 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 0°C

Project Name: Raritan Bay
Project #/PO#: SE-0380 (KEMRON)
Sampler: Stephen E. McLaughlin

	FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	# of Bottles Preservative Used: MeOH	DI	HCl	HNO3	H2SO4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	ANALYSIS TYPE: Cd/Cr/Pb metals + Tin (1664)	SAMPLE CONTROL: CRACKED-BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1	SW2-C2 (Day 21) PID:	3/23/11	10:59					1				1					
2	WJ3-C2 (Day 21) PID:	3/23/11	11:10					1				1					
3	SW4-C5 (Day 21) PID:	3/23/11	11:30					1				1					
4	PID:																
5	PID:																
6	PID:																
7	PID:																
8	PID:																
9	PID:																
10	PID:																

RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME	RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME
Stephen E. McL	DATE 3/24/11 TIME 1510	Fed Ex		Fed Ex		Nick Faulth	DATE 3/25 TIME 1235
RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME	RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kem-on.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel

PAGE 1 OF 1

TAL-4124-450 (0509)

Track # 8704 1733 3185

Cooler Receipt Form

WORK ORDER #: KUC0546

Client: Schnabel Project: Raritan Bay

Temperature Upon Receipt by IR: 0°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: 1 2 3+ Custody Seals Intact? Y N
Ice Present? Y N N/A Melted Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? Y N
All Sample Containers Intact: Y N All Sample Containers labeled: Y N
All Sample Containers received: Y N All Container labels match COC: Y N
List Discrepancies below if indicated:

_____

_____

_____

_____

_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#:_____ **PM or Client contacted? Y N N/A**

Signature: Nick Flatlett **Date/Time:** 3/28/11

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUD0427
Client Project/Site: Raritan NJ
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
04/29/2011 12:39:27 PM
Crystal Pollock
Lab Director
crystal.pollock@testamericainc.com

Designee for

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

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Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0427

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUD0427-01	SW2-C2 (Day 47)	Water	04/18/11 11:10	04/19/11 10:00
KUD0427-02	NJ3-C1 (Day 47)	Water	04/18/11 11:40	04/19/11 10:00
KUD0427-03	SW4-C5 (Day 47)	Water	04/18/11 11:58	04/19/11 10:00

Qualifier Definition/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0427

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample ID: SW2-C2 (Day 47)

Lab Sample ID: KUD0427-01

Date Collected: 04/18/11 11:10

Matrix: Water

Date Received: 04/19/11 10:00

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Silicon	ND		0.500		mg/L		04/25/11 09:25	04/27/11 11:23	1.00
Antimony	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Arsenic	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Barium	**0.012**		0.0050		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Cadmium	ND		0.0040		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Calcium	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Chromium	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Cobalt	ND		0.020		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Copper	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Iron	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Lead	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Magnesium	ND		0.50		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Manganese	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Nickel	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Potassium	ND		10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Selenium	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Silver	ND		0.020		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Sodium	**2.0**		0.50		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Thallium	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Tin	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Vanadium	ND		0.025		mg/L		04/25/11 09:25	04/27/11 11:23	1.0
Zinc	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:23	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0040		mg/L		04/25/11 09:25	04/28/11 10:29	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		04/20/11 06:20	04/20/11 15:51	1.00

Client Sample ID: NJ3-C1 (Day 47)

Lab Sample ID: KUD0427-02

Date Collected: 04/18/11 11:40

Matrix: Water

Date Received: 04/19/11 10:00

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Silicon	ND		0.500		mg/L		04/25/11 09:25	04/27/11 11:30	1.00
Antimony	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Arsenic	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Barium	**0.029**		0.0050		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Cadmium	ND		0.0040		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Calcium	**0.18**		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Chromium	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Cobalt	ND		0.020		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Copper	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Iron	**9.1**		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Lead	**0.24**		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Magnesium	ND		0.50		mg/L		04/25/11 09:25	04/27/11 11:30	1.0

Client Sample ID: NJ3-C1 (Day 47)

Lab Sample ID: KUD0427-02

Date Collected: 04/18/11 11:40
Matrix: Water
Date Received: 04/19/11 10:00

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Nickel	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Potassium	ND		10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Selenium	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Silver	ND		0.020		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Sodium	**9.6**		0.50		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Thallium	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Tin	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Vanadium	ND		0.025		mg/L		04/25/11 09:25	04/27/11 11:30	1.0
Zinc	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:30	1.0

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0040		mg/L		04/25/11 09:25	04/28/11 10:31	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		04/20/11 06:20	04/20/11 15:53	1.00

Client Sample ID: SW4-C5 (Day 47)

Lab Sample ID: KUD0427-03

Date Collected: 04/18/11 11:58
Matrix: Water
Date Received: 04/19/11 10:00

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Silicon	ND		0.500		mg/L		04/25/11 09:25	04/27/11 11:32	1.00
Antimony	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Arsenic	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Barium	**0.021**		0.0050		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Cadmium	ND		0.0040		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Calcium	**0.53**		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Chromium	ND		0.050		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Cobalt	ND		0.020		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Copper	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Iron	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Lead	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Magnesium	ND		0.50		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Manganese	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Nickel	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Potassium	ND		10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Selenium	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Silver	ND		0.020		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Sodium	**2.0**		0.50		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Thallium	ND		0.20		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Tin	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Vanadium	ND		0.025		mg/L		04/25/11 09:25	04/27/11 11:32	1.0
Zinc	ND		0.10		mg/L		04/25/11 09:25	04/27/11 11:32	1.0

Analytical Data

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0427

Client Sample ID: SW4-C5 (Day 47)

Lab Sample ID: KUD0427-03

Date Collected: 04/18/11 11:58

Matrix: Water

Date Received: 04/19/11 10:00

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0040		mg/L		04/25/11 09:25	04/28/11 10:33	1.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		04/20/11 06:20	04/20/11 15:55	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0427

Client Sample ID: SW2-C2 (Day 47)

Lab Sample ID: KUD0427-01
Date Collected: 04/18/11 11:10
Matrix: Water
Date Received: 04/19/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0446_P	04/20/11 06:20	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000766	04/20/11 15:51	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000819	04/27/11 11:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000819	04/27/11 11:23	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	1.0	U000826	04/28/11 10:29	MKR	TestAmerica King Of Prussia

Client Sample ID: NJ3-C1 (Day 47)

Lab Sample ID: KUD0427-02
Date Collected: 04/18/11 11:40
Matrix: Water
Date Received: 04/19/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0446_P	04/20/11 06:20	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000766	04/20/11 15:53	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000819	04/27/11 11:30	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000819	04/27/11 11:30	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	1.0	U000826	04/28/11 10:31	MKR	TestAmerica King Of Prussia

Client Sample ID: SW4-C5 (Day 47)

Lab Sample ID: KUD0427-03
Date Collected: 04/18/11 11:58
Matrix: Water
Date Received: 04/19/11 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
total	Prep	EPA 7470A		1.00	11D0446_P	04/20/11 06:20	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 7470A		1.00	U000766	04/20/11 15:55	MR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.0	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.0	U000819	04/27/11 11:32	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water		1.00	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7		1.00	U000819	04/27/11 11:32	MKR	TestAmerica King Of Prussia
total	Prep	EPA 200.7 Water	RE1	1.0	11D0565_P	04/25/11 09:25	PAM	TestAmerica King Of Prussia
total	Analysis	EPA 200.7	RE1	1.0	U000826	04/28/11 10:33	MKR	TestAmerica King Of Prussia

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: Raritan NJ

TestAmerica Job ID: KUD0427

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia		USDA		P330-10-00327
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

04/29/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com Phone #: (610) 696-6066
E-mail: mpainter@schnabel-eng.com Fax #: (610) 696-7771
Project Name: Raritan Bay
Project #/PO#: SE-0380 (KEMRON
Sampler: Stephen E. McClanahan

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD. 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
Temp. Upon Receipt: 0°C
If Yes, please explain:

	FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	# of Bottles Preservative Used: MeOH	DI	HCl	HNO3	H2SO4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐ YES ☐ NO	6010B Tal metals + Tin + Si (total)	ANALYSIS TYPE	SAMPLE CONTROL: CRACKED-BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1	SW2-C2 (Day 47) PID:	4/18/11	11:10					1				1		1				KUD0427-01
2	WJ3-C1 (Day 47) PID:	4/18/11	11:40					1				1		1				-02
3	SW4-C5 (Day 47) PID:	4/18/11	11:58					1				1		1				-03
4	PID:																	
5	PID:																	
6	PID:																	
7	PID:																	
8	PID:																	
9	PID:																	
10	PID:																	

RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME	RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME
S. McC.	4/18/11 1500	Fed Ex		Fed Ex		Nick Fleckette	4/19/11 10:00
RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME	RELINQUISHED	DATE / TIME	RECEIVED	DATE / TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel

PAGE 1 OF 1

TAL-4124-450 (0509) Truck # 8704 1733 3196 Custody Seal Present

Cooler Receipt Form

WORK ORDER #: KUD0427

Client: Schnabel Project: Raritan NJ

Temperature Upon Receipt by IR: 0°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: **1 2 3+**
Ice Present? **Y N N/A Melted**
Custody Seals Intact? **Y N**
Packing Material: **Bubble Wrap Other None**

For Subcontracted Samples only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? **Y N**
All Sample Containers Intact: **Y N**
All Sample Containers received: **Y N**
All Sample Containers labeled: **Y N**
All Container labels match COC: **Y N**
List Discrepancies below if indicated:

_____
_____
_____
_____
_____

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID/Location - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: Nick Fiedlitto **Date/Time:** 4.19.11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica King Of Prussia
1008 West Ninth Avenue
King of Prussia, PA 19406
Tel: 610.337.9992

TestAmerica Job ID: KUF0009
Client Project/Site: SE-0380 (KEMRON)
Client Project Description: Raritan NJ

For:
SCHNABEL ENGINEERING
510 East Gay Street
West Chester, PA 19380

Attn: Mia Painter

Authorized for release by:
06/13/2011 09:15:14 AM

Jill Miller
Project Manager
jill.miller@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

Results relate only to the items tested and the sample(s) as received by the laboratory. The test results in this report meet all 2003 NELAC requirements for accredited parameters, exceptions are noted in this report. Pursuant to NELAC, this report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sample Summary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
KUF0009-01	SW2-C2 (Day 90)	Water	05/31/11 10:30	06/01/11 10:30
KUF0009-02	WJ3-C1 (Day 90)	Water	05/31/11 11:05	06/01/11 10:30
KUF0009-03	SW4-C5 (Day 90)	Water	05/31/11 11:25	06/01/11 10:30

Definitions/Glossary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Qualifiers

Metals

Qualifier	Qualifier Description
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample Results

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Client Sample ID: SW2-C2 (Day 90)

Lab Sample ID: KUF0009-01

Date Collected: 05/31/11 10:30
Matrix: Water
Date Received: 06/01/11 10:30

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		06/03/11 06:35	06/07/11 12:45	1.00
Calcium	**0.169**		0.100		mg/L		06/03/11 06:35	06/07/11 12:45	1.00
Iron	ND		0.10		mg/L		06/03/11 06:35	06/07/11 12:45	1.0
Magnesium	ND		0.50		mg/L		06/03/11 06:35	06/07/11 12:45	1.0
Potassium	ND		10		mg/L		06/03/11 06:35	06/07/11 12:45	1.0
Sodium	**1.9**		0.50		mg/L		06/03/11 06:35	06/07/11 12:45	1.0
Tin	ND		0.10		mg/L		06/03/11 06:35	06/07/11 12:45	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Arsenic	**1.0**		1.0		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Barium	**15**		0.96		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Beryllium	ND		0.56		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Cadmium	ND		0.43		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Chromium	ND		1.4		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Cobalt	ND		0.18		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Copper	**1.2**		1.0		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Lead	ND		0.96		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Manganese	ND		10		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Nickel	ND		0.97		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Selenium	ND		3.6		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Silver	ND		0.40		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Thallium	ND		0.40		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Vanadium	ND		0.51		ug/l		06/08/11 07:59	06/10/11 10:06	2.0
Zinc	ND	C	20		ug/l		06/08/11 07:59	06/10/11 10:06	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**1.7**		1.0		ug/l		06/10/11 08:45	06/10/11 13:27	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		06/06/11 06:39	06/07/11 08:46	1.00

Client Sample ID: WJ3-C1 (Day 90)

Lab Sample ID: KUF0009-02

Date Collected: 05/31/11 11:05
Matrix: Water
Date Received: 06/01/11 10:30

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		06/03/11 06:35	06/07/11 12:48	1.00
Calcium	**0.155**		0.100		mg/L		06/03/11 06:35	06/07/11 12:48	1.00
Iron	**4.4**		0.10		mg/L		06/03/11 06:35	06/07/11 12:48	1.0
Magnesium	ND		0.50		mg/L		06/03/11 06:35	06/07/11 12:48	1.0
Potassium	ND		10		mg/L		06/03/11 06:35	06/07/11 12:48	1.0
Sodium	**12**		0.50		mg/L		06/03/11 06:35	06/07/11 12:48	1.0
Tin	ND		0.10		mg/L		06/03/11 06:35	06/07/11 12:48	1.0

Client Sample Results

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Client Sample ID: WJ3-C1 (Day 90)

Lab Sample ID: KUF0009-02

Date Collected: 05/31/11 11:05
Matrix: Water
Date Received: 06/01/11 10:30

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Antimony	ND	L	1.0		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Arsenic	ND		1.0		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Barium	**31**		0.96		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Beryllium	ND		0.56		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Cadmium	ND		0.43		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Chromium	ND		1.4		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Cobalt	ND		0.18		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Copper	**4.5**		1.0		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Lead	**170**		0.96		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Manganese	ND		10		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Nickel	ND		0.97		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Selenium	ND		3.6		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Silver	ND		0.40		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Thallium	ND		0.40		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Vanadium	ND		0.51		ug/l		06/08/11 07:59	06/10/11 10:11	2.0
Zinc	ND	C	20		ug/l		06/08/11 07:59	06/10/11 10:11	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		06/06/11 06:39	06/07/11 08:48	1.00

Client Sample ID: SW4-C5 (Day 90)

Lab Sample ID: KUF0009-03

Date Collected: 05/31/11 11:25
Matrix: Water
Date Received: 06/01/11 10:30

Method: EPA 200.7 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silicon	ND		0.500		mg/L		06/03/11 06:35	06/07/11 12:50	1.00
Calcium	**0.784**		0.100		mg/L		06/03/11 06:35	06/07/11 12:50	1.00
Iron	ND		0.10		mg/L		06/03/11 06:35	06/07/11 12:50	1.0
Magnesium	ND		0.50		mg/L		06/03/11 06:35	06/07/11 12:50	1.0
Potassium	ND		10		mg/L		06/03/11 06:35	06/07/11 12:50	1.0
Sodium	**2.3**		0.50		mg/L		06/03/11 06:35	06/07/11 12:50	1.0
Tin	ND		0.10		mg/L		06/03/11 06:35	06/07/11 12:50	1.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		20		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Arsenic	**3.1**		1.0		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Barium	**27**		0.96		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Beryllium	ND		0.56		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Cadmium	ND		0.43		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Chromium	ND		1.4		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Cobalt	**0.24**		0.18		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Copper	ND		1.0		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Lead	ND		0.96		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Manganese	ND		10		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Nickel	**2.0**		0.97		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Selenium	ND		3.6		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Silver	ND		0.40		ug/l		06/08/11 07:59	06/10/11 10:16	2.0

Client Sample Results

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Client Sample ID: SW4-C5 (Day 90)

Lab Sample ID: KUF0009-03

Date Collected: 05/31/11 11:25

Matrix: Water

Date Received: 06/01/11 10:30

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.40		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Vanadium	ND		0.51		ug/l		06/08/11 07:59	06/10/11 10:16	2.0
Zinc	ND	C	20		ug/l		06/08/11 07:59	06/10/11 10:16	2.0

Method: EPA 200.8 - Total Metals by EPA 200 Series Methods - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		1.0		ug/l		06/10/11 08:45	06/10/11 13:42	2.0

Method: EPA 7470A - Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		1.00		ug/l		06/06/11 06:39	06/07/11 08:53	1.00

Lab Chronicle

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Client Sample ID: SW2-C2 (Day 90)

Lab Sample ID: KUF0009-01
Date Collected: 05/31/11 10:30
Matrix: Water
Date Received: 06/01/11 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total	Prep	EPA 200.7 Water		1.00	11F0078_P	06/03/11 06:35	PAM	TAL KOP
Total	Analysis	EPA 200.7		1.00	U001141	06/07/11 12:45	MKR	TAL KOP
Total	Prep	EPA 200.7 Water		1.0	11F0078_P	06/03/11 06:35	PAM	TAL KOP
Total	Analysis	EPA 200.7		1.0	U001141	06/07/11 12:45	MKR	TAL KOP
Total	Prep	EPA 7470A		1.00	11F0113_P	06/06/11 06:39	PAM	TAL KOP
Total	Analysis	EPA 7470A		1.00	U001136	06/07/11 08:46	WINHG	TAL KOP
Total	Prep	EPA 200.8 Water		1.0	11F0182_P	06/08/11 07:59	PAM	TAL KOP
Total	Analysis	EPA 200.8		2.0	11F0182	06/10/11 10:06	RW	TAL KOP
Total	Prep	EPA 200.8 Water	RE1	1.0	11F0245_P	06/10/11 08:45	PAM	TAL KOP
Total	Analysis	EPA 200.8	RE1	2.0	11F0245	06/10/11 13:27	RW	TAL KOP

Client Sample ID: WJ3-C1 (Day 90)

Lab Sample ID: KUF0009-02
Date Collected: 05/31/11 11:05
Matrix: Water
Date Received: 06/01/11 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total	Prep	EPA 200.7 Water		1.00	11F0078_P	06/03/11 06:35	PAM	TAL KOP
Total	Analysis	EPA 200.7		1.00	U001141	06/07/11 12:48	MKR	TAL KOP
Total	Prep	EPA 200.7 Water		1.0	11F0078_P	06/03/11 06:35	PAM	TAL KOP
Total	Analysis	EPA 200.7		1.0	U001141	06/07/11 12:48	MKR	TAL KOP
Total	Prep	EPA 7470A		1.00	11F0113_P	06/06/11 06:39	PAM	TAL KOP
Total	Analysis	EPA 7470A		1.00	U001136	06/07/11 08:48	WINHG	TAL KOP
Total	Prep	EPA 200.8 Water		1.0	11F0182_P	06/08/11 07:59	PAM	TAL KOP
Total	Analysis	EPA 200.8		2.0	11F0182	06/10/11 10:11	RW	TAL KOP

Client Sample ID: SW4-C5 (Day 90)

Lab Sample ID: KUF0009-03
Date Collected: 05/31/11 11:25
Matrix: Water
Date Received: 06/01/11 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total	Prep	EPA 200.7 Water		1.00	11F0078_P	06/03/11 06:35	PAM	TAL KOP
Total	Analysis	EPA 200.7		1.00	U001141	06/07/11 12:50	MKR	TAL KOP
Total	Prep	EPA 200.7 Water		1.0	11F0078_P	06/03/11 06:35	PAM	TAL KOP
Total	Analysis	EPA 200.7		1.0	U001141	06/07/11 12:50	MKR	TAL KOP
Total	Prep	EPA 7470A		1.00	11F0113_P	06/06/11 06:39	PAM	TAL KOP
Total	Analysis	EPA 7470A		1.00	U001136	06/07/11 08:53	WINHG	TAL KOP
Total	Prep	EPA 200.8 Water		1.0	11F0182_P	06/08/11 07:59	PAM	TAL KOP
Total	Analysis	EPA 200.8		2.0	11F0182	06/10/11 10:16	RW	TAL KOP
Total	Prep	EPA 200.8 Water	RE1	1.0	11F0245_P	06/10/11 08:45	PAM	TAL KOP
Total	Analysis	EPA 200.8	RE1	2.0	11F0245	06/10/11 13:42	RW	TAL KOP

Laboratory References:
TAL KOP = TestAmerica King Of Prussia, 1008 West Ninth Avenue, King of Prussia, PA 19406, TEL 610.337.9992

Certification Summary

Client: SCHNABEL ENGINEERING
Project/Site: SE-0380 (KEMRON)

TestAmerica Job ID: KUF0009

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica King Of Prussia	Maryland	State Program	3	253
TestAmerica King Of Prussia	New Jersey	NELAC	2	PA004
TestAmerica King Of Prussia	Pennsylvania	NELAC	3	46-00505
TestAmerica King Of Prussia	USDA	USDA	0	P330-10-00327

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

1008 W. Ninth Avenue
King of Prussia, PA 19406
(610) 337-9992
FAX (610) 337-9939

06/13/2011

Client: Schnabel Engineering
Address: 510 East Gay Street
West Chester, PA 19380
Report to: tjordan@kemron.com Phone #: (610) 696-6066
E-mail: mpainter@schnabel-eng.com Fax #: (610) 696-7771
Project Name: Raritan Bay
Project #/PO#: SE-0380 (KEMRON)
Sampler: Stephen E. McLanahan

Bill To: Same
Address:
Terms: Net 30 days
State & Program:
Phone #: ( )
Fax #: ( )

TAT: STD 5 DAY 4 DAY 3 DAY 2 DAY 1 DAY <24 HRS.
Received: ☐ ice ☐ ambient
DATE RESULTS NEEDED:
Deliverable Package: ☐ NO ☐ YES
If Yes, please explain:
Temp. Upon Receipt: 3.3 C

	FIELD ID, LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	MeOH	DI	HCl	HNO3	H2SO4	NaOH	NONE	TOTAL # OF BOTTLES	SAMPLES FIELD FILTERED ☐YES ☐NO	6010B TAL Metals + Ti + Si (total)								CRACKED/BROKEN	IMPROPERLY SEALED	LABORATORY ID NUMBER
1	SW2-C2 (Day 90) PID:	5/31/11	10:30	Water				1				1		1										KUF0009-01
2	WJ3-C2 (Day 90) PID:	5/31/11	11:05	Water				1				1		1										-02
3	SW4-C5 (Day 90) PID:	5/31/11	11:25	Water				1				1		1										-03
4	PID:																							
5	PID:																							
6	PID:																							
7	PID:																							
8	PID:																							
9	PID:																							
10	PID:																							

RELINQUISHED	DATE	RECEIVED	DATE	RELINQUISHED	DATE	RECEIVED	DATE
Steph E. McLanahan	5/31/11	Fed Ex		Fed Ex		Nick Fiedette	6-1-11
	TIME 1510		TIME		TIME		TIME 10:30
RELINQUISHED	DATE	RECEIVED	DATE	RELINQUISHED	DATE	RECEIVED	DATE
	TIME		TIME		TIME		TIME

COMMENTS: Please send report to both Tommy Jordan (tjordan@kemron.com) of KEMRON and Mia Painter (mpainter@schnabel-eng.com) of Schnabel
7971 5224 1968

PAGE 1 OF 1

TAL-4124-450 (0509)

Cooler Receipt Form

WORK ORDER #: 1C0F0009

Client: Schnabel Eng Project: Raritan Bay

Temperature Upon Receipt by IR: 3.3°C

Cooler received from: **TA Courier Client FedEx UPS Other:** _____

For Received Shipments only:
Number of Coolers: 1 2 3+ Custody Seals Intact? Y N
Ice Present? Y N N/A Melted Packing Material: **Bubble Wrap Other None**

For Samples to be Subcontracted after reciept only:
ALL preserved containers (except VOA) checked for correct pH and are acceptable? **Y N N/A**
If Samples need preservation: Preservative/lot#: _____

Ensure that Preservation Stickers are affixed to each container.
Residual Chlorine checks done on each container that needs it? **Y N N/A**

Voa Vials have air bubbles > 6mm? **Y N N/A**
Sufficient volume for all analyses? Y N
All Sample Containers Intact: Y N All Sample Containers labeled: Y N
All Sample Containers received: Y N All Container labels match COC: Y N
Sample Location (State) Notated: Y N (Client must be contacted for this information)
List Discrepancies below if indicated:

existing project

Review COC against Sample Acceptance Checklist:

1. Client Name & Address present	Yes	No
2. Project Name and/or Number included	Yes	No
3. Field Sampler Name listed	Yes	No
4. Field ID - one sample per line	Yes	No
5. Date collected (for each sample)	Yes	No
6. Time collected (for each sample)	Yes	No
7. Matrix (for each sample)	Yes	No
8. Number & Types of bottles per sample (and preservation type)	Yes	No
9. Analysis Requested	Yes	No
10. Sign & Date in the Relinquished Box	Yes	No

Discrepancies: _____

Spec Sheet/CAR#: _____ **PM or Client contacted? Y N N/A**

Signature: _____ **Date/Time:** 6/1/11

Attachment 3

Semi-Dynamic Leach (SDL) Test Methodology and Observations (Kemron Letter Report)

KEMRON
ENVIRONMENTAL SERVICES

1359-A Ellsworth Industrial Blvd • Atlanta, GA 30318 • TEL 404-636-0928 • FAX 404-636-7162

June 13, 2011

Mia Painter
Schnabel Engineering, LLC
510 East Gay Street
West Chester, PA 19380

Re: Raritan Bay Final Letter Report
ASTM C 1308 Accelerated Leach Test
KEMRON ATG Project #SE-0380

Dear Mr. Painter:

This letter report includes sample chain of custody and laboratory data for lead slag core samples SW2- C2, WJ3- C1, and SW4- C5. The following testing was completed for the referenced samples:

ASTM C1308 - *08 Standard Test Method for Accelerated Leach Test for Diffusive Releases from Solidified Waste* (modified)

KEMRON Environmental Services, Inc. appreciates this opportunity to provide laboratory services to Schnabel Engineering. If you have any questions, or require additional information, please contact me at (404) 636-0928.

Sincerely,

KEMRON Environmental Services, Inc.

Tommy A. Jordan, P.G.
Project Manager

Attachments

SAMPLE CHAIN-OF-CUSTODY RECORD

KEMRON ENVIRONMENTAL SERVICES

KEMRON ENVIRONMENTAL SERVICES, INC.
1359-A Ellsworth Industrial Boulevard
ATLANTA, GEORGIA 30318
(404) 636-0928 FAX (404) 636-7162
WWW.KEMRON.COM

PROJECT NAME: Raritan Bay Slag Superfund Site			PROJECT #: 10615032.00
TAT or DUE DATE: standard	CONTACT: Mia Painter mpainter@schnabel-eng.com	PROJECT MANAGER: Tommy Jordan	
	PHONE#: 610-696-6066 EXT. 162	RECEIVING LAB: (404) 601 - 6908	PO#: 10615032
SAMPLED BY: Steve Penzone (PRINTED NAME)		SIGNATURE	

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample	Preservative	# / Size of Cont.	ASTM C1308 mod- SDL								
SW2-C2	Lead Slag Core	2/22/2011		None	1	X								
WJ3-C1	Lead Slag Core	2/22/2011		None	1	X								
SW4-C5	Lead Slag Core	2/22/2011		None	1	X								

ANALYSES (indicate target list)

SAMPLES RELINQUISHED BY:	DATE/ TIME	SAMPLES ACCEPTED BY:	DATE/ TIME	COMMENTS:
[signature]	2/23/11	[signature]	2/25/11 13:20	analytical per contract

REV 5 11/26/01

Dry Weight Results is Default for Soils/Applicable Wastes

fr\treat\coc1.xls

ASTM C1308 LEACHABILITY

SAMPLE PREPARATION

Sheet 1 of 2

PROJECT:	Raritan Bay	TESTED BY:	SEM
PROJECT No.:	SE-0380	TRACKING CODE:	7253_ANS
SAMPLE No.:	SW2-C2		
TEST DATE:	3/2/2011		

MOISTURE CONTENT (Dry Basis)	***RESULTS***
1. MOISTURE TIN NO.	
2. WT MOISTURE TIN (tare weight)	***g***
3. WT WET SOIL + TARE	***g***
4. WT DRY SOIL + TARE	***g***
5. WT WATER, Ww	0.00 g
6. WT DRY SOIL, Ws	0.00 g
7. MOISTURE CONTENT, W	#DIV/0! %

SOIL SPECIMEN DIMENSIONS		
TRIPLICATE ANALYSES	***DIAMETER RESULTS***	***LENGTH RESULTS***
No. 1	***1.74 in.***	***4.28 in.***
No. 2	***1.74 in.***	***4.28 in.***
No. 3	***1.74 in.***	***4.29 in.***
Average	1.74 in.	4.28 in.

SPECIMEN CONDITIONS	***INITIAL***
Specimen WT, Wo	***850.60 g***
Area, Ao	2.38 in^2
Volume, Vo	10.19 in^3
Bulk Unit Weight	318.1 pcf
Dry Unit Weight	#DIV/0! pcf

ASTM C1308 LEACHABILITY

TESTING DATA

PROJECT:	Raritan Bay
PROJECT NO.:	SE-0380
SAMPLE NO:	SW2-C2
START DATE:	3/2/2011
TRACKING CODE:	7253_ANS

LEACH INTERVAL	TESTED BY	DATE		TIME		VOLUME LEACHATE (ml)	TEMP (°C)	PID (ppm)	Conduct. (mS/cm³)	pH (s.u.)	OBSERVATIONS	
		IN	OUT	IN	OUT							
Initial	SEM					1816	20.00	-	0.000	6.85	Initial	
1	SEM	3/2/2011	3/2/2011	10:05	12:05	1816	19.95	-	0.015	5.25	2 HR	
2	SEM	3/2/2011	3/2/2011	12:05	17:05	1816	20.99		0.008	4.92	7 HR	sample turning orange rust color
3	SEM	3/2/2011	3/3/2011	17:05	10:05	1816	20.36		0.011	4.48	Day 1	sample turning orange rust color
4	SEM	3/3/2011	3/4/2011	10:05	10:05	1816	20.38		0.008	4.74	Day 2	sample turning orange rust color
5	SEM	3/4/2011	3/5/2011	10:05	10:05	1816	19.84		0.006	4.96	Day 3	sample turning orange rust color
6	SEM	3/5/2011	3/6/2011	10:05	10:05	1816	19.48		0.004	4.85	Day 4	sample turning orange rust color
7	SEM	3/6/2011	3/7/2011	10:05	10:05	1816	19.67		0.005	5.43	Day 5	sample turning orange rust color
8	SEM	3/7/2011	3/8/2011	10:05	10:05	1816	20.51		0.004	5.71	Day 6	sample turning orange rust color
9	SEM	3/8/2011	3/9/2011	10:05	10:05	1816	21.39		0.003	4.61	Day 7	sample turning orange rust color
10	ADC	3/9/2011	3/16/2011	10:05	10:05	1816	20.62		0.011	5.55	Day 14	water & sample very orange/rust color
11	SEM	3/16/2011	3/23/2011	10:05	10:05	1816	20.37		0.007	5.32	Day 21	water & sample very orange/rust color
12	SEM	3/23/2011	4/18/2011	10:05	10:05	1816	20.31		0.013	6.97	Day 47	water and sample very orange rust color
13	SEM	4/18/2011	5/31/2011	10:05	10:05	1816	20.49		0.010	6.30	Day 90	sample completely covered in orange, orange water with precipitate in bottom

ASTM C1308 LEACHABILITY

SAMPLE PREPARATION

Sheet 1 of 2

PROJECT:	Raritan Bay	TESTED BY:	SEM
PROJECT No.:	SE-0380	TRACKING CODE:	7254_ANS
SAMPLE No.:	WJ3-C1		
TEST DATE:	3/2/2011		

MOISTURE CONTENT (Dry Basis)	***RESULTS***
1. MOISTURE TIN NO.	
2. WT MOISTURE TIN (tare weight)	***g***
3. WT WET SOIL + TARE	***g***
4. WT DRY SOIL + TARE	***g***
5. WT WATER, Ww	0.00 g
6. WT DRY SOIL, Ws	0.00 g
7. MOISTURE CONTENT, W	#DIV/0! %

SOIL SPECIMEN DIMENSIONS		
TRIPLICATE ANALYSES	***DIAMETER RESULTS***	***LENGTH RESULTS***
No. 1	***1.73 in.***	***4.23 in.***
No. 2	***1.74 in.***	***4.23 in.***
No. 3	***1.74 in.***	***4.23 in.***
Average	1.74 in.	4.23 in.

SPECIMEN CONDITIONS	***INITIAL***
Specimen WT, Wo	***847.40 g***
Area, Ao	2.37 in^2
Volume, Vo	10.02 in^3
Bulk Unit Weight	322.2 pcf
Dry Unit Weight	#DIV/0! pcf

ASTM C1308 LEACHABILITY

TESTING DATA

PROJECT:	Raritan Bay
PROJECT NO.:	SE-0380
SAMPLE NO:	WJ3-C1
START DATE:	3/2/2011
TRACKING CODE:	7254_ANS

LEACH INTERVAL	TESTED BY	DATE		TIME		VOLUME LEACHATE (ml)	TEMP (°C)	PID (ppm)	Conduct. (mS/cm³)	pH (s.u.)	OBSERVATIONS	
		IN	OUT	IN	OUT							
Initial	SEM					1799	20.00	-	0.000	6.74	Initial	
1	SEM	3/2/2011	3/2/2011	10:10	12:10	1799	19.95	-	0.012	5.08	2 HR	
2	SEM	3/2/2011	3/2/2011	12:10	17:10	1799	21.05	-	0.011	4.41	7 HR	sample turning orange rust color
3	SEM	3/2/2011	3/3/2011	17:10	10:10	1799	20.33	-	0.022	4.65	Day 1	sample turning orange rust color
4	SEM	3/3/2011	3/4/2011	10:10	10:10	1799	20.35	-	0.018	4.63	Day 2	sample turning orange rust color
5	SEM	3/4/2011	3/5/2011	10:10	10:10	1799	19.76	-	0.013	4.70	Day 3	sample turning orange rust color
6	SEM	3/5/2011	3/6/2011	10:10	10:10	1799	19.54	-	0.011	4.85	Day 4	sample turning orange rust color
7	SEM	3/6/2011	3/7/2011	10:10	10:10	1799	19.63	-	0.010	4.81	Day 5	sample turning orange rust color
8	SEM	3/7/2011	3/8/2011	10:10	10:10	1799	20.49	-	0.009	5.57	Day 6	sample turning orange rust color
9	SEM	3/8/2011	3/9/2011	10:10	10:10	1799	21.16	-	0.009	4.59	Day 7	sample turning orange rust color
10	ADC	3/9/2011	3/16/2011	10:10	10:10	1799	20.46	-	0.050	4.98	Day 14	water and sample very orange/rust color
11	SEM	3/16/2011	3/23/2011	10:10	10:10	1799	20.31	-	0.037	5.02	Day 21	water and sample very orange/rust color
12	SEM	3/23/2011	4/18/2011	10:10	10:10	1799	20.36	-	0.096	4.99	Day 47	water and sample very orange color
13	SEM	4/18/2011	5/31/2011	10:10	10:10	1799	20.66	-	0.080	5.04	Day 90	water deep orange with precipitate in the bottom, sample 95% covered in orange

ASTM C1308 LEACHABILITY

SAMPLE PREPARATION

Sheet 1 of 2

PROJECT:	Raritan Bay	TESTED BY:	SEM
PROJECT No.:	SE-0380	TRACKING CODE:	7255_ANS
SAMPLE No.:	SW4-C5		
TEST DATE:	3/2/2011		

MOISTURE CONTENT (Dry Basis)	***RESULTS***
1. MOISTURE TIN NO.	
2. WT MOISTURE TIN (tare weight)	***g***
3. WT WET SOIL + TARE	***g***
4. WT DRY SOIL + TARE	***g***
5. WT WATER, Ww	0.00 g
6. WT DRY SOIL, Ws	0.00 g
7. MOISTURE CONTENT, W	#DIV/0! %

SOIL SPECIMEN DIMENSIONS		
TRIPLICATE	***DIAMETER***	***LENGTH***
ANALYSES	***RESULTS***	***RESULTS***
No. 1	***1.73 in.***	***4.64 in.***
No. 2	***1.74 in.***	***4.64 in.***
No. 3	***1.74 in.***	***4.64 in.***
Average	1.74 in.	4.64 in.

SPECIMEN CONDITIONS	***INITIAL***
Specimen WT, Wo	***920.70 g***
Area, Ao	2.37 in^2
Volume, Vo	10.99 in^3
Bulk Unit Weight	319.1 pcf
Dry Unit Weight	#DIV/0! pcf

ASTM C1308 LEACHABILITY

TESTING DATA

PROJECT:	Raritan Bay
PROJECT NO.:	SE-0380
SAMPLE NO:	SW4-C5
START DATE:	3/2/2011
TRACKING CODE:	7255_ANS

LEACH INTERVAL	TESTED BY	DATE		TIME		VOLUME LEACHATE (ml)	TEMP (°C)	PID (ppm)	Conduct. (mS/cm³)	pH (s.u.)	OBSERVATIONS	
		IN	OUT	IN	OUT							
Initial	SEM					1943	20.00	-	0.000	6.84	Initial	
1	SEM	3/2/2011	3/2/2011	10:15	12:15	1943	19.91	-	0.015	4.66	2 HR	
2	SEM	3/2/2011	3/2/2011	12:15	17:15	1943	21.05	-	0.022	4.23	7 HR	sample turning orange/rust color
3	SEM	3/2/2011	3/3/2011	17:15	10:15	1943	20.41	-	0.026	4.54	Day 1	sample turning orange/rust color
4	SEM	3/3/2011	3/4/2011	10:15	10:15	1943	20.42	-	0.014	4.07	Day 2	sample turning orange/rust color
5	SEM	3/4/2011	3/5/2011	10:15	10:15	1943	19.75	-	0.007	3.96	Day 3	sample turning orange/rust color
6	SEM	3/5/2011	3/6/2011	10:15	10:15	1943	19.50	-	0.005	4.41	Day 4	sample turning orange/rust color
7	SEM	3/6/2011	3/7/2011	10:15	10:15	1943	19.74	-	0.004	5.05	Day 5	sample turning orange/rust color
8	SEM	3/7/2011	3/8/2011	10:15	10:15	1943	20.56	-	0.004	5.31	Day 6	sample turning orange/rust color
9	SEM	3/8/2011	3/9/2011	10:15	10:15	1943	21.03	-	0.005	4.82	Day 7	sample turning orange/rust color
10	ADC	3/9/2011	3/16/2011	10:15	10:15	1943	20.47	-	0.011	4.78	Day 14	water and sample very orange rust color
11	SEM	3/16/2011	3/23/2011	10:15	10:15	1943	20.54	-	0.007	5.11	Day 21	water and sample very orange rust color
12	SEM	3/23/2011	4/28/2011	10:15	10:15	1943	20.31	-	0.012	5.99	Day 47	water and sample very orange color
13	SEM	4/28/2011	5/31/2011	10:15	10:15	1943	20.61	-	0.012	5.79	Day 90	water very dark orange with precipitate, sample 90% covered in orange

Appendix C

Volume Estimates

Appendix C - Treatment Zone Volume Calculations - Surface Remediation Target Zones
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

Target Zone	Area No.	Sector	Area (ft)	Matrix	Depth (ft)	Volume (ft^3)	Volume (CY)
Surface Area - 01	Area 11	Jetty	177597	SE	2	355194	13155
Surface Area - 02	Area 11	Jetty	17648	SE	2	35297	1307
Surface Area - 04	Area 8	Jetty	96162	SE	2	192324	7123
Surface Area - 05	Area 6	Seawall	3600	SO	2	7200	267
Surface Area - 06	Area 5	Seawall	4091	SE	2	8183	303
Surface Area - 08	Area 5	Seawall	2204	SE	2	4407	163
Surface Area - 09	Area 2	Seawall	51201	SE	2	102401	3793
Surface Area - 10	Area 1	Seawall	10330	SE	2	20660	765
Surface Area - 11	Area 1	Seawall	5056	SO	2	10112	375
Surface Area - 12	Area 1	Seawall	3600	SE	2	7200	267
Surface Area - 13	Area 1	Seawall	3600	SE	2	7200	267
Surface Area - 14	Area 1	Seawall	3600	SE	2	7200	267
Surface Area - 15	Area 1	Seawall	47936	SE	2	95873	3551
Surface Area - 16	Area 1	Seawall	45642	SO	2	91283	3381
Surface Area - 17	Area 1	Seawall	15210	SO	2	30421	1127
Surface Area - 18	Area 1	Seawall	3600	SO	2	7200	267
Surface Area - 19	Area 1	Seawall	3600	SO	2	7200	267
Surface Area - 20	Area 9	Margaret's Creek	1227184	SE	2	2454368	90903
Surface Area - 21	Area 9	Margaret's Creek	2859	SO	2	5718	212
Surface Area - 22	Area 1	Seawall	3600	SE	2	7200	267
Surface Area - 24	Area 9	Margaret's Creek	3600	SE	2	7200	267
Surface Area - 25	Area 9	Margaret's Creek	3600	SE	2	7200	267
Surface Area - 27	Area 9	Margaret's Creek	3600	SO	2	7200	267
Surface Area - 28	Area 9	Margaret's Creek	3550	SO	2	7099	263
Surface Area - 29	Area 1	Seawall	205861	SE	2	411721	15249
Surface Area - 31	Area 3	Seawall	2002	SO	2	4004	148
Surface Area - 32	Area 3	Seawall	2766	SO	2	5531	205
Surface Area - 33	Area 1	Seawall	3600	SE	2	7200	267
Surface Area - 34	Area 7	Jetty	47886	SE	2	95773	3547
Surface Area - 35	Area 7	Jetty	3555	SE	2	7109	263
Surface Area - 36	Area 6	Seawall	3600	SO	2	7200	267
Surface Area - 37	Area 6	Seawall	4658	SE	2	9316	345
Surface Area - 38	Area 5	Seawall	4604	SO	2	9209	341
Surface Area - 39	Area 5	Seawall	3992	SO	2	7983	296
Surface Area - 40	Area 1	Seawall	12277	SE	2	24554	909
Surface Area - 41	Area 1	Seawall	8736	SE	2	17473	647
Surface Area - 42	Area 1	Seawall	50631	SE	2	101262	3750
Surface Area - 43	Area 9	Margaret's Creek	41728	SO	2	83457	3091
Surface Area - 44	Area 9	Margaret's Creek	45059	SO	2	90118	3338
Surface Area - 45	Area 9	Margaret's Creek	34909	SO	2	69817	2586
Surface Area - 46	Area 7	Jetty	79417	SE	2	158835	5883
Surface Area - 47	Area 8	Jetty	81608	SE	2	163215	6045
Surface Area - 48	Area 8	Jetty	37388	SO	2	74775	2769
Surface Area - 49	Area 5	Seawall	1894	SO	2	3788	140
Surface Area - 50	Area 5	Seawall	14070	SE	2	28139	1042
Surface Area - 51	Area 5	Seawall	16535	SE	2	33070	1225
Surface Area - 52	Area 5	Seawall	38719	SO	2	77438	2868

SE = Sediment ; SO = Soil
ft^3 = cubic feet; CY = cubic yards

Appendix C - Treatment Zone Volume Calculations - Surface Remediation Target Zones
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

Target Zone	Area No.	Sector	Area (ft)	Matrix	Depth (ft)	Volume (ft^3)	Volume (CY)
Surface Area - 53	Area 2	Seawall	41637	SO	2	83274	3084
Surface Area - 54	Area 1	Seawall	4691	SO	2	9382	347
Surface Area - 55	Area 1	Seawall	11006	SE	2	22011	815
Surface Area - 56	Area 1	Seawall	7429	SE	2	14858	550
Surface Area - 57	Area 1	Seawall	11575	SE	2	23150	857
Surface Area - 58	Area 1	Seawall	27628	SO	2	55257	2047
Surface Area - 60	Area 9	Margaret's Creek	1578	SO	2	3156	117
Surface Area - 61	Area 9	Margaret's Creek	30179	SO	2	60359	2236
Surface Area - 62	Area 9	Margaret's Creek	7465	SE	2	14930	553
Surface Area - 63	Area 9	Margaret's Creek	13150	SO	2	26300	974
Surface Area - 64	Area 1	Seawall	4210	SO	2	8420	312
Surface Area - 65	Area 11	Jetty	11704	SE	2	23409	867
Surface Area - 66	Area 1	Seawall	10323	SO	2	20646	765
Surface Area - 67	Area 1	Seawall	1143	SE	2	2285	85
Surface Area - 68	Area 1	Seawall	5021	SE	2	10042	372
Surface Area - 69	Area 1	Seawall	14164	SO	2	28328	1049
Surface Area - 70	Area 1	Seawall	4945	SE	2	9890	366
Surface Area - 71	Area 1	Seawall	9841	SO	2	19682	729
Surface Area - 72	Area 1	Seawall	1189	SE	2	2379	88
Surface Area - 73	Area 1	Seawall	905	SE	2	1811	67
Surface Area - 74	Area 1	Seawall	2230	SO	2	4460	165
Surface Area - 75	Area 1	Seawall	4062	SO	2	8124	301
Surface Area - 76	Area 1	Seawall	791	SE	2	1582	59
Surface Area - 77	Area 9	Margaret's Creek	1898	SO	2	3795	141
Surface Area - 78	Area 9	Margaret's Creek	6525	SO	2	13049	483
Surface Area - 79	Area 9	Margaret's Creek	2665	SO	2	5329	197
Surface Area - 80	Area 9	Margaret's Creek	13252	SO	2	26505	982
Surface Area - 81	Area 9	Margaret's Creek	2112	SO	2	4224	156
Surface Area - 82	Area 8	Jetty	2224	SO	2	4449	165
Surface Area - 83	Area 9	Margaret's Creek	3600	SE	2	7200	267
Surface Area - 84	Area 9	Margaret's Creek	3600	SE	2	7200	267
Surface Area - 86	Area 1	Seawall	8637	SE	2	17273	640

SE = Sediment ; SO = Soil
ft^3 = cubic feet; CY = cubic yards

Appendix C - Treatment Zone Volume Calculations - Subsurface Remediation Target Zones
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

Target Zone	Area No.	Sector	Area (ft)	Matrix	Depth (ft)	Volume (ft^3)	Volume (CY)
Subsurface Area - 01	Area 7	Jetty	3555	SE	2	7109	263
Subsurface Area - 02	Area 2	Seawall	42448	SO	8	339586	12577
Subsurface Area - 03	Area 8	Jetty	77504	SE	4	310015	11482
Subsurface Area - 04	Area 9	Margaret's Creek	3555	SE	2	7109	263
Subsurface Area - 05	Area 9	Margaret's Creek	3555	SE	2	7109	263
Subsurface Area - 06	Area 9	Margaret's Creek	3555	SO	2	7109	263
Subsurface Area - 07	Area 9	Margaret's Creek	3555	SO	2	7109	263
Subsurface Area - 08	Area 9	Margaret's Creek	3555	SE	2	7109	263
Subsurface Area - 09	Area 9	Margaret's Creek	3600	SE	2	7200	267
Subsurface Area - 10	Area 9	Margaret's Creek	3600	SO	2	7200	267
Subsurface Area - 11	Area 8	Jetty	8592	SO	2	17184	636
Subsurface Area - 12	Area 8	Jetty	2579	SO	2	5157	191
Subsurface Area - 13	Area 2	Seawall	980	SE	2	1961	73
Subsurface Area - 14	Area 2	Seawall	1308	SE	2	2617	97
Subsurface Area - 15	Area 2	Seawall	2394	SE	2	4787	177
Subsurface Area - 16	Area 2	Seawall	3682	SO	2	7363	273
Subsurface Area - 17	Area 9	Margaret's Creek	26935	SE	2	53869	1995
Subsurface Area - 21	Area 9	Margaret's Creek	14411	SO	2	28823	1068
Subsurface Area - 22	Area 8	Jetty	58238	SE	2	116476	4314
Subsurface Area - 23	Area 1	Seawall	18382	SO	2	36764	1362
Subsurface Area - 24	Area 11	Jetty	28970	SO	2	57940	2146
Subsurface Area - 25	Area 11	Jetty	20455	SE	2	40910	1515
Subsurface Area - 26	Area 1	Seawall	104	SE	2	209	8
Subsurface Area - 27	Area 7	Jetty	3555	SE	2	7109	263
Subsurface Area - 28	Area 9	Margaret's Creek	13037	SO	2	26073	966
Subsurface Area - 30	Area 1	Seawall	5032	SE	2	10065	373
Subsurface Area - 31	Area 4	Seawall	4283	SO	2.5	10708	397
Subsurface Area - 33	Area 1	Seawall	4039	SO	2.5	10098	374
Subsurface Area - 34	Area 4	Seawall	3458	SO	2	6916	256

SE = Sediment ; SO = Soil
ft^3 = cubic feet; CY = cubic yards

Table 2-5
Summary of Volume Estimates with Arsenic = 15 mg/kg and Lead = 400 mg/kg
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

	Source Materials Volume	Source Materials Weight	Soil Volume, CY			Soil Weight	Sediment volume, CY			Sediment Wt.	Total Volume	Total Weight
	Cubic Yards	Ton	Surface	Subsurface	Total	Ton	Surface	Subsurface	Total	Ton	Cubic Yards	Ton
Jetty Sector												
Area 7	-	-	-	-	-	-	9,694	527	10,221	17,376	10,221	17,376
Area 8	4,994	21,474	2,935	828	3,763	5,645	13,169	15,796	28,965	49,241	37,722	76,359
Area 11	-	-	-	2,146	2,146	3,219	15,330	1,516	16,846	28,638	18,992	31,857
Total	5,000	21,500	3,000	3,000	6,000	8,900	38,200	17,800	56,000	95,300	66,900	125,600
Seawall Sector												
Area 1	5,295	22,769	11,131	1,736	12,867	19,301	30,105	381	30,486	51,826	48,648	93,895
Area 2	59	254	3,085	12,850	15,935	23,903	3,793	347	4,140	7,038	20,134	31,194
Area 3	-	-	354	-	354	531	-	-	-	-	354	531
Area 4	-	-	-	653	653	980	-	-	-	-	653	980
Area 5	9	39	3,646	-	3,646	5,469	2,734	-	2,734	4,648	6,389	10,156
Area 6	-	-	534	-	534	801	346	-	346	588	880	1,389
Total	5,400	23,100	18,800	15,200	34,000	51,000	37,000	700	37,700	64,100	77,100	138,100
Margaret's Creek Sector												
Area 9	711	3,100	15,042	2,826	17,900	26,900	92,522	3,052	95,600	162,500	114,200	192,500
Total All Sectors*	**11,100**	**48,000**	**37,000**	**21,000**	**58,000**	**87,000**	**168,000**	**22,000**	**190,000**	**322,000**	**259,000**	**457,000**

CY - Cubic Yards
* - Total volumes for source materials are rounded to the nearest hundred CY and the total volumes for soil and sediment are rounded to the nearest thousand CY

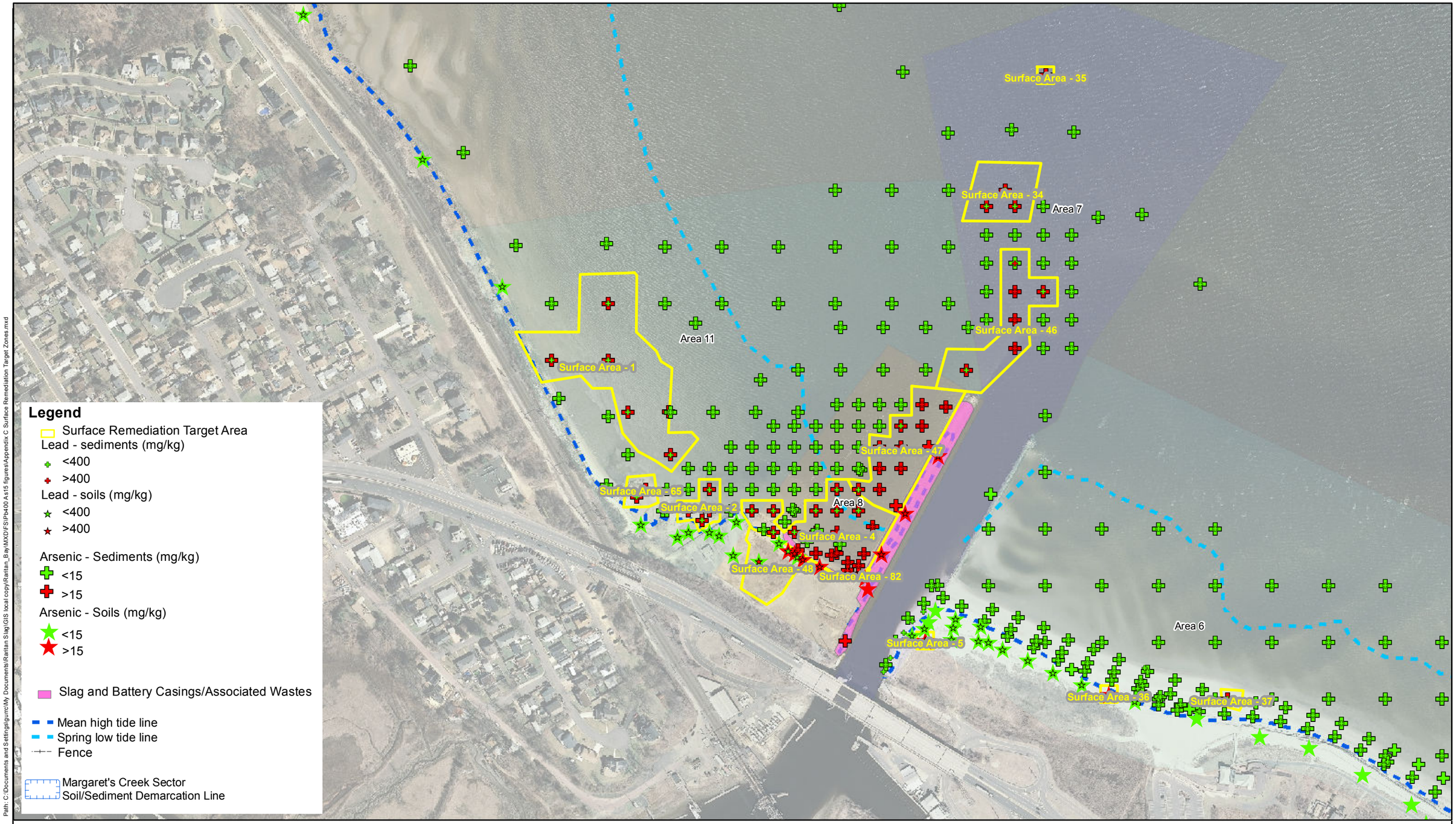
Table 4-1
Summary of Volumes Addressed by Remedial Components of Alternatives
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

	Alternative 2				Alternative 3				Alternative 4				Alternative 5				Alternative 6			
	Source Materials		Soil/Sediment		Source Materials		Soil/Sediment		Source Materials		Soil/Sediment		Source Materials		Soil/Sediment		Source Materials		Soil/Sediment	
	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors	Jetty Sector	Seawall and MC Sectors
Volume addressed by Off-site Disposal (CY) *	5,000	6,100	62,000	185,200	5,000	6,100	44,500	89,800	-	-	44,500	89,800	-	-	28,400	8,800	-	-	38,800	8,800
Volume addressed by On-site Containment (CY) *	-	-	-	-	-	-	-	-	5,000	6,100	-	-	5,000	6,100	5,700	81,000	5,000	6,100	5,700	81,000
Volume addressed by MNR (CY) *	-	-	-	-	-	-	17,500	95,400	-	-	17,500	95,400	-	-	17,500	95,400	-	-	17,500	95,400
Volume addressed by Capping (CY) *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,400	-	-	-	-	-
Total Volume (CY) *	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200	5,000	6,100	62,000	185,200

Notes:
CY - Cubic Yards
MC - Margaret's Creek
Alternative 1 - No Action
Alternative 2 – Excavation/Dredging, Offsite Disposal, Institutional Controls And Long-Term Monitoring
Alternative 3 – Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls And Long-Term Monitoring
Alternative 4 – Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
Alternative 5 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring
Alternative 6 – Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
* - All volumes are rounded to the nearest hundred CY

Summary of Volume Estimates by Alternative with Arsenic = 15 mg/kg and Lead = 400 mg/kg
Feasibility Study
Raritan Bay Slag Superfund Site
Old Bridge and Sayreville, NJ

Option	Material	Volume (cubic yards)					
		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
On-site containment	Source material				11,100	11,100	11,100
	Soil/Sediment					86,700	86,700
	Total				*11,100*	*97,800*	*97,800*
Off-site disposal	Source material		11,100	11,100			
	Soil/Sediment		247,200	134,300	134,300	37,200	47,600
	Total				*134,300*	*37,200*	*47,600*
MNR	Sediment			112,900	112,900	112,900	112,900
Capping	Sediment					10,400	
	Total	*0*	*258,300*	*258,300*	*258,300*	*258,300*	*258,300*



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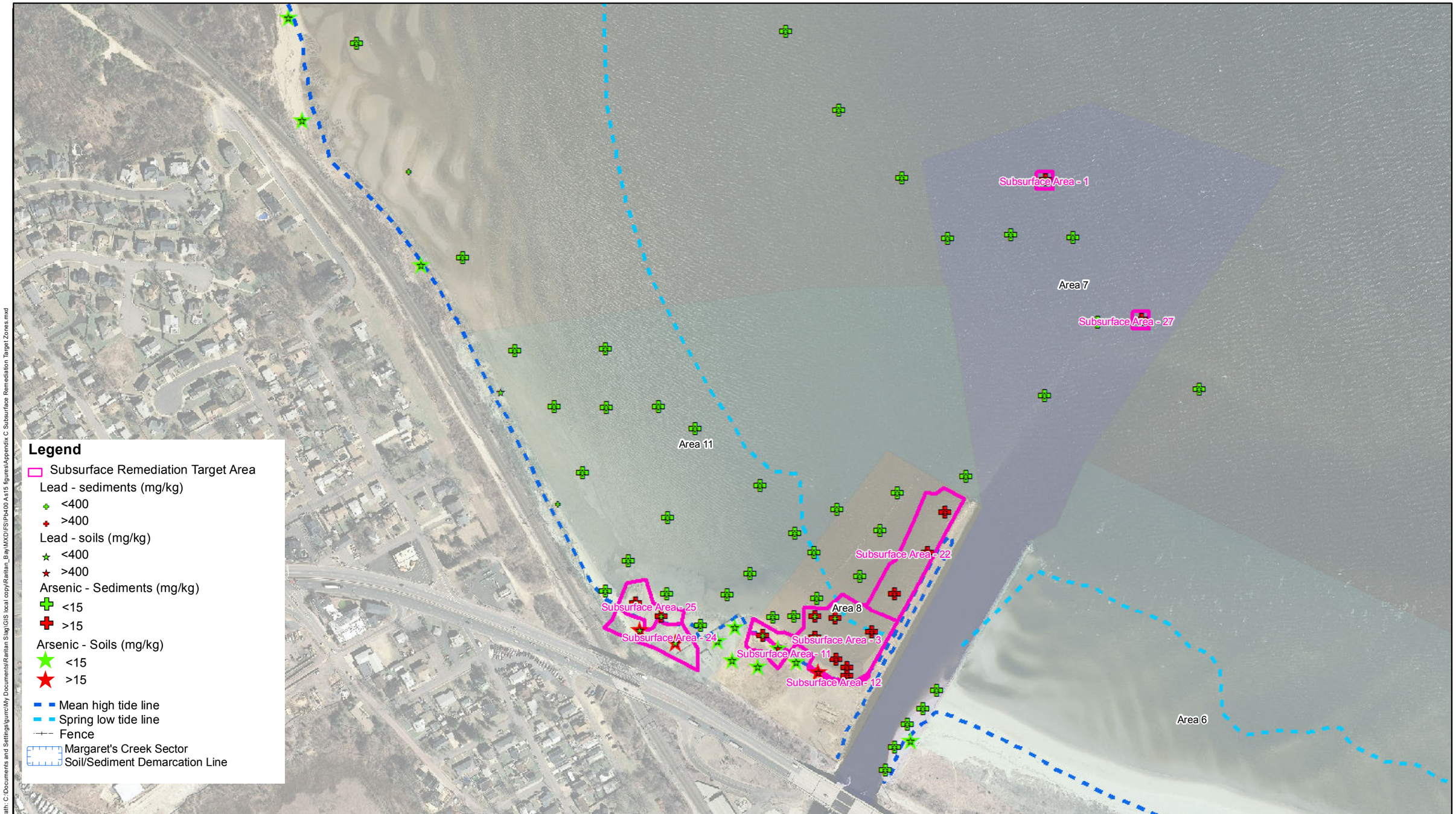
N

0 125 250 500 Feet

1. The depth of remediation extends from 0 to 2 feet below ground surface for all areas
2. Source areas consisting of slag and battery casings/associated wastes were delineated based on the slag survey performed in January 2011
3. The soil and sediment remediation target zones were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)
4.) The term 'sediment' refers to solids that are submerged in water, and the term 'soil' refers to solids other than the slag and battery casings/associated wastes that are on dry land

Appendix C
Volume Calculations - Surface Remediation Target Areas
Jetty Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



N

0 125 250 500 Feet

NOTES
1. The remediation target area extends from 2 feet below ground surface to approximately the depth of the deepest contaminated sample
2. The target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Appendix C
Subsurface Remediation Target Areas
Jetty Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA

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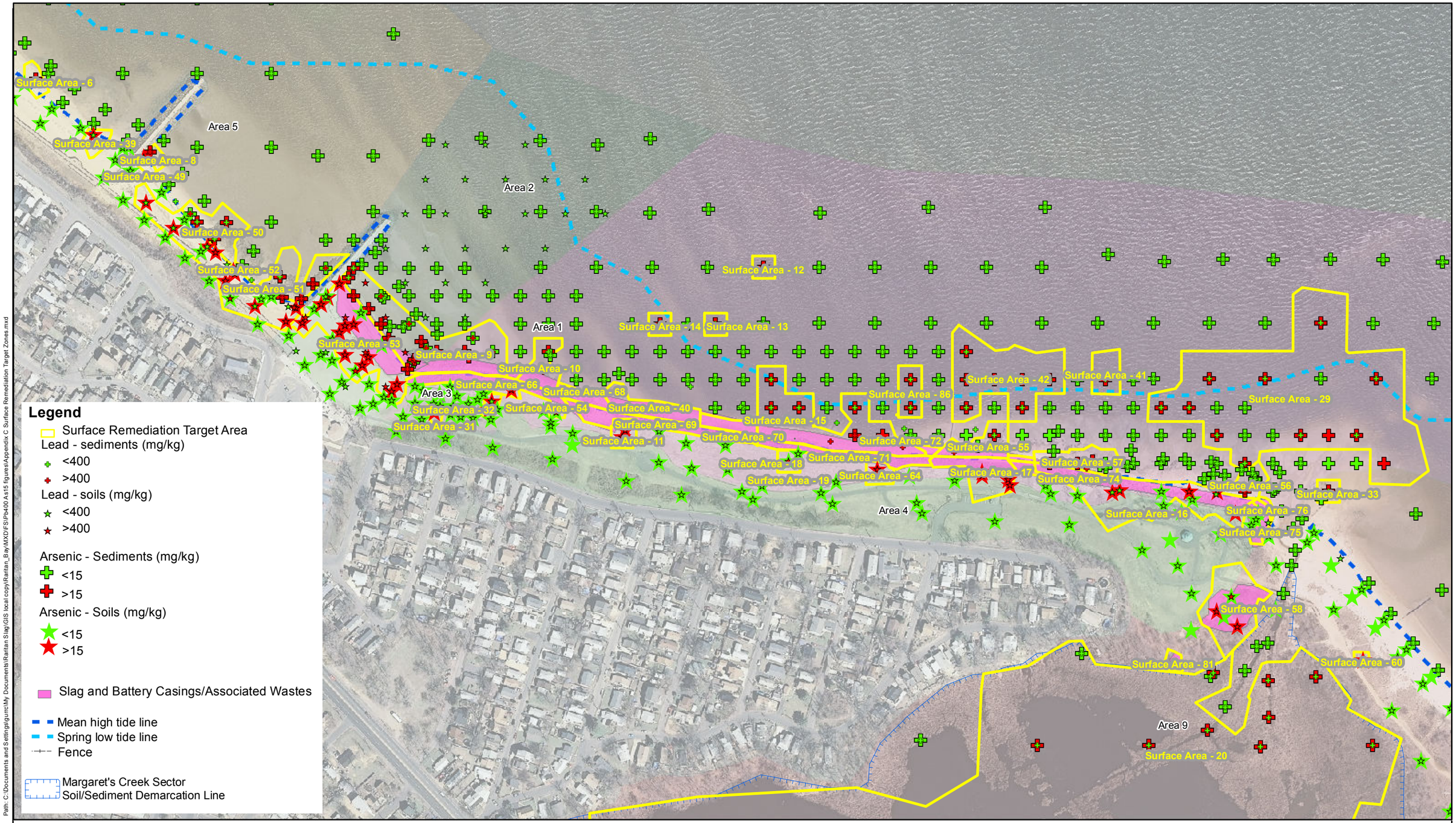

N

0 100 200 400 Feet

1. The depth of remediation extends from 0 to 2 feet below ground surface for all areas
2. Source areas consisting of slag and battery casings/associated wastes were delineated based on the slag survey performed in January 2011
3. The soil and sediment remediation target zones were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)
4.) The term 'sediment' refers to solids that are submerged in water, and the term 'soil' refers to solids other than the slag and battery casings/associated wastes that are on dry land

Appendix C
Volume Calculations - Surface Remediation Target Areas
Seawall Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA

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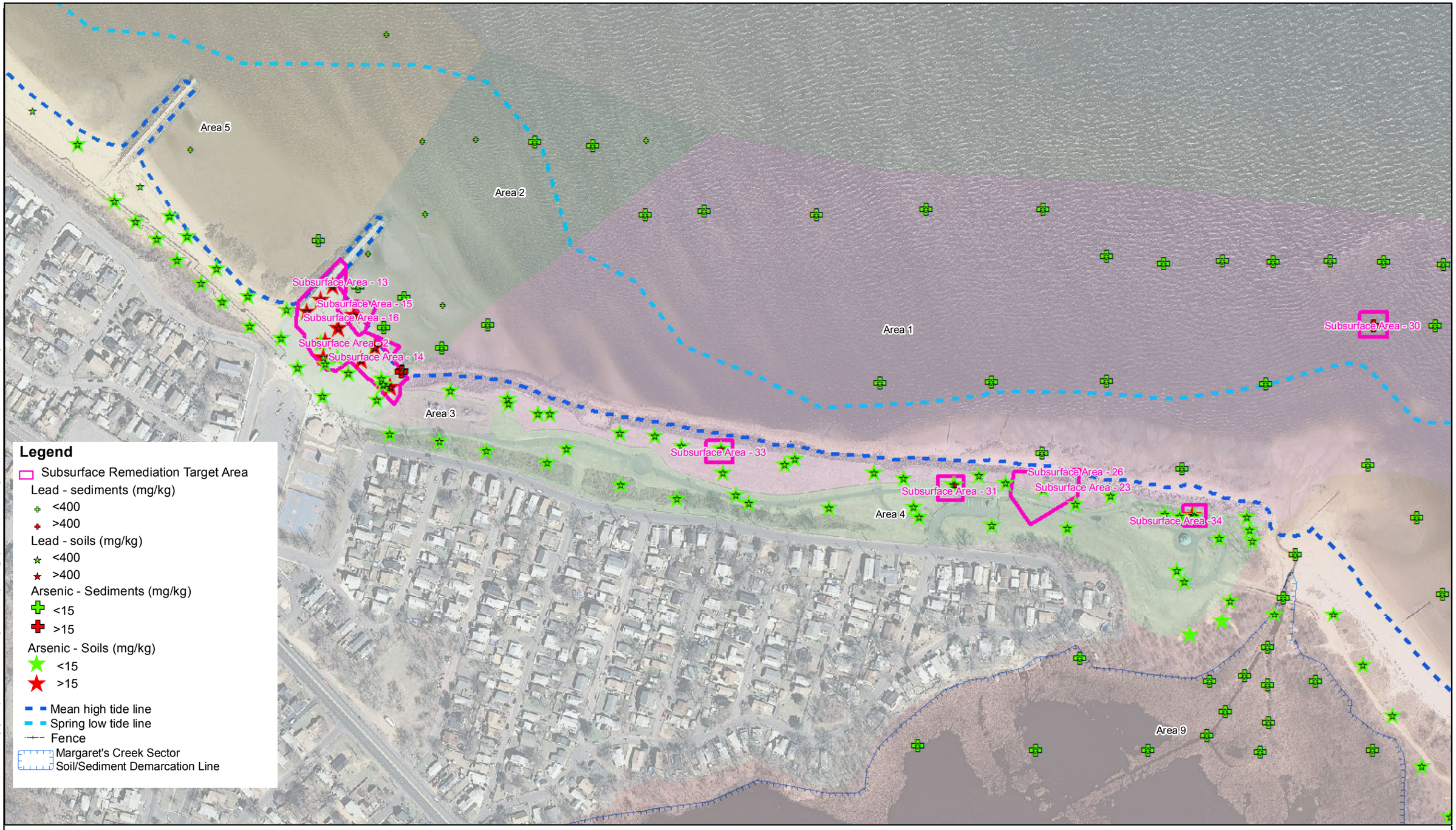

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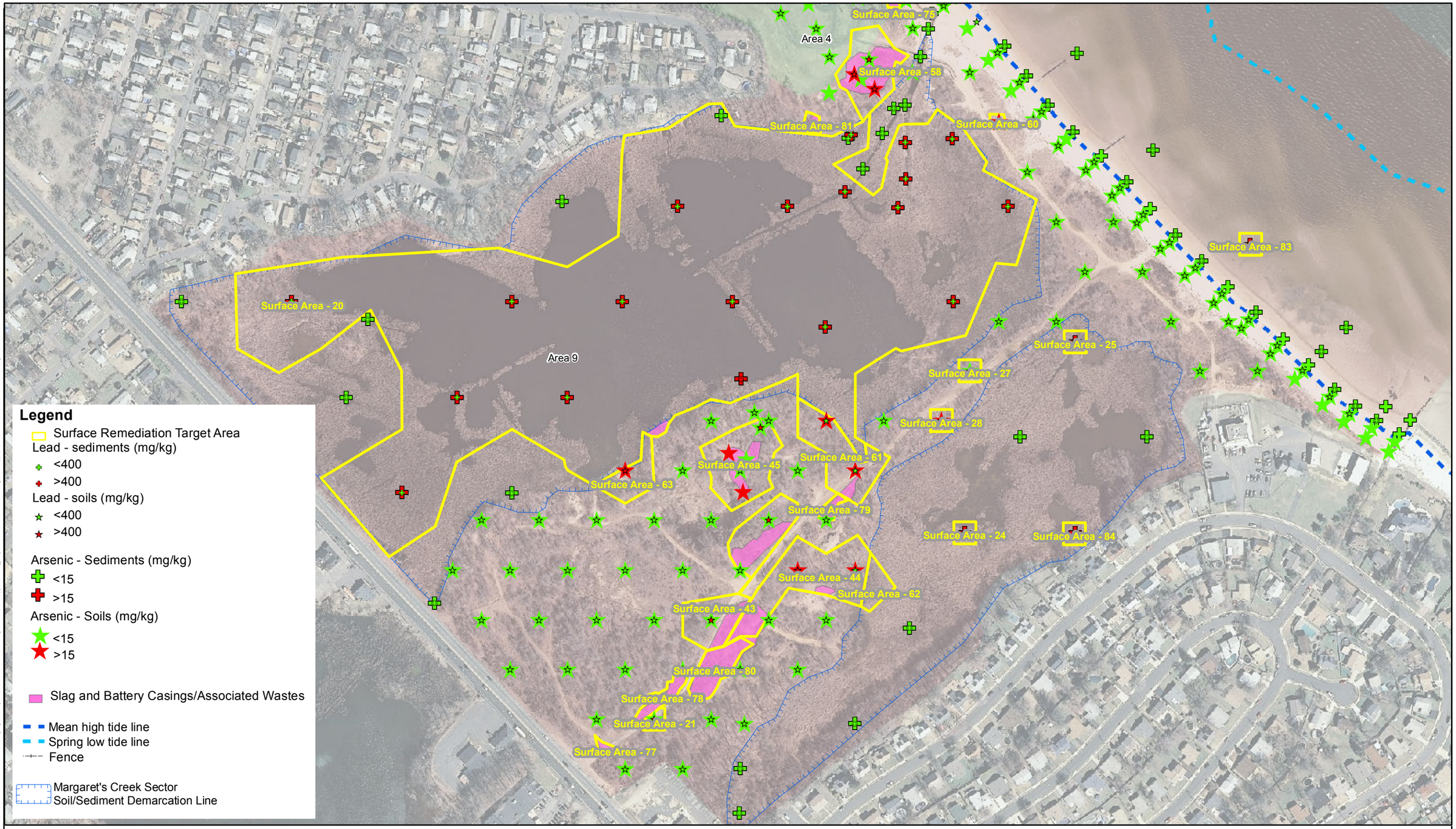
N

0 125 250 500 Feet

NOTES
1. The remediation target area extends from 2 feet below ground surface to approximately the depth of the deepest contaminated sample
2. The target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Appendix C
Subsurface Remediation Target Areas
Seawall Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



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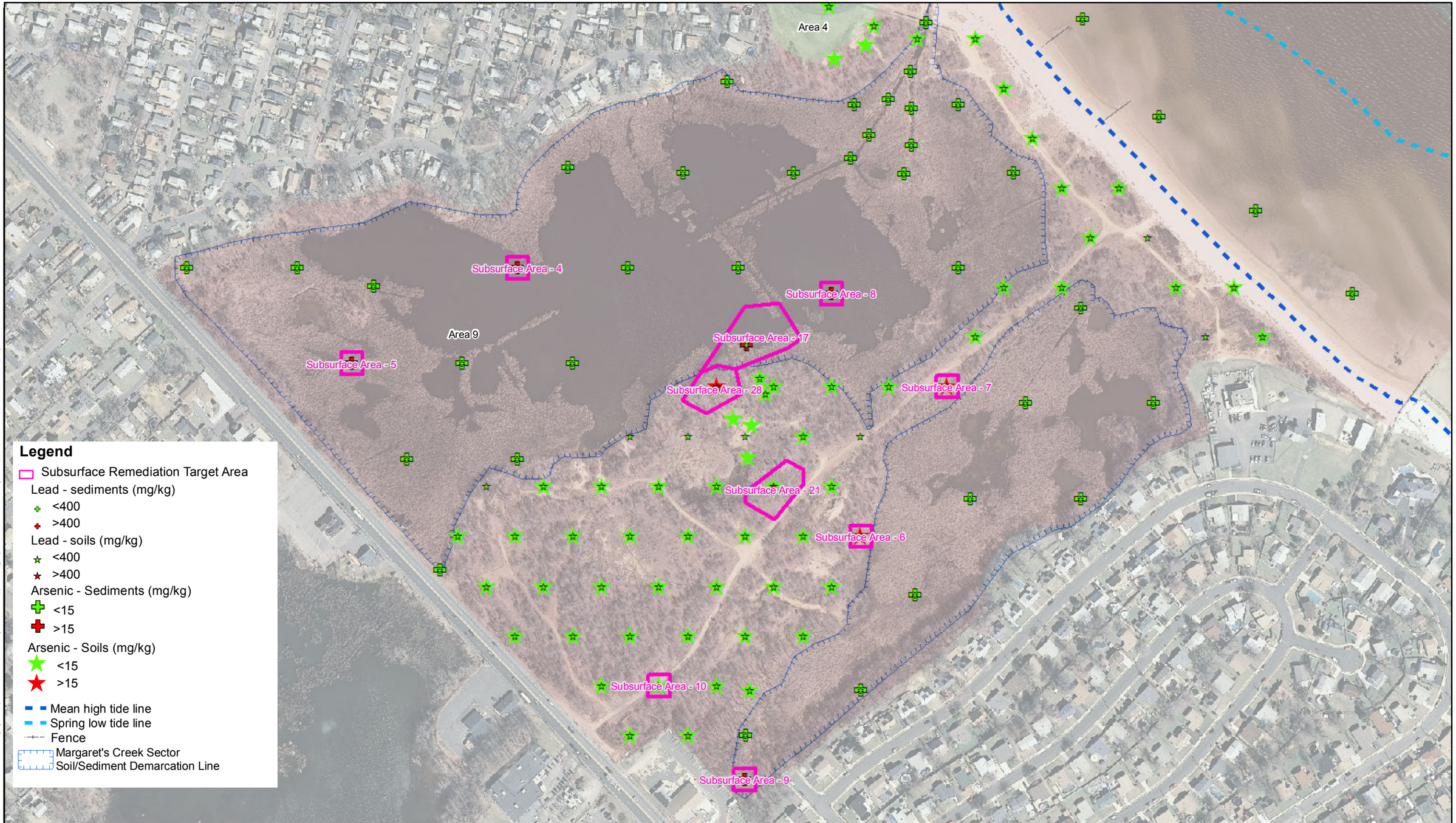
N

0 125 250 500 Feet

1. The depth of remediation extends from 0 to 2 feet below ground surface for all areas
2. Source areas consisting of slag and battery casings/associated wastes were delineated based on the slag survey performed in January 2011
3. The soil and sediment remediation target zones were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)
4.) The term 'sediment' refers to solids that are submerged in water, and the term 'soil' refers to solids other than the slag and battery casings/associated wastes that are on dry land

Appendix C
Volume Calculations - Surface Remediation Target Areas
Margaret's Creek Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA



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N

0 125 250 500 Feet

NOTES
1. The remediation target area extends from 2 feet below ground surface to approximately the depth of the deepest contaminated sample
2. The target areas were delineated by generating Thiessen polygons based on the sample points (please see Section 2.4 of the FS for more details)

Appendix C
Subsurface Remediation Target Areas
Margaret's Creek Sector
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

EPA

Appendix D

Detailed Cost Estimates

COST SUMMARY INDEX

Sheet Name	Subtitle Name	Description
CS-S	Alternative Cost Summary	Alternative Cost Summary
CS-1	Cost Estimate Summary	ALTERNATIVE 1: No Action
PV-1	Present Value Analysis	ALTERNATIVE 1: No Action
CS-2	Cost Estimate Summary	ALTERNATIVE 2: Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring
PV-2	Present Value Analysis	ALTERNATIVE 2: Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring
CS-3	Cost Estimate Summary	ALTERNATIVE 3: Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
PV-3	Present Value Analysis	ALTERNATIVE 3: Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
CS-4	Cost Estimate Summary	ALTERNATIVE 4: Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
PV-4	Present Value Analysis	ALTERNATIVE 4: Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
CS-5	Cost Estimate Summary	ALTERNATIVE 5: Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring
PV-5	Present Value Analysis	ALTERNATIVE 5: Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring
CS-6	Cost Estimate Summary	ALTERNATIVE 6: Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
PV-6	Present Value Analysis	ALTERNATIVE 6: Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
PV-AERFT	Annual Escalation Rate Factors	Summary of Annual Escalation Rate Factors Table
PV-ESC	ENR Construction Cost Index History	Summary of ENR Construction Cost Indices for Escalation Rate Determination
PV-ADRFT	Annual Discount Rate Factors	Summary of Annual Discount Rate Factors Table
PV-OMB	OMB Nominal Interest Rates	Summary of OMB Nominal Interest Rates for Discount Rate Factor Determination

TABLE CS-S

ALTERNATIVE COST SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Alternative	Total Capital Cost	Total Annual Cost (30 Year Evaluation Period)	Total Periodic Cost	Present Value Cost
1	$0	$0	$0	$0
2	$215,984,000	$1,545,000	$336,000	$217,430,000
3	$117,785,000	$5,895,000	$336,000	$122,566,000
4	$111,854,000	$9,241,000	$336,000	$119,137,000
5	$71,157,000	$11,296,000	$336,000	$79,986,000
6	$74,622,000	$10,201,000	$336,000	$82,614,000

Notes:
Capital costs, annual costs, and periodic costs are presented on tables CS-1 through CS-6
Estimated remedial timeframes and associated present value analysis for each remedial alternative are provided on tables PV-1 through PV-6.
Costs presented have an expected accuracy range for feasibility study estimates (-30% to +50% of the actual cost of the alternative).
Present value discounting is not included in total capital cost, total annual cost (30 year period of evaluation) and total periodic costs.

ALTERNATIVE 1: No Action
ALTERNATIVE 2: Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring
ALTERNATIVE 3: Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
ALTERNATIVE 4: Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring
ALTERNATIVE 5: Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring
ALTERNATIVE 6: Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

TABLE CS-1

ALTERNATIVE 1
No Action

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 1 is required by the NCP to provide an environmental baseline against which impacts of the various remedial alternatives can be compared.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$0	$0	
			SUBTOTAL	$0	
Contingency (Scope and Bid)	20%			$0	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$0	
Project Management	10%			$0	Percentage from Exhibit 5-8 was used.
Remedial Design	20%			$0	Percentage from Exhibit 5-8 was used.
Construction Management	15%			$0	Percentage from Exhibit 5-8 was used.
			TOTAL	$0	
			TOTAL CAPITAL COST	**$0**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

QTY Quantity
LS Lump sum

TABLE PV-1

ALTERNATIVE 1
No Action

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate: 3.11%
Discount Rate: 5.25%

Year[1]	Capital Costs[2]	Five-year Review Costs	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[6,7]
0	$0	$0	$0	1.0000	$0	1.0000	$0
1	$0	$0	$0	1.0311	$0	0.9501	$0
2	$0	$0	$0	1.0632	$0	0.9027	$0
3	$0	$0	$0	1.0962	$0	0.8577	$0
4	$0	$0	$0	1.1303	$0	0.8149	$0
5	$0	$0	$0	1.1655	$0	0.7743	$0
6	$0	$0	$0	1.2017	$0	0.7356	$0
7	$0	$0	$0	1.2391	$0	0.6989	$0
8	$0	$0	$0	1.2776	$0	0.6641	$0
9	$0	$0	$0	1.3174	$0	0.6310	$0
10	$0	$0	$0	1.3583	$0	0.5995	$0
11	$0	$0	$0	1.4006	$0	0.5696	$0
12	$0	$0	$0	1.4441	$0	0.5412	$0
13	$0	$0	$0	1.4891	$0	0.5142	$0
14	$0	$0	$0	1.5354	$0	0.4885	$0
15	$0	$0	$0	1.5831	$0	0.4642	$0
16	$0	$0	$0	1.6323	$0	0.4410	$0
17	$0	$0	$0	1.6831	$0	0.4190	$0
18	$0	$0	$0	1.7355	$0	0.3981	$0
19	$0	$0	$0	1.7894	$0	0.3783	$0
20	$0	$0	$0	1.8451	$0	0.3594	$0
21	$0	$0	$0	1.9025	$0	0.3415	$0
22	$0	$0	$0	1.9616	$0	0.3244	$0
23	$0	$0	$0	2.0226	$0	0.3082	$0
24	$0	$0	$0	2.0855	$0	0.2929	$0
25	$0	$0	$0	2.1504	$0	0.2783	$0
26	$0	$0	$0	2.2173	$0	0.2644	$0
27	$0	$0	$0	2.2862	$0	0.2512	$0
28	$0	$0	$0	2.3573	$0	0.2387	$0
29	$0	$0	$0	2.4307	$0	0.2268	$0
30	$0	$0	$0	2.5062	$0	0.2154	$0
TOTALS:	**$0**	**$0**	**$0**		**$0**		$0
TOTAL PRESENT VALUE OF ALTERNATIVE 1							**$0**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-1

3 - Total annual expenditure is the total cost per year with no escalation or discounting.

4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.

5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-2

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$1,438,377	$1,438,377	See MII Project Cost Summary Report Page 5
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,882,947	$2,882,947	See MII Project Cost Summary Report Page 6
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,220,185	$8,220,185	See MII Project Cost Summary Report Page 7
Jetty Sector Site Activities	1	LS	$10,758,399	$10,758,399	See MII Project Cost Summary Report Page 9
Margaret's Creek Sector Site Activities	1	LS	$18,512,118	$18,512,118	See MII Project Cost Summary Report Page 11
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Seawall Areas	1	LS	$4,677,357	$4,677,357	See MII Project Cost Summary Report Page 11
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	1	LS	$4,355,495	$4,355,495	See MII Project Cost Summary Report Page 12
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	1	LS	$620,194	$620,194	See MII Project Cost Summary Report Page 12
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$21,891,870	$21,891,870	See MII Project Cost Summary Report Page 12
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$18,170,880	$18,170,880	See MII Project Cost Summary Report Page 13
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	1	LS	$34,826,812	$34,826,812	See MII Project Cost Summary Report Page 13
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 14
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 14
Backfill of Excavations	1	LS	$19,311,893	$19,311,893	See MII Project Cost Summary Report Page 14
Wetland Restoration	1	LS	$3,419,385	$3,419,385	See MII Project Cost Summary Report Page 14
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$153,834,888	
Contingency (Scope and Bid)	20%			$30,766,978	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$184,601,866	

TABLE CS-2

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

Project Management	5%	$9,230,093	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$11,076,112	Percentage from Exhibit 5-8 was used.
Construction Management	6%	$11,076,112	Percentage from Exhibit 5-8 was used.
	TOTAL	$215,984,183	
	TOTAL CAPITAL COST	**$215,984,000**	Total capital cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$90,582	
Contingency (Scope and Bid)	20%			$18,116	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$108,698	
Project Management	8%			$8,696	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$16,305	Middle value of the recommended range was used.
			TOTAL	$133,699	
	TOTAL QUARTERLY MONITORING COSTS			**$134,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$56,025	
Contingency (Scope and Bid)	20%			$11,205	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$67,230	
Project Management	10%			$6,723	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$10,085	Middle value of the recommended range was used.
			TOTAL	$84,038	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$84,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-2

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
			SUBTOTAL	$27,197	
Contingency (Scope and Bid)	20%			$5,439	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$32,636	
Project Management	10%			$3,264	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$4,895	Middle value of the recommended range was used.
			TOTAL	$40,795	
			TOTAL ANNUAL MONITORING COSTS	**$41,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
EA Each
QTY Quantity
LS Lump sum

TABLE PV-2

ALTERNATIVE 2
Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate: 3.11%
Discount Rate: 5.25%

Year[1]	Capital Costs[2]	ANNUAL COSTS		PERIODIC COSTS	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[5,6]
		O&M Costs	Monitoring Costs	Five-Year Review					
0	$215,984,000	$0	$0	$0	$215,984,000	1.0000	$215,984,000	1.0000	$215,984,000
1	$0	$0	$134,000	$0	$134,000	1.0311	$138,167	0.9501	$131,273
2	$0	$0	$134,000	$0	$134,000	1.0632	$142,469	0.9027	$128,607
3	$0	$0	$84,000	$0	$84,000	1.0962	$92,081	0.8577	$78,978
4	$0	$0	$84,000	$0	$84,000	1.1303	$94,945	0.8149	$77,371
5	$0	$0	$84,000	$56,000	$140,000	1.1655	$163,170	0.7743	$126,343
6	$0	$0	$41,000	$0	$41,000	1.2017	$49,270	0.7356	$36,243
7	$0	$0	$41,000	$0	$41,000	1.2391	$50,803	0.6989	$35,506
8	$0	$0	$41,000	$0	$41,000	1.2776	$52,382	0.6641	$34,787
9	$0	$0	$41,000	$0	$41,000	1.3174	$54,013	0.6310	$34,082
10	$0	$0	$41,000	$56,000	$97,000	1.3583	$131,755	0.5995	$78,987
11	$0	$0	$41,000	$0	$41,000	1.4006	$57,425	0.5696	$32,709
12	$0	$0	$41,000	$0	$41,000	1.4441	$59,208	0.5412	$32,043
13	$0	$0	$41,000	$0	$41,000	1.4891	$61,053	0.5142	$31,394
14	$0	$0	$41,000	$0	$41,000	1.5354	$62,951	0.4885	$30,752
15	$0	$0	$41,000	$56,000	$97,000	1.5831	$153,561	0.4642	$71,283
16	$0	$0	$41,000	$0	$41,000	1.6323	$66,924	0.4410	$29,514
17	$0	$0	$41,000	$0	$41,000	1.6831	$69,007	0.4190	$28,914
18	$0	$0	$41,000	$0	$41,000	1.7355	$71,156	0.3981	$28,327
19	$0	$0	$41,000	$0	$41,000	1.7894	$73,365	0.3783	$27,754
20	$0	$0	$41,000	$56,000	$97,000	1.8451	$178,975	0.3594	$64,324
21	$0	$0	$41,000	$0	$41,000	1.9025	$78,003	0.3415	$26,638
22	$0	$0	$41,000	$0	$41,000	1.9616	$80,426	0.3244	$26,090
23	$0	$0	$41,000	$0	$41,000	2.0226	$82,927	0.3082	$25,558
24	$0	$0	$41,000	$0	$41,000	2.0855	$85,506	0.2929	$25,045
25	$0	$0	$41,000	$56,000	$97,000	2.1504	$208,589	0.2783	$58,050
26	$0	$0	$41,000	$0	$41,000	2.2173	$90,909	0.2644	$24,036
27	$0	$0	$41,000	$0	$41,000	2.2862	$93,734	0.2512	$23,546
28	$0	$0	$41,000	$0	$41,000	2.3573	$96,649	0.2387	$23,070
29	$0	$0	$41,000	$0	$41,000	2.4307	$99,659	0.2268	$22,603
30	$0	$0	$41,000	$56,000	$97,000	2.5062	$243,101	0.2154	$52,364
TOTALS:	**$215,984,000**	**$0**	**$1,545,000**	**$336,000**	**$217,865,000**		**$218,966,182**		$217,430,191
TOTAL PRESENT VALUE OF ALTERNATIVE 2									**$217,430,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-2
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-3

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$1,095,516	$1,095,516	See MII Project Cost Summary Report Page 14
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,880,574	$2,880,574	See MII Project Cost Summary Report Page 16
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,224,488	$8,220,185	See MII Project Cost Summary Report Page 17
Jetty Sector Site Activities	1	LS	$7,475,456	$7,473,894	See MII Project Cost Summary Report Page 20
Margaret's Creek Sector Site Activities	1	LS	$1,049,737	$561,533	See MII Project Cost Summary Report Page 21
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Seawall Areas	1	LS	$4,677,357	$4,677,357	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	1	LS	$4,355,495	$4,355,495	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	1	LS	$620,194	$620,194	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$22,085,928	$21,891,870	See MII Project Cost Summary Report Page 22
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$13,089,849	$13,023,926	See MII Project Cost Summary Report Page 23
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	1	LS	$6,197,893	$5,336,400	See MII Project Cost Summary Report Page 24
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 24
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 24
Backfill of Excavations	1	LS	$9,270,465	$9,006,237	See MII Project Cost Summary Report Page 24
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$83,892,157	
Contingency (Scope and Bid)	20%			$16,778,431	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$100,670,588	

TABLE CS-3

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

Project Management	5%	$5,033,529	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$6,040,235	Percentage from Exhibit 5-8 was used.
Construction Management	6%	$6,040,235	Percentage from Exhibit 5-8 was used.
	TOTAL	$117,784,587	
	TOTAL CAPITAL COST	**$117,785,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 16
			SUBTOTAL	$166,291	
Contingency (Scope and Bid)	20%			$33,258	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$199,549	
Project Management	8%			$15,964	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$29,932	Middle value of the recommended range was used.
			TOTAL	$245,445	
	TOTAL SEMI-ANNUAL MNR MONITORING COSTS			**$245,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 17
			SUBTOTAL	$84,946	
Contingency (Scope and Bid)	20%			$16,989	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,935	
Project Management	8%			$8,155	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,290	Middle value of the recommended range was used.
			TOTAL	$125,380	
	TOTAL ANNUAL MNR MONITORING COSTS			**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-3

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$90,582	
Contingency (Scope and Bid)	20%			$18,116	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$108,698	
Project Management	8%			$8,696	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$16,305	Middle value of the recommended range was used.
			TOTAL	$133,699	
	TOTAL QUARTERLY MONITORING COSTS			**$134,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$56,025	
Contingency (Scope and Bid)	20%			$11,205	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$67,230	
Project Management	10%			$6,723	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$10,085	Middle value of the recommended range was used.
			TOTAL	$84,038	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$84,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-3

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
			SUBTOTAL	$27,197	
Contingency (Scope and Bid)	20%			$5,439	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$32,636	
Project Management	10%			$3,264	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$4,895	Middle value of the recommended range was used.
			TOTAL	$40,795	
			TOTAL ANNUAL MONITORING COSTS	**$41,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

TABLE PV-3

ALTERNATIVE 3
Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate: 3.11%
Discount Rate: 5.25%

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	Capital Costs[2]	O&M Costs	Monitoring Costs	Five-year Review	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[5,6]
0	$117,785,000	$0	$0	$0	$117,785,000	1.0000	$117,785,000	1.0000	$117,785,000
1	$0	$0	$379,000	$0	$379,000	1.0311	$390,787	0.9501	$371,287
2	$0	$0	$379,000	$0	$379,000	1.0632	$402,953	0.9027	$363,745
3	$0	$0	$329,000	$0	$329,000	1.0962	$360,650	0.8577	$309,329
4	$0	$0	$329,000	$0	$329,000	1.1303	$371,869	0.8149	$303,036
5	$0	$0	$329,000	$56,000	$385,000	1.1655	$448,718	0.7743	$347,442
6	$0	$0	$166,000	$0	$166,000	1.2017	$199,482	0.7356	$146,739
7	$0	$0	$166,000	$0	$166,000	1.2391	$205,691	0.6989	$143,757
8	$0	$0	$166,000	$0	$166,000	1.2776	$212,082	0.6641	$140,843
9	$0	$0	$166,000	$0	$166,000	1.3174	$218,688	0.6310	$137,992
10	$0	$0	$166,000	$56,000	$222,000	1.3583	$301,543	0.5995	$180,775
11	$0	$0	$166,000	$0	$166,000	1.4006	$232,500	0.5696	$132,432
12	$0	$0	$166,000	$0	$166,000	1.4441	$239,721	0.5412	$129,737
13	$0	$0	$166,000	$0	$166,000	1.4891	$247,191	0.5142	$127,105
14	$0	$0	$166,000	$0	$166,000	1.5354	$254,876	0.4885	$124,507
15	$0	$0	$166,000	$56,000	$222,000	1.5831	$351,448	0.4642	$163,142
16	$0	$0	$166,000	$0	$166,000	1.6323	$270,962	0.4410	$119,494
17	$0	$0	$166,000	$0	$166,000	1.6831	$279,395	0.4190	$117,066
18	$0	$0	$166,000	$0	$166,000	1.7355	$288,093	0.3981	$114,690
19	$0	$0	$166,000	$0	$166,000	1.7894	$297,040	0.3783	$112,370
20	$0	$0	$166,000	$56,000	$222,000	1.8451	$409,612	0.3594	$147,215
21	$0	$0	$166,000	$0	$166,000	1.9025	$315,815	0.3415	$107,851
22	$0	$0	$166,000	$0	$166,000	1.9616	$325,626	0.3244	$105,633
23	$0	$0	$166,000	$0	$166,000	2.0226	$335,752	0.3082	$103,479
24	$0	$0	$166,000	$0	$166,000	2.0855	$346,193	0.2929	$101,400
25	$0	$0	$166,000	$56,000	$222,000	2.1504	$477,389	0.2783	$132,857
26	$0	$0	$166,000	$0	$166,000	2.2173	$368,072	0.2644	$97,318
27	$0	$0	$166,000	$0	$166,000	2.2862	$379,509	0.2512	$95,333
28	$0	$0	$166,000	$0	$166,000	2.3573	$391,312	0.2387	$93,406
29	$0	$0	$166,000	$0	$166,000	2.4307	$403,496	0.2268	$91,513
30	$0	$0	$166,000	$56,000	$222,000	2.5062	$556,376	0.2154	$119,843
TOTALS:	**$117,785,000**	**$0**	**$5,895,000**	**$336,000**	**$124,016,000**		**$127,667,838**		$122,566,336
TOTAL PRESENT VALUE OF ALTERNATIVE 3									**$122,566,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-3
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-4

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$1,494,508	$1,494,508	See MII Project Cost Summary Report Page 24
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,886,705	$2,886,705	See MII Project Cost Summary Report Page 26
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,224,488	$8,220,185	See MII Project Cost Summary Report Page 27
Jetty Sector Site Activities	1	LS	$7,475,456	$7,473,894	See MII Project Cost Summary Report Page 29
Margaret's Creek Sector Site Activities	1	LS	$1,049,737	$561,533	See MII Project Cost Summary Report Page 31
Transportation of Contaminated Materials to Onsite Containment Cell	1	LS	$115,766	$115,766	See MII Project Cost Summary Report Page 32
Onsite Containtment Cell Construction					
Onsite Cell A Near the Western Jetty	1	LS	$1,215,800	$1,215,800	See MII Project Cost Summary Report Page 32
Onsite Cell B Near Margaret's Creek Area	1	LS	$3,654,198	$3,654,198	See MII Project Cost Summary Report Page 35
Groundwater Monitoring Well Installation	1	LS	$38,394	$38,394	See MII Project Cost Summary Report Page 37
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$22,085,928	$21,891,870	See MII Project Cost Summary Report Page 38
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$13,089,949	$13,023,926	See MII Project Cost Summary Report Page 38
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	1	LS	$6,197,893	$5,336,400	See MII Project Cost Summary Report Page 39
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 40
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 40
Backfill of Excavations	1	LS	$9,270,465	$9,006,237	See MII Project Cost Summary Report Page 40
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$79,668,392	
Contingency (Scope and Bid)	20%			$15,933,678	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$95,602,070	

TABLE CS-4

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

Project Management	5%	$4,780,104	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$5,736,124	Percentage from Exhibit 5-8 was used.
Construction Management	6%	$5,736,124	Percentage from Exhibit 5-8 was used.
	TOTAL	$111,854,422	
	TOTAL CAPITAL COST	**$111,854,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 31
			SUBTOTAL	$166,291	
Contingency (Scope and Bid)	20%			$33,258	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$199,549	
Project Management	8%			$15,964	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$29,932	Middle value of the recommended range was used.
			TOTAL	$245,445	
			TOTAL SEMI-ANNUAL MNR MONITORING COSTS	**$245,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 32
			SUBTOTAL	$84,946	
Contingency (Scope and Bid)	20%			$16,989	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,935	
Project Management	8%			$8,155	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,290	Middle value of the recommended range was used.
			TOTAL	$125,380	
			TOTAL ANNUAL MNR MONITORING COSTS	**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-4

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Quarterly Containment Cell Sampling per Year	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 40
Quarterly Containment Cell Inspections per Year	1	EA	$14,852	$14,852	See MII Project Cost Summary Report Page 41
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$140,028	
Contingency (Scope and Bid)	20%			$28,006	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$168,034	
Project Management	8%			$13,443	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$25,205	Middle value of the recommended range was used.
			TOTAL	$206,682	
	TOTAL QUARTERLY MONITORING COSTS			**$207,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Containment Cell Sampling per Year	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 41
Semi-Annual Containment Cell Inspections per Year	1	EA	$9,226	$9,226	See MII Project Cost Summary Report Page 41
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$84,348	
Contingency (Scope and Bid)	20%			$16,870	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,218	
Project Management	8%			$8,097	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,183	Middle value of the recommended range was used.
			TOTAL	$124,498	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$124,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-4

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
Annual Containment Cell Sampling	1	EA	$11,349	$11,349	See MII Project Cost Summary Report Page 40
Annual Containment Cell Inspections per Year	1	EA	$6,414	$6,414	See MII Project Cost Summary Report Page 41
			SUBTOTAL	$44,960	
Contingency (Scope and Bid)	20%			$8,992	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$53,952	
Project Management	10%			$5,395	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$8,093	Middle value of the recommended range was used.
			TOTAL	$67,440	
			TOTAL ANNUAL MONITORING COSTS	**$67,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

OPERATION & MAINTENANCE ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
O&M of Onsite Containment Cell	1	EA	$54,179	$54,179	See MII Project Cost Summary Report Page 41
			SUBTOTAL	$54,179	
Contingency (Scope and Bid)	20%			$10,836	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$65,015	
Project Management	10%			$6,502	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$9,752	Middle value of the recommended range was used.
			TOTAL	$81,269	
			TOTAL O&M ANNUAL COSTS	**$81,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-4

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

TABLE PV-4

ALTERNATIVE 4
Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate: 3.11%
Discount Rate: 5.25%

Year[1]	Capital Costs[2]	ANNUAL COSTS		PERIODIC COSTS	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[5,6]
		O&M Costs	Monitoring Costs	Five-year Review					
0	$111,854,000	$0	$0	$0	$111,854,000	1.0000	$111,854,000	1.0000	$111,854,000
1	$0	$81,000	$452,000	$0	$533,000	1.0311	$549,576	0.9501	$522,152
2	$0	$81,000	$452,000	$0	$533,000	1.0632	$566,686	0.9027	$511,547
3	$0	$81,000	$369,000	$0	$450,000	1.0962	$493,290	0.8577	$423,095
4	$0	$81,000	$369,000	$0	$450,000	1.1303	$508,635	0.8149	$414,487
5	$0	$81,000	$369,000	$56,000	$506,000	1.1655	$589,743	0.7743	$456,638
6	$0	$81,000	$192,000	$0	$273,000	1.2017	$328,064	0.7356	$241,324
7	$0	$81,000	$192,000	$0	$273,000	1.2391	$338,274	0.6989	$236,420
8	$0	$81,000	$192,000	$0	$273,000	1.2776	$348,785	0.6641	$231,628
9	$0	$81,000	$192,000	$0	$273,000	1.3174	$359,650	0.6310	$226,939
10	$0	$81,000	$192,000	$56,000	$329,000	1.3583	$446,881	0.5995	$267,905
11	$0	$81,000	$192,000	$0	$273,000	1.4006	$382,364	0.5696	$217,794
12	$0	$81,000	$192,000	$0	$273,000	1.4441	$394,239	0.5412	$213,362
13	$0	$81,000	$192,000	$0	$273,000	1.4891	$406,524	0.5142	$209,035
14	$0	$81,000	$192,000	$0	$273,000	1.5354	$419,164	0.4885	$204,762
15	$0	$81,000	$192,000	$56,000	$329,000	1.5831	$520,840	0.4642	$241,774
16	$0	$81,000	$192,000	$0	$273,000	1.6323	$445,618	0.4410	$196,517
17	$0	$81,000	$192,000	$0	$273,000	1.6831	$459,486	0.4190	$192,525
18	$0	$81,000	$192,000	$0	$273,000	1.7355	$473,792	0.3981	$188,616
19	$0	$81,000	$192,000	$0	$273,000	1.7894	$488,506	0.3783	$184,802
20	$0	$81,000	$192,000	$56,000	$329,000	1.8451	$607,038	0.3594	$218,169
21	$0	$81,000	$192,000	$0	$273,000	1.9025	$519,383	0.3415	$177,369
22	$0	$81,000	$192,000	$0	$273,000	1.9616	$535,517	0.3244	$173,722
23	$0	$81,000	$192,000	$0	$273,000	2.0226	$552,170	0.3082	$170,179
24	$0	$81,000	$192,000	$0	$273,000	2.0855	$569,342	0.2929	$166,760
25	$0	$81,000	$192,000	$56,000	$329,000	2.1504	$707,482	0.2783	$196,892
26	$0	$81,000	$192,000	$0	$273,000	2.2173	$605,323	0.2644	$160,047
27	$0	$81,000	$192,000	$0	$273,000	2.2862	$624,133	0.2512	$156,782
28	$0	$81,000	$192,000	$0	$273,000	2.3573	$643,543	0.2387	$153,614
29	$0	$81,000	$192,000	$0	$273,000	2.4307	$663,581	0.2268	$150,500
30	$0	$81,000	$192,000	$56,000	$329,000	2.5062	$824,540	0.2154	$177,606
TOTALS:	**$111,854,000**	**$2,430,000**	**$6,811,000**	**$336,000**	**$121,431,000**		**$127,226,167**		$119,136,962
TOTAL PRESENT VALUE OF ALTERNATIVE 4									**$119,137,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-4
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-5

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$810,759	$810,759	See MII Project Cost Summary Report Page 42
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,888,331	$2,888,331	See MII Project Cost Summary Report Page 43
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Capping of Area 8	1	LS	$3,281,526	$3,281,526	See MII Project Cost Summary Report Page 44
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,220,516	$8,220,516	See MII Project Cost Summary Report Page 45
Jetty Sector Site Activities	1	LS	$5,528,133	$5,528,133	See MII Project Cost Summary Report Page 48
Margaret's Creek Sector Site Activities	1	LS	$561,533	$561,533	See MII Project Cost Summary Report Page 49
Transportation of Contaminated Materials to Onsite Containment Cell	1	LS	$754,290	$754,290	See MII Project Cost Summary Report Page 50
Onsite Containtment Cell Construction					
Onsite Cell 1 Near the Western Jetty	1	LS	$1,239,922	$1,239,922	See MII Project Cost Summary Report Page 50
Onsite Cell 2 Near Margaret's Creek Area	1	LS	$2,688,944	$2,685,454	See MII Project Cost Summary Report Page 53
Onsite Cell 3 Near Margaret's Creek Area	1	LS	$4,991,371	$4,991,371	See MII Project Cost Summary Report Page 55
Groundwater Monitoring Well Installation	1	LS	$38,394	$38,394	See MII Project Cost Summary Report Page 58
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$1,130,916	$573,540	See MII Project Cost Summary Report Page 58
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$6,358,507	$6,296,915	See MII Project Cost Summary Report Page 59
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 59
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 59
Backfill of Excavations	1	LS	$8,326,163	$8,061,935	See MII Project Cost Summary Report Page 60
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$50,681,595	

TABLE CS-5

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

Contingency (Scope and Bid)	20%	$10,136,319	10% Scope, 10% Bid (Low end of the recommended range).
	SUBTOTAL	$60,817,914	
Project Management	5%	$3,040,896	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$3,649,075	Percentage from Exhibit 5-8 was used. Includes pre-design field investigation
Construction Management	6%	$3,649,075	Percentage from Exhibit 5-8 was used.
	TOTAL	$71,156,960	
	TOTAL CAPITAL COST	**$71,157,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR AND AREA 8 MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Area 8 Cap Sampling	1	EA	$39,729	$39,729	See MII Project Cost Summary Report Page 62
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 44
			SUBTOTAL	$206,020	
Contingency (Scope and Bid)	20%			$41,204	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$247,224	
Project Management	8%			$19,778	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$37,084	Middle value of the recommended range was used.
			TOTAL	$304,086	
	TOTAL SEMI-ANNUAL MNR AND AREA 8 MONITORING COSTS			**$304,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-5

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

ANNUAL MNR AND AREA 8 MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Area 8 Cap Sampling	1	EA	$21,597	$21,597	See MII Project Cost Summary Report Page 62
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 45
			SUBTOTAL	$106,543	
Contingency (Scope and Bid)	20%			$21,309	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$127,852	
Project Management	8%			$10,228	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$19,178	Middle value of the recommended range was used.
			TOTAL	$157,258	
TOTAL ANNUAL MNR AND AREA 8 MONITORING COSTS				**$157,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Quarterly Containment Cell Sampling per Year	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 60
Quarterly Containment Cell Inspections per Year	1	EA	$14,852	$14,852	See MII Project Cost Summary Report Page 61
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$140,028	
Contingency (Scope and Bid)	20%			$28,006	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$168,034	
Project Management	8%			$13,443	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$25,205	Middle value of the recommended range was used.
			TOTAL	$206,682	
TOTAL QUARTERLY MONITORING COSTS				**$207,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-5

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Containment Cell Sampling per Year	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 60
Semi-Annual Containment Cell Inspections per Year	1	EA	$9,226	$9,226	See MII Project Cost Summary Report Page 61
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$84,348	
Contingency (Scope and Bid)	20%			$16,870	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,218	
Project Management	8%			$8,097	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,183	Middle value of the recommended range was used.
			TOTAL	$124,498	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$124,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
Annual Containment Cell Sampling	1	EA	$11,349	$11,349	See MII Project Cost Summary Report Page 60
Annual Containment Cell Inspections per Year	1	EA	$6,414	$6,414	See MII Project Cost Summary Report Page 61
			SUBTOTAL	$44,960	
Contingency (Scope and Bid)	20%			$8,992	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$53,952	
Project Management	10%			$5,395	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$8,093	Middle value of the recommended range was used.
			TOTAL	$67,440	
	TOTAL ANNUAL MONITORING COSTS			**$67,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-5

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring.

ANNUAL ONSITE CONTAINMENT OPERATION & MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
O&M of Onsite Containment Cell	1	EA	$75,470	$75,470	See MII Project Cost Summary Report Page 61
			SUBTOTAL	$75,470	
Contingency (Scope and Bid)	20%			$15,094	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$90,564	
Project Management	10%			$9,056	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$13,585	Middle value of the recommended range was used.
			TOTAL	$113,205	
			TOTAL O&M ANNUAL COSTS	**$113,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
EA Each
QTY Quantity
LS Lump sum

TABLE PV-5

ALTERNATIVE 5
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate: 3.11%
Discount Rate: 5.25%

Year[1]	Capital Costs[2]	ANNUAL COSTS		PERIODIC COSTS	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[5,6]
		O&M Costs	Monitoring Costs	Five-year Review					
0	$71,157,000	$0	$0	$0	$71,157,000	1.0000	$71,157,000	1.0000	$71,157,000
1	$0	$113,000	$511,000	$0	$624,000	1.0311	$643,406	0.9501	$611,300
2	$0	$113,000	$511,000	$0	$624,000	1.0632	$663,437	0.9027	$598,884
3	$0	$113,000	$428,000	$0	$541,000	1.0962	$593,044	0.8577	$508,654
4	$0	$113,000	$428,000	$0	$541,000	1.1303	$611,492	0.8149	$498,305
5	$0	$113,000	$428,000	$56,000	$597,000	1.1655	$695,804	0.7743	$538,761
6	$0	$113,000	$224,000	$0	$337,000	1.2017	$404,973	0.7356	$297,898
7	$0	$113,000	$224,000	$0	$337,000	1.2391	$417,577	0.6989	$291,844
8	$0	$113,000	$224,000	$0	$337,000	1.2776	$430,551	0.6641	$285,929
9	$0	$113,000	$224,000	$0	$337,000	1.3174	$443,964	0.6310	$280,141
10	$0	$113,000	$224,000	$56,000	$393,000	1.3583	$533,812	0.5995	$320,020
11	$0	$113,000	$224,000	$0	$337,000	1.4006	$472,002	0.5696	$268,852
12	$0	$113,000	$224,000	$0	$337,000	1.4441	$486,662	0.5412	$263,381
13	$0	$113,000	$224,000	$0	$337,000	1.4891	$501,827	0.5142	$258,039
14	$0	$113,000	$224,000	$0	$337,000	1.5354	$517,430	0.4885	$252,764
15	$0	$113,000	$224,000	$56,000	$393,000	1.5831	$622,158	0.4642	$288,806
16	$0	$113,000	$224,000	$0	$337,000	1.6323	$550,085	0.4410	$242,588
17	$0	$113,000	$224,000	$0	$337,000	1.6831	$567,205	0.4190	$237,659
18	$0	$113,000	$224,000	$0	$337,000	1.7355	$584,864	0.3981	$232,834
19	$0	$113,000	$224,000	$0	$337,000	1.7894	$603,028	0.3783	$228,125
20	$0	$113,000	$224,000	$56,000	$393,000	1.8451	$725,124	0.3594	$260,610
21	$0	$113,000	$224,000	$0	$337,000	1.9025	$641,143	0.3415	$218,950
22	$0	$113,000	$224,000	$0	$337,000	1.9616	$661,059	0.3244	$214,448
23	$0	$113,000	$224,000	$0	$337,000	2.0226	$681,616	0.3082	$210,074
24	$0	$113,000	$224,000	$0	$337,000	2.0855	$702,814	0.2929	$205,854
25	$0	$113,000	$224,000	$56,000	$393,000	2.1504	$845,107	0.2783	$235,193
26	$0	$113,000	$224,000	$0	$337,000	2.2173	$747,230	0.2644	$197,568
27	$0	$113,000	$224,000	$0	$337,000	2.2862	$770,449	0.2512	$193,537
28	$0	$113,000	$224,000	$0	$337,000	2.3573	$794,410	0.2387	$189,626
29	$0	$113,000	$224,000	$0	$337,000	2.4307	$819,146	0.2268	$185,782
30	$0	$113,000	$224,000	$56,000	$393,000	2.5062	$984,937	0.2154	$212,155
TOTALS:	**$71,157,000**	**$3,390,000**	**$7,906,000**	**$336,000**	**$82,789,000**		**$89,873,355**		$79,985,581
TOTAL PRESENT VALUE OF ALTERNATIVE 5									**$79,986,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-5
4 - Total annual expenditure is the total cost per year with no escalation or discounting.

4 - Total annual expenditure is the total cost per year with no escalation or discounting.
5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-6

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

CAPITAL COSTS: (Assumed to be Incurred During Year 0)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	1	LS	$63,467	$63,467	See MII Project Cost Summary Report Page 1
General Conditions	1	LS	$810,759	$810,759	See MII Project Cost Summary Report Page 62
Mobilization	1	LS	$150,000	$150,000	See MII Project Cost Summary Report Page 2
Sediment and Erosion Control Measures	1	LS	$2,888,331	$2,888,331	See MII Project Cost Summary Report Page 63
Construction and Removal of Access Roads					
Access Road to Bay	1	LS	$487,046	$487,046	See MII Project Cost Summary Report Page 2
Access Road to Margaret Creek	1	LS	$142,351	$142,351	See MII Project Cost Summary Report Page 2
Removal and Handling of Contaminated Materials by Area					
Seawall Sector Site Activities	1	LS	$8,220,185	$8,220,185	See MII Project Cost Summary Report Page 65
Jetty Sector Site Activities	1	LS	$7,473,894	$7,473,894	See MII Project Cost Summary Report Page 68
Margaret's Creek Sector Site Activities	1	LS	$561,533	$561,533	See MII Project Cost Summary Report Page 69
Transportation of Contaminated Materials to Onsite Containment Cell	1	LS	$754,290	$754,290	See MII Project Cost Summary Report Page 70
Onsite Containtment Cell Construction					
Onsite Cell 1 Near the Western Jetty	1	LS	$1,239,922	$1,239,922	See MII Project Cost Summary Report Page 70
Onsite Cell 2 Near Margaret's Creek Area	1	LS	$2,685,454	$2,685,454	See MII Project Cost Summary Report Page 73
Onsite Cell 3 Near Margaret's Creek Area	1	LS	$4,991,371	$4,991,371	See MII Project Cost Summary Report Page 75
Groundwater Monitoring Well Installation	1	LS	$38,394	$38,394	See MII Project Cost Summary Report Page 78
Transportation and Offsite Disposal of Excavated Materials					
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	1	LS	$573,340	$573,340	See MII Project Cost Summary Report Page 78
Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	1	LS	$9,156,864	$9,156,864	See MII Project Cost Summary Report Page 79
Site Restoration					
Seawall Reconstruction	1	LS	$2,757,445	$2,757,445	See MII Project Cost Summary Report Page 79
Jetty Reconstruction	1	LS	$898,667	$898,667	See MII Project Cost Summary Report Page 79
Backfill of Excavations	1	LS	$9,006,237	$9,006,237	See MII Project Cost Summary Report Page 80
Demobilization and Decontamination	1	LS	$250,000	$250,000	See MII Project Cost Summary Report Page 2
			SUBTOTAL	$53,149,550	
Contingency (Scope and Bid)	20%			$10,629,910	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$63,779,460	

TABLE CS-6

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

Project Management	5%	$3,188,973	Percentage from Exhibit 5-8 was used.
Remedial Design	6%	$3,826,768	Percentage from Exhibit 5-8 was used.
Construction Management	6%	$3,826,768	Percentage from Exhibit 5-8 was used.
	TOTAL	$74,621,969	
	TOTAL CAPITAL COST	**$74,622,000**	Total capital cost is rounded to the nearest $1,000.

SEMI-ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 1 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual MNR Sampling	1	EA	$166,291	$166,291	See MII Project Cost Summary Report Page 64
			SUBTOTAL	$166,291	
Contingency (Scope and Bid)	20%			$33,258	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$199,549	
Project Management	8%			$15,964	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$29,932	Middle value of the recommended range was used.
			TOTAL	$245,445	
			TOTAL SEMI-ANNUAL MNR MONITORING COSTS	**$245,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL MNR MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual MNR Sampling	1	EA	$84,946	$84,946	See MII Project Cost Summary Report Page 65
			SUBTOTAL	$84,946	
Contingency (Scope and Bid)	20%			$16,989	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,935	
Project Management	8%			$8,155	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,290	Middle value of the recommended range was used.
			TOTAL	$125,380	
			TOTAL ANNUAL MNR MONITORING COSTS	**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-6

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Quarterly Monitoring of Groundwater	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 3
Quaterly Monitoring of Surface Water	1	EA	$41,720	$41,720	See MII Project Cost Summary Report Page 4
Quarterly Containment Cell Sampling per Year	1	EA	$34,594	$34,594	See MII Project Cost Summary Report Page 80
Quarterly Containment Cell Inspections per Year	1	EA	$14,852	$14,852	See MII Project Cost Summary Report Page 81
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$140,028	
Contingency (Scope and Bid)	20%			$28,006	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$168,034	
Project Management	8%			$13,443	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$25,205	Middle value of the recommended range was used.
			TOTAL	$206,682	
	TOTAL QUARTERLY MONITORING COSTS			**$207,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

MONITORING COSTS: (Assumed to be Incurred During Year 3 through 5)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Semi-Annual Monitoring of Groundwater	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 3
Semi-Annual Monitoring of Surface Water	1	EA	$22,660	$22,660	See MII Project Cost Summary Report Page 4
Semi-Annual Containment Cell Sampling per Year	1	EA	$19,097	$19,097	See MII Project Cost Summary Report Page 80
Semi-Annual Containment Cell Inspections per Year	1	EA	$9,226	$9,226	See MII Project Cost Summary Report Page 81
Semi-Annual Monitoring of Biota	1	EA	$14,268	$14,268	See MII Project Cost Summary Report Page 4
			SUBTOTAL	$84,348	
Contingency (Scope and Bid)	20%			$16,870	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$101,218	
Project Management	8%			$8,097	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$15,183	Middle value of the recommended range was used.
			TOTAL	$124,498	
	TOTAL SEMI-ANNUAL MONITORING COSTS			**$124,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-6

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

MONITORING COSTS: (Assumed to be Incurred During Year 6 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Annual Monitoring of Groundwater	1	EA	$14,067	$14,067	See MII Project Cost Summary Report Page 3
Annual Monitoring of Surface Water	1	EA	$13,130	$13,130	See MII Project Cost Summary Report Page 3
Annual Containment Cell Sampling	1	EA	$11,349	$11,349	See MII Project Cost Summary Report Page 80
Annual Containment Cell Inspections per Year	1	EA	$6,414	$6,414	See MII Project Cost Summary Report Page 81
			SUBTOTAL	$44,960	
Contingency (Scope and Bid)	20%			$8,992	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$53,952	
Project Management	10%			$5,395	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$8,093	Middle value of the recommended range was used.
			TOTAL	$67,440	
			TOTAL ANNUAL MONITORING COSTS	**$67,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

ANNUAL ONSITE CONTAINMENT OPERATION & MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
O&M of Onsite Containment Cell	1	EA	$75,470	$75,470	See MII Project Cost Summary Report Page 81
			SUBTOTAL	$75,470	
Contingency (Scope and Bid)	20%			$15,094	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$90,564	
Project Management	10%			$9,056	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$13,585	Middle value of the recommended range was used.
			TOTAL	$113,205	
			TOTAL O&M ANNUAL COSTS	**$113,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-6

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

COST ESTIMATE SUMMARY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 1 at Western Jetty and Cell 2 and Cell 3 at Margaret's Creek). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	1	LS	$42,097	$42,097	See MII Project Cost Summary Report Page 1
			SUBTOTAL	$42,097	
Contingency (Scope and Bid)	20%			$8,419	10% Scope, 10% Bid (Low end of the recommended range).
			SUBTOTAL	$50,516	
Project Management	10%			$5,052	The high end of the recommended range was used.
			TOTAL	$55,568	
			TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$56,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump sum

TABLE PV-6

ALTERNATIVE 6
Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

PRESENT VALUE ANALYSIS

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012
Date: June 2012

Escalation Rate: 3.11%
Discount Rate: 5.25%

		ANNUAL COSTS		PERIODIC COSTS					
Year[1]	Capital Costs[2]	O&M Costs	Monitoring Costs	Five-year Review	Total Annual Expenditure[3]	Escalation Factor	Escalated Cost[4]	Discount Factor	Present Value[5,6]
0	$74,622,000	$0	$0	$0	$74,622,000	1.0000	$74,622,000	1.0000	$74,622,000
1	$0	$113,000	$452,000	$0	$565,000	1.0311	$582,572	0.9501	$553,501
2	$0	$113,000	$452,000	$0	$565,000	1.0632	$600,708	0.9027	$542,259
3	$0	$113,000	$369,000	$0	$482,000	1.0962	$528,368	0.8577	$453,182
4	$0	$113,000	$369,000	$0	$482,000	1.1303	$544,805	0.8149	$443,961
5	$0	$113,000	$369,000	$56,000	$538,000	1.1655	$627,039	0.7743	$485,516
6	$0	$113,000	$192,000	$0	$305,000	1.2017	$366,519	0.7356	$269,611
7	$0	$113,000	$192,000	$0	$305,000	1.2391	$377,926	0.6989	$264,132
8	$0	$113,000	$192,000	$0	$305,000	1.2776	$389,668	0.6641	$258,779
9	$0	$113,000	$192,000	$0	$305,000	1.3174	$401,807	0.6310	$253,540
10	$0	$113,000	$192,000	$56,000	$361,000	1.3583	$490,346	0.5995	$293,963
11	$0	$113,000	$192,000	$0	$305,000	1.4006	$427,183	0.5696	$243,323
12	$0	$113,000	$192,000	$0	$305,000	1.4441	$440,451	0.5412	$238,372
13	$0	$113,000	$192,000	$0	$305,000	1.4891	$454,176	0.5142	$233,537
14	$0	$113,000	$192,000	$0	$305,000	1.5354	$468,297	0.4885	$228,763
15	$0	$113,000	$192,000	$56,000	$361,000	1.5831	$571,499	0.4642	$265,290
16	$0	$113,000	$192,000	$0	$305,000	1.6323	$497,852	0.4410	$219,553
17	$0	$113,000	$192,000	$0	$305,000	1.6831	$513,346	0.4190	$215,092
18	$0	$113,000	$192,000	$0	$305,000	1.7355	$529,328	0.3981	$210,725
19	$0	$113,000	$192,000	$0	$305,000	1.7894	$545,767	0.3783	$206,464
20	$0	$113,000	$192,000	$56,000	$361,000	1.8451	$666,081	0.3594	$239,390
21	$0	$113,000	$192,000	$0	$305,000	1.9025	$580,263	0.3415	$198,160
22	$0	$113,000	$192,000	$0	$305,000	1.9616	$598,288	0.3244	$194,085
23	$0	$113,000	$192,000	$0	$305,000	2.0226	$616,893	0.3082	$190,126
24	$0	$113,000	$192,000	$0	$305,000	2.0855	$636,078	0.2929	$186,307
25	$0	$113,000	$192,000	$56,000	$361,000	2.1504	$776,294	0.2783	$216,043
26	$0	$113,000	$192,000	$0	$305,000	2.2173	$676,277	0.2644	$178,808
27	$0	$113,000	$192,000	$0	$305,000	2.2862	$697,291	0.2512	$175,159
28	$0	$113,000	$192,000	$0	$305,000	2.3573	$718,977	0.2387	$171,620
29	$0	$113,000	$192,000	$0	$305,000	2.4307	$741,364	0.2268	$168,141
30	$0	$113,000	$192,000	$56,000	$361,000	2.5062	$904,738	0.2154	$194,881
TOTALS:	**$74,622,000**	**$3,390,000**	**$6,811,000**	**$336,000**	**$85,159,000**		**$91,592,196**		$82,614,283
TOTAL PRESENT VALUE OF ALTERNATIVE 6									**$82,614,000**

Notes:

1 - Duration is assumed to be 30 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-6
3 - Total annual expenditure is the total cost per year with no escalation or discounting.
4 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
5 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
6 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE PV-AERFT

ANNUAL ESCALATION RATE FACTORS TABLE

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012

Escalation Rate (Percent): **3.11%**

Year	Escalation Factor	Year	Escalation Factor	Year	Escalation Factor
0	1.0000	36	3.0118	72	9.0710
1	1.0311	37	3.1055	73	9.3531
2	1.0632	38	3.2021	74	9.6440
3	1.0962	39	3.3016	75	9.9440
4	1.1303	40	3.4043	76	10.2532
5	1.1655	41	3.5102	77	10.5721
6	1.2017	42	3.6194	78	10.9009
7	1.2391	43	3.7319	79	11.2399
8	1.2776	44	3.8480	80	11.5895
9	1.3174	45	3.9677	81	11.9499
10	1.3583	46	4.0911	82	12.3215
11	1.4006	47	4.2183	83	12.7047
12	1.4441	48	4.3495	84	13.0998
13	1.4891	49	4.4848	85	13.5072
14	1.5354	50	4.6242	86	13.9273
15	1.5831	51	4.7680	87	14.3605
16	1.6323	52	4.9163	88	14.8071
17	1.6831	53	5.0692	89	15.2676
18	1.7355	54	5.2269	90	15.7424
19	1.7894	55	5.3894	91	16.2320
20	1.8451	56	5.5570	92	16.7368
21	1.9025	57	5.7299	93	17.2573
22	1.9616	58	5.9081	94	17.7940
23	2.0226	59	6.0918	95	18.3474
24	2.0855	60	6.2813	96	18.9180
25	2.1504	61	6.4766	97	19.5064
26	2.2173	62	6.6780	98	20.1130
27	2.2862	63	6.8857	99	20.7385
28	2.3573	64	7.0999	100	21.3835
29	2.4307	65	7.3207		
30	2.5062	66	7.5483		
31	2.5842	67	7.7831		
32	2.6646	68	8.0252		
33	2.7474	69	8.2747		
34	2.8329	70	8.5321		
35	2.9210	71	8.7974		

Notes:
The net present value will not be calculated with the real discount rate as recommended by EPA's *Guide to Developing and Documenting Cost Estimates during the Feasibility Study*; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

TABLE PV-ESC

ENR CONSTRUCTION COST INDEX HISTORY

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012

ENR's Construction Cost Index History (1990-2009)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann Avg	Yr to Yr Esc
1989	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	4615	
1990	4680	4685	4691	4693	4707	4732	4734	4752	4774	4771	4787	4777	4732	2.54%
1991	4777	4773	4772	4766	4801	4818	4854	4892	4891	4892	4896	4889	4835	2.18%
1992	4888	4884	4927	4946	4965	4973	4992	5032	5042	5052	5058	5059	4985	3.10%
1993	5071	5070	5106	5167	5262	5260	5252	5230	5255	5264	5278	5310	5210	4.51%
1994	5336	5371	5381	5405	5405	5408	5409	5424	5437	5437	5439	5439	5408	3.80%
1995	5443	5444	5435	5432	5433	5432	5484	5506	5491	5511	5519	5524	5471	1.16%
1996	5523	5532	5537	5550	5572	5597	5617	5652	5683	5719	5740	5744	5622	2.76%
1997	5765	5769	5759	5799	5837	5860	5863	5854	5851	5848	5838	5858	5825	3.61%
1998	5852	5874	5875	5883	5881	5895	5921	5929	5963	5986	5995	5991	5920	1.63%
1999	6000	5992	5986	6008	6006	6039	6076	6091	6128	6134	6127	6127	6060	2.36%
2000	6130	6160	6202	6201	6233	6238	6225	6233	6224	6259	6266	6283	6221	2.66%
2001	6281	6272	6279	6286	6288	6318	6404	6389	6391	6397	6410	6390	6342	1.95%
2002	6462	6462	6502	6480	6512	6532	6605	6592	6589	6579	6578	6563	6538	3.09%
2003	6581	6640	6627	6635	6642	6694	6695	6733	6741	6771	6794	6782	6695	2.40%
2004	6825	6862	6957	7017	7065	7109	7126	7188	7298	7314	7312	7308	7115	6.27%
2005	7297	7298	7309	7355	7398	7415	7422	7479	7540	7563	7630	7647	7446	4.65%
2006	7660	7689	7692	7695	7691	7700	7721	7722	7763	7883	7911	7888	7751	4.10%
2007	7880	7880	7856	7865	7942	7939	7959	8007	8050	8045	8092	8089	7967	2.79%
2008	8090	8094	8109	8112	8141	8185	8293	8362	8557	8623	8602	8551	8310	4.31%
2009	8549	8533	8534	8528	8574	8578	8566	8564	8586	8596	8592	8641	8570	3.13%
2010	8660	8672	8671	8677	8761	8805	8865	8858	8836	8921	8951	8952	8802	2.71%
2011	8938	8998	9011	9027	9035	9053	9080	9088	9116	9147	NDA	NDA	9049	2.81%
20-year Ave.														**3.11%**

Notes:

- Material source: ENR Construction Cost Index History (http://enr.construction.com/economics/historical_indices/Material_Price_Index_History.asp). ENR index is based on 200 hours of common labor at the 20-city average of common labor rates, plus 25 cwt of standard structural steel shapes at the mill price prior to 1996 and the fabricated 20-city price from 1996, plus 1.128 tons of portland cement at the 20-city price, plus 1,088 board ft of 2 x 4 lumber at the 20-city price.

- NDA - No data available

- NP - Not published

TABLE PV-ADRFT

ANNUAL DISCOUNT RATE FACTORS TABLE

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012

Discount Rate (Percent): 5.25% **10-year average of 30-year rates**

Year	Discount Factor[1,2]	Year	Discount Factor[1,2]	Year	Discount Factor[1,2]
0	1.0000	34	0.1756	68	0.0308
1	0.9501	35	0.1668	69	0.0293
2	0.9027	36	0.1585	70	0.0278
3	0.8577	37	0.1506	71	0.0264
4	0.8149	38	0.1431	72	0.0251
5	0.7743	39	0.1359	73	0.0239
6	0.7356	40	0.1292	74	0.0227
7	0.6989	41	0.1227	75	0.0215
8	0.6641	42	0.1166	76	0.0205
9	0.6310	43	0.1108	77	0.0194
10	0.5995	44	0.1053	78	0.0185
11	0.5696	45	0.1000	79	0.0176
12	0.5412	46	0.0950	80	0.0167
13	0.5142	47	0.0903	81	0.0158
14	0.4885	48	0.0858	82	0.0151
15	0.4642	49	0.0815	83	0.0143
16	0.4410	50	0.0774	84	0.0136
17	0.4190	51	0.0736	85	0.0129
18	0.3981	52	0.0699	86	0.0123
19	0.3783	53	0.0664	87	0.0117
20	0.3594	54	0.0631	88	0.0111
21	0.3415	55	0.0599	89	0.0105
22	0.3244	56	0.0570	90	0.0100
23	0.3082	57	0.0541	91	0.0095
24	0.2929	58	0.0514	92	0.0090
25	0.2783	59	0.0489	93	0.0086
26	0.2644	60	0.0464	94	0.0081
27	0.2512	61	0.0441	95	0.0077
28	0.2387	62	0.0419	96	0.0074
29	0.2268	63	0.0398	97	0.0070
30	0.2154	64	0.0378	98	0.0066
31	0.2047	65	0.0359	99	0.0063
32	0.1945	66	0.0341	100	0.0060
33	0.1848	67	0.0324		

Notes:

[1] Annual discount factors were calculated using the formulas and guidance presented in Section 4.0 of A *Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 2000.

[2] The net present value will not be calculated with the real discount rate as recommended by EPA's *Guide to Developing and Documenting Cost Estimates during the Feasibility Study*; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

TABLE PV-OMB

OMB NOMINAL TREASURY INTEREST RATES

Site: Raritan Bay
Location: Middlesex County, New Jersey
Phase: Feasibility Study
Base Year: 2012

Year	3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
1990	7.4%	7.5%	7.6%	7.7%	N/A	7.8%
1991	7.2%	7.4%	7.4%	7.5%	N/A	7.7%
1992	6.1%	6.5%	6.7%	7.0%	N/A	7.1%
1993	5.6%	6.0%	6.3%	6.7%	N/A	6.8%
1994	5.0%	5.3%	5.5%	5.7%	N/A	5.8%
1995	7.3%	7.6%	7.7%	7.9%	N/A	8.1%
1996	5.4%	5.5%	5.5%	5.6%	N/A	5.7%
1997	5.8%	5.9%	6.0%	6.1%	N/A	6.3%
1998	5.6%	5.7%	5.8%	5.9%	N/A	6.1%
1999	4.7%	4.8%	4.9%	4.9%	N/A	5.0%
2000	5.9%	6.0%	6.0%	6.1%	N/A	6.3%
2001	5.4%	5.4%	5.4%	5.4%	N/A	5.3%
2002	4.1%	4.5%	4.8%	5.1%	N/A	5.8%
2003	3.1%	3.6%	3.9%	4.2%	N/A	5.1%
2004	3.0%	3.7%	4.2%	4.6%	5.4%	5.5%
2005	3.7%	4.1%	4.4%	4.6%	5.2%	5.2%
2006	4.7%	4.8%	4.9%	5.0%	5.3%	5.2%
2007	4.9%	4.9%	4.9%	5.0%	5.1%	5.1%
2008	4.1%	4.3%	4.4%	4.6%	4.9%	4.9%
2009	2.7%	3.3%	3.7%	4.2%	4.7%	4.5%
2010	2.3%	3.1%	3.5%	3.9%	4.4%	4.5%
2011	1.4%	1.9%	2.4%	3.0%	3.9%	4.2%
20-year Ave.	5.00%	7.50%	7.50%	7.50%	5.00%	7.50%
10-year Ave.	4.00%	4.25%	4.50%	4.75%	5.00%	**5.25%**

Notes:

- Nominal Treasury interest rates were taken from the annual budget assumptions for the first year of the budget forecast
- Averages rounded to nearest quarter of a percent

N/A - No data is available prior to 2004 for the 20-year interest rate.

REVISED FINAL Feasibility Study Cost Estimate

Middlesex County, New Jersey

OU1 Feasibility Study

Estimated by	CDM Federal Programs Corporation
Designed by	CDM Federal Programs Corporation
Prepared by	CDM Federal Programs Corporation
Preparation Date	2/1/2012
Effective Date of Pricing	2/1/2012
Estimated Construction Time	Days

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Designed by
CDM Federal Programs Corporation

Estimated by
CDM Federal Programs Corporation

Prepared by
CDM Federal Programs Corporation

Design Document	EPA CERCLIS Final Feasibility Study
Document Date	6/22/2012
District	USEPA Region 2
Contact	
Budget Year	2011
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency

Preparation Date	2/1/2012
Escalation Date	10/30/2011
Eff. Pricing Date	2/1/2012
Estimated Duration	0 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB10EB: MII English Cost Book 2010

Labor RTN_LB_11: RTNFS_LB_2011

Note: Labor rates from most recent Davis-Bacon wage rate determinations. Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment RTNFS_EQ_2: MII Equipment Region 1 2009

01 NORTHEAST

Sales Tax	7.00
Working Hours per Year	1,360
Labor Adjustment Factor	1.12
Cost of Money	2.50
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.145
Gas	3.513
Diesel Off-Road	3.349
Diesel On-Road	3.728

Shipping Rates

Over 0 CWT	17.42
Over 240 CWT	16.01
Over 300 CWT	13.92
Over 400 CWT	11.96
Over 500 CWT	6.15
Over 700 CWT	6.15
Over 800 CWT	9.14

Date	Author	Note
12/15/2011		RARITAN BAY SLAG SUPERFUND SITE FEASIBILITY STUDY COST ESTIMATE MIDDLESEX COUNTY, NEW JERSEY ATTACHMENTS: Attachment A - Cost Estimate Assumptions, Wage Determinations and Calculations Attachment B - Vendor Quotes Attachment C - MCACES MII Input Backup

Direct Cost Markups	**Category**	**Method**
Productivity	Productivity	Productivity
Overtime	Overtime	Overtime

	Days/Week	*Hours/Shift*	*Shifts/Day*	*1st Shift*	*2nd Shift*	*3rd Shift*
Standard	*5.00*	*8.00*	*1.00*	*8.00*	*0.00*	*0.00*
Actual	*5.00*	*8.00*	*1.00*	*8.00*	*0.00*	*0.00*

Day	*OT Factor*	*Working*	*OT Percent*	*FCCM Percent*
Monday	*1.50*	*Yes*	*0.00*	*0.00*
Tuesday	*1.50*	*Yes*		
Wednesday	*1.50*	*Yes*		
Thursday	*1.50*	*Yes*		
Friday	*1.50*	*Yes*		
Saturday	*1.50*	*No*		
Sunday	*2.00*	*No*		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		
Equipment Adjustment Factor	TaxAdj	Running % on Selected Costs
EQCost		

Contractor Markups	**Category**	**Method**
JOOH - Subcontractor	JOOH	Running %
JOOH	JOOH	Running %
HOOH - Subcontractor	HOOH	Running %
HOOH - AE Contractor	HOOH	Running %
HOOH	HOOH	Running %
Profit - Subcontractor	Profit	Running %
Profit - AE Contractor	Profit	Running %
Profit	Profit	Running %
General Liability	MiscContract	Direct %
Bond	Bond	Bond Table
HTRW (Other), Banded, 24 months, 1.00% Surcharge		

Contract Price	*Bond Rate*
0	*4.40*
3,000,000	*3.85*
5,000,000	*3.30*
7,500,000	*2.75*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Project Cost Summary Report			**418,614,548**	**0**	**0**	**418,614,548**
			1,294,497.91			*1,294,497.91*
COM Common Components to Alternatives	**1.00**	**EA**	**1,294,498**	**0**	**0**	**1,294,498**
COM-01 Five-Year Site Review	**1.00**	**LS**	**42,097**	**0**	**0**	**42,097**
			4,219.39			*4,219.39*
COM-01-01 Site Visit	**1.00**	**EA**	**4,219**	**0**	**0**	**4,219**
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	3,528	0	0	3,528
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	692	0	0	692
			37,877.22			*37,877.22*
COM-01-02 Five-Year Review Reporting	**1.00**	**EA**	**37,877**	**0**	**0**	**37,877**
			128.90	*0.00%*	*0.00%*	*128.90*
FOP FA-PROJM Project Managers	40.00	HR	5,156	0	0	5,156
			99.98	*0.00%*	*0.00%*	*99.98*
FOP FC-ENGPE Engineers, Project	120.00	HR	11,998	0	0	11,998
			113.34	*0.00%*	*0.00%*	*113.34*
HNC FC-ENGQC Engineer, Quality Control	24.00	HR	2,720	0	0	2,720
			53.11	*0.00%*	*0.00%*	*53.11*
HTW HO-CADD Draftsman/CADD (HTW Projects)	40.00	HR	2,124	0	0	2,124
			52.56	*0.00%*	*0.00%*	*52.56*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	40.00	HR	2,102	0	0	2,102
			81.25	*0.00%*	*0.00%*	*81.25*
HTW HO-PRJSCI Project Scientist (HTW Projects)	160.00	HR	13,000	0	0	13,000
USR REPRO-02 Reproduction Costs for Five-Year Site Review Reports	1.00	LS	776	0	0	776
COM-02 Institutional Controls	**1.00**	**LS**	**63,467**	**0**	**0**	**63,467**
			128.90	*0.00%*	*0.00%*	*128.90*
FOP FA-PROJM Project Managers	20.00	HR	2,578	0	0	2,578
			99.98	*0.00%*	*0.00%*	*99.98*
FOP FC-ENGPE Engineers, Project	40.00	HR	3,999	0	0	3,999
			278.21	*0.00%*	*0.00%*	*278.21*
LGL L-ASA Environmental Lawyer	120.00	HR	33,386	0	0	33,386
			79.77	*0.00%*	*0.00%*	*79.77*
LGL L-LARE Paralegal	60.00	HR	4,786	0	0	4,786
			52.56	*0.00%*	*0.00%*	*52.56*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	40.00	HR	2,102	0	0	2,102
USR REPRO-01 Reproduction Costs for Institutional Controls	1.00	LS	363	0	0	363
SIGN Access Prevention Signs	**1.00**	**LS**	**16,253**	**0**	**0**	**16,253**
			211.35	*0.00%*	*0.00%*	*211.35*
USR SIGN-01 Labor - Access Prevention Sign Installation	50.00	HR	10,568	0	0	10,568

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			3.09	*0.00%*	*0.00%*	*3.09*
USR SIGN-02 Equipment- Access Prevention Sign Installation	50.00	HR	155	0	0	155
			98.35	*0.00%*	*0.00%*	*98.35*
USR SIGN-03 U-Channel Sign Post - 10'	25.00	EA	2,459	0	0	2,459
			8.16	*0.00%*	*0.00%*	*8.16*
USR SIGN-04 Concrete Mix	50.00	EA	408	0	0	408
			106.54	*0.00%*	*0.00%*	*106.54*
USR SIGN-05 Access Prevention Sign	25.00	EA	2,664	0	0	2,664
COM-03 Mobilization	**1.00**	**LS**	**150,000**	**0**	**0**	**150,000**
USR MOB Site Mobilization	1.00	LS	150,000	0	0	150,000
COM-04 Demobilization and Decontamination	**1.00**	**LS**	**250,000**	**0**	**0**	**250,000**
USR DEMOB Site Demobilization and Decontamination	1.00	LS	250,000	0	0	250,000
COM-05 Construction of Access Roads	**1.00**	**LS**	**629,397**	**0**	**0**	**629,397**
			487,046.45			*487,046.45*
COM-05-01 Access Road to Bay	**1.00**	**EA**	**487,046**	**0**	**0**	**487,046**
			0.21	*0.00%*	*0.00%*	*0.21*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	52,800.00	SF	11,303	0	0	11,303
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	105,600.00	SF	13,787	0	0	13,787
			84.54	*0.00%*	*0.00%*	*84.54*
RSM 310516100300 Aggregate for earthwork, crushed stone, 1.40 tons per C.Y., 1-1/2", spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	4,612.00	LCY	389,889	0	0	389,889
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	3,920.00	ECY	16,645	0	0	16,645
			14.14	*0.00%*	*0.00%*	*14.14*
USR REST-03 Removal of Access Road	3,920.00	BCY	55,421	0	0	55,421
COM-05-02 Access Road to Margaret Creek	**1.00**	**LS**	**142,351**	**0**	**0**	**142,351**
			0.21	*0.00%*	*0.00%*	*0.21*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	30,000.00	SF	6,422	0	0	6,422
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	30,000.00	SF	3,917	0	0	3,917
			84.54	*0.00%*	*0.00%*	*84.54*
RSM 310516100300 Aggregate for earthwork, crushed stone, 1.40 tons per C.Y., 1-1/2", spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1,318.00	LCY	111,421	0	0	111,421
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	1,120.00	ECY	4,756	0	0	4,756
			14.14	*0.00%*	*0.00%*	*14.14*
USR REST-03 Removal of Access Road using Excavator and Haul Truck	1,120.00	BCY	15,835	0	0	15,835
COM-06 Monitoring of Groundwater and Surface Water	**1.00**	**LS**	**159,537**	**0**	**0**	**159,537**
			67,758.13			*67,758.13*
COM-06-01 Monitoring of Groundwater	**1.00**	**EA**	**67,758**	**0**	**0**	**67,758**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
COM-06-01-01 Annual Sampling per Year	**1.00**	**LS**	**14,067**	**0**	**0**	**14,067**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	21.00	EA	2,718	0	0	2,718
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	32.00	HR	5,782	0	0	5,782
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	21.00	EA	122	0	0	122
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	4.00	DAY	1,844	0	0	1,844
COM-06-01-02 Quarterly Sampling per Year	**1.00**	**LS**	**34,594**	**0**	**0**	**34,594**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	7,766	0	0	7,766
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	96.00	HR	17,347	0	0	17,347
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	348	0	0	348
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	5,533	0	0	5,533
COM-06-01-03 Semi-annual Sampling per Year	**1.00**	**LS**	**19,097**	**0**	**0**	**19,097**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	3,883	0	0	3,883
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	48.00	HR	8,673	0	0	8,673
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	174	0	0	174
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	2,767	0	0	2,767
			77,510.73			*77,510.73*
COM-06-02 Monitoring of Surface Water	**1.00**	**EA**	**77,511**	**0**	**0**	**77,511**
COM-06-02-01 Annual Sampling per Year	**1.00**	**LS**	**13,130**	**0**	**0**	**13,130**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	10.00	EA	1,294	0	0	1,294
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	32.00	HR	5,782	0	0	5,782

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	4.00	DAY	551	0	0	551
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	10.00	EA	58	0	0	58
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	4.00	DAY	1,844	0	0	1,844
COM-06-02-02 Quarterly Sampling	**1.00**	**LS**	**41,720**	**0**	**0**	**41,720**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	40.00	EA	5,177	0	0	5,177
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	128.00	HR	23,129	0	0	23,129
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	16.00	DAY	2,204	0	0	2,204
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	40.00	EA	232	0	0	232
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	16.00	DAY	7,378	0	0	7,378
COM-06-02-03 Semi-annual Sampling	**1.00**	**LS**	**22,660**	**0**	**0**	**22,660**
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	64.00	HR	11,564	0	0	11,564
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	8.00	DAY	1,102	0	0	1,102
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	20.00	EA	116	0	0	116
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	20.00	EA	2,589	0	0	2,589
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	8.00	DAY	3,689	0	0	3,689
			14,268.13			*14,268.13*
COM-06-03 Monitoring of Biota	**1.00**	**EA**	**14,268**	**0**	**0**	**14,268**
COM-06-03-03 Semi-annual Sampling	**1.00**	**LS**	**14,268**	**0**	**0**	**14,268**
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	32.00	HR	5,782	0	0	5,782
			137.75	*0.00%*	*0.00%*	*137.75*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	4.00	DAY	551	0	0	551
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	12.00	EA	70	0	0	70
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			201.70	*0.00%*	*0.00%*	*201.70*
USR LABAN-16 Metals, Biological Tissue Analysis, Aquatic Organism	12.00	EA	2,420	0	0	2,420
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	4.00	DAY	1,844	0	0	1,844
ALT2 Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**152,742,022**	**0**	**0**	**152,742,022**
ALT2-01 General Conditions	**1.00**	**LS**	**1,438,377**	**0**	**0**	**1,438,377**
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**1,215,301**	**0**	**0**	**1,215,301**
			106.52	*0.00%*	*0.00%*	*106.52*
FOP FA-PROJM Project Managers	2,080.00	HR	221,552	0	0	221,552
			82.62	*0.00%*	*0.00%*	*82.62*
FOP FC-ENGPE Engineers, Project	4,160.00	HR	343,689	0	0	343,689
			84.38	*0.00%*	*0.00%*	*84.38*
HNC FA-AGENS General Superintendent (P.M.)	4,160.00	HR	351,010	0	0	351,010
			43.43	*0.00%*	*0.00%*	*43.43*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	8,686	0	0	8,686
			65.35	*0.00%*	*0.00%*	*65.35*
FOP FC-FLDER Field Engineers	100.00	HR	6,535	0	0	6,535
			67.27	*0.00%*	*0.00%*	*67.27*
HNC FD-SAENG Safety Engineer	200.00	HR	13,454	0	0	13,454
			197.35	*0.00%*	*0.00%*	*197.35*
USR GENCON-01 Per Diem	1,370.00	DAY	270,375	0	0	270,375
			223,076.09			*223,076.09*
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**223,076**	**0**	**0**	**223,076**
			379.84	*0.00%*	*0.00%*	*379.84*
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	24.00	EA	9,116	0	0	9,116
			122.85	*0.00%*	*0.00%*	*122.85*
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	24.00	EA	2,948	0	0	2,948
			106.25	*0.00%*	*0.00%*	*106.25*
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	24.00	MO	2,550	0	0	2,550
			112.89	*0.00%*	*0.00%*	*112.89*
RSM 015213400120 Field Office Expense, office supplies, average	24.00	MO	2,709	0	0	2,709
			199.22	*0.00%*	*0.00%*	*199.22*
RSM 015213400160 Field Office Expense, field office lights & HVAC	24.00	MO	4,781	0	0	4,781
			109.85	*0.00%*	*0.00%*	*109.85*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
HNC 015213201400 Toilet, portable, chemical, rent per month	48.00	MO	5,273	0	0	5,273
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	10,400.00	HR	157,629	0	0	157,629
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	455	0	0	455
			99.61	*0.00%*	*0.00%*	*99.61*
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	11,953	0	0	11,953
			6,206.10	*0.00%*	*0.00%*	*6,206.10*
USR CC-E-02-01 Small Tools Allowance	1.00	EA	6,206	0	0	6,206
			0.93	*0.00%*	*0.00%*	*0.93*
USR CC-E-02-02 Cell Phone Allowance	10,900.00	HR	10,147	0	0	10,147
			9,309.15	*0.00%*	*0.00%*	*9,309.15*
USR CC-E-02-03 Electrician	1.00	EA	9,309	0	0	9,309
ALT2-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**2,882,947**	**0**	**0**	**2,882,947**
			252.04	*0.00%*	*0.00%*	*252.04*
USR EC-04 Maintenance Crew	24.00	MO	6,049	0	0	6,049
			2,813,518.51			*2,813,518.51*
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**2,813,519**	**0**	**0**	**2,813,519**
			298,470.41	*0.00%*	*0.00%*	*298,470.41*
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	298,470	0	0	298,470
			181,707.95	*0.00%*	*0.00%*	*181,707.95*
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	363,416	0	0	363,416
			121,136.08	*0.00%*	*0.00%*	*121,136.08*
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	1,211,361	0	0	1,211,361
			16,264.33	*0.00%*	*0.00%*	*16,264.33*
USR COFFDAM-04 Installation Crew	36.00	DAY	585,516	0	0	585,516
			1,473.70	*0.00%*	*0.00%*	*1,473.70*
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	8,842	0	0	8,842
			1,861.25	*0.00%*	*0.00%*	*1,861.25*
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	67,005	0	0	67,005
			4,536.79	*0.00%*	*0.00%*	*4,536.79*
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	163,324	0	0	163,324
			23.27	*0.00%*	*0.00%*	*23.27*
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	107,022	0	0	107,022
			1.26	*0.00%*	*0.00%*	*1.26*
USR COFFDAM-09 Sand Bag	4,600.00	EA	5,791	0	0	5,791
			31.14	*0.00%*	*0.00%*	*31.14*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	2,772	0	0	2,772
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**63,380**	**0**	**0**	**63,380**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	23,245	0	0	23,245
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	27,120.00	LF	8,621	0	0	8,621
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	27,120.00	LF	31,514	0	0	31,514
ALT2-03 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**37,490,702**	**0**	**0**	**37,490,702**
			8,220,185.04			*8,220,185.04*
SEA Seawall Sector Site Activities	**1.00**	**EA**	**8,220,185**	**0**	**0**	**8,220,185**
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**6,038,190**	**0**	**0**	**6,038,190**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	4,378,592	0	0	4,378,592
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	1,290,225	0	0	1,290,225
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	57,279	0	0	57,279
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	84,779	0	0	84,779
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	5,295.00	LCY	43,907	0	0	43,907
			183,408.04			*183,408.04*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**183,408**	**0**	**0**	**183,408**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	172,016	0	0	172,016
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	7,709	0	0	7,709
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			1,482,004.11			*1,482,004.11*
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**1,482,004**	**0**	**0**	**1,482,004**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	595,148	0	0	595,148
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	719,188	0	0	719,188
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	31,929	0	0	31,929
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	104,993	0	0	104,993

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	59.00	LCY	489	0	0	489
			30,256.38			*30,256.38*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**30,256**	**0**	**0**	**30,256**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	25,433	0	0	25,433
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	1,140	0	0	1,140
			8,730.31			*8,730.31*
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**8,730**	**0**	**0**	**8,730**
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	2,332	0	0	2,332
			6,397.86			*6,397.86*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**6,398**	**0**	**0**	**6,398**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	2,598	0	0	2,598
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	116	0	0	116
			38,445.65			*38,445.65*
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**38,446**	**0**	**0**	**38,446**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	27,660	0	0	27,660
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	1,228	0	0	1,228
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	4,303	0	0	4,303
			5,254.94			*5,254.94*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**5,255**	**0**	**0**	**5,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	1,504	0	0	1,504
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	67	0	0	67
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			573,930.10			*573,930.10*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**573,930**	**0**	**0**	**573,930**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	392,936	0	0	392,936
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	115,785	0	0	115,785
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	5,141	0	0	5,141
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	24,023	0	0	24,023
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	9.00	LCY	75	0	0	75
			35,970.99			*35,970.99*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**35,971**	**0**	**0**	**35,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	30,903	0	0	30,903
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	1,385	0	0	1,385
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			78,885.00			*78,885.00*
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**78,885**	**0**	**0**	**78,885**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	440.00	LCY	50,553	0	0	50,553
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	14,896	0	0	14,896
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	662	0	0	662
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	3,518	0	0	3,518
			9,255.17			*9,255.17*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**9,255**	**0**	**0**	**9,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	5,333	0	0	5,333
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	239	0	0	239
			10,758,398.67			*10,758,398.67*
JET Jetty Sector Site Activities	**1.00**	**EA**	**10,758,399**	**0**	**0**	**10,758,399**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			1,958,189.14			*1,958,189.14*
JET-07 Area 7 Site Activities	**1.00**	**EA**	**1,958,189**	**0**	**0**	**1,958,189**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	12,780.00	LCY	1,468,339	0	0	1,468,339
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	12,780.00	LCY	432,671	0	0	432,671
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	13,291.00	LCY	19,208	0	0	19,208
			37,971.10			*37,971.10*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**37,971**	**0**	**0**	**37,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	32,817	0	0	32,817
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	1,471	0	0	1,471
			5,567,223.52			*5,567,223.52*
JET-08 Area 8 Site Activities	**1.00**	**EA**	**5,567,224**	**0**	**0**	**5,567,224**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	4,160,295	0	0	4,160,295
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	1,225,900	0	0	1,225,900
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	54,423	0	0	54,423
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onstie Disposal	3,763.00	BCY	24,794	0	0	24,794
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	4,994.00	LCY	41,411	0	0	41,411
			60,400.96			*60,400.96*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**60,401**	**0**	**0**	**60,401**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	54,285	0	0	54,285
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	2,433	0	0	2,433
			3,232,986.01			*3,232,986.01*
JET-10 Area 11 Site Activities	**1.00**	**EA**	**3,232,986**	**0**	**0**	**3,232,986**
			114.89	*0.00%*	*0.00%*	*114.89*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR DREDG-01 Dredging of Sediment	21,060.00	LCY	2,419,658	0	0	2,419,658
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	21,060.00	LCY	712,992	0	0	712,992
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	21,902.00	LCY	31,653	0	0	31,653
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	14,140	0	0	14,140
			54,543.49			*54,543.49*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**54,543**	**0**	**0**	**54,543**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	48,679	0	0	48,679
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	2,181	0	0	2,181
			18,512,118.38			*18,512,118.38*
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**18,512,118**	**0**	**0**	**18,512,118**
			18,512,118.38			*18,512,118.38*
MC-09 Area 9 Site Activities	**1.00**	**EA**	**18,512,118**	**0**	**0**	**18,512,118**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	119,470.00	LCY	13,726,330	0	0	13,726,330
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	123,003.00	LCY	4,164,303	0	0	4,164,303
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	127,923.00	LCY	184,874	0	0	184,874
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	117,730	0	0	117,730
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	711.00	LCY	5,896	0	0	5,896
			312,986.91			*312,986.91*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**312,987**	**0**	**0**	**312,987**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	296,037	0	0	296,037
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	13,266	0	0	13,266
ALT2-04 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**84,542,607**	**0**	**0**	**84,542,607**
			4,677,356.79			*4,677,356.79*
SEA-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings	**1.00**	**EA**	**4,677,357**	**0**	**0**	**4,677,357**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Removed from Seawall Areas						
			147.52	*0.00%*	*0.00%*	*147.52*
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	5,363.00	LCY	791,167	0	0	791,167
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	23,062.00	TON	3,886,189	0	0	3,886,189
			4,355,494.51			*4,355,494.51*
WJ-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	**1.00**	**EA**	**4,355,495**	**0**	**0**	**4,355,495**
			147.52	*0.00%*	*0.00%*	*147.52*
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	4,994.00	LCY	736,731	0	0	736,731
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	21,475.00	TON	3,618,763	0	0	3,618,763
			620,194.20			*620,194.20*
MC-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	**1.00**	**EA**	**620,194**	**0**	**0**	**620,194**
			147.52	*0.00%*	*0.00%*	*147.52*
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	711.00	LCY	104,889	0	0	104,889
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	3,058.00	TON	515,305	0	0	515,305
			21,891,869.62			*21,891,869.62*
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**21,891,870**	**0**	**0**	**21,891,870**
			9,715,497.42			*9,715,497.42*
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**9,715,497**	**0**	**0**	**9,715,497**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	103,751.00	TON	6,462,402	0	0	6,462,402
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	1,265,093	0	0	1,265,093
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	9,438.00	HR	1,445,820	0	0	1,445,820
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	542,183	0	0	542,183
			8,284,153.21			*8,284,153.21*
SEA-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**8,284,153**	**0**	**0**	**8,284,153**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	23,055.00	LCY	2,456,386	0	0	2,456,386
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	34,584.00	TON	5,827,767	0	0	5,827,767
			3,892,218.99			*3,892,218.99*
SEA-SOIL-03 Waste Characterization	**1.00**	**EA**	**3,892,219**	**0**	**0**	**3,892,219**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	6,289.00	EA	3,853,682	0	0	3,853,682
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	6,289.00	EA	38,537	0	0	38,537
			18,170,879.63			*18,170,879.63*
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**18,170,880**	**0**	**0**	**18,170,880**
			9,017,196.49			*9,017,196.49*
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**9,017,196**	**0**	**0**	**9,017,196**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	96,303.00	TON	5,998,484	0	0	5,998,484
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	4,379.00	EA	1,173,944	0	0	1,173,944
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	8,758.00	HR	1,341,650	0	0	1,341,650
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	4,379.00	EA	503,119	0	0	503,119
			5,767,099.85			*5,767,099.85*
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**5,767,100**	**0**	**0**	**5,767,100**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	16,050.00	LCY	1,710,041	0	0	1,710,041
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	24,076.00	TON	4,057,059	0	0	4,057,059
			3,386,583.29			*3,386,583.29*
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**3,386,583**	**0**	**0**	**3,386,583**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	5,472.00	EA	3,353,053	0	0	3,353,053
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	5,472.00	EA	33,531	0	0	33,531
			34,826,811.80			*34,826,811.80*
MC-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	**1.00**	**EA**	**34,826,812**	**0**	**0**	**34,826,812**
			15,454,906.95			*15,454,906.95*
MC-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**15,454,907**	**0**	**0**	**15,454,907**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	165,072.00	TON	10,281,941	0	0	10,281,941
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	7,504.00	EA	2,011,709	0	0	2,011,709
			153.19	*0.00%*	*0.00%*	*153.19*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	15,008.00	HR	2,299,096	0	0	2,299,096
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	7,504.00	EA	862,161	0	0	862,161
			13,180,497.83			*13,180,497.83*
MC-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**13,180,498**	**0**	**0**	**13,180,498**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	36,683.00	LCY	3,908,376	0	0	3,908,376
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	55,024.00	TON	9,272,122	0	0	9,272,122
			6,191,407.02			*6,191,407.02*
MC-SOIL-03 Waste Characterization	**1.00**	**EA**	**6,191,407**	**0**	**0**	**6,191,407**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	10,004.00	EA	6,130,106	0	0	6,130,106
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	10,004.00	EA	61,301	0	0	61,301
ALT2-05 Site Restoration	**1.00**	**LS**	**26,387,389**	**0**	**0**	**26,387,389**
REST-01 Seawall Reconstruction	**1.00**	**LS**	**2,757,445**	**0**	**0**	**2,757,445**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	7,500.00	TON	1,263,829	0	0	1,263,829
			99.57	*0.00%*	*0.00%*	*99.57*
USR REST-02 Reconstruction using Corestone	15,000.00	TON	1,493,616	0	0	1,493,616
REST-02 Jetty Reconstruction	**1.00**	**LS**	**898,667**	**0**	**0**	**898,667**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	5,333.00	TON	898,667	0	0	898,667
REST-03 Backfill of Excavations	**1.00**	**LS**	**19,311,893**	**0**	**0**	**19,311,893**
			42.89	*0.00%*	*0.00%*	*42.89*
USR DREDG-03 Backfilling of Sediment Dredged	402,339.00	TON	17,257,762	0	0	17,257,762
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	1,446,651	0	0	1,446,651
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	362,194	0	0	362,194
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	245,286	0	0	245,286
REST-04 Wetland Restoration	**1.00**	**LS**	**3,419,385**	**0**	**0**	**3,419,385**
			260,425.33	*0.00%*	*0.00%*	*260,425.33*
USR REST-04 Wetland Restoration	13.13	ACR	3,419,385	0	0	3,419,385
ALT3 Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**83,050,528**	**0**	**0**	**83,050,528**
ALT3-01 General Conditions	**1.00**	**LS**	**1,095,516**	**0**	**0**	**1,095,516**
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**921,112**	**0**	**0**	**921,112**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			106.52	*0.00%*	*0.00%*	*106.52*
FOP FA-PROJM Project Managers	1,560.00	HR	166,164	0	0	166,164
			82.62	*0.00%*	*0.00%*	*82.62*
FOP FC-ENGPE Engineers, Project	3,120.00	HR	257,766	0	0	257,766
			84.38	*0.00%*	*0.00%*	*84.38*
HNC FA-AGENS General Superintendent (P.M.)	3,120.00	HR	263,257	0	0	263,257
			43.43	*0.00%*	*0.00%*	*43.43*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	8,686	0	0	8,686
			65.35	*0.00%*	*0.00%*	*65.35*
FOP FC-FLDER Field Engineers	100.00	HR	6,535	0	0	6,535
			67.27	*0.00%*	*0.00%*	*67.27*
HNC FD-SAENG Safety Engineer	200.00	HR	13,454	0	0	13,454
			197.35	*0.00%*	*0.00%*	*197.35*
USR GENCON-01 Per Diem	1,040.00	DAY	205,248	0	0	205,248
			174,404.15			*174,404.15*
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**174,404**	**0**	**0**	**174,404**
			379.84	*0.00%*	*0.00%*	*379.84*
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	18.00	EA	6,837	0	0	6,837
			122.85	*0.00%*	*0.00%*	*122.85*
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	18.00	EA	2,211	0	0	2,211
			106.25	*0.00%*	*0.00%*	*106.25*
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	18.00	MO	1,912	0	0	1,912
			112.89	*0.00%*	*0.00%*	*112.89*
RSM 015213400120 Field Office Expense, office supplies, average	18.00	MO	2,032	0	0	2,032
			199.22	*0.00%*	*0.00%*	*199.22*
RSM 015213400160 Field Office Expense, field office lights & HVAC	18.00	MO	3,586	0	0	3,586
			109.85	*0.00%*	*0.00%*	*109.85*
HNC 015213201400 Toilet, portable, chemical, rent per month	36.00	MO	3,955	0	0	3,955
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	7,800.00	HR	118,221	0	0	118,221
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	455	0	0	455
			99.61	*0.00%*	*0.00%*	*99.61*
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	11,953	0	0	11,953
			6,206.10	*0.00%*	*0.00%*	*6,206.10*
USR CC-E-02-01 Small Tools Allowance	1.00	EA	6,206	0	0	6,206
			0.93	*0.00%*	*0.00%*	*0.93*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR CC-E-02-02 Cell Phone Allowance	8,300.00	HR	7,727	0	0	7,727
			9,309.15	*0.00%*	*0.00%*	*9,309.15*
USR CC-E-02-03 Electrician	1.00	EA	9,309	0	0	9,309
ALT3-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**2,880,574**	**0**	**0**	**2,880,574**
			204.22	*0.00%*	*0.00%*	*204.22*
USR EC-04 Maintenance Crew	18.00	MO	3,676	0	0	3,676
			2,813,518.51			*2,813,518.51*
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**2,813,519**	**0**	**0**	**2,813,519**
			298,470.41	*0.00%*	*0.00%*	*298,470.41*
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	298,470	0	0	298,470
			181,707.95	*0.00%*	*0.00%*	*181,707.95*
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	363,416	0	0	363,416
			121,136.08	*0.00%*	*0.00%*	*121,136.08*
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	1,211,361	0	0	1,211,361
			16,264.33	*0.00%*	*0.00%*	*16,264.33*
USR COFFDAM-04 Installation Crew	36.00	DAY	585,516	0	0	585,516
			1,473.70	*0.00%*	*0.00%*	*1,473.70*
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	8,842	0	0	8,842
			1,861.25	*0.00%*	*0.00%*	*1,861.25*
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	67,005	0	0	67,005
			4,536.79	*0.00%*	*0.00%*	*4,536.79*
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	163,324	0	0	163,324
			23.27	*0.00%*	*0.00%*	*23.27*
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	107,022	0	0	107,022
			1.26	*0.00%*	*0.00%*	*1.26*
USR COFFDAM-09 Sand Bag	4,600.00	EA	5,791	0	0	5,791
			31.14	*0.00%*	*0.00%*	*31.14*
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	2,772	0	0	2,772
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**63,380**	**0**	**0**	**63,380**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	23,245	0	0	23,245
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	27,120.00	LF	8,621	0	0	8,621
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	27,120.00	LF	31,514	0	0	31,514
ALT3-03 MNR	**1.00**	**LS**	**251,237**	**0**	**0**	**251,237**
ALT3-03-01 Semi-annual Sampling	**1.00**	**LS**	**166,291**	**0**	**0**	**166,291**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	38,310	0	0	38,310
			180.69	*0.00%*	*0.00%*	*180.69*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR STVISIT-01 Site Visit by Scientist	480.00	HR	86,733	0	0	86,733
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	8,265	0	0	8,265
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	1,717	0	0	1,717
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	27,666	0	0	27,666
ALT3-03-02 Annual Sampling	**1.00**	**LS**	**84,946**	**0**	**0**	**84,946**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	19,155	0	0	19,155
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	240.00	HR	43,366	0	0	43,366
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	4,133	0	0	4,133
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	858	0	0	858
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	13,833	0	0	13,833
ALT3-04 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**16,255,612**	**0**	**0**	**16,255,612**
			8,220,185.04			*8,220,185.04*
SEA Seawall Sector Site Activities	**1.00**	**EA**	**8,220,185**	**0**	**0**	**8,220,185**
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**6,038,190**	**0**	**0**	**6,038,190**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	4,378,592	0	0	4,378,592
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	1,290,225	0	0	1,290,225
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	57,279	0	0	57,279
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	84,779	0	0	84,779
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	5,295.00	LCY	43,907	0	0	43,907
			183,408.04			*183,408.04*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**183,408**	**0**	**0**	**183,408**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	172,016	0	0	172,016

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	7,709	0	0	7,709
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
SEA-02 Area 2 Site Activities	**1.00**	**LS**	**1,482,004**	**0**	**0**	**1,482,004**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	595,148	0	0	595,148
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	719,188	0	0	719,188
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	31,929	0	0	31,929
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	104,993	0	0	104,993
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	59.00	LCY	489	0	0	489
			30,256.38			*30,256.38*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**30,256**	**0**	**0**	**30,256**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	25,433	0	0	25,433
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	1,140	0	0	1,140
SEA-03 Area 3 Site Activities	**1.00**	**LS**	**8,730**	**0**	**0**	**8,730**
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	2,332	0	0	2,332
			6,397.86			*6,397.86*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**6,398**	**0**	**0**	**6,398**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	2,598	0	0	2,598
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	116	0	0	116
SEA-04 Area 4 Site Activities	**1.00**	**LS**	**38,446**	**0**	**0**	**38,446**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	27,660	0	0	27,660
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	1,228	0	0	1,228
			6.59	*0.00%*	*0.00%*	*6.59*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	4,303	0	0	4,303
			5,254.94			*5,254.94*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**5,255**	**0**	**0**	**5,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	1,504	0	0	1,504
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	67	0	0	67
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
SEA-05 Area 5 Site Activities	**1.00**	**LS**	**573,930**	**0**	**0**	**573,930**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	392,936	0	0	392,936
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	115,785	0	0	115,785
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	5,141	0	0	5,141
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	24,023	0	0	24,023
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	9.00	LCY	75	0	0	75
			35,970.99			*35,970.99*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**35,971**	**0**	**0**	**35,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	30,903	0	0	30,903
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	1,385	0	0	1,385
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
SEA-06 Area 6 Site Activities	**1.00**	**LS**	**78,885**	**0**	**0**	**78,885**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	440.00	LCY	50,553	0	0	50,553
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	14,896	0	0	14,896
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	662	0	0	662
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	3,518	0	0	3,518
			9,255.17			*9,255.17*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**9,255**	**0**	**0**	**9,255**
			136.74	*0.00%*	*0.00%*	*136.74*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	5,333	0	0	5,333
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	239	0	0	239
			7,473,894.35			*7,473,894.35*
JET Jetty Sector Site Activities	**1.00**	**EA**	**7,473,894**	**0**	**0**	**7,473,894**
JET-07 Area 7 Site Activities	**1.00**	**LS**	**1,143,824**	**0**	**0**	**1,143,824**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	845,616	0	0	845,616
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	249,175	0	0	249,175
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	11,062	0	0	11,062
			37,971.10			*37,971.10*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**37,971**	**0**	**0**	**37,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	32,817	0	0	32,817
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	1,471	0	0	1,471
JET-10 Area 11 Site Activities	**1.00**	**LS**	**6,330,070**	**0**	**0**	**6,330,070**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	530,808	0	0	530,808
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	156,411	0	0	156,411
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	6,944	0	0	6,944
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	14,140	0	0	14,140
			54,543.49			*54,543.49*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**54,543**	**0**	**0**	**54,543**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	48,679	0	0	48,679
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	2,181	0	0	2,181
			5,567,223.52			*5,567,223.52*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
JET-08 Area 8 Site Activities	**1.00**	**EA**	**5,567,224**	**0**	**0**	**5,567,224**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	4,160,295	0	0	4,160,295
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	1,225,900	0	0	1,225,900
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	54,423	0	0	54,423
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	24,794	0	0	24,794
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	4,994.00	LCY	41,411	0	0	41,411
			60,400.96			*60,400.96*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**60,401**	**0**	**0**	**60,401**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	54,285	0	0	54,285
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	2,433	0	0	2,433
			561,532.58			*561,532.58*
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
MC-09 Area 9 Site Activities	**1.00**	**LS**	**561,533**	**0**	**0**	**561,533**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	119,611	0	0	119,611
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	5,310	0	0	5,310
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	117,730	0	0	117,730
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	5,896	0	0	5,896
			312,986.91			*312,986.91*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**312,987**	**0**	**0**	**312,987**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	296,037	0	0	296,037
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	13,266	0	0	13,266
ALT3-05 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**49,905,240**	**0**	**0**	**49,905,240**
			4,677,356.79			*4,677,356.79*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
SEA-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Seawall Areas	**1.00**	**EA**	**4,677,357**	**0**	**0**	**4,677,357**
			147.52	*0.00%*	*0.00%*	*147.52*
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	5,363.00	LCY	791,167	0	0	791,167
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	23,062.00	TON	3,886,189	0	0	3,886,189
			4,355,494.51			*4,355,494.51*
WJ-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	**1.00**	**EA**	**4,355,495**	**0**	**0**	**4,355,495**
			147.52	*0.00%*	*0.00%*	*147.52*
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	4,994.00	LCY	736,731	0	0	736,731
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	21,475.00	TON	3,618,763	0	0	3,618,763
			620,194.20			*620,194.20*
MC-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	**1.00**	**EA**	**620,194**	**0**	**0**	**620,194**
			147.52	*0.00%*	*0.00%*	*147.52*
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	711.00	LCY	104,889	0	0	104,889
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	3,058.00	TON	515,305	0	0	515,305
			21,891,869.62			*21,891,869.62*
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**21,891,870**	**0**	**0**	**21,891,870**
			9,715,497.42			*9,715,497.42*
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**9,715,497**	**0**	**0**	**9,715,497**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	103,751.00	TON	6,462,402	0	0	6,462,402
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	1,265,093	0	0	1,265,093
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	9,438.00	HR	1,445,820	0	0	1,445,820
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	542,183	0	0	542,183
			8,284,153.21			*8,284,153.21*
SEA-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**8,284,153**	**0**	**0**	**8,284,153**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	23,055.00	LCY	2,456,386	0	0	2,456,386
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	34,584.00	TON	5,827,767	0	0	5,827,767
			3,892,218.99			*3,892,218.99*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
SEA-SOIL-03 Waste Characterization	**1.00**	**EA**	**3,892,219**	**0**	**0**	**3,892,219**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	6,289.00	EA	3,853,682	0	0	3,853,682
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	6,289.00	EA	38,537	0	0	38,537
			13,023,925.63			*13,023,925.63*
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**13,023,926**	**0**	**0**	**13,023,926**
			6,463,120.29			*6,463,120.29*
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**6,463,120**	**0**	**0**	**6,463,120**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	69,022.00	TON	4,299,216	0	0	4,299,216
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	841,519	0	0	841,519
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	6,278.00	HR	961,735	0	0	961,735
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	360,651	0	0	360,651
			4,133,506.43			*4,133,506.43*
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**4,133,506**	**0**	**0**	**4,133,506**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	11,504.00	LCY	1,225,689	0	0	1,225,689
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	17,256.00	TON	2,907,817	0	0	2,907,817
			2,427,298.91			*2,427,298.91*
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**2,427,299**	**0**	**0**	**2,427,299**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	3,922.00	EA	2,403,266	0	0	2,403,266
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	3,922.00	EA	24,033	0	0	24,033
			5,336,399.58			*5,336,399.58*
MC-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	**1.00**	**EA**	**5,336,400**	**0**	**0**	**5,336,400**
			2,368,143.64			*2,368,143.64*
MC-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**2,368,144**	**0**	**0**	**2,368,144**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	25,292.00	TON	1,575,378	0	0	1,575,378
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	1,150.00	EA	308,298	0	0	308,298

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	2,300.00	HR	352,340	0	0	352,340
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	1,150.00	EA	132,128	0	0	132,128
			2,019,492.76			*2,019,492.76*
MC-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**2,019,493**	**0**	**0**	**2,019,493**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	5,620.00	LCY	598,781	0	0	598,781
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	8,431.00	TON	1,420,712	0	0	1,420,712
			948,763.19			*948,763.19*
MC-SOIL-03 Waste Characterization	**1.00**	**EA**	**948,763**	**0**	**0**	**948,763**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	1,533.00	EA	939,369	0	0	939,369
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,533.00	EA	9,394	0	0	9,394
ALT3-06 Site Restoration	**1.00**	**LS**	**12,662,349**	**0**	**0**	**12,662,349**
REST-01 Seawall Reconstruction	**1.00**	**LS**	**2,757,445**	**0**	**0**	**2,757,445**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	7,500.00	TON	1,263,829	0	0	1,263,829
			99.57	*0.00%*	*0.00%*	*99.57*
USR REST-02 Reconstruction using Corestone	15,000.00	TON	1,493,616	0	0	1,493,616
REST-02 Jetty Reconstruction	**1.00**	**LS**	**898,667**	**0**	**0**	**898,667**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	5,333.00	TON	898,667	0	0	898,667
			9,006,237.46			*9,006,237.46*
REST-03 Backfill of Excavations	**1.00**	**EA**	**9,006,237**	**0**	**0**	**9,006,237**
			42.89	*0.00%*	*0.00%*	*42.89*
USR DREDG-03 Backfilling of Sediment Dredged	162,078.00	TON	6,952,106	0	0	6,952,106
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	1,446,651	0	0	1,446,651
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	362,194	0	0	362,194
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	245,286	0	0	245,286
ALT4 Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**78,976,475**	**0**	**0**	**78,976,475**
ALT4-01 General Conditions	**1.00**	**LS**	**1,494,508**	**0**	**0**	**1,494,508**
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**1,263,326**	**0**	**0**	**1,263,326**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			106.52	*0.00%*	*0.00%*	*106.52*
FOP FA-PROJM Project Managers	2,167.00	HR	230,819	0	0	230,819
			82.62	*0.00%*	*0.00%*	*82.62*
FOP FC-ENGPE Engineers, Project	4,333.00	HR	357,981	0	0	357,981
			84.38	*0.00%*	*0.00%*	*84.38*
HNC FA-AGENS General Superintendent (P.M.)	4,333.00	HR	365,607	0	0	365,607
			43.43	*0.00%*	*0.00%*	*43.43*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	8,686	0	0	8,686
			65.35	*0.00%*	*0.00%*	*65.35*
FOP FC-FLDER Field Engineers	100.00	HR	6,535	0	0	6,535
			67.27	*0.00%*	*0.00%*	*67.27*
HNC FD-SAENG Safety Engineer	200.00	HR	13,454	0	0	13,454
			197.35	*0.00%*	*0.00%*	*197.35*
USR GENCON-01 Per Diem	1,420.00	DAY	280,243	0	0	280,243
			231,182.71			*231,182.71*
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**231,183**	**0**	**0**	**231,183**
			379.84	*0.00%*	*0.00%*	*379.84*
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	25.00	EA	9,496	0	0	9,496
			122.85	*0.00%*	*0.00%*	*122.85*
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	25.00	EA	3,071	0	0	3,071
			106.25	*0.00%*	*0.00%*	*106.25*
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	25.00	MO	2,656	0	0	2,656
			112.89	*0.00%*	*0.00%*	*112.89*
RSM 015213400120 Field Office Expense, office supplies, average	25.00	MO	2,822	0	0	2,822
			199.22	*0.00%*	*0.00%*	*199.22*
RSM 015213400160 Field Office Expense, field office lights & HVAC	25.00	MO	4,980	0	0	4,980
			109.85	*0.00%*	*0.00%*	*109.85*
HNC 015213201400 Toilet, portable, chemical, rent per month	50.00	MO	5,492	0	0	5,492
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	10,833.00	HR	164,191	0	0	164,191
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	455	0	0	455
			99.61	*0.00%*	*0.00%*	*99.61*
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	11,953	0	0	11,953
			6,206.10	*0.00%*	*0.00%*	*6,206.10*
USR CC-E-02-01 Small Tools Allowance	1.00	EA	6,206	0	0	6,206
			0.93	*0.00%*	*0.00%*	*0.93*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR CC-E-02-02 Cell Phone Allowance	11,333.00	HR	10,550	0	0	10,550
			9,309.15	*0.00%*	*0.00%*	*9,309.15*
USR CC-E-02-03 Electrician	1.00	EA	9,309	0	0	9,309
ALT4-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**2,886,705**	**0**	**0**	**2,886,705**
			252.04	*0.00%*	*0.00%*	*252.04*
USR EC-04 Maintenance Crew	25.00	MO	6,301	0	0	6,301
			2,813,518.51			*2,813,518.51*
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**2,813,519**	**0**	**0**	**2,813,519**
			298,470.41	*0.00%*	*0.00%*	*298,470.41*
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	298,470	0	0	298,470
			181,707.95	*0.00%*	*0.00%*	*181,707.95*
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	363,416	0	0	363,416
			121,136.08	*0.00%*	*0.00%*	*121,136.08*
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	1,211,361	0	0	1,211,361
			16,264.33	*0.00%*	*0.00%*	*16,264.33*
USR COFFDAM-04 Installation Crew	36.00	DAY	585,516	0	0	585,516
			1,473.70	*0.00%*	*0.00%*	*1,473.70*
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	8,842	0	0	8,842
			1,861.25	*0.00%*	*0.00%*	*1,861.25*
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	67,005	0	0	67,005
			4,536.79	*0.00%*	*0.00%*	*4,536.79*
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	163,324	0	0	163,324
			23.27	*0.00%*	*0.00%*	*23.27*
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	107,022	0	0	107,022
			1.26	*0.00%*	*0.00%*	*1.26*
USR COFFDAM-09 Sand Bag	4,600.00	EA	5,791	0	0	5,791
			31.14	*0.00%*	*0.00%*	*31.14*
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	2,772	0	0	2,772
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**63,380**	**0**	**0**	**63,380**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	23,245	0	0	23,245
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	27,120.00	LF	8,621	0	0	8,621
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	27,120.00	LF	31,514	0	0	31,514
			3,505.52			*3,505.52*
EC-03 Silt Fencing Around the Perimeter of Containment Cells	**1.00**	**EA**	**3,506**	**0**	**0**	**3,506**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	1,500.00	LF	1,286	0	0	1,286
			0.32	*0.00%*	*0.00%*	*0.32*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR EC-02 Silt Fence Removal	1,500.00	LF	477	0	0	477
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	1,500.00	LF	1,743	0	0	1,743
ALT4-03 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**16,255,612**	**0**	**0**	**16,255,612**
			8,220,185.04			*8,220,185.04*
SEA Seawall Sector Site Activities	**1.00**	**EA**	**8,220,185**	**0**	**0**	**8,220,185**
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**6,038,190**	**0**	**0**	**6,038,190**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	4,378,592	0	0	4,378,592
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	1,290,225	0	0	1,290,225
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	57,279	0	0	57,279
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	84,779	0	0	84,779
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	5,295.00	LCY	43,907	0	0	43,907
			183,408.04			*183,408.04*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**183,408**	**0**	**0**	**183,408**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	172,016	0	0	172,016
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	7,709	0	0	7,709
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			1,482,004.11			*1,482,004.11*
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**1,482,004**	**0**	**0**	**1,482,004**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	595,148	0	0	595,148
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	719,188	0	0	719,188
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	31,929	0	0	31,929
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	104,993	0	0	104,993
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	59.00	LCY	489	0	0	489
			30,256.38			*30,256.38*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**30,256**	**0**	**0**	**30,256**
			136.74	*0.00%*	*0.00%*	*136.74*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	25,433	0	0	25,433
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	1,140	0	0	1,140
			8,730.31			*8,730.31*
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**8,730**	**0**	**0**	**8,730**
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	2,332	0	0	2,332
			6,397.86			*6,397.86*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**6,398**	**0**	**0**	**6,398**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	2,598	0	0	2,598
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	116	0	0	116
			38,445.65			*38,445.65*
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**38,446**	**0**	**0**	**38,446**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	27,660	0	0	27,660
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	1,228	0	0	1,228
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	4,303	0	0	4,303
			5,254.94			*5,254.94*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**5,255**	**0**	**0**	**5,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	1,504	0	0	1,504
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	67	0	0	67
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			573,930.10			*573,930.10*
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**573,930**	**0**	**0**	**573,930**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	392,936	0	0	392,936
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	115,785	0	0	115,785

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	5,141	0	0	5,141
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	24,023	0	0	24,023
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	9.00	LCY	75	0	0	75
			35,970.99			*35,970.99*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**35,971**	**0**	**0**	**35,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	30,903	0	0	30,903
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	1,385	0	0	1,385
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			78,885.00			*78,885.00*
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**78,885**	**0**	**0**	**78,885**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	440.00	LCY	50,553	0	0	50,553
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	14,896	0	0	14,896
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	662	0	0	662
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	3,518	0	0	3,518
			9,255.17			*9,255.17*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**9,255**	**0**	**0**	**9,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	5,333	0	0	5,333
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	239	0	0	239
			7,473,894.35			*7,473,894.35*
JET Jetty Sector Site Activities	**1.00**	**EA**	**7,473,894**	**0**	**0**	**7,473,894**
			1,143,823.96			*1,143,823.96*
JET-07 Area 7 Site Activities	**1.00**	**EA**	**1,143,824**	**0**	**0**	**1,143,824**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	845,616	0	0	845,616
			33.86	*0.00%*	*0.00%*	*33.86*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	249,175	0	0	249,175
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	11,062	0	0	11,062
			37,971.10			*37,971.10*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**37,971**	**0**	**0**	**37,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	32,817	0	0	32,817
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	1,471	0	0	1,471
			5,567,223.52			*5,567,223.52*
JET-08 Area 8 Site Activities	**1.00**	**EA**	**5,567,224**	**0**	**0**	**5,567,224**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	4,160,295	0	0	4,160,295
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	1,225,900	0	0	1,225,900
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	54,423	0	0	54,423
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	24,794	0	0	24,794
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	4,994.00	LCY	41,411	0	0	41,411
			60,400.96			*60,400.96*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**60,401**	**0**	**0**	**60,401**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	54,285	0	0	54,285
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	2,433	0	0	2,433
			762,846.88			*762,846.88*
JET-10 Area 11 Site Activities	**1.00**	**EA**	**762,847**	**0**	**0**	**762,847**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	530,808	0	0	530,808
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	156,411	0	0	156,411
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	6,944	0	0	6,944
			6.59	*0.00%*	*0.00%*	*6.59*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	14,140	0	0	14,140
			54,543.49			*54,543.49*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**54,543**	**0**	**0**	**54,543**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	48,679	0	0	48,679
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	2,181	0	0	2,181
			561,532.58			*561,532.58*
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
			561,532.58			*561,532.58*
MC-09 Area 9 Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	119,611	0	0	119,611
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	5,310	0	0	5,310
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	117,730	0	0	117,730
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	5,896	0	0	5,896
			312,986.91			*312,986.91*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**312,987**	**0**	**0**	**312,987**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	296,037	0	0	296,037
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	13,266	0	0	13,266
ALT4-04 MNR	**1.00**	**LS**	**251,237**	**0**	**0**	**251,237**
ALT4-04-01 Semi-annual Sampling	**1.00**	**LS**	**166,291**	**0**	**0**	**166,291**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	38,310	0	0	38,310
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	480.00	HR	86,733	0	0	86,733
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	8,265	0	0	8,265
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	1,717	0	0	1,717
			3,600.61	*0.00%*	*0.00%*	*3,600.61*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	27,666	0	0	27,666
ALT4-04-02 Annual Sampling	**1.00**	**LS**	**84,946**	**0**	**0**	**84,946**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	19,155	0	0	19,155
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	240.00	HR	43,366	0	0	43,366
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	4,133	0	0	4,133
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	858	0	0	858
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	13,833	0	0	13,833
ALT4-05 Transportation of Contaminated Materials to Onsite Containment Cell	**1.00**	**LS**	**115,766**	**0**	**0**	**115,766**
			12.07	*0.00%*	*0.00%*	*12.07*
USR HAUL-MC-01 Transportation of Slag and Battery Casings from Seawall to Margaret's Creek Cells	5,363.00	LCY	64,757	0	0	64,757
			8.94	*0.00%*	*0.00%*	*8.94*
USR HAUL-WJ-01 Transportation of Slag and Battery Casings from Western Jetty to Western Jetty Containment Cell	4,994.00	LCY	44,652	0	0	44,652
			8.94	*0.00%*	*0.00%*	*8.94*
USR HAUL-MC-03 Transportation of Slag and Battery Casings from Margaret's Creek to Margaret's Creek Cells	711.00	LCY	6,357	0	0	6,357
ALT4-06 Onsite Containtment Cell Construction	**1.00**	**LS**	**4,908,392**	**0**	**0**	**4,908,392**
CELL-A Onsite Cell A Near the Western Jetty	**1.00**	**LS**	**1,215,800**	**0**	**0**	**1,215,800**
CELL-01 Site Preparation	**1.00**	**LS**	**777,929**	**0**	**0**	**777,929**
			70.48	*0.00%*	*0.00%*	*70.48*
RSM 311313202040 Selective clearing and grubbing, 1-1/2 C.Y. excavator, 4" to 6" diameter, stump removal on site by hydraulic excavator	30.00	EA	2,114	0	0	2,114
			27.66	*0.00%*	*0.00%*	*27.66*
RSM 320130105910 Site maintenance, road & walk maintenance, asphaltic concrete paving, cold patch, 2" thick	334.00	SY	9,238	0	0	9,238
			0.93	*0.00%*	*0.00%*	*0.93*
RSM 320116715320 Cold milling asphalt paving, asphalt pavement, 1" to 3" deep, removal from concrete base, rip, load and sweep, excludes hauling	667.00	SY	620	0	0	620
			765,956.86	*0.00%*	*0.00%*	*765,956.86*
USR PREP-02 Sub Base Improvements	1.00	ACR	765,957	0	0	765,957
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**148,098**	**0**	**0**	**148,098**
			4.25	*0.00%*	*0.00%*	*4.25*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,056.00	ECY	21,469	0	0	21,469
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	7,023.00	LCY	126,629	0	0	126,629
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**32,176**	**0**	**0**	**32,176**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	34,432.00	SF	32,176	0	0	32,176
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**60,552**	**0**	**0**	**60,552**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**12,674**	**0**	**0**	**12,674**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	7,758	0	0	7,758
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	378	0	0	378
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	335	0	0	335
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**47,878**	**0**	**0**	**47,878**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,105.00	LCY	45,281	0	0	45,281
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,105.00	LCY	2,597	0	0	2,597
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**18,913**	**0**	**0**	**18,913**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	21,576.00	SF	18,913	0	0	18,913
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**21,206**	**0**	**0**	**21,206**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	4,994.00	ECY	21,206	0	0	21,206
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**36,240**	**0**	**0**	**36,240**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	41,344.00	SF	36,240	0	0	36,240
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**58,516**	**0**	**0**	**58,516**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**12,674**	**0**	**0**	**12,674**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	7,758	0	0	7,758
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	378	0	0	378
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	335	0	0	335
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**45,842**	**0**	**0**	**45,842**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,058.00	LCY	43,355	0	0	43,355
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,058.00	LCY	2,486	0	0	2,486
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**31,034**	**0**	**0**	**31,034**
			0.75	*0.00%*	*0.00%*	*0.75*
USR GEO-01 LLDPE Geomembrane for Cover	41,344.00	SF	31,034	0	0	31,034
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**21,534**	**0**	**0**	**21,534**
			0.52	*0.00%*	*0.00%*	*0.52*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	41,344.00	SF	21,534	0	0	21,534
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**3,351**	**0**	**0**	**3,351**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	114.00	ECY	484	0	0	484
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	159.00	LCY	2,867	0	0	2,867
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**6,251**	**0**	**0**	**6,251**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	41.00	LCY	2,016	0	0	2,016
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	29.00	ECY	123	0	0	123
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	41,344.00	SF	4,112	0	0	4,112
CELL-B Onsite Cell B Near Margaret's Creek Area	**1.00**	**LS**	**3,654,198**	**0**	**0**	**3,654,198**
CELL-01 Site Preparation	**1.00**	**LS**	**3,101,076**	**0**	**0**	**3,101,076**
			9,312.22	*0.00%*	*0.00%*	*9,312.22*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	4.00	ACR	37,249	0	0	37,249
			765,956.86	*0.00%*	*0.00%*	*765,956.86*
USR PREP-02 Sub Base Improvements	4.00	ACR	3,063,827	0	0	3,063,827
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**169,230**	**0**	**0**	**169,230**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,778.00	ECY	24,535	0	0	24,535
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	8,025.00	LCY	144,696	0	0	144,696
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**42,661**	**0**	**0**	**42,661**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	45,653.00	SF	42,661	0	0	42,661
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**82,658**	**0**	**0**	**82,658**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**15,498**	**0**	**0**	**15,498**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	800.00	LF	10,345	0	0	10,345
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	504	0	0	504
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	4.00	EA	447	0	0	447

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
polyethylene, 90 degree elbows, 4" dia, SDR 21						
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**67,160**	**0**	**0**	**67,160**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,550.00	LCY	63,517	0	0	63,517
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,550.00	LCY	3,643	0	0	3,643
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**26,539**	**0**	**0**	**26,539**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	30,276.00	SF	26,539	0	0	26,539
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**25,791**	**0**	**0**	**25,791**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	6,074.00	ECY	25,791	0	0	25,791
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**47,945**	**0**	**0**	**47,945**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	54,697.00	SF	47,945	0	0	47,945
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**76,115**	**0**	**0**	**76,115**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**15,498**	**0**	**0**	**15,498**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	800.00	LF	10,345	0	0	10,345
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	504	0	0	504
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	4.00	EA	447	0	0	447

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
polyethylene, 90 degree elbows, 4" dia, SDR 21						
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**60,617**	**0**	**0**	**60,617**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,399.00	LCY	57,329	0	0	57,329
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,399.00	LCY	3,288	0	0	3,288
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**41,058**	**0**	**0**	**41,058**
			0.75	*0.00%*	*0.00%*	*0.75*
USR GEO-01 LLDPE Geomembrane for Cover	54,697.00	SF	41,058	0	0	41,058
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**28,489**	**0**	**0**	**28,489**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	54,697.00	SF	28,489	0	0	28,489
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**4,428**	**0**	**0**	**4,428**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	151.00	ECY	641	0	0	641
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	210.00	LCY	3,786	0	0	3,786
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**8,208**	**0**	**0**	**8,208**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	53.00	LCY	2,606	0	0	2,606
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	38.00	ECY	161	0	0	161
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	54,697.00	SF	5,440	0	0	5,440
CELL-01 Groundwater Monitoring - Well Installation	**1.00**	**LS**	**38,394**	**0**	**0**	**38,394**
USR OM-02 Mobilization/Demobilization of Drill Rig	1.00	LS	15,319	0	0	15,319
			61.60	*0.00%*	*0.00%*	*61.60*
HTW 023223135112 Monitoring well construction, drilling, hollow stem auger, normal soil, 2" or less casing/screen, 4-1/4" ID x 8" OD auger	300.00	LF	18,480	0	0	18,480

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			306.38	*0.00%*	*0.00%*	*306.38*
USR OM-03 Well Completion	15.00	EA	4,596	0	0	4,596
ALT4-07 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**40,252,195**	**0**	**0**	**40,252,195**
			21,891,869.62			*21,891,869.62*
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**21,891,870**	**0**	**0**	**21,891,870**
			9,715,497.42			*9,715,497.42*
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**9,715,497**	**0**	**0**	**9,715,497**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	103,751.00	TON	6,462,402	0	0	6,462,402
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	1,265,093	0	0	1,265,093
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	9,438.00	HR	1,445,820	0	0	1,445,820
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	542,183	0	0	542,183
			8,284,153.21			*8,284,153.21*
SEA-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**8,284,153**	**0**	**0**	**8,284,153**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	23,055.00	LCY	2,456,386	0	0	2,456,386
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	34,584.00	TON	5,827,767	0	0	5,827,767
			3,892,218.99			*3,892,218.99*
SEA-SOIL-03 Waste Characterization	**1.00**	**EA**	**3,892,219**	**0**	**0**	**3,892,219**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	6,289.00	EA	3,853,682	0	0	3,853,682
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	6,289.00	EA	38,537	0	0	38,537
			13,023,925.63			*13,023,925.63*
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**13,023,926**	**0**	**0**	**13,023,926**
			6,463,120.29			*6,463,120.29*
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**6,463,120**	**0**	**0**	**6,463,120**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	69,022.00	TON	4,299,216	0	0	4,299,216
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	841,519	0	0	841,519
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	6,278.00	HR	961,735	0	0	961,735

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	360,651	0	0	360,651
			4,133,506.43			*4,133,506.43*
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**4,133,506**	**0**	**0**	**4,133,506**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	11,504.00	LCY	1,225,689	0	0	1,225,689
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	17,256.00	TON	2,907,817	0	0	2,907,817
			2,427,298.91			*2,427,298.91*
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**2,427,299**	**0**	**0**	**2,427,299**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	3,922.00	EA	2,403,266	0	0	2,403,266
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	3,922.00	EA	24,033	0	0	24,033
			5,336,399.58			*5,336,399.58*
MC-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	**1.00**	**EA**	**5,336,400**	**0**	**0**	**5,336,400**
			2,368,143.64			*2,368,143.64*
MC-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**2,368,144**	**0**	**0**	**2,368,144**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	25,292.00	TON	1,575,378	0	0	1,575,378
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	1,150.00	EA	308,298	0	0	308,298
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	2,300.00	HR	352,340	0	0	352,340
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	1,150.00	EA	132,128	0	0	132,128
			2,019,492.76			*2,019,492.76*
MC-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**2,019,493**	**0**	**0**	**2,019,493**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	5,620.00	LCY	598,781	0	0	598,781
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	8,431.00	TON	1,420,712	0	0	1,420,712
			948,763.19			*948,763.19*
MC-SOIL-03 Waste Characterization	**1.00**	**EA**	**948,763**	**0**	**0**	**948,763**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	1,533.00	EA	939,369	0	0	939,369
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,533.00	EA	9,394	0	0	9,394

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
ALT4-08 Site Restoration	**1.00**	**LS**	**12,662,349**	**0**	**0**	**12,662,349**
REST-01 Seawall Reconstruction	**1.00**	**LS**	**2,757,445**	**0**	**0**	**2,757,445**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	7,500.00	TON	1,263,829	0	0	1,263,829
			99.57	*0.00%*	*0.00%*	*99.57*
USR REST-02 Reconstruction using Corestone	15,000.00	TON	1,493,616	0	0	1,493,616
REST-02 Jetty Reconstruction	**1.00**	**LS**	**898,667**	**0**	**0**	**898,667**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	5,333.00	TON	898,667	0	0	898,667
			9,006,237.46			*9,006,237.46*
REST-03 Backfill of Excavations	**1.00**	**EA**	**9,006,237**	**0**	**0**	**9,006,237**
			42.89	*0.00%*	*0.00%*	*42.89*
USR DREDG-03 Backfilling of Sediment Dredged	162,078.00	TON	6,952,106	0	0	6,952,106
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	1,446,651	0	0	1,446,651
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	362,194	0	0	362,194
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	245,286	0	0	245,286
ALT4-09 O&M	**1.00**	**LS**	**149,711**	**0**	**0**	**149,711**
OM-01 O&M of Onsite Containment Cell	**1.00**	**LS**	**149,711**	**0**	**0**	**149,711**
OM-01-02 Annual Sampling per Year	**1.00**	**LS**	**11,349**	**0**	**0**	**11,349**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	15.00	EA	1,941	0	0	1,941
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	24.00	HR	4,337	0	0	4,337
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	15.00	EA	87	0	0	87
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	3.00	DAY	1,383	0	0	1,383
OM-01-03 Quarterly Sampling per Year	**1.00**	**LS**	**34,594**	**0**	**0**	**34,594**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	7,766	0	0	7,766
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	96.00	HR	17,347	0	0	17,347
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	348	0	0	348
			3,600.61	*0.00%*	*0.00%*	*3,600.61*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	5,533	0	0	5,533
OM-01-04 Semi-annual Sampling per Year	**1.00**	**LS**	**19,097**	**0**	**0**	**19,097**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	3,883	0	0	3,883
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	48.00	HR	8,673	0	0	8,673
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	174	0	0	174
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	2,767	0	0	2,767
OM-01-05 Quarterly Inspections per Year	**1.00**	**LS**	**14,852**	**0**	**0**	**14,852**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	64.00	HR	9,407	0	0	9,407
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	8.00	DAY	1,844	0	0	1,844
OM-01-06 Semi-annual Inspections	**1.00**	**LS**	**9,226**	**0**	**0**	**9,226**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	32.00	HR	4,704	0	0	4,704
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	4.00	DAY	922	0	0	922
OM-01-01 Annual Inspections	**1.00**	**LS**	**6,414**	**0**	**0**	**6,414**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	16.00	HR	2,352	0	0	2,352
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	2.00	DAY	461	0	0	461
			54,178.59			*54,178.59*
OM-AN Annual for 30 years	**1.00**	**EA**	**54,179**	**0**	**0**	**54,179**
OM-01-08 Mowing and Snow Removal	**1.00**	**LS**	**9,241**	**0**	**0**	**9,241**
			84.49	*0.00%*	*0.00%*	*84.49*
RSM 320190191670 Mowing, mowing brush, medium density, tractor with rotary mower	97.00	MSF	8,196	0	0	8,196

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			130.63	*0.00%*	*0.00%*	*130.63*
USR 320130200240 Snow removal, clearing, 1 C.Y., with wheeled skid steer loader	8.00	HR	1,045	0	0	1,045
OM-01-09 Leachate Pumping	**1.00**	**LS**	**29,707**	**0**	**0**	**29,707**
			270.23	*0.00%*	*0.00%*	*270.23*
USR EW-07 Transport Water	48.00	HR	12,971	0	0	12,971
			174.34	*0.00%*	*0.00%*	*174.34*
USR EW-DW-01 Dewatering (pumping)	96.00	HR	16,736	0	0	16,736
OM-01-10 Erosion Repair	**1.00**	**LS**	**7,411**	**0**	**0**	**7,411**
			231.59	*0.00%*	*0.00%*	*231.59*
USR OM-01 Erosion Repair	32.00	HR	7,411	0	0	7,411
OM-01-07 Additional Inspections after Storm Events	**1.00**	**LS**	**7,820**	**0**	**0**	**7,820**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	3,528	0	0	3,528
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	692	0	0	692
ALT5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**50,072,098**	**0**	**0**	**50,072,098**
ALT5-01 General Conditions	**1.00**	**LS**	**810,759**	**0**	**0**	**810,759**
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**676,921**	**0**	**0**	**676,921**
			106.52	*0.00%*	*0.00%*	*106.52*
FOP FA-PROJM Project Managers	1,127.00	HR	120,043	0	0	120,043
			82.62	*0.00%*	*0.00%*	*82.62*
FOP FC-ENGPE Engineers, Project	2,253.00	HR	186,137	0	0	186,137
			84.38	*0.00%*	*0.00%*	*84.38*
HNC FA-AGENS General Superintendent (P.M.)	2,253.00	HR	190,102	0	0	190,102
			43.43	*0.00%*	*0.00%*	*43.43*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	8,686	0	0	8,686
			65.35	*0.00%*	*0.00%*	*65.35*
FOP FC-FLDER Field Engineers	100.00	HR	6,535	0	0	6,535
			67.27	*0.00%*	*0.00%*	*67.27*
HNC FD-SAENG Safety Engineer	200.00	HR	13,454	0	0	13,454
			197.35	*0.00%*	*0.00%*	*197.35*
USR GENCON-01 Per Diem	770.00	DAY	151,963	0	0	151,963
			133,838.85			*133,838.85*
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**133,839**	**0**	**0**	**133,839**
			379.84	*0.00%*	*0.00%*	*379.84*
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	13.00	EA	4,938	0	0	4,938
			122.85	*0.00%*	*0.00%*	*122.85*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	13.00	EA	1,597	0	0	1,597
			106.25	*0.00%*	*0.00%*	*106.25*
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	13.00	MO	1,381	0	0	1,381
			112.89	*0.00%*	*0.00%*	*112.89*
RSM 015213400120 Field Office Expense, office supplies, average	13.00	MO	1,468	0	0	1,468
			199.22	*0.00%*	*0.00%*	*199.22*
RSM 015213400160 Field Office Expense, field office lights & HVAC	13.00	MO	2,590	0	0	2,590
			109.85	*0.00%*	*0.00%*	*109.85*
HNC 015213201400 Toilet, portable, chemical, rent per month	26.00	MO	2,856	0	0	2,856
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	5,633.00	HR	85,377	0	0	85,377
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	455	0	0	455
			99.61	*0.00%*	*0.00%*	*99.61*
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	11,953	0	0	11,953
			6,206.10	*0.00%*	*0.00%*	*6,206.10*
USR CC-E-02-01 Small Tools Allowance	1.00	EA	6,206	0	0	6,206
			0.93	*0.00%*	*0.00%*	*0.93*
USR CC-E-02-02 Cell Phone Allowance	6,133.00	HR	5,709	0	0	5,709
			9,309.15	*0.00%*	*0.00%*	*9,309.15*
USR CC-E-02-03 Electrician	1.00	EA	9,309	0	0	9,309
ALT5-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**2,888,331**	**0**	**0**	**2,888,331**
			252.04	*0.00%*	*0.00%*	*252.04*
USR EC-04 Maintenance Crew	13.00	MO	3,277	0	0	3,277
			2,813,518.51			*2,813,518.51*
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**2,813,519**	**0**	**0**	**2,813,519**
			298,470.41	*0.00%*	*0.00%*	*298,470.41*
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	298,470	0	0	298,470
			181,707.95	*0.00%*	*0.00%*	*181,707.95*
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	363,416	0	0	363,416
			121,136.08	*0.00%*	*0.00%*	*121,136.08*
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	1,211,361	0	0	1,211,361
			16,264.33	*0.00%*	*0.00%*	*16,264.33*
USR COFFDAM-04 Installation Crew	36.00	DAY	585,516	0	0	585,516
			1,473.70	*0.00%*	*0.00%*	*1,473.70*
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	8,842	0	0	8,842
			1,861.25	*0.00%*	*0.00%*	*1,861.25*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	67,005	0	0	67,005
			4,536.79	*0.00%*	*0.00%*	*4,536.79*
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	163,324	0	0	163,324
			23.27	*0.00%*	*0.00%*	*23.27*
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	107,022	0	0	107,022
			1.26	*0.00%*	*0.00%*	*1.26*
USR COFFDAM-09 Sand Bag	4,600.00	EA	5,791	0	0	5,791
			31.14	*0.00%*	*0.00%*	*31.14*
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	2,772	0	0	2,772
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**63,380**	**0**	**0**	**63,380**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	23,245	0	0	23,245
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	27,120.00	LF	8,621	0	0	8,621
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	27,120.00	LF	31,514	0	0	31,514
			8,156.17			*8,156.17*
EC-03 Silt Fencing Around the Perimeter of Containment Cells	**1.00**	**EA**	**8,156**	**0**	**0**	**8,156**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	3,490.00	LF	2,991	0	0	2,991
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	3,490.00	LF	1,109	0	0	1,109
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	3,490.00	LF	4,055	0	0	4,055
ALT5-03 Capping of Area 8	**1.00**	**LS**	**3,281,526**	**0**	**0**	**3,281,526**
			4.92	*0.00%*	*0.00%*	*4.92*
USR GEO-04 Reactive Core Mat with Organoclay and Apetite	81,608.00	SF	401,303	0	0	401,303
			909.73	*0.00%*	*0.00%*	*909.73*
USR GEO-05 Triton Marine Mattress	628.00	EA	571,309	0	0	571,309
			42.62	*0.00%*	*0.00%*	*42.62*
USR GEO-06 3" to 6" Rip Rap Stone to fill Triton Marine Mattresses	1,904.00	TON	81,144	0	0	81,144
			4,442.55	*0.00%*	*0.00%*	*4,442.55*
USR GEO-07 Transportation of Reactive Core Mats	3.00	EA	13,328	0	0	13,328
			4,442.55	*0.00%*	*0.00%*	*4,442.55*
USR GEO-08 Transportation of Marine Mattresses	6.00	EA	26,655	0	0	26,655
			26.81	*0.00%*	*0.00%*	*26.81*
USR GEO-09 Construction and Loading of Triton Marine Mattresses and Deploy the Mattresses and Reactive Core Mats from a barge.	81,608.00	SF	2,187,787	0	0	2,187,787
ALT5-04 MNR	**1.00**	**LS**	**251,237**	**0**	**0**	**251,237**
ALT5-04-01 Semi-annual Sampling	**1.00**	**LS**	**166,291**	**0**	**0**	**166,291**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	38,310	0	0	38,310
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	480.00	HR	86,733	0	0	86,733
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	8,265	0	0	8,265
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	1,717	0	0	1,717
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	27,666	0	0	27,666
ALT5-04-02 Annual Sampling	**1.00**	**LS**	**84,946**	**0**	**0**	**84,946**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	19,155	0	0	19,155
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	240.00	HR	43,366	0	0	43,366
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	4,133	0	0	4,133
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	858	0	0	858
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	13,833	0	0	13,833
ALT5-05 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**14,310,182**	**0**	**0**	**14,310,182**
			8,220,515.93			*8,220,515.93*
SEA Seawall Sector Site Activities	**1.00**	**EA**	**8,220,516**	**0**	**0**	**8,220,516**
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**6,038,190**	**0**	**0**	**6,038,190**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	4,378,592	0	0	4,378,592
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	1,290,225	0	0	1,290,225
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	57,279	0	0	57,279
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	84,779	0	0	84,779
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	5,295.00	LCY	43,907	0	0	43,907
			183,408.04			*183,408.04*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Post Excavation Confirmation Sampling	**1.00**	**EA**	**183,408**	**0**	**0**	**183,408**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	172,016	0	0	172,016
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	7,709	0	0	7,709
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			1,482,004.11			*1,482,004.11*
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**1,482,004**	**0**	**0**	**1,482,004**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	595,148	0	0	595,148
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	719,188	0	0	719,188
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	31,929	0	0	31,929
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	104,993	0	0	104,993
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	59.00	LCY	489	0	0	489
			30,256.38			*30,256.38*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**30,256**	**0**	**0**	**30,256**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	25,433	0	0	25,433
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	1,140	0	0	1,140
			8,730.31			*8,730.31*
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**8,730**	**0**	**0**	**8,730**
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	2,332	0	0	2,332
			6,397.86			*6,397.86*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**6,398**	**0**	**0**	**6,398**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	2,598	0	0	2,598
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	116	0	0	116

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			38,445.65			*38,445.65*
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**38,446**	**0**	**0**	**38,446**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	27,660	0	0	27,660
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	1,228	0	0	1,228
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	4,303	0	0	4,303
			5,254.94			*5,254.94*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**5,255**	**0**	**0**	**5,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	1,504	0	0	1,504
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	67	0	0	67
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			574,260.99			*574,260.99*
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**574,261**	**0**	**0**	**574,261**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	392,936	0	0	392,936
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	115,785	0	0	115,785
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	5,141	0	0	5,141
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	24,023	0	0	24,023
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	9.00	LCY	75	0	0	75
			36,301.88			*36,301.88*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**36,302**	**0**	**0**	**36,302**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	30,903	0	0	30,903
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	280.00	EA	1,716	0	0	1,716
			78,885.00			*78,885.00*
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**78,885**	**0**	**0**	**78,885**
			114.89	*0.00%*	*0.00%*	*114.89*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR DREDG-01 Dredging of Sediment	440.00	LCY	50,553	0	0	50,553
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	14,896	0	0	14,896
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	662	0	0	662
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	3,518	0	0	3,518
			9,255.17			*9,255.17*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**9,255**	**0**	**0**	**9,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	5,333	0	0	5,333
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	239	0	0	239
			5,528,133.22			*5,528,133.22*
JET Jetty Sector Site Activities	**1.00**	**EA**	**5,528,133**	**0**	**0**	**5,528,133**
			1,143,823.96			*1,143,823.96*
JET-07 Area 7 Site Activities	**1.00**	**EA**	**1,143,824**	**0**	**0**	**1,143,824**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	845,616	0	0	845,616
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	249,175	0	0	249,175
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	11,062	0	0	11,062
			37,971.10			*37,971.10*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**37,971**	**0**	**0**	**37,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	32,817	0	0	32,817
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	1,471	0	0	1,471
			3,621,462.38			*3,621,462.38*
JET-08 Area 8 Site Activities	**1.00**	**EA**	**3,621,462**	**0**	**0**	**3,621,462**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	23,260.00	LCY	2,672,423	0	0	2,672,423
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	23,260.00	LCY	787,474	0	0	787,474

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	24,190.00	LCY	34,959	0	0	34,959
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	24,794	0	0	24,794
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	4,994.00	LCY	41,411	0	0	41,411
			60,400.96			*60,400.96*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**60,401**	**0**	**0**	**60,401**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	54,285	0	0	54,285
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	2,433	0	0	2,433
			762,846.88			*762,846.88*
JET-10 Area 11 Site Activities	**1.00**	**EA**	**762,847**	**0**	**0**	**762,847**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	530,808	0	0	530,808
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	156,411	0	0	156,411
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	6,944	0	0	6,944
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	14,140	0	0	14,140
			54,543.49			*54,543.49*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**54,543**	**0**	**0**	**54,543**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	48,679	0	0	48,679
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	2,181	0	0	2,181
			561,532.58			*561,532.58*
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
			561,532.58			*561,532.58*
MC-09 Area 9 Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	119,611	0	0	119,611
			1.45	*0.00%*	*0.00%*	*1.45*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	5,310	0	0	5,310
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	117,730	0	0	117,730
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	5,896	0	0	5,896
			312,986.91			*312,986.91*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**312,987**	**0**	**0**	**312,987**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	296,037	0	0	296,037
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	13,266	0	0	13,266
ALT5-06 Transportation of Contaminated Materials to Onsite Containment Cell	**1.00**	**LS**	**754,290**	**0**	**0**	**754,290**
			9.78	*0.00%*	*0.00%*	*9.78*
USR HAUL-MC-01 Transportation of Slag and Battery Casings from Seawall to Margaret's Creek Cells	5,363.00	LCY	52,469	0	0	52,469
			7.24	*0.00%*	*0.00%*	*7.24*
USR HAUL-WJ-01 Transportation of Slag and Battery Casings from Western Jetty to Western Jetty Containment Cell	4,994.00	LCY	36,179	0	0	36,179
			7.24	*0.00%*	*0.00%*	*7.24*
USR HAUL-MC-03 Transportation of Slag and Battery Casings from Margaret's Creek to Margaret's Creek Cells	711.00	LCY	5,151	0	0	5,151
			6.32	*0.00%*	*0.00%*	*6.32*
USR HAUL-MC-02 Transportation of Soil from Seawall to Margaret's Creek Cells	88,824.00	LCY	561,134	0	0	561,134
			3.27	*0.00%*	*0.00%*	*3.27*
USR HAUL-WJ-02 Transportation of Soil from Western Jetty to Western Jetty Containment Cell	7,890.00	LCY	25,812	0	0	25,812
			3.27	*0.00%*	*0.00%*	*3.27*
USR HAUL-MC-04 Transportation of Soil from Margaret's Creek to Margaret's Creek Cells	22,481.00	LCY	73,546	0	0	73,546
ALT5-07 Onsite Containtment Cell Construction	**1.00**	**LS**	**8,955,142**	**0**	**0**	**8,955,142**
CELL-A Onsite Cell #1 Near the Western Jetty	**1.00**	**LS**	**1,239,922**	**0**	**0**	**1,239,922**
CELL-01 Site Preparation	**1.00**	**LS**	**777,929**	**0**	**0**	**777,929**
			70.48	*0.00%*	*0.00%*	*70.48*
RSM 311313202040 Selective clearing and grubbing, 1-1/2 C.Y. excavator, 4" to 6" diameter, stump removal on site by hydraulic excavator	30.00	EA	2,114	0	0	2,114
			27.66	*0.00%*	*0.00%*	*27.66*
RSM 320130105910 Site maintenance, road & walk maintenance, asphaltic concrete paving, cold patch, 2" thick	334.00	SY	9,238	0	0	9,238
			0.93	*0.00%*	*0.00%*	*0.93*
RSM 320116715320 Cold milling asphalt paving, asphalt pavement, 1" to 3" deep, removal from concrete base, rip, load and sweep, excludes hauling	667.00	SY	620	0	0	620
			765,956.86	*0.00%*	*0.00%*	*765,956.86*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR PREP-02 Sub Base Improvements	1.00	ACR	765,957	0	0	765,957
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**148,098**	**0**	**0**	**148,098**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,056.00	ECY	21,469	0	0	21,469
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	7,023.00	LCY	126,629	0	0	126,629
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**32,176**	**0**	**0**	**32,176**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	34,432.00	SF	32,176	0	0	32,176
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**60,552**	**0**	**0**	**60,552**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**12,674**	**0**	**0**	**12,674**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	7,758	0	0	7,758
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	378	0	0	378
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	335	0	0	335
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**47,878**	**0**	**0**	**47,878**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,105.00	LCY	45,281	0	0	45,281
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,105.00	LCY	2,597	0	0	2,597
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**18,913**	**0**	**0**	**18,913**
			0.88	*0.00%*	*0.00%*	*0.88*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	21,576.00	SF	18,913	0	0	18,913
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**45,328**	**0**	**0**	**45,328**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	10,675.00	ECY	45,328	0	0	45,328
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**36,240**	**0**	**0**	**36,240**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	41,344.00	SF	36,240	0	0	36,240
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**58,516**	**0**	**0**	**58,516**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**12,674**	**0**	**0**	**12,674**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	7,758	0	0	7,758
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	378	0	0	378
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	335	0	0	335
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**45,842**	**0**	**0**	**45,842**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,058.00	LCY	43,355	0	0	43,355
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,058.00	LCY	2,486	0	0	2,486
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**31,034**	**0**	**0**	**31,034**
			0.75	*0.00%*	*0.00%*	*0.75*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR GEO-01 LLDPE Geomembrane for Cover	41,344.00	SF	31,034	0	0	31,034
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**21,534**	**0**	**0**	**21,534**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	41,344.00	SF	21,534	0	0	21,534
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**3,351**	**0**	**0**	**3,351**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	114.00	ECY	484	0	0	484
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	159.00	LCY	2,867	0	0	2,867
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**6,251**	**0**	**0**	**6,251**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	41.00	LCY	2,016	0	0	2,016
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	29.00	ECY	123	0	0	123
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	41,344.00	SF	4,112	0	0	4,112
CELL-B Onsite Cell #2 Near Margaret's Creek Area	**1.00**	**LS**	**2,685,454**	**0**	**0**	**2,685,454**
CELL-01 Site Preparation	**1.00**	**LS**	**1,550,538**	**0**	**0**	**1,550,538**
			9,312.22	*0.00%*	*0.00%*	*9,312.22*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	2.00	ACR	18,624	0	0	18,624
			765,956.86	*0.00%*	*0.00%*	*765,956.86*
USR PREP-02 Sub Base Improvements	2.00	ACR	1,531,914	0	0	1,531,914
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**262,312**	**0**	**0**	**262,312**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	8,956.00	ECY	38,029	0	0	38,029
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	12,439.00	LCY	224,283	0	0	224,283
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**87,641**	**0**	**0**	**87,641**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	93,787.00	SF	87,641	0	0	87,641
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**178,490**	**0**	**0**	**178,490**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**29,006**	**0**	**0**	**29,006**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	21,982	0	0	21,982
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	3,699	0	0	3,699
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	4.00	EA	504	0	0	504

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
polyethylene, tees, 4" dia, SDR 21/SDR 26						
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	447	0	0	447
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**149,484**	**0**	**0**	**149,484**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	3,450.00	LCY	141,376	0	0	141,376
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	3,450.00	LCY	8,108	0	0	8,108
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**59,107**	**0**	**0**	**59,107**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	67,431.00	SF	59,107	0	0	59,107
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**128,002**	**0**	**0**	**128,002**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	30,145.00	ECY	128,002	0	0	128,002
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**98,164**	**0**	**0**	**98,164**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	111,988.00	SF	98,164	0	0	98,164
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**153,056**	**0**	**0**	**153,056**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**29,006**	**0**	**0**	**29,006**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	21,982	0	0	21,982
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	3,699	0	0	3,699
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	4.00	EA	504	0	0	504

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
polyethylene, tees, 4" dia, SDR 21/SDR 26						
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	447	0	0	447
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**124,050**	**0**	**0**	**124,050**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	2,863.00	LCY	117,322	0	0	117,322
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	2,863.00	LCY	6,728	0	0	6,728
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**84,062**	**0**	**0**	**84,062**
			0.75	*0.00%*	*0.00%*	*0.75*
USR GEO-01 LLDPE Geomembrane for Cover	111,988.00	SF	84,062	0	0	84,062
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**58,329**	**0**	**0**	**58,329**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	111,988.00	SF	58,329	0	0	58,329
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**9,025**	**0**	**0**	**9,025**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	308.00	ECY	1,308	0	0	1,308
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	428.00	LCY	7,717	0	0	7,717
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**16,727**	**0**	**0**	**16,727**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	107.00	LCY	5,262	0	0	5,262
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	77.00	ECY	327	0	0	327
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	111,988.00	SF	11,138	0	0	11,138
CELL-C Onsite Cell #3 Near Margaret's Creek Area	**1.00**	**LS**	**4,991,371**	**0**	**0**	**4,991,371**
CELL-01 Site Preparation	**1.00**	**LS**	**3,101,076**	**0**	**0**	**3,101,076**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			9,312.22	*0.00%*	*0.00%*	*9,312.22*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	4.00	ACR	37,249	0	0	37,249
			765,956.86	*0.00%*	*0.00%*	*765,956.86*
USR PREP-02 Sub Base Improvements	4.00	ACR	3,063,827	0	0	3,063,827
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**327,894**	**0**	**0**	**327,894**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	11,195.00	ECY	47,536	0	0	47,536
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	15,549.00	LCY	280,358	0	0	280,358
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**153,426**	**0**	**0**	**153,426**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	164,185.00	SF	153,426	0	0	153,426
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**329,707**	**0**	**0**	**329,707**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**48,677**	**0**	**0**	**48,677**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	40,732	0	0	40,732
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	3,907	0	0	3,907
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	882	0	0	882
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	782	0	0	782
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**281,031**	**0**	**0**	**281,031**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	6,486.00	LCY	265,788	0	0	265,788
			2.35	*0.00%*	*0.00%*	*2.35*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	6,486.00	LCY	15,243	0	0	15,243
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**111,127**	**0**	**0**	**111,127**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	126,776.00	SF	111,127	0	0	111,127
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**238,080**	**0**	**0**	**238,080**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	56,069.00	ECY	238,080	0	0	238,080
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**171,341**	**0**	**0**	**171,341**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	195,470.00	SF	171,341	0	0	171,341
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**265,191**	**0**	**0**	**265,191**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**48,677**	**0**	**0**	**48,677**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	40,732	0	0	40,732
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	3,907	0	0	3,907
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	882	0	0	882
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	782	0	0	782
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**216,514**	**0**	**0**	**216,514**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	4,997.00	LCY	204,771	0	0	204,771
			2.35	*0.00%*	*0.00%*	*2.35*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	4,997.00	LCY	11,744	0	0	11,744
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**146,727**	**0**	**0**	**146,727**
			0.75	*0.00%*	*0.00%*	*0.75*
USR GEO-01 LLDPE Geomembrane for Cover	195,470.00	SF	146,727	0	0	146,727
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**101,811**	**0**	**0**	**101,811**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	195,470.00	SF	101,811	0	0	101,811
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**15,731**	**0**	**0**	**15,731**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	537.00	ECY	2,280	0	0	2,280
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	746.00	LCY	13,451	0	0	13,451
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**29,260**	**0**	**0**	**29,260**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	188.00	LCY	9,245	0	0	9,245
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	135.00	ECY	573	0	0	573
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	195,470.00	SF	19,442	0	0	19,442
CELL-01 Groundwater Monitoring - Well Installation	**1.00**	**LS**	**38,394**	**0**	**0**	**38,394**
USR OM-02 Mobilization/Demobilization of Drill Rig	1.00	LS	15,319	0	0	15,319
			61.60	*0.00%*	*0.00%*	*61.60*
HTW 023223135112 Monitoring well construction, drilling, hollow stem auger, normal soil, 2" or less casing/screen, 4-1/4" ID x 8" OD auger	300.00	LF	18,480	0	0	18,480
			306.38	*0.00%*	*0.00%*	*306.38*
USR OM-03 Well Completion	15.00	EA	4,596	0	0	4,596
ALT5-08 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**6,870,256**	**0**	**0**	**6,870,256**
			573,340.19			*573,340.19*
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**573,340**	**0**	**0**	**573,340**
			477,411.75			*477,411.75*
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**477,412**	**0**	**0**	**477,412**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	5,097.00	TON	317,480	0	0	317,480
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	62,196	0	0	62,196
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	464.00	HR	71,081	0	0	71,081
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	26,655	0	0	26,655

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			95,928.44			*95,928.44*
SEA-SOIL-02 Waste Characterization	**1.00**	**EA**	**95,928**	**0**	**0**	**95,928**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	155.00	EA	94,979	0	0	94,979
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	155.00	EA	950	0	0	950
			6,296,915.43			*6,296,915.43*
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**6,296,915**	**0**	**0**	**6,296,915**
			4,949,058.08			*4,949,058.08*
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**4,949,058**	**0**	**0**	**4,949,058**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	52,860.00	TON	3,292,523	0	0	3,292,523
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	2,403.00	EA	644,208	0	0	644,208
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	4,806.00	HR	736,238	0	0	736,238
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	2,403.00	EA	276,089	0	0	276,089
			330,397.02			*330,397.02*
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**330,397**	**0**	**0**	**330,397**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	920.00	LCY	98,021	0	0	98,021
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	1,379.00	TON	232,376	0	0	232,376
			1,017,460.33			*1,017,460.33*
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**1,017,460**	**0**	**0**	**1,017,460**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	1,644.00	EA	1,007,386	0	0	1,007,386
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,644.00	EA	10,074	0	0	10,074
ALT5-09 Site Restoration	**1.00**	**LS**	**11,718,046**	**0**	**0**	**11,718,046**
REST-01 Seawall Reconstruction	**1.00**	**LS**	**2,757,445**	**0**	**0**	**2,757,445**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	7,500.00	TON	1,263,829	0	0	1,263,829
			99.57	*0.00%*	*0.00%*	*99.57*
USR REST-02 Reconstruction using Corestone	15,000.00	TON	1,493,616	0	0	1,493,616
REST-02 Jetty Reconstruction	**1.00**	**LS**	**898,667**	**0**	**0**	**898,667**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	5,333.00	TON	898,667	0	0	898,667

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			8,061,935.20			*8,061,935.20*
REST-03 Backfill of Excavations	**1.00**	**EA**	**8,061,935**	**0**	**0**	**8,061,935**
			42.89	*0.00%*	*0.00%*	*42.89*
USR DREDG-03 Backfilling of Sediment Dredged	140,063.00	TON	6,007,804	0	0	6,007,804
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	1,446,651	0	0	1,446,651
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	362,194	0	0	362,194
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	245,286	0	0	245,286
ALT5-10 O&M	**1.00**	**LS**	**232,329**	**0**	**0**	**232,329**
OM-01 O&M of Onsite Containment Cell	**1.00**	**LS**	**171,003**	**0**	**0**	**171,003**
OM-01-02 Annual Sampling per Year	**1.00**	**LS**	**11,349**	**0**	**0**	**11,349**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	15.00	EA	1,941	0	0	1,941
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	24.00	HR	4,337	0	0	4,337
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	15.00	EA	87	0	0	87
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	3.00	DAY	1,383	0	0	1,383
OM-01-03 Quarterly Sampling per Year	**1.00**	**LS**	**34,594**	**0**	**0**	**34,594**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	7,766	0	0	7,766
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	96.00	HR	17,347	0	0	17,347
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	348	0	0	348
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	5,533	0	0	5,533
OM-01-04 Semi-annual Sampling per Year	**1.00**	**LS**	**19,097**	**0**	**0**	**19,097**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	3,883	0	0	3,883
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	48.00	HR	8,673	0	0	8,673
			5.80	*0.00%*	*0.00%*	*5.80*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	174	0	0	174
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	2,767	0	0	2,767
OM-01-05 Quarterly Inspections per Year	**1.00**	**LS**	**14,852**	**0**	**0**	**14,852**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	64.00	HR	9,407	0	0	9,407
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	8.00	DAY	1,844	0	0	1,844
OM-01-06 Semi-annual Inspections	**1.00**	**LS**	**9,226**	**0**	**0**	**9,226**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	32.00	HR	4,704	0	0	4,704
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	4.00	DAY	922	0	0	922
OM-01-01 Annual Inspections	**1.00**	**LS**	**6,414**	**0**	**0**	**6,414**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	16.00	HR	2,352	0	0	2,352
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	2.00	DAY	461	0	0	461
			75,470.36			*75,470.36*
OM-AN Annual for 30 years	**1.00**	**EA**	**75,470**	**0**	**0**	**75,470**
OM-01-08 Mowing and Snow Removal	**1.00**	**LS**	**30,532**	**0**	**0**	**30,532**
			84.49	*0.00%*	*0.00%*	*84.49*
RSM 320190191670 Mowing, mowing brush, medium density, tractor with rotary mower	349.00	MSF	29,487	0	0	29,487
			130.63	*0.00%*	*0.00%*	*130.63*
USR 320130200240 Snow removal, clearing, 1 C.Y., with wheeled skid steer loader	8.00	HR	1,045	0	0	1,045
OM-01-09 Leachate Pumping	**1.00**	**LS**	**29,707**	**0**	**0**	**29,707**
			270.23	*0.00%*	*0.00%*	*270.23*
USR EW-07 Transport Water	48.00	HR	12,971	0	0	12,971
			174.34	*0.00%*	*0.00%*	*174.34*
USR EW-DW-01 Dewatering (pumping)	96.00	HR	16,736	0	0	16,736
OM-01-10 Erosion Repair	**1.00**	**LS**	**7,411**	**0**	**0**	**7,411**
			231.59	*0.00%*	*0.00%*	*231.59*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR OM-01 Erosion Repair	32.00	HR	7,411	0	0	7,411
OM-01-07 Additional Inspections after Storm Events	**1.00**	**LS**	**7,820**	**0**	**0**	**7,820**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	3,528	0	0	3,528
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	692	0	0	692
OM-02 O&M of Cap at Area 8	**1.00**	**LS**	**61,326**	**0**	**0**	**61,326**
OM-02-01 Semi-annual Sampling	**1.00**	**LS**	**39,729**	**0**	**0**	**39,729**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	33.00	EA	4,271	0	0	4,271
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	160.00	HR	28,911	0	0	28,911
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	20.00	DAY	2,755	0	0	2,755
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	33.00	EA	191	0	0	191
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
OM-02-02 Annual Sampling	**1.00**	**LS**	**21,597**	**0**	**0**	**21,597**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	16.00	EA	2,071	0	0	2,071
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	80.00	HR	14,455	0	0	14,455
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	10.00	DAY	1,378	0	0	1,378
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	16.00	EA	93	0	0	93
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
ALT6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**52,478,927**	**0**	**0**	**52,478,927**
ALT6-01 General Conditions	**1.00**	**LS**	**810,759**	**0**	**0**	**810,759**
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**676,921**	**0**	**0**	**676,921**
			106.52	*0.00%*	*0.00%*	*106.52*
FOP FA-PROJM Project Managers	1,127.00	HR	120,043	0	0	120,043
			82.62	*0.00%*	*0.00%*	*82.62*
FOP FC-ENGPE Engineers, Project	2,253.00	HR	186,137	0	0	186,137
			84.38	*0.00%*	*0.00%*	*84.38*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
HNC FA-AGENS General Superintendent (P.M.)	2,253.00	HR	190,102	0	0	190,102
			43.43	*0.00%*	*0.00%*	*43.43*
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	8,686	0	0	8,686
			65.35	*0.00%*	*0.00%*	*65.35*
FOP FC-FLDER Field Engineers	100.00	HR	6,535	0	0	6,535
			67.27	*0.00%*	*0.00%*	*67.27*
HNC FD-SAENG Safety Engineer	200.00	HR	13,454	0	0	13,454
			197.35	*0.00%*	*0.00%*	*197.35*
USR GENCON-01 Per Diem	770.00	DAY	151,963	0	0	151,963
			133,838.85			*133,838.85*
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**133,839**	**0**	**0**	**133,839**
			379.84	*0.00%*	*0.00%*	*379.84*
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	13.00	EA	4,938	0	0	4,938
			122.85	*0.00%*	*0.00%*	*122.85*
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	13.00	EA	1,597	0	0	1,597
			106.25	*0.00%*	*0.00%*	*106.25*
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	13.00	MO	1,381	0	0	1,381
			112.89	*0.00%*	*0.00%*	*112.89*
RSM 015213400120 Field Office Expense, office supplies, average	13.00	MO	1,468	0	0	1,468
			199.22	*0.00%*	*0.00%*	*199.22*
RSM 015213400160 Field Office Expense, field office lights & HVAC	13.00	MO	2,590	0	0	2,590
			109.85	*0.00%*	*0.00%*	*109.85*
HNC 015213201400 Toilet, portable, chemical, rent per month	26.00	MO	2,856	0	0	2,856
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	5,633.00	HR	85,377	0	0	85,377
			15.16	*0.00%*	*0.00%*	*15.16*
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	455	0	0	455
			99.61	*0.00%*	*0.00%*	*99.61*
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	11,953	0	0	11,953
			6,206.10	*0.00%*	*0.00%*	*6,206.10*
USR CC-E-02-01 Small Tools Allowance	1.00	EA	6,206	0	0	6,206
			0.93	*0.00%*	*0.00%*	*0.93*
USR CC-E-02-02 Cell Phone Allowance	6,133.00	HR	5,709	0	0	5,709
			9,309.15	*0.00%*	*0.00%*	*9,309.15*
USR CC-E-02-03 Electrician	1.00	EA	9,309	0	0	9,309
ALT6-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**2,888,331**	**0**	**0**	**2,888,331**
			252.04	*0.00%*	*0.00%*	*252.04*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR EC-04 Maintenance Crew	13.00	MO	3,277	0	0	3,277
			2,813,518.51			*2,813,518.51*
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**2,813,519**	**0**	**0**	**2,813,519**
			298,470.41	*0.00%*	*0.00%*	*298,470.41*
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	298,470	0	0	298,470
			181,707.95	*0.00%*	*0.00%*	*181,707.95*
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	363,416	0	0	363,416
			121,136.08	*0.00%*	*0.00%*	*121,136.08*
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	1,211,361	0	0	1,211,361
			16,264.33	*0.00%*	*0.00%*	*16,264.33*
USR COFFDAM-04 Installation Crew	36.00	DAY	585,516	0	0	585,516
			1,473.70	*0.00%*	*0.00%*	*1,473.70*
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	8,842	0	0	8,842
			1,861.25	*0.00%*	*0.00%*	*1,861.25*
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	67,005	0	0	67,005
			4,536.79	*0.00%*	*0.00%*	*4,536.79*
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	163,324	0	0	163,324
			23.27	*0.00%*	*0.00%*	*23.27*
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	107,022	0	0	107,022
			1.26	*0.00%*	*0.00%*	*1.26*
USR COFFDAM-09 Sand Bag	4,600.00	EA	5,791	0	0	5,791
			31.14	*0.00%*	*0.00%*	*31.14*
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	2,772	0	0	2,772
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**63,380**	**0**	**0**	**63,380**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	23,245	0	0	23,245
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	27,120.00	LF	8,621	0	0	8,621
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	27,120.00	LF	31,514	0	0	31,514
			8,156.17			*8,156.17*
EC-03 Silt Fencing Around the Perimeter of Containment Cells	**1.00**	**EA**	**8,156**	**0**	**0**	**8,156**
			0.86	*0.00%*	*0.00%*	*0.86*
USR EC-01 Silt Fence, contractor grade including 2 in stakes	3,490.00	LF	2,991	0	0	2,991
			0.32	*0.00%*	*0.00%*	*0.32*
USR EC-02 Silt Fence Removal	3,490.00	LF	1,109	0	0	1,109
			1.16	*0.00%*	*0.00%*	*1.16*
USR EC-03 Silt Fence Installation	3,490.00	LF	4,055	0	0	4,055
ALT6-03 MNR	**1.00**	**LS**	**251,237**	**0**	**0**	**251,237**
ALT6-03-01 Semi-annual Sampling	**1.00**	**LS**	**166,291**	**0**	**0**	**166,291**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	38,310	0	0	38,310
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	480.00	HR	86,733	0	0	86,733
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	8,265	0	0	8,265
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	1,717	0	0	1,717
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	27,666	0	0	27,666
ALT6-03-02 Annual Sampling	**1.00**	**LS**	**84,946**	**0**	**0**	**84,946**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	19,155	0	0	19,155
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	240.00	HR	43,366	0	0	43,366
			137.75	*0.00%*	*0.00%*	*137.75*
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	4,133	0	0	4,133
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	858	0	0	858
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	13,833	0	0	13,833
ALT6-04 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**16,255,612**	**0**	**0**	**16,255,612**
			8,220,185.04			*8,220,185.04*
SEA Seawall Sector Site Activities	**1.00**	**EA**	**8,220,185**	**0**	**0**	**8,220,185**
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**6,038,190**	**0**	**0**	**6,038,190**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	4,378,592	0	0	4,378,592
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	1,290,225	0	0	1,290,225
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	57,279	0	0	57,279
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	84,779	0	0	84,779
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	5,295.00	LCY	43,907	0	0	43,907
			183,408.04			*183,408.04*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Post Excavation Confirmation Sampling	**1.00**	**EA**	**183,408**	**0**	**0**	**183,408**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	172,016	0	0	172,016
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	7,709	0	0	7,709
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			1,482,004.11			*1,482,004.11*
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**1,482,004**	**0**	**0**	**1,482,004**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	595,148	0	0	595,148
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	719,188	0	0	719,188
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	31,929	0	0	31,929
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	104,993	0	0	104,993
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	59.00	LCY	489	0	0	489
			30,256.38			*30,256.38*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**30,256**	**0**	**0**	**30,256**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	25,433	0	0	25,433
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	1,140	0	0	1,140
			8,730.31			*8,730.31*
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**8,730**	**0**	**0**	**8,730**
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	2,332	0	0	2,332
			6,397.86			*6,397.86*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**6,398**	**0**	**0**	**6,398**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	2,598	0	0	2,598
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	116	0	0	116

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			38,445.65			*38,445.65*
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**38,446**	**0**	**0**	**38,446**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	27,660	0	0	27,660
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	1,228	0	0	1,228
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	4,303	0	0	4,303
			5,254.94			*5,254.94*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**5,255**	**0**	**0**	**5,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	1,504	0	0	1,504
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	67	0	0	67
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			573,930.10			*573,930.10*
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**573,930**	**0**	**0**	**573,930**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	392,936	0	0	392,936
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	115,785	0	0	115,785
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	5,141	0	0	5,141
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	24,023	0	0	24,023
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	9.00	LCY	75	0	0	75
			35,970.99			*35,970.99*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**35,971**	**0**	**0**	**35,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	30,903	0	0	30,903
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	1,385	0	0	1,385
			78,885.00			*78,885.00*
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**78,885**	**0**	**0**	**78,885**
			114.89	*0.00%*	*0.00%*	*114.89*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR DREDG-01 Dredging of Sediment	440.00	LCY	50,553	0	0	50,553
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	14,896	0	0	14,896
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	662	0	0	662
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	3,518	0	0	3,518
			9,255.17			*9,255.17*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**9,255**	**0**	**0**	**9,255**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	5,333	0	0	5,333
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	239	0	0	239
			7,473,894.35			*7,473,894.35*
JET Jetty Sector Site Activities	**1.00**	**EA**	**7,473,894**	**0**	**0**	**7,473,894**
			1,143,823.96			*1,143,823.96*
JET-07 Area 7 Site Activities	**1.00**	**EA**	**1,143,824**	**0**	**0**	**1,143,824**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	845,616	0	0	845,616
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	249,175	0	0	249,175
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	11,062	0	0	11,062
			37,971.10			*37,971.10*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**37,971**	**0**	**0**	**37,971**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	32,817	0	0	32,817
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	1,471	0	0	1,471
			5,567,223.52			*5,567,223.52*
JET-08 Area 8 Site Activities	**1.00**	**EA**	**5,567,224**	**0**	**0**	**5,567,224**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	4,160,295	0	0	4,160,295
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	1,225,900	0	0	1,225,900

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	54,423	0	0	54,423
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	24,794	0	0	24,794
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	4,994.00	LCY	41,411	0	0	41,411
			60,400.96			*60,400.96*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**60,401**	**0**	**0**	**60,401**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	54,285	0	0	54,285
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	2,433	0	0	2,433
			762,846.88			*762,846.88*
JET-10 Area 11 Site Activities	**1.00**	**EA**	**762,847**	**0**	**0**	**762,847**
			114.89	*0.00%*	*0.00%*	*114.89*
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	530,808	0	0	530,808
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	156,411	0	0	156,411
			1.45	*0.00%*	*0.00%*	*1.45*
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	6,944	0	0	6,944
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	14,140	0	0	14,140
			54,543.49			*54,543.49*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**54,543**	**0**	**0**	**54,543**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	48,679	0	0	48,679
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	2,181	0	0	2,181
			561,532.58			*561,532.58*
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
			561,532.58			*561,532.58*
MC-09 Area 9 Site Activities	**1.00**	**EA**	**561,533**	**0**	**0**	**561,533**
			33.86	*0.00%*	*0.00%*	*33.86*
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	119,611	0	0	119,611
			1.45	*0.00%*	*0.00%*	*1.45*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	5,310	0	0	5,310
			6.59	*0.00%*	*0.00%*	*6.59*
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	117,730	0	0	117,730
			8.29	*0.00%*	*0.00%*	*8.29*
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	5,896	0	0	5,896
			312,986.91			*312,986.91*
Post Excavation Confirmation Sampling	**1.00**	**EA**	**312,987**	**0**	**0**	**312,987**
			136.74	*0.00%*	*0.00%*	*136.74*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	296,037	0	0	296,037
			3,683.42	*0.00%*	*0.00%*	*3,683.42*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,683	0	0	3,683
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	13,266	0	0	13,266
ALT6-05 Transportation of Contaminated Materials to Onsite Containment Cell	**1.00**	**LS**	**754,290**	**0**	**0**	**754,290**
			9.78	*0.00%*	*0.00%*	*9.78*
USR HAUL-MC-01 Transportation of Slag and Battery Casings from Seawall to Margaret's Creek Cells	5,363.00	LCY	52,469	0	0	52,469
			7.24	*0.00%*	*0.00%*	*7.24*
USR HAUL-WJ-01 Transportation of Slag and Battery Casings from Western Jetty to Western Jetty Containment Cell	4,994.00	LCY	36,179	0	0	36,179
			7.24	*0.00%*	*0.00%*	*7.24*
USR HAUL-MC-03 Transportation of Slag and Battery Casings from Margaret's Creek to Margaret's Creek Cells	711.00	LCY	5,151	0	0	5,151
			6.32	*0.00%*	*0.00%*	*6.32*
USR HAUL-MC-02 Transportation of Soil from Seawall to Margaret's Creek Cells	88,824.00	LCY	561,134	0	0	561,134
			3.27	*0.00%*	*0.00%*	*3.27*
USR HAUL-WJ-02 Transportation of Soil from Western Jetty to Western Jetty Containment Cell	7,890.00	LCY	25,812	0	0	25,812
			3.27	*0.00%*	*0.00%*	*3.27*
USR HAUL-MC-04 Transportation of Soil from Margaret's Creek to Margaret's Creek Cells	22,481.00	LCY	73,546	0	0	73,546
ALT6-06 Onsite Containtment Cell Construction	**1.00**	**LS**	**8,955,142**	**0**	**0**	**8,955,142**
CELL-A Onsite Cell #1 Near the Western Jetty	**1.00**	**LS**	**1,239,922**	**0**	**0**	**1,239,922**
CELL-01 Site Preparation	**1.00**	**LS**	**777,929**	**0**	**0**	**777,929**
			70.48	*0.00%*	*0.00%*	*70.48*
RSM 311313202040 Selective clearing and grubbing, 1-1/2 C.Y. excavator, 4" to 6" diameter, stump removal on site by hydraulic excavator	30.00	EA	2,114	0	0	2,114
			27.66	*0.00%*	*0.00%*	*27.66*
RSM 320130105910 Site maintenance, road & walk maintenance, asphaltic concrete paving, cold patch, 2" thick	334.00	SY	9,238	0	0	9,238
			0.93	*0.00%*	*0.00%*	*0.93*
RSM 320116715320 Cold milling asphalt paving, asphalt pavement, 1" to 3" deep, removal from concrete base, rip, load and sweep, excludes hauling	667.00	SY	620	0	0	620
			765,956.86	*0.00%*	*0.00%*	*765,956.86*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR PREP-02 Sub Base Improvements	1.00	ACR	765,957	0	0	765,957
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**148,098**	**0**	**0**	**148,098**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,056.00	ECY	21,469	0	0	21,469
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	7,023.00	LCY	126,629	0	0	126,629
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**32,176**	**0**	**0**	**32,176**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	34,432.00	SF	32,176	0	0	32,176
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**60,552**	**0**	**0**	**60,552**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**12,674**	**0**	**0**	**12,674**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	7,758	0	0	7,758
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	378	0	0	378
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	335	0	0	335
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**47,878**	**0**	**0**	**47,878**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,105.00	LCY	45,281	0	0	45,281
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,105.00	LCY	2,597	0	0	2,597
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**18,913**	**0**	**0**	**18,913**
			0.88	*0.00%*	*0.00%*	*0.88*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	21,576.00	SF	18,913	0	0	18,913
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**45,328**	**0**	**0**	**45,328**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	10,675.00	ECY	45,328	0	0	45,328
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**36,240**	**0**	**0**	**36,240**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	41,344.00	SF	36,240	0	0	36,240
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**58,516**	**0**	**0**	**58,516**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**12,674**	**0**	**0**	**12,674**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	7,758	0	0	7,758
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	1,829	0	0	1,829
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	378	0	0	378
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	335	0	0	335
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**45,842**	**0**	**0**	**45,842**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	1,058.00	LCY	43,355	0	0	43,355
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,058.00	LCY	2,486	0	0	2,486
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**31,034**	**0**	**0**	**31,034**
			0.75	*0.00%*	*0.00%*	*0.75*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR GEO-01 LLDPE Geomembrane for Cover	41,344.00	SF	31,034	0	0	31,034
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**21,534**	**0**	**0**	**21,534**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	41,344.00	SF	21,534	0	0	21,534
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**3,351**	**0**	**0**	**3,351**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	114.00	ECY	484	0	0	484
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	159.00	LCY	2,867	0	0	2,867
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**6,251**	**0**	**0**	**6,251**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	41.00	LCY	2,016	0	0	2,016
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	29.00	ECY	123	0	0	123
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	41,344.00	SF	4,112	0	0	4,112
CELL-B Onsite Cell #2 Near Margaret's Creek Area	**1.00**	**LS**	**2,685,454**	**0**	**0**	**2,685,454**
CELL-01 Site Preparation	**1.00**	**LS**	**1,550,538**	**0**	**0**	**1,550,538**
			9,312.22	*0.00%*	*0.00%*	*9,312.22*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	2.00	ACR	18,624	0	0	18,624
			765,956.86	*0.00%*	*0.00%*	*765,956.86*
USR PREP-02 Sub Base Improvements	2.00	ACR	1,531,914	0	0	1,531,914
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**262,312**	**0**	**0**	**262,312**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	8,956.00	ECY	38,029	0	0	38,029
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	12,439.00	LCY	224,283	0	0	224,283
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**87,641**	**0**	**0**	**87,641**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	93,787.00	SF	87,641	0	0	87,641
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**178,490**	**0**	**0**	**178,490**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**29,006**	**0**	**0**	**29,006**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	21,982	0	0	21,982
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	3,699	0	0	3,699
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	4.00	EA	504	0	0	504

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
polyethylene, tees, 4" dia, SDR 21/SDR 26						
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	447	0	0	447
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**149,484**	**0**	**0**	**149,484**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	3,450.00	LCY	141,376	0	0	141,376
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	3,450.00	LCY	8,108	0	0	8,108
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**59,107**	**0**	**0**	**59,107**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	67,431.00	SF	59,107	0	0	59,107
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**128,002**	**0**	**0**	**128,002**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	30,145.00	ECY	128,002	0	0	128,002
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**98,164**	**0**	**0**	**98,164**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	111,988.00	SF	98,164	0	0	98,164
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**153,056**	**0**	**0**	**153,056**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**29,006**	**0**	**0**	**29,006**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	21,982	0	0	21,982
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	3,699	0	0	3,699
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	4.00	EA	504	0	0	504

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
polyethylene, tees, 4" dia, SDR 21/SDR 26						
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	447	0	0	447
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**124,050**	**0**	**0**	**124,050**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	2,863.00	LCY	117,322	0	0	117,322
			2.35	*0.00%*	*0.00%*	*2.35*
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	2,863.00	LCY	6,728	0	0	6,728
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**84,062**	**0**	**0**	**84,062**
			0.75	*0.00%*	*0.00%*	*0.75*
USR GEO-01 LLDPE Geomembrane for Cover	111,988.00	SF	84,062	0	0	84,062
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**58,329**	**0**	**0**	**58,329**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	111,988.00	SF	58,329	0	0	58,329
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**9,025**	**0**	**0**	**9,025**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	308.00	ECY	1,308	0	0	1,308
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	428.00	LCY	7,717	0	0	7,717
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**16,727**	**0**	**0**	**16,727**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	107.00	LCY	5,262	0	0	5,262
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	77.00	ECY	327	0	0	327
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	111,988.00	SF	11,138	0	0	11,138
CELL-C Onsite Cell #3 Near Margaret's Creek Area	**1.00**	**LS**	**4,991,371**	**0**	**0**	**4,991,371**
CELL-01 Site Preparation	**1.00**	**LS**	**3,101,076**	**0**	**0**	**3,101,076**

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			9,312.22	*0.00%*	*0.00%*	*9,312.22*
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	4.00	ACR	37,249	0	0	37,249
			765,956.86	*0.00%*	*0.00%*	*765,956.86*
USR PREP-02 Sub Base Improvements	4.00	ACR	3,063,827	0	0	3,063,827
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**327,894**	**0**	**0**	**327,894**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	11,195.00	ECY	47,536	0	0	47,536
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	15,549.00	LCY	280,358	0	0	280,358
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**153,426**	**0**	**0**	**153,426**
			0.93	*0.00%*	*0.00%*	*0.93*
USR GEO-02 LLDPE Geomembrane for Liner	164,185.00	SF	153,426	0	0	153,426
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**329,707**	**0**	**0**	**329,707**
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**48,677**	**0**	**0**	**48,677**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	40,732	0	0	40,732
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	3,907	0	0	3,907
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	882	0	0	882
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	782	0	0	782
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-04-02 Sand Bedding	**1.00**	**LS**	**281,031**	**0**	**0**	**281,031**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	6,486.00	LCY	265,788	0	0	265,788
			2.35	*0.00%*	*0.00%*	*2.35*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	6,486.00	LCY	15,243	0	0	15,243
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**111,127**	**0**	**0**	**111,127**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	126,776.00	SF	111,127	0	0	111,127
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**238,080**	**0**	**0**	**238,080**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	56,069.00	ECY	238,080	0	0	238,080
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**171,341**	**0**	**0**	**171,341**
			0.88	*0.00%*	*0.00%*	*0.88*
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	195,470.00	SF	171,341	0	0	171,341
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**265,191**	**0**	**0**	**265,191**
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**48,677**	**0**	**0**	**48,677**
			12.93	*0.00%*	*0.00%*	*12.93*
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	40,732	0	0	40,732
			8.31	*0.00%*	*0.00%*	*8.31*
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	3,907	0	0	3,907
			126.00	*0.00%*	*0.00%*	*126.00*
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	882	0	0	882
			111.78	*0.00%*	*0.00%*	*111.78*
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	782	0	0	782
			662.57	*0.00%*	*0.00%*	*662.57*
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	663	0	0	663
			416.70	*0.00%*	*0.00%*	*416.70*
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	417	0	0	417
			13.11	*0.00%*	*0.00%*	*13.11*
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	13	0	0	13
			398.44	*0.00%*	*0.00%*	*398.44*
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	398	0	0	398
			882.58	*0.00%*	*0.00%*	*882.58*
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	883	0	0	883
CELL-08-02 Sand Bedding	**1.00**	**LS**	**216,514**	**0**	**0**	**216,514**
			40.98	*0.00%*	*0.00%*	*40.98*
USR EW-BF-03 Drainage Sand	4,997.00	LCY	204,771	0	0	204,771
			2.35	*0.00%*	*0.00%*	*2.35*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	4,997.00	LCY	11,744	0	0	11,744
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**146,727**	**0**	**0**	**146,727**
			0.75	*0.00%*	*0.00%*	*0.75*
USR GEO-01 LLDPE Geomembrane for Cover	195,470.00	SF	146,727	0	0	146,727
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**101,811**	**0**	**0**	**101,811**
			0.52	*0.00%*	*0.00%*	*0.52*
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	195,470.00	SF	101,811	0	0	101,811
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**15,731**	**0**	**0**	**15,731**
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	537.00	ECY	2,280	0	0	2,280
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill	746.00	LCY	13,451	0	0	13,451
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**29,260**	**0**	**0**	**29,260**
			49.17	*0.00%*	*0.00%*	*49.17*
USR EW-BF-04 Topsoil	188.00	LCY	9,245	0	0	9,245
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	135.00	ECY	573	0	0	573
			0.10	*0.00%*	*0.00%*	*0.10*
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	195,470.00	SF	19,442	0	0	19,442
CELL-01 Groundwater Monitoring - Well Installation	**1.00**	**LS**	**38,394**	**0**	**0**	**38,394**
USR OM-02 Mobilization/Demobilization of Drill Rig	1.00	LS	15,319	0	0	15,319
			61.60	*0.00%*	*0.00%*	*61.60*
HTW 023223135112 Monitoring well construction, drilling, hollow stem auger, normal soil, 2" or less casing/screen, 4-1/4" ID x 8" OD auger	300.00	LF	18,480	0	0	18,480
			306.38	*0.00%*	*0.00%*	*306.38*
USR OM-03 Well Completion	15.00	EA	4,596	0	0	4,596
ALT6-07 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**9,730,204**	**0**	**0**	**9,730,204**
			573,340.19			*573,340.19*
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**573,340**	**0**	**0**	**573,340**
			477,411.75			*477,411.75*
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**477,412**	**0**	**0**	**477,412**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	5,097.00	TON	317,480	0	0	317,480
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	62,196	0	0	62,196
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	464.00	HR	71,081	0	0	71,081
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	26,655	0	0	26,655

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			95,928.44			*95,928.44*
SEA-SOIL-02 Waste Characterization	**1.00**	**EA**	**95,928**	**0**	**0**	**95,928**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	155.00	EA	94,979	0	0	94,979
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	155.00	EA	950	0	0	950
			9,156,864.17			*9,156,864.17*
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**9,156,864**	**0**	**0**	**9,156,864**
			6,462,368.64			*6,462,368.64*
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**6,462,369**	**0**	**0**	**6,462,369**
			62.29	*0.00%*	*0.00%*	*62.29*
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	69,021.00	TON	4,299,153	0	0	4,299,153
			268.08	*0.00%*	*0.00%*	*268.08*
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	3,138.00	EA	841,250	0	0	841,250
			153.19	*0.00%*	*0.00%*	*153.19*
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	6,276.00	HR	961,429	0	0	961,429
			114.89	*0.00%*	*0.00%*	*114.89*
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	3,138.00	EA	360,536	0	0	360,536
			1,298,272.60			*1,298,272.60*
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**1,298,273**	**0**	**0**	**1,298,273**
			106.54	*0.00%*	*0.00%*	*106.54*
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	3,613.00	LCY	384,946	0	0	384,946
			168.51	*0.00%*	*0.00%*	*168.51*
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	5,420.00	TON	913,327	0	0	913,327
			1,396,222.93			*1,396,222.93*
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**1,396,223**	**0**	**0**	**1,396,223**
			612.77	*0.00%*	*0.00%*	*612.77*
USR LABAN-16 Sampling and Testing for Waste Characterization	2,256.00	EA	1,382,399	0	0	1,382,399
			6.13	*0.00%*	*0.00%*	*6.13*
USR LABAN-SHIP-001 Overnight Sample Shipment	2,256.00	EA	13,824	0	0	13,824
ALT6-08 Site Restoration	**1.00**	**LS**	**12,662,349**	**0**	**0**	**12,662,349**
REST-01 Seawall Reconstruction	**1.00**	**LS**	**2,757,445**	**0**	**0**	**2,757,445**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	7,500.00	TON	1,263,829	0	0	1,263,829
			99.57	*0.00%*	*0.00%*	*99.57*
USR REST-02 Reconstruction using Corestone	15,000.00	TON	1,493,616	0	0	1,493,616
REST-02 Jetty Reconstruction	**1.00**	**LS**	**898,667**	**0**	**0**	**898,667**
			168.51	*0.00%*	*0.00%*	*168.51*
USR REST-01 Reconstruction using Capstone	5,333.00	TON	898,667	0	0	898,667

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
			9,006,237.46			*9,006,237.46*
REST-03 Backfill of Excavations	**1.00**	**EA**	**9,006,237**	**0**	**0**	**9,006,237**
			42.89	*0.00%*	*0.00%*	*42.89*
USR DREDG-03 Backfilling of Sediment Dredged	162,078.00	TON	6,952,106	0	0	6,952,106
			18.03	*0.00%*	*0.00%*	*18.03*
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	1,446,651	0	0	1,446,651
			0.13	*0.00%*	*0.00%*	*0.13*
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	362,194	0	0	362,194
			4.25	*0.00%*	*0.00%*	*4.25*
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	245,286	0	0	245,286
ALT6-09 O&M	**1.00**	**LS**	**171,003**	**0**	**0**	**171,003**
OM-01 O&M of Onsite Containment Cell	**1.00**	**LS**	**171,003**	**0**	**0**	**171,003**
OM-01-02 Annual Sampling per Year	**1.00**	**LS**	**11,349**	**0**	**0**	**11,349**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	15.00	EA	1,941	0	0	1,941
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	24.00	HR	4,337	0	0	4,337
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	15.00	EA	87	0	0	87
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	3.00	DAY	1,383	0	0	1,383
OM-01-03 Quarterly Sampling per Year	**1.00**	**LS**	**34,594**	**0**	**0**	**34,594**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	7,766	0	0	7,766
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	96.00	HR	17,347	0	0	17,347
			5.80	*0.00%*	*0.00%*	*5.80*
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	348	0	0	348
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	5,533	0	0	5,533
OM-01-04 Semi-annual Sampling per Year	**1.00**	**LS**	**19,097**	**0**	**0**	**19,097**
			129.43	*0.00%*	*0.00%*	*129.43*
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	3,883	0	0	3,883
			180.69	*0.00%*	*0.00%*	*180.69*
USR STVISIT-01 Site Visit by Scientist	48.00	HR	8,673	0	0	8,673
			5.80	*0.00%*	*0.00%*	*5.80*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	174	0	0	174
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			461.10	*0.00%*	*0.00%*	*461.10*
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	2,767	0	0	2,767
OM-01-05 Quarterly Inspections per Year	**1.00**	**LS**	**14,852**	**0**	**0**	**14,852**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	64.00	HR	9,407	0	0	9,407
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	8.00	DAY	1,844	0	0	1,844
OM-01-06 Semi-annual Inspections	**1.00**	**LS**	**9,226**	**0**	**0**	**9,226**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	32.00	HR	4,704	0	0	4,704
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	4.00	DAY	922	0	0	922
OM-01-01 Annual Inspections	**1.00**	**LS**	**6,414**	**0**	**0**	**6,414**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	16.00	HR	2,352	0	0	2,352
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	2.00	DAY	461	0	0	461
			75,470.36			*75,470.36*
OM-AN Annual for 30 years	**1.00**	**EA**	**75,470**	**0**	**0**	**75,470**
OM-01-08 Mowing and Snow Removal	**1.00**	**LS**	**30,532**	**0**	**0**	**30,532**
			84.49	*0.00%*	*0.00%*	*84.49*
RSM 320190191670 Mowing, mowing brush, medium density, tractor with rotary mower	349.00	MSF	29,487	0	0	29,487
			130.63	*0.00%*	*0.00%*	*130.63*
USR 320130200240 Snow removal, clearing, 1 C.Y., with wheeled skid steer loader	8.00	HR	1,045	0	0	1,045
OM-01-09 Leachate Pumping	**1.00**	**LS**	**29,707**	**0**	**0**	**29,707**
			270.23	*0.00%*	*0.00%*	*270.23*
USR EW-07 Transport Water	48.00	HR	12,971	0	0	12,971
			174.34	*0.00%*	*0.00%*	*174.34*
USR EW-DW-01 Dewatering (pumping)	96.00	HR	16,736	0	0	16,736
OM-01-10 Erosion Repair	**1.00**	**LS**	**7,411**	**0**	**0**	**7,411**
			231.59	*0.00%*	*0.00%*	*231.59*

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
USR OM-01 Erosion Repair	32.00	HR	7,411	0	0	7,411
OM-01-07 Additional Inspections after Storm Events	**1.00**	**LS**	**7,820**	**0**	**0**	**7,820**
			3,600.61	*0.00%*	*0.00%*	*3,600.61*
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	3,601	0	0	3,601
			146.99	*0.00%*	*0.00%*	*146.99*
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	3,528	0	0	3,528
			230.55	*0.00%*	*0.00%*	*230.55*
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	692	0	0	692

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Contract Cost Summary Report				**274,562,961**	**62,565,732**	**337,128,693**	**81,485,855**	**418,614,548**	
				993,085.54		*1,091,792.95*		*1,294,497.91*	
COM Common Components to Alternatives	**1.00**	**EA**	**Prime Contractor**	**993,086**	**98,707**	**1,091,793**	**202,705**	**1,294,498**	
(Note: Assume no cost changes between applicable alternatives.)									
COM-01 Five-Year Site Review	**1.00**	**LS**	**Prime Contractor**	**29,032**	**0**	**29,032**	**13,064**	**42,097**	
(Note: Common Component for Alternatives 2, 3, 4, 5 and 6.)									
				2,909.92		*2,909.92*		*4,219.39*	
COM-01-01 Site Visit	**1.00**	**EA**	**AE Contractor**	**2,910**	**0**	**2,910**	**1,309**	**4,219**	
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	AE Contractor	2,433	0	2,433	1,095	3,528	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	AE Contractor	477	0	477	215	692	
(Note: Per GSA website on 11/23/2011)									
				26,122.22		*26,122.22*		*37,877.22*	
COM-01-02 Five-Year Review Reporting	**1.00**	**EA**	**AE Contractor**	**26,122**	**0**	**26,122**	**11,755**	**37,877**	
				88.90		*88.90*		*128.90*	
FOP FA-PROJM Project Managers	40.00	HR	AE Contractor	3,556	0	3,556	1,600	5,156	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				68.95		*68.95*		*99.98*	
FOP FC-ENGPE Engineers, Project	120.00	HR	AE Contractor	8,274	0	8,274	3,723	11,998	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				78.17		*78.17*		*113.34*	
HNC FC-ENGQC Engineer, Quality Control	24.00	HR	AE Contractor	1,876	0	1,876	844	2,720	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				36.63		*36.63*		*53.11*	
HTW HO-CADD Draftsman/CADD (HTW Projects)	40.00	HR	AE Contractor	1,465	0	1,465	659	2,124	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				36.25		*36.25*		*52.56*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	40.00	HR	AE Contractor	1,450	0	1,450	652	2,102	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				56.04		*56.04*		*81.25*	
HTW HO-PRJSCI Project Scientist (HTW Projects)	160.00	HR	AE Contractor	8,966	0	8,966	4,035	13,000	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
USR REPRO-02 Reproduction Costs for Five-Year Site Review Reports	1.00	LS	AE Contractor	535	0	535	241	776	
(Note: Allowance Per Previous Project Experience)									
COM-02 Institutional Controls	**1.00**	**LS**	**Prime Contractor**	**43,171**	**2,485**	**45,656**	**17,811**	**63,467**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Common Component for Alternatives 2, 3, 4, 5 and 6.)									
				88.90		*88.90*		*128.90*	
FOP FA-PROJM Project Managers	20.00	HR	AE Contractor	1,778	0	1,778	800	2,578	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				68.95		*68.95*		*99.98*	
FOP FC-ENGPE Engineers, Project	40.00	HR	AE Contractor	2,758	0	2,758	1,241	3,999	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				191.87		*191.87*		*278.21*	
LGL L-ASA Environmental Lawyer	120.00	HR	AE Contractor	23,025	0	23,025	10,361	33,386	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				55.02		*55.02*		*79.77*	
LGL L-LARE Paralegal	60.00	HR	AE Contractor	3,301	0	3,301	1,485	4,786	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				36.25		*36.25*		*52.56*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	40.00	HR	AE Contractor	1,450	0	1,450	652	2,102	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
USR REPRO-01 Reproduction Costs for Institutional Controls	1.00	LS	AE Contractor	250	0	250	113	363	
(Note: Allowance Per Previous Project Experience)									
SIGN Access Prevention Signs	**1.00**	**LS**	**Earthwork Subcontractor**	**10,610**	**2,485**	**13,094**	**3,159**	**16,253**	
(Note: Signboards warning and restricting fishing in all areas of the site (including Margaret's creek). Assume 18 signboards for ~9000 feet of shoreline, 3 signs for Margaret's creek area, 4 additional signs for the beach areas – a total of 25 signs.)									
				137.97		*170.28*		*211.35*	
USR SIGN-01 Labor - Access Prevention Sign Installation	50.00	HR	Earthwork Subcontractor	6,898	1,616	8,514	2,054	10,568	
(Note: Assume 2 hours per sign. See QTO-01 for quantities.)									
				2.02		*2.49*		*3.09*	
USR SIGN-02 Equipment- Access Prevention Sign Installation	50.00	HR	Earthwork Subcontractor	101	24	125	30	155	
(Note: Assume 2 hours per sign. See QTO-01 for quantities.)									
				64.20		*79.24*		*98.35*	
USR SIGN-03 U-Channel Sign Post - 10'	25.00	EA	Earthwork Subcontractor	1,605	376	1,981	478	2,459	
(Note: Estimated per previous project work, Vendors Quote - RS Hughes, April 2010, includes delivery)									
				5.33		*6.58*		*8.16*	
USR SIGN-04 Concrete Mix	50.00	EA	Earthwork Subcontractor	266	62	329	79	408	
(Note: Estimated 2 bags per sign based on per previous project work, Vendors Quote - Home Depot Quikrete Fast Setting Concrete Mix, April 2010)									
				69.55		*85.84*		*106.54*	
USR SIGN-05 Access Prevention Sign	25.00	EA	Earthwork	1,739	407	2,146	518	2,664	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
(Note: Estimated per previous project work, Vendors Quote - MySecurity Sign.com, April 2010, includes delivery)									
			Prime Contractor						
COM-03 Mobilization	**1.00**	**LS**	**Other**	**150,000**	**0**	**150,000**	**0**	**150,000**	
(Note: Common Component for Alternatives 2, 3, 4, 5 and 6.)									
USR MOB Site Mobilization	1.00	LS	Prime Contractor	150,000	0	150,000	0	150,000	
			Other						
(Note: Mobilization and demobilization of dredge equipment based on vendor quote from EQ on 11/8/2011 and adjusted per estimator experience.)									
			Prime Contractor						
COM-04 Demobilization and Decontamination	**1.00**	**LS**	**Other**	**250,000**	**0**	**250,000**	**0**	**250,000**	
(Note: Common Component for Alternatives 2, 3, 4, 5 and 6.)									
USR DEMOB Site Demobilization and Decontamination	1.00	LS	Prime Contractor	250,000	0	250,000	0	250,000	
			Other						
(Note: Mobilization and demobilization of dredge equipment based on vendor quote from EQ on 11/8/2011 and adjusted per estimator experience.)									
COM-05 Construction of Access Roads	**1.00**	**LS**	**Prime Contractor**	**410,857**	**96,223**	**507,079**	**122,318**	**629,397**	
(Note: Common Component for Alternatives 2, 3, 4, 5 and 6. Assume 10ft wide access road on Margaret's Creek Wetland, and 10ft wide access road along bay.)									
				317,933.34		*392,393.33*		*487,046.45*	
			Earthwork						
COM-05-01 Access Road to Bay	**1.00**	**EA**	**Subcontractor**	**317,933**	**74,460**	**392,393**	**94,653**	**487,046**	
				0.14		*0.17*		*0.21*	
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	52,800.00	SF	Earthwork Subcontractor	7,378	1,728	9,106	2,197	11,303	
(Note: Assume clearing and grubbing over half the surface area of the roadway.)									
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	105,600.00	SF	Earthwork Subcontractor	9,000	2,108	11,108	2,679	13,787	
				55.18		*68.11*		*84.54*	
RSM 310516100300 Aggregate for earthwork, crushed stone, 1.40 tons per C.Y., 1-1/2", spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	4,612.00	LCY	Earthwork Subcontractor	254,511	59,607	314,118	75,772	389,889	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	3,920.00	ECY	Earthwork Subcontractor	10,866	2,545	13,410	3,235	16,645	
				9.23		*11.39*		*14.14*	
USR REST-03 Removal of Access Road	3,920.00	BCY	Earthwork Subcontractor	36,178	8,473	44,651	10,771	55,421	
(Note: See PD-01 for Productivity Calculations)									
			Earthwork						
COM-05-02 Access Road to Margaret Creek	**1.00**	**LS**	**Subcontractor**	**92,923**	**21,763**	**114,686**	**27,665**	**142,351**	
(Note: Common Component for Alternatives 3 and 4. Assume 25ft wide access road on Margaret's Creek Wetland.)									
				0.14		*0.17*		*0.21*	
RSM 311110100200 Clearing & grubbing, medium trees, to	30,000.00	SF	Earthwork	4,192	982	5,174	1,248	6,422	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
12" diameter, cut and chip			Subcontractor						
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	30,000.00	SF	Earthwork Subcontractor	2,557	599	3,156	761	3,917	
				55.18		*68.11*		*84.54*	
RSM 310516100300 Aggregate for earthwork, crushed stone, 1.40 tons per C.Y., 1-1/2", spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1,318.00	LCY	Earthwork Subcontractor	72,733	17,034	89,767	21,654	111,421	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	1,120.00	ECY	Earthwork Subcontractor	3,104	727	3,832	924	4,756	
				9.23		*11.39*		*14.14*	
USR REST-03 Removal of Access Road using Excavator and Haul Truck (Note: See Productivity Calculations)	1,120.00	BCY	Earthwork Subcontractor	10,337	2,421	12,757	3,077	15,835	
COM-06 Monitoring of Groundwater and Surface Water (Note: Common Component for Alternatives 2, 3, 4, 5 and 6.)	**1.00**	**LS**	**Prime Contractor Other**	**110,026**	**0**	**110,026**	**49,511**	**159,537**	
				46,729.74		*46,729.74*		*67,758.13*	
COM-06-01 Monitoring of Groundwater	**1.00**	**EA**	**AE Contractor**	**46,730**	**0**	**46,730**	**21,028**	**67,758**	
COM-06-01-01 Annual Sampling per Year (Note: Assumed yearly quantities for annual sampling. See QTO-01 for quantity breakdown and assumptions.)	**1.00**	**LS**	**AE Contractor**	**9,701**	**0**	**9,701**	**4,366**	**14,067**	
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered (Note: Vendor Quote: TestAmerica GSA, 4/27/2011)	21.00	EA	AE Contractor	1,874	0	1,874	844	2,718	
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist (Note: Crew includes Rental Vehicle and Fuel Costs.)	32.00	HR	AE Contractor	3,988	0	3,988	1,794	5,782	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment (Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)	21.00	EA	AE Contractor	84	0	84	38	122	
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation (Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew) (Note: Per GSA website on 11/23/2011)	4.00	DAY	AE Contractor	1,272	0	1,272	572	1,844	
COM-06-01-02 Quarterly Sampling per Year	**1.00**	**LS**	**AE Contractor**	**23,858**	**0**	**23,858**	**10,736**	**34,594**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Assumed yearly quantities for quarterly sampling. See QTO-01 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	AE Contractor	5,356	0	5,356	2,410	7,766	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	96.00	HR	AE Contractor	11,963	0	11,963	5,383	17,347	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	AE Contractor	240	0	240	108	348	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	AE Contractor	3,816	0	3,816	1,717	5,533	
(Note: Per GSA website on 11/23/2011)									
COM-06-01-03 Semi-annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**13,171**	**0**	**13,171**	**5,927**	**19,097**	
(Note: Assumed yearly quantities for semi-annually sampling. See QTO-01 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	AE Contractor	2,678	0	2,678	1,205	3,883	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	48.00	HR	AE Contractor	5,982	0	5,982	2,692	8,673	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	AE Contractor	120	0	120	54	174	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	AE Contractor	1,908	0	1,908	859	2,767	
(Note: Per GSA website on 11/23/2011)									
				53,455.68		*53,455.68*		*77,510.73*	
COM-06-02 Monitoring of Surface Water	**1.00**	**EA**	**AE Contractor**	**53,456**	**0**	**53,456**	**24,055**	**77,511**	
COM-06-02-01 Annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**9,055**	**0**	**9,055**	**4,075**	**13,130**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Assumed yearly quantities for annual sampling. See QTO-01 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	10.00	EA	AE Contractor	893	0	893	402	1,294	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	32.00	HR	AE Contractor	3,988	0	3,988	1,794	5,782	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	4.00	DAY	AE Contractor	380	0	380	171	551	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	10.00	EA	AE Contractor	40	0	40	18	58	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	4.00	DAY	AE Contractor	1,272	0	1,272	572	1,844	
(Note: Per GSA website on 11/23/2011)									
COM-06-02-02 Quarterly Sampling	**1.00**	**LS**	**AE Contractor**	**28,772**	**0**	**28,772**	**12,948**	**41,720**	
(Note: Assumed yearly quantities for quarterly sampling. See QTO-01 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	40.00	EA	AE Contractor	3,570	0	3,570	1,607	5,177	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	128.00	HR	AE Contractor	15,951	0	15,951	7,178	23,129	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	16.00	DAY	AE Contractor	1,520	0	1,520	684	2,204	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	40.00	EA	AE Contractor	160	0	160	72	232	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	16.00	DAY	AE Contractor	5,088	0	5,088	2,290	7,378	
(Note: Per GSA website on 11/23/2011)									
COM-06-02-03 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**15,628**	**0**	**15,628**	**7,033**	**22,660**	
(Note: Assumed yearly quantities for semi-annually sampling. See QTO-01 for quantity breakdown and assumptions.)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	64.00	HR	AE Contractor	7,975	0	7,975	3,589	11,564	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	8.00	DAY	AE Contractor	760	0	760	342	1,102	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	20.00	EA	AE Contractor	80	0	80	36	116	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	20.00	EA	AE Contractor	1,785	0	1,785	803	2,589	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	8.00	DAY	AE Contractor	2,544	0	2,544	1,145	3,689	
(Note: Per GSA website on 11/23/2011)									
				9,840.09		*9,840.09*		*14,268.13*	
			Prime Contractor						
COM-06-03 Monitoring of Biota	**1.00**	**EA**	**Other**	**9,840**	**0**	**9,840**	**4,428**	**14,268**	
COM-06-03-03 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**9,840**	**0**	**9,840**	**4,428**	**14,268**	
(Note: Assumed yearly quantities for semi-annually sampling. See QTO-01 for quantity breakdown and assumptions.)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	32.00	HR	AE Contractor	3,988	0	3,988	1,794	5,782	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	4.00	DAY	AE Contractor	380	0	380	171	551	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	12.00	EA	AE Contractor	48	0	48	22	70	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Preparation									
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				139.10		*139.10*		*201.70*	
USR LABAN-16 Metals, Biological Tissue Analysis, Aquatic Organism	12.00	EA	AE Contractor	1,669	0	1,669	751	2,420	
(Note: Vendor Quote. Columbia Analytical Service, 2/13/2012. Price includes sample preparation and homogenization.)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	4.00	DAY	AE Contractor	1,272	0	1,272	572	1,844	
(Note: Per GSA website on 11/23/2011)									
ALT2 Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**Prime Contractor**	**99,926,574**	**23,131,403**	**123,057,977**	**29,684,045**	**152,742,022**	
ALT2-01 General Conditions	**1.00**	**LS**	**Prime Contractor**	**1,158,841**	**0**	**1,158,841**	**279,536**	**1,438,377**	
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**Prime Contractor**	**979,118**	**0**	**979,118**	**236,183**	**1,215,301**	
				85.82		*85.82*		*106.52*	
FOP FA-PROJM Project Managers	2,080.00	HR	Prime Contractor	178,495	0	178,495	43,057	221,552	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				66.56		*66.56*		*82.62*	
FOP FC-ENGPE Engineers, Project	4,160.00	HR	Prime Contractor	276,896	0	276,896	66,793	343,689	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				67.98		*67.98*		*84.38*	
HNC FA-AGENS General Superintendent (P.M.)	4,160.00	HR	Prime Contractor	282,794	0	282,794	68,216	351,010	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, December 2011.)									
				34.99		*34.99*		*43.43*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	Prime Contractor	6,998	0	6,998	1,688	8,686	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				52.65		*52.65*		*65.35*	
FOP FC-FLDER Field Engineers	100.00	HR	Prime Contractor	5,265	0	5,265	1,270	6,535	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				54.20		*54.20*		*67.27*	
HNC FD-SAENG Safety Engineer	200.00	HR	Prime Contractor	10,840	0	10,840	2,615	13,454	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				159.00		*159.00*		*197.35*	
USR GENCON-01 Per Diem	1,370.00	DAY	Prime Contractor	217,830	0	217,830	52,545	270,375	
(Note: Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				179,723.25		*179,723.25*		*223,076.09*	
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**Prime Contractor**	**179,723**	**0**	**179,723**	**43,353**	**223,076**	
				306.02		*306.02*		*379.84*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	24.00	EA	Prime Contractor	7,344	0	7,344	1,772	9,116	
				98.98		*98.98*		*122.85*	
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	24.00	EA	Prime Contractor	2,375	0	2,375	573	2,948	
				85.60		*85.60*		*106.25*	
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	24.00	MO	Prime Contractor	2,054	0	2,054	496	2,550	
				90.95		*90.95*		*112.89*	
RSM 015213400120 Field Office Expense, office supplies, average	24.00	MO	Prime Contractor	2,183	0	2,183	527	2,709	
				160.50		*160.50*		*199.22*	
RSM 015213400160 Field Office Expense, field office lights & HVAC	24.00	MO	Prime Contractor	3,852	0	3,852	929	4,781	
				88.50		*88.50*		*109.85*	
HNC 015213201400 Toilet, portable, chemical, rent per month	48.00	MO	Prime Contractor	4,248	0	4,248	1,025	5,273	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	10,400.00	HR	Prime Contractor	126,995	0	126,995	30,634	157,629	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	Prime Contractor	366	0	366	88	455	
				80.25		*80.25*		*99.61*	
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	Prime Contractor	9,630	0	9,630	2,323	11,953	
				5,000.00		*5,000.00*		*6,206.10*	
USR CC-E-02-01 Small Tools Allowance	1.00	EA	Prime Contractor	5,000	0	5,000	1,206	6,206	
(Note: Allowance per CCI estimator)									
				0.75		*0.75*		*0.93*	
USR CC-E-02-02 Cell Phone Allowance	10,900.00	HR	Prime Contractor	8,175	0	8,175	1,972	10,147	
(Note: Sub bid cost per CCI estimator.)									
				7,500.00		*7,500.00*		*9,309.15*	
USR CC-E-02-03 Electrician	1.00	EA	Prime Contractor	7,500	0	7,500	1,809	9,309	
(Note: Sub bid cost per CCI estimator.)									
ALT2-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**Prime Contractor**	**1,881,925**	**440,747**	**2,322,672**	**560,275**	**2,882,947**	

(Note: Includes silt fencing along access roads and rental and installation of a temporary portable coffer dam during seawall demolition and reconstruction. Turbidity Curtains are included in the sediment dredging unit cost.)

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				164.53		*203.06*		*252.04*	
USR EC-04 Maintenance Crew	24.00	MO	Earthwork Subcontractor	3,949	925	4,873	1,176	6,049	
				1,836,603.77		*2,266,736.37*		*2,813,518.51*	
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**Dredging Subcontractor**	**1,836,604**	**430,133**	**2,266,736**	**546,782**	**2,813,519**	
				194,835.00		*240,465.36*		*298,470.41*	
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	Dredging Subcontractor	194,835	45,630	240,465	58,005	298,470	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				118,615.00		*146,394.63*		*181,707.95*	
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	Dredging Subcontractor	237,230	55,559	292,789	70,627	363,416	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				79,075.00		*97,594.37*		*121,136.08*	
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	Dredging Subcontractor	790,750	185,194	975,944	235,417	1,211,361	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				10,617.00		*13,103.50*		*16,264.33*	
USR COFFDAM-04 Installation Crew	36.00	DAY	Dredging Subcontractor	382,212	89,514	471,726	113,790	585,516	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				962.00		*1,187.30*		*1,473.70*	
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	Dredging Subcontractor	5,772	1,352	7,124	1,718	8,842	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				1,214.98		*1,499.53*		*1,861.25*	
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	Dredging Subcontractor	43,739	10,244	53,983	13,022	67,005	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				2,961.52		*3,655.10*		*4,536.79*	
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	Dredging Subcontractor	106,615	24,969	131,584	31,741	163,324	
				15.19		*18.74*		*23.27*	
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	Dredging Subcontractor	69,861	16,362	86,223	20,799	107,022	
				0.82		*1.01*		*1.26*	
USR COFFDAM-09 Sand Bag	4,600.00	EA	Dredging Subcontractor	3,780	885	4,665	1,125	5,791	
(Note: Vendor Quote from Uline on 12/14/2011. Unit cost is for 100 count bundle of 50 lbs bags (14 x 26"))									
				20.33		*25.09*		*31.14*	
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	Dredging	1,809	424	2,233	539	2,772	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean sand. Cost includes delivery to Old Bridge, NJ at Route 35.)									
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**Earthwork Subcontractor**	**41,373**	**9,690**	**51,062**	**12,317**	**63,380**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	Earthwork Subcontractor	15,174	3,554	18,727	4,517	23,245	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	27,120.00	LF	Earthwork Subcontractor	5,628	1,318	6,946	1,675	8,621	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	27,120.00	LF	Earthwork Subcontractor	20,572	4,818	25,389	6,124	31,514	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
ALT2-03 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**Earthwork Subcontractor**	**24,473,116**	**5,731,604**	**30,204,720**	**7,285,982**	**37,490,702**	
				5,365,958.22		*6,622,665.63*		*8,220,185.04*	
SEA Seawall Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,365,958**	**1,256,707**	**6,622,666**	**1,597,519**	**8,220,185**	
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**3,941,599**	**923,123**	**4,864,722**	**1,173,468**	**6,038,190**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	Dredging Subcontractor	2,858,250	669,402	3,527,652	850,940	4,378,592	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	Dredging Subcontractor	842,231	197,251	1,039,482	250,744	1,290,225	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	Earthwork Subcontractor	37,390	8,757	46,147	11,132	57,279	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	Earthwork Subcontractor	55,342	12,961	68,303	16,476	84,779	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	5,295.00	LCY	Earthwork Subcontractor	28,661	6,712	35,374	8,533	43,907	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				119,724.78		*147,764.32*		*183,408.04*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**119,725**	**28,040**	**147,764**	**35,644**	**183,408**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	Earthwork Subcontractor	112,288	26,298	138,586	33,430	172,016	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	Earthwork Subcontractor	5,032	1,178	6,210	1,498	7,709	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				967,420.09		*1,193,989.87*		*1,482,004.11*	
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**967,420**	**226,570**	**1,193,990**	**288,014**	**1,482,004**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	Dredging Subcontractor	388,500	90,987	479,487	115,662	595,148	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	Dredging Subcontractor	469,470	109,950	579,420	139,768	719,188	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	Earthwork Subcontractor	20,842	4,881	25,724	6,205	31,929	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	Earthwork Subcontractor	68,537	16,051	84,589	20,405	104,993	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	59.00	LCY	Earthwork Subcontractor	319	75	394	95	489	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				19,750.70		*24,376.32*		*30,256.38*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**19,751**	**4,626**	**24,376**	**5,880**	**30,256**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	Earthwork Subcontractor	16,602	3,888	20,490	4,943	25,433	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	Earthwork Subcontractor	744	174	918	221	1,140	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				5,698.96		*7,033.66*		*8,730.31*	
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,699**	**1,335**	**7,034**	**1,697**	**8,730**	
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	Earthwork Subcontractor	1,523	357	1,879	453	2,332	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				4,176.38		*5,154.49*		*6,397.86*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**4,176**	**978**	**5,154**	**1,243**	**6,398**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	Earthwork Subcontractor	1,696	397	2,093	505	2,598	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	Earthwork Subcontractor	76	18	94	23	116	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				25,096.48		*30,974.08*		*38,445.65*	
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**25,096**	**5,878**	**30,974**	**7,472**	**38,446**	
				22.10		*27.28*		*33.86*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	Earthwork Subcontractor	18,056	4,229	22,284	5,375	27,660	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	Earthwork Subcontractor	802	188	990	239	1,228	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	Earthwork Subcontractor	2,809	658	3,466	836	4,303	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				3,430.31		*4,233.69*		*5,254.94*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**3,430**	**803**	**4,234**	**1,021**	**5,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	Earthwork Subcontractor	982	230	1,212	292	1,504	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	Earthwork Subcontractor	44	10	54	13	67	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				374,649.10		*462,391.92*		*573,930.10*	
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**374,649**	**87,743**	**462,392**	**111,538**	**573,930**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	Dredging Subcontractor	256,500	60,072	316,572	76,364	392,936	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	Dredging Subcontractor	75,582	17,701	93,283	22,502	115,785	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	Earthwork Subcontractor	3,356	786	4,142	999	5,141	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	Earthwork Subcontractor	15,682	3,673	19,354	4,669	24,023	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	9.00	LCY	Earthwork Subcontractor	49	11	60	15	75	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				23,481.08		*28,980.35*		*35,970.99*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**23,481**	**5,499**	**28,980**	**6,991**	**35,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	Earthwork Subcontractor	20,173	4,724	24,897	6,006	30,903	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	Earthwork Subcontractor	904	212	1,116	269	1,385	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				51,494.41		*63,554.40*		*78,885.00*	
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**51,494**	**12,060**	**63,554**	**15,331**	**78,885**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	440.00	LCY	Dredging Subcontractor	33,000	7,729	40,729	9,825	50,553	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	Dredging Subcontractor	9,724	2,277	12,001	2,895	14,896	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	Earthwork Subcontractor	432	101	533	129	662	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	Earthwork Subcontractor	2,297	538	2,835	684	3,518	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				6,041.57		*7,456.51*		*9,255.17*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**6,042**	**1,415**	**7,457**	**1,799**	**9,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	Earthwork Subcontractor	3,481	815	4,296	1,036	5,333	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	Earthwork Subcontractor	156	37	193	46	239	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				7,022,848.94		*8,667,600.16*		*10,758,398.67*	
JET Jetty Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**7,022,849**	**1,644,751**	**8,667,600**	**2,090,799**	**10,758,399**	
				1,278,263.33		*1,577,632.60*		*1,958,189.14*	
JET-07 Area 7 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**1,278,263**	**299,369**	**1,577,633**	**380,557**	**1,958,189**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	12,780.00	LCY	Dredging Subcontractor	958,500	224,481	1,182,981	285,359	1,468,339	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	12,780.00	LCY	Dredging Subcontractor	282,438	66,147	348,585	84,086	432,671	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	13,291.00	LCY	Earthwork Subcontractor	12,539	2,937	15,475	3,733	19,208	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				24,786.71		*30,591.76*		*37,971.10*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**24,787**	**5,805**	**30,592**	**7,379**	**37,971**	
				89.26		*110.16*		*136.74*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	Earthwork Subcontractor	21,422	5,017	26,439	6,378	32,817	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	Earthwork Subcontractor	960	225	1,185	286	1,471	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,634,162.57		*4,485,283.44*		*5,567,223.52*	
JET-08 Area 8 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**3,634,163**	**851,121**	**4,485,283**	**1,081,940**	**5,567,224**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	Dredging Subcontractor	2,715,750	636,029	3,351,779	808,516	4,160,295	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	Dredging Subcontractor	800,241	187,416	987,657	238,243	1,225,900	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	Earthwork Subcontractor	35,526	8,320	43,846	10,577	54,423	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onstie Disposal	3,763.00	BCY	Earthwork Subcontractor	16,185	3,790	19,975	4,818	24,794	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	4,994.00	LCY	Earthwork Subcontractor	27,032	6,331	33,363	8,048	41,411	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				39,428.44		*48,662.58*		*60,400.96*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**39,428**	**9,234**	**48,663**	**11,738**	**60,401**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	Earthwork Subcontractor	35,436	8,299	43,735	10,550	54,285	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	Earthwork Subcontractor	1,588	372	1,960	473	2,433	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,110,423.04		*2,604,684.11*		*3,232,986.01*	
JET-10 Area 11 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**2,110,423**	**494,261**	**2,604,684**	**628,302**	**3,232,986**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	21,060.00	LCY	Dredging Subcontractor	1,579,500	369,919	1,949,419	470,239	2,419,658	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	21,060.00	LCY	Dredging Subcontractor	465,426	109,003	574,429	138,564	712,992	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	21,902.00	LCY	Earthwork Subcontractor	20,662	4,839	25,501	6,151	31,653	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	Earthwork Subcontractor	9,230	2,162	11,392	2,748	14,140	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				35,604.80		*43,943.45*		*54,543.49*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**35,605**	**8,339**	**43,943**	**10,600**	**54,543**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	Earthwork Subcontractor	31,776	7,442	39,218	9,460	48,679	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	Earthwork Subcontractor	1,424	334	1,758	424	2,181	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				12,084,308.72		*14,914,453.83*		*18,512,118.38*	
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**12,084,309**	**2,830,145**	**14,914,454**	**3,597,665**	**18,512,118**	
				12,084,308.72		*14,914,453.83*		*18,512,118.38*	
MC-09 Area 9 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**12,084,309**	**2,830,145**	**14,914,454**	**3,597,665**	**18,512,118**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	119,470.00	LCY	Dredging Subcontractor	8,960,250	2,098,491	11,058,741	2,667,589	13,726,330	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	123,003.00	LCY	Dredging Subcontractor	2,718,366	636,641	3,355,008	809,295	4,164,303	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	127,923.00	LCY	Earthwork Subcontractor	120,681	28,264	148,945	35,929	184,874	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	Earthwork Subcontractor	76,851	17,999	94,850	22,880	117,730	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	711.00	LCY	Earthwork Subcontractor	3,849	901	4,750	1,146	5,896	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				204,311.06		*252,160.71*		*312,986.91*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**204,311**	**47,850**	**252,161**	**60,826**	**312,987**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	Earthwork Subcontractor	193,247	45,258	238,505	57,532	296,037	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	Earthwork	8,660	2,028	10,688	2,578	13,266	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT2-04 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**Earthwork Subcontractor**	**55,187,577**	**12,924,931**	**68,112,507**	**16,430,099**	**84,542,607**	
				3,053,276.90		*3,768,354.35*		*4,677,356.79*	
SEA-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Seawall Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**3,053,277**	**715,077**	**3,768,354**	**909,002**	**4,677,357**	
				96.30		*118.85*		*147.52*	
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	5,363.00	LCY	Earthwork Subcontractor	516,457	120,954	637,411	153,756	791,167	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	23,062.00	TON	Earthwork Subcontractor	2,536,820	594,123	3,130,943	755,246	3,886,189	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				2,843,172.20		*3,509,043.13*		*4,355,494.51*	
WJ-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**2,843,172**	**665,871**	**3,509,043**	**846,451**	**4,355,495**	
				96.30		*118.85*		*147.52*	
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	4,994.00	LCY	Earthwork Subcontractor	480,922	112,632	593,554	143,177	736,731	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	21,475.00	TON	Earthwork Subcontractor	2,362,250	553,239	2,915,489	703,274	3,618,763	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				404,849.30		*499,665.01*		*620,194.20*	
MC-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	**1.00**	**EA**	**Earthwork Subcontractor**	**404,849**	**94,816**	**499,665**	**120,529**	**620,194**	
				96.30		*118.85*		*147.52*	
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	711.00	LCY	Earthwork Subcontractor	68,469	16,036	84,505	20,384	104,889	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	3,058.00	TON	Earthwork Subcontractor	336,380	78,780	415,160	100,145	515,305	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				14,290,536.91		*17,637,380.65*		*21,891,869.62*	
SEA-SOIL Transportation and Offsite Disposal of	**1.00**	**EA**	**Earthwork**	**14,290,537**	**3,346,844**	**17,637,381**	**4,254,489**	**21,891,870**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Soil and Dewatered Sediment Removed from Seawall Areas			**Subcontractor**						
				6,342,065.66		*7,827,377.44*		*9,715,497.42*	
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**6,342,066**	**1,485,312**	**7,827,377**	**1,888,120**	**9,715,497**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	103,751.00	TON	Earthwork Subcontractor	4,218,516	987,976	5,206,492	1,255,910	6,462,402	
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	4,719.00	EA	Earthwork Subcontractor	825,825	193,408	1,019,233	245,859	1,265,093	
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	9,438.00	HR	Earthwork Subcontractor	943,800	221,038	1,164,838	280,982	1,445,820	
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	4,719.00	EA	Earthwork Subcontractor	353,925	82,889	436,814	105,368	542,183	
				5,407,715.25		*6,674,202.16*		*8,284,153.21*	
SEA-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**5,407,715**	**1,266,487**	**6,674,202**	**1,609,951**	**8,284,153**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)	23,055.00	LCY	Earthwork Subcontractor	1,603,475	375,534	1,979,009	477,377	2,456,386	
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)	34,584.00	TON	Earthwork Subcontractor	3,804,240	890,953	4,695,193	1,132,574	5,827,767	
				2,540,756.00		*3,135,801.06*		*3,892,218.99*	
SEA-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**2,540,756**	**595,045**	**3,135,801**	**756,418**	**3,892,219**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization (Note: Per Estimator, based on previous work)	6,289.00	EA	Earthwork Subcontractor	2,515,600	589,154	3,104,754	748,929	3,853,682	
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	6,289.00	EA	Earthwork Subcontractor	25,156	5,892	31,048	7,489	38,537	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				11,861,555.48		*14,639,531.77*		*18,170,879.63*	
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**11,861,555**	**2,777,976**	**14,639,532**	**3,531,348**	**18,170,880**	
				5,886,229.98		*7,264,785.04*		*9,017,196.49*	
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**5,886,230**	**1,378,555**	**7,264,785**	**1,752,411**	**9,017,196**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	96,303.00	TON	Earthwork Subcontractor	3,915,680	917,052	4,832,732	1,165,752	5,998,484	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	4,379.00	EA	Earthwork Subcontractor	766,325	179,473	945,798	228,145	1,173,944	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	8,758.00	HR	Earthwork Subcontractor	875,800	205,112	1,080,912	260,738	1,341,650	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	4,379.00	EA	Earthwork Subcontractor	328,425	76,917	405,342	97,777	503,119	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				3,764,637.50		*4,646,315.60*		*5,767,099.85*	
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**3,764,638**	**881,678**	**4,646,316**	**1,120,784**	**5,767,100**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	16,050.00	LCY	Earthwork Subcontractor	1,116,278	261,432	1,377,710	332,331	1,710,041	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	24,076.00	TON	Earthwork Subcontractor	2,648,360	620,246	3,268,606	788,453	4,057,059	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				2,210,688.00		*2,728,431.13*		*3,386,583.29*	
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**2,210,688**	**517,743**	**2,728,431**	**658,152**	**3,386,583**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	5,472.00	EA	Earthwork Subcontractor	2,188,800	512,617	2,701,417	651,636	3,353,053	
(Note: Per Estimator, based on previous work)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	5,472.00	EA	Earthwork Subcontractor	21,888	5,126	27,014	6,516	33,531	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				22,734,186.17		*28,058,532.57*		*34,826,811.80*	
MC-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	**1.00**	**EA**	**Earthwork Subcontractor**	**22,734,186**	**5,324,346**	**28,058,533**	**6,768,279**	**34,826,812**	
				10,088,627.52		*12,451,384.09*		*15,454,906.95*	
MC-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**10,088,628**	**2,362,757**	**12,451,384**	**3,003,523**	**15,454,907**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	165,072.00	TON	Earthwork Subcontractor	6,711,828	1,571,910	8,283,738	1,998,203	10,281,941	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	7,504.00	EA	Earthwork Subcontractor	1,313,200	307,551	1,620,751	390,958	2,011,709	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	15,008.00	HR	Earthwork Subcontractor	1,500,800	351,487	1,852,287	446,809	2,299,096	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	7,504.00	EA	Earthwork Subcontractor	562,800	131,808	694,608	167,553	862,161	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				8,603,942.65		*10,618,986.02*		*13,180,497.83*	
MC-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**8,603,943**	**2,015,043**	**10,618,986**	**2,561,512**	**13,180,498**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	36,683.00	LCY	Earthwork Subcontractor	2,551,303	597,515	3,148,818	759,558	3,908,376	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	55,024.00	TON	Earthwork Subcontractor	6,052,640	1,417,528	7,470,168	1,801,954	9,272,122	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				4,041,616.00		*4,988,162.47*		*6,191,407.02*	
MC-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**4,041,616**	**946,546**	**4,988,162**	**1,203,245**	**6,191,407**	
				400.00		*493.68*		*612.77*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-16 Sampling and Testing for Waste Characterization	10,004.00	EA	Earthwork Subcontractor	4,001,600	937,175	4,938,775	1,191,331	6,130,106	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	10,004.00	EA	Earthwork Subcontractor	40,016	9,372	49,388	11,913	61,301	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT2-05 Site Restoration	**1.00**	**LS**	**Earthwork Subcontractor**	**17,225,114**	**4,034,122**	**21,259,236**	**5,128,153**	**26,387,389**	
(Note: Includes backfill of excavations, seawall reconstruction, jetty reconstruction, and wetland restoration.)									
REST-01 Seawall Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**1,800,000**	**421,560**	**2,221,560**	**535,885**	**2,757,445**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes access provided by construction haul road built by others prior to the start of our work, assuming a triangular cross section with a 25 ft wide base, 15 ft high and 2200 ft long = 412,500 CF = 15,278 CY = 22,500 tons, assuming 2/3rds Corestone = 15,000 tons at $60 to $65 per ton and 1/3rd Capstone = 7,500 tons)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	7,500.00	TON	Earthwork Subcontractor	825,000	193,215	1,018,215	245,614	1,263,829	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				65.00		*80.22*		*99.57*	
USR REST-02 Reconstruction using Corestone	15,000.00	TON	Earthwork Subcontractor	975,000	228,345	1,203,345	290,271	1,493,616	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
REST-02 Jetty Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**586,630**	**137,389**	**724,019**	**174,648**	**898,667**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes barge access only, 4 ft high x 30 ft wide by 800 ft long = 96,000 CF = 3556 CY = 5333 tons, assuming all “Capstone”)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	5,333.00	TON	Earthwork Subcontractor	586,630	137,389	724,019	174,648	898,667	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
REST-03 Backfill of Excavations	**1.00**	**LS**	**Earthwork Subcontractor**	**12,606,384**	**2,952,415**	**15,558,799**	**3,753,094**	**19,311,893**	
				28.00		*34.56*		*42.89*	
USR DREDG-03 Backfilling of Sediment Dredged	402,339.00	TON	Earthwork Subcontractor	11,265,492	2,638,378	13,903,870	3,353,892	17,257,762	
(Note: Vendor Quote from CCI on 12/13/2011. Unit cost includes material (clean beach sand), labor and equipment for placement from a barge.)									
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	Earthwork Subcontractor	944,342	221,165	1,165,507	281,144	1,446,651	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	Earthwork Subcontractor	236,432	55,372	291,805	70,389	362,194	
				2.77		*3.42*		*4.25*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	Earthwork Subcontractor	160,117	37,500	197,617	47,669	245,286	
REST-04 Wetland Restoration	**1.00**	**LS**	**Earthwork Subcontractor**	**2,232,100**	**522,758**	**2,754,858**	**664,527**	**3,419,385**	
				170,000.00		*209,814.00*		*260,425.33*	
USR REST-04 Wetland Restoration	13.13	ACR	Earthwork Subcontractor	2,232,100	522,758	2,754,858	664,527	3,419,385	
(Note: Area of wetland restoration includes all upland areas of Margaret's Creek Sector that are classified as wetlands by the NJDEP and not constantly submerged under water. Wetland restoration includes wetlands construction and maintenance performed in accordance with NJDEP procedures. Unit cost is based on the cost for similar wetland construction and maintenance activities at another site in Sayreville, NJ. The unit cost includes mobilization, G&A and contingency. Assumes 15 lbs per acre wetlands seed mix, 400 trees per acre, 200 shrub plantings per acre. The cost also included other items such as a 12-inch layer loam spread, herbaceous planting, etc.)									
ALT3 Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**Prime Contractor**	**54,390,891**	**12,490,366**	**66,881,257**	**16,169,271**	**83,050,528**	
ALT3-01 General Conditions	**1.00**	**LS**	**Prime Contractor**	**882,612**	**0**	**882,612**	**212,904**	**1,095,516**	
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**Prime Contractor**	**742,102**	**0**	**742,102**	**179,010**	**921,112**	
				85.82		*85.82*		*106.52*	
FOP FA-PROJM Project Managers	1,560.00	HR	Prime Contractor	133,871	0	133,871	32,292	166,164	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				66.56		*66.56*		*82.62*	
FOP FC-ENGPE Engineers, Project	3,120.00	HR	Prime Contractor	207,672	0	207,672	50,095	257,766	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				67.98		*67.98*		*84.38*	
HNC FA-AGENS General Superintendent (P.M.)	3,120.00	HR	Prime Contractor	212,096	0	212,096	51,162	263,257	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, December 2011.)									
				34.99		*34.99*		*43.43*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	Prime Contractor	6,998	0	6,998	1,688	8,686	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				52.65		*52.65*		*65.35*	
FOP FC-FLDER Field Engineers	100.00	HR	Prime Contractor	5,265	0	5,265	1,270	6,535	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				54.20		*54.20*		*67.27*	
HNC FD-SAENG Safety Engineer	200.00	HR	Prime Contractor	10,840	0	10,840	2,615	13,454	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				159.00		*159.00*		*197.35*	
USR GENCON-01 Per Diem	1,040.00	DAY	Prime Contractor	165,360	0	165,360	39,888	205,248	
(Note: Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				140,510.27		*140,510.27*		*174,404.15*	
GENCON-02 Temporary Construction Facilities	**1.00**	**EA**	**Prime Contractor**	**140,510**	**0**	**140,510**	**33,894**	**174,404**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
and Equipment									
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	18.00	EA	Prime Contractor	*306.02* 5,508	0	*306.02* 5,508	1,329	*379.84* 6,837	
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	18.00	EA	Prime Contractor	*98.98* 1,782	0	*98.98* 1,782	430	*122.85* 2,211	
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	18.00	MO	Prime Contractor	*85.60* 1,541	0	*85.60* 1,541	372	*106.25* 1,912	
RSM 015213400120 Field Office Expense, office supplies, average	18.00	MO	Prime Contractor	*90.95* 1,637	0	*90.95* 1,637	395	*112.89* 2,032	
RSM 015213400160 Field Office Expense, field office lights & HVAC	18.00	MO	Prime Contractor	*160.50* 2,889	0	*160.50* 2,889	697	*199.22* 3,586	
HNC 015213201400 Toilet, portable, chemical, rent per month	36.00	MO	Prime Contractor	*88.50* 3,186	0	*88.50* 3,186	769	*109.85* 3,955	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	7,800.00	HR	Prime Contractor	*12.21* 95,246	0	*12.21* 95,246	22,975	*15.16* 118,221	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	Prime Contractor	*12.21* 366	0	*12.21* 366	88	*15.16* 455	
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	Prime Contractor	*80.25* 9,630	0	*80.25* 9,630	2,323	*99.61* 11,953	
USR CC-E-02-01 Small Tools Allowance (Note: Allowance per CCI estimator)	1.00	EA	Prime Contractor	*5,000.00* 5,000	0	*5,000.00* 5,000	1,206	*6,206.10* 6,206	
USR CC-E-02-02 Cell Phone Allowance (Note: Sub bid cost per CCI estimator.)	8,300.00	HR	Prime Contractor	*0.75* 6,225	0	*0.75* 6,225	1,502	*0.93* 7,727	
USR CC-E-02-03 Electrician (Note: Sub bid cost per CCI estimator.)	1.00	EA	Prime Contractor	*7,500.00* 7,500	0	*7,500.00* 7,500	1,809	*9,309.15* 9,309	
ALT3-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**Prime Contractor**	**1,880,938**	**439,822**	**2,320,760**	**559,814**	**2,880,574**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Includes silt fencing along access roads and rental and installation of a temporary portable coffer dam during seawall demolition and reconstruction. Turbidity Curtains are included in the sediment dredging unit cost.)									
				164.53		*164.53*		*204.22*	
USR EC-04 Maintenance Crew	18.00	MO	Prime Contractor	2,962	0	2,962	714	3,676	
				1,836,603.77		*2,266,736.37*		*2,813,518.51*	
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**Dredging Subcontractor**	**1,836,604**	**430,133**	**2,266,736**	**546,782**	**2,813,519**	
				194,835.00		*240,465.36*		*298,470.41*	
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	Dredging Subcontractor	194,835	45,630	240,465	58,005	298,470	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				118,615.00		*146,394.63*		*181,707.95*	
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	Dredging Subcontractor	237,230	55,559	292,789	70,627	363,416	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				79,075.00		*97,594.37*		*121,136.08*	
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	Dredging Subcontractor	790,750	185,194	975,944	235,417	1,211,361	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				10,617.00		*13,103.50*		*16,264.33*	
USR COFFDAM-04 Installation Crew	36.00	DAY	Dredging Subcontractor	382,212	89,514	471,726	113,790	585,516	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				962.00		*1,187.30*		*1,473.70*	
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	Dredging Subcontractor	5,772	1,352	7,124	1,718	8,842	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				1,214.98		*1,499.53*		*1,861.25*	
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	Dredging Subcontractor	43,739	10,244	53,983	13,022	67,005	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				2,961.52		*3,655.10*		*4,536.79*	
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	Dredging Subcontractor	106,615	24,969	131,584	31,741	163,324	
				15.19		*18.74*		*23.27*	
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	Dredging Subcontractor	69,861	16,362	86,223	20,799	107,022	
				0.82		*1.01*		*1.26*	
USR COFFDAM-09 Sand Bag	4,600.00	EA	Dredging Subcontractor	3,780	885	4,665	1,125	5,791	
(Note: Vendor Quote from Uline on 12/14/2011. Unit cost is for 100 count bundle of 50 lbs bags (14 x 26"))									
				20.33		*25.09*		*31.14*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	Dredging Subcontractor	1,809	424	2,233	539	2,772	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean sand. Cost includes delivery to Old Bridge, NJ at Route 35.)									
			Earthwork						
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**Subcontractor**	**41,373**	**9,690**	**51,062**	**12,317**	**63,380**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	Earthwork Subcontractor	15,174	3,554	18,727	4,517	23,245	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	27,120.00	LF	Earthwork Subcontractor	5,628	1,318	6,946	1,675	8,621	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	27,120.00	LF	Earthwork Subcontractor	20,572	4,818	25,389	6,124	31,514	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
			Prime Contractor						
ALT3-03 MNR	**1.00**	**LS**	**Other**	**173,267**	**0**	**173,267**	**77,970**	**251,237**	
(Note: Periodic Monitoring of Sediment and Surface Water for Monitored Natural Recovery of Areas 7, 11 and Margaret's Creek. Assumes a two person crew and a jon boat for the sampling. Semi-annual for first five years, and Annually for next 25 years.)									
ALT3-03-01 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**114,684**	**0**	**114,684**	**51,608**	**166,291**	
(Note: Assume semi-annual sampling and analysis of metals (total & dissolved) for the first five-years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	AE Contractor	26,421	0	26,421	11,889	38,310	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	480.00	HR	AE Contractor	59,816	0	59,816	26,917	86,733	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	AE Contractor	5,700	0	5,700	2,565	8,265	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	AE Contractor	1,184	0	1,184	533	1,717	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	AE Contractor	19,080	0	19,080	8,586	27,666	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per GSA website on 11/23/2011)									
ALT3-03-02 Annual Sampling	**1.00**	**LS**	**AE Contractor**	**58,583**	**0**	**58,583**	**26,363**	**84,946**	
(Note: Assume annual sampling and analysis of metals (total & dissolved) for the next twenty five years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	AE Contractor	13,210	0	13,210	5,945	19,155	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	240.00	HR	AE Contractor	29,908	0	29,908	13,459	43,366	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	AE Contractor	2,850	0	2,850	1,283	4,133	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	AE Contractor	592	0	592	266	858	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	AE Contractor	9,540	0	9,540	4,293	13,833	
(Note: Per GSA website on 11/23/2011)									
ALT3-04 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**Earthwork Subcontractor**	**10,611,310**	**2,485,169**	**13,096,479**	**3,159,133**	**16,255,612**	
				5,365,958.22		*6,622,665.63*		*8,220,185.04*	
SEA Seawall Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,365,958**	**1,256,707**	**6,622,666**	**1,597,519**	**8,220,185**	
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**3,941,599**	**923,123**	**4,864,722**	**1,173,468**	**6,038,190**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	Dredging Subcontractor	2,858,250	669,402	3,527,652	850,940	4,378,592	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	Dredging Subcontractor	842,231	197,251	1,039,482	250,744	1,290,225	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	Earthwork	37,390	8,757	46,147	11,132	57,279	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	Earthwork Subcontractor	55,342	12,961	68,303	16,476	84,779	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	5,295.00	LCY	Earthwork Subcontractor	28,661	6,712	35,374	8,533	43,907	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				119,724.78		*147,764.32*		*183,408.04*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**119,725**	**28,040**	**147,764**	**35,644**	**183,408**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	Earthwork Subcontractor	112,288	26,298	138,586	33,430	172,016	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	Earthwork Subcontractor	5,032	1,178	6,210	1,498	7,709	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
SEA-02 Area 2 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**967,420**	**226,570**	**1,193,990**	**288,014**	**1,482,004**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	Dredging Subcontractor	388,500	90,987	479,487	115,662	595,148	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	Dredging Subcontractor	469,470	109,950	579,420	139,768	719,188	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	Earthwork Subcontractor	20,842	4,881	25,724	6,205	31,929	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	Earthwork Subcontractor	68,537	16,051	84,589	20,405	104,993	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	59.00	LCY	Earthwork Subcontractor	319	75	394	95	489	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				19,750.70		*24,376.32*		*30,256.38*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**19,751**	**4,626**	**24,376**	**5,880**	**30,256**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	Earthwork Subcontractor	16,602	3,888	20,490	4,943	25,433	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	Earthwork Subcontractor	744	174	918	221	1,140	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
SEA-03 Area 3 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**5,699**	**1,335**	**7,034**	**1,697**	**8,730**	
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	Earthwork Subcontractor	1,523	357	1,879	453	2,332	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				4,176.38		*5,154.49*		*6,397.86*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**4,176**	**978**	**5,154**	**1,243**	**6,398**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	Earthwork Subcontractor	1,696	397	2,093	505	2,598	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	Earthwork Subcontractor	76	18	94	23	116	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
SEA-04 Area 4 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**25,096**	**5,878**	**30,974**	**7,472**	**38,446**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	Earthwork Subcontractor	18,056	4,229	22,284	5,375	27,660	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	Earthwork Subcontractor	802	188	990	239	1,228	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	Earthwork Subcontractor	2,809	658	3,466	836	4,303	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				3,430.31		*4,233.69*		*5,254.94*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**3,430**	**803**	**4,234**	**1,021**	**5,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	Earthwork Subcontractor	982	230	1,212	292	1,504	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	Earthwork Subcontractor	44	10	54	13	67	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
SEA-05 Area 5 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**374,649**	**87,743**	**462,392**	**111,538**	**573,930**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	Dredging Subcontractor	256,500	60,072	316,572	76,364	392,936	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	Dredging Subcontractor	75,582	17,701	93,283	22,502	115,785	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	Earthwork Subcontractor	3,356	786	4,142	999	5,141	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	Earthwork Subcontractor	15,682	3,673	19,354	4,669	24,023	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	9.00	LCY	Earthwork Subcontractor	49	11	60	15	75	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				23,481.08		*28,980.35*		*35,970.99*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**23,481**	**5,499**	**28,980**	**6,991**	**35,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	Earthwork Subcontractor	20,173	4,724	24,897	6,006	30,903	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	Earthwork Subcontractor	904	212	1,116	269	1,385	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
SEA-06 Area 6 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**51,494**	**12,060**	**63,554**	**15,331**	**78,885**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	440.00	LCY	Dredging Subcontractor	33,000	7,729	40,729	9,825	50,553	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	Dredging Subcontractor	9,724	2,277	12,001	2,895	14,896	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	Earthwork Subcontractor	432	101	533	129	662	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	Earthwork Subcontractor	2,297	538	2,835	684	3,518	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				6,041.57		*7,456.51*		*9,255.17*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**6,042**	**1,415**	**7,457**	**1,799**	**9,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	Earthwork Subcontractor	3,481	815	4,296	1,036	5,333	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	Earthwork Subcontractor	156	37	193	46	239	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				4,878,795.87		*6,021,409.87*		*7,473,894.35*	
JET Jetty Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**4,878,796**	**1,142,614**	**6,021,410**	**1,452,484**	**7,473,894**	
JET-07 Area 7 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**746,663**	**174,869**	**921,532**	**222,292**	**1,143,824**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	Dredging Subcontractor	552,000	129,278	681,278	164,338	845,616	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	Dredging Subcontractor	162,656	38,094	200,750	48,425	249,175	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	Earthwork Subcontractor	7,221	1,691	8,912	2,150	11,062	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				24,786.71		*30,591.76*		*37,971.10*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**24,787**	**5,805**	**30,592**	**7,379**	**37,971**	
				89.26		*110.16*		*136.74*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	Earthwork Subcontractor	21,422	5,017	26,439	6,378	32,817	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	Earthwork Subcontractor	960	225	1,185	286	1,471	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
JET-10 Area 11 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**4,132,132**	**967,745**	**5,099,878**	**1,230,193**	**6,330,070**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	Dredging Subcontractor	346,500	81,150	427,650	103,158	530,808	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	Dredging Subcontractor	102,102	23,912	126,014	30,397	156,411	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	Earthwork Subcontractor	4,533	1,062	5,595	1,350	6,944	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	Earthwork Subcontractor	9,230	2,162	11,392	2,748	14,140	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				35,604.80		*43,943.45*		*54,543.49*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**35,605**	**8,339**	**43,943**	**10,600**	**54,543**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	Earthwork Subcontractor	31,776	7,442	39,218	9,460	48,679	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	Earthwork Subcontractor	1,424	334	1,758	424	2,181	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,634,162.57		*4,485,283.44*		*5,567,223.52*	
JET-08 Area 8 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**3,634,163**	**851,121**	**4,485,283**	**1,081,940**	**5,567,224**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	Dredging Subcontractor	2,715,750	636,029	3,351,779	808,516	4,160,295	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	Dredging Subcontractor	800,241	187,416	987,657	238,243	1,225,900	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	Earthwork Subcontractor	35,526	8,320	43,846	10,577	54,423	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	Earthwork Subcontractor	16,185	3,790	19,975	4,818	24,794	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-05 Excavation/Picking of Slag and Battery Casings for Offsite Disposal	4,994.00	LCY	Earthwork Subcontractor	27,032	6,331	33,363	8,048	41,411	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-02 Slag for crew output.)									
				39,428.44		*48,662.58*		*60,400.96*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**39,428**	**9,234**	**48,663**	**11,738**	**60,401**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	Earthwork Subcontractor	35,436	8,299	43,735	10,550	54,285	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	Earthwork Subcontractor	1,588	372	1,960	473	2,433	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				366,556.27		*452,403.74*		*561,532.58*	
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
MC-09 Area 9 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	Dredging Subcontractor	78,079	18,286	96,365	23,245	119,611	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	Earthwork Subcontractor	3,466	812	4,278	1,032	5,310	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	Earthwork Subcontractor	76,851	17,999	94,850	22,880	117,730	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	Earthwork Subcontractor	3,849	901	4,750	1,146	5,896	
				204,311.06		*252,160.71*		*312,986.91*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**204,311**	**47,850**	**252,161**	**60,826**	**312,987**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	Earthwork Subcontractor	193,247	45,258	238,505	57,532	296,037	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	Earthwork Subcontractor	8,660	2,028	10,688	2,578	13,266	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT3-05 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**Earthwork Subcontractor**	**32,577,057**	**7,629,547**	**40,206,603**	**9,698,637**	**49,905,240**	
				3,053,276.90		*3,768,354.35*		*4,677,356.79*	
SEA-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed	**1.00**	**EA**	**Earthwork Subcontractor**	**3,053,277**	**715,077**	**3,768,354**	**909,002**	**4,677,357**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
from Seawall Areas									
				96.30		*118.85*		*147.52*	
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	5,363.00	LCY	Earthwork Subcontractor	516,457	120,954	637,411	153,756	791,167	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	23,062.00	TON	Earthwork Subcontractor	2,536,820	594,123	3,130,943	755,246	3,886,189	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				2,843,172.20		*3,509,043.13*		*4,355,494.51*	
WJ-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Western Jetty Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**2,843,172**	**665,871**	**3,509,043**	**846,451**	**4,355,495**	
				96.30		*118.85*		*147.52*	
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	4,994.00	LCY	Earthwork Subcontractor	480,922	112,632	593,554	143,177	736,731	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	21,475.00	TON	Earthwork Subcontractor	2,362,250	553,239	2,915,489	703,274	3,618,763	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				404,849.30		*499,665.01*		*620,194.20*	
MC-SLAG Transportation and Offsite Disposal of Hazardous Slag and Battery Casings Removed from Margaret's Creek Area	**1.00**	**EA**	**Earthwork Subcontractor**	**404,849**	**94,816**	**499,665**	**120,529**	**620,194**	
				96.30		*118.85*		*147.52*	
USR DISP-HZ-02 Slag and Battery Disposal at Hazardous Waste Facility	711.00	LCY	Earthwork Subcontractor	68,469	16,036	84,505	20,384	104,889	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Slag and Battery Transportation to Hazardous Waste Facility	3,058.00	TON	Earthwork Subcontractor	336,380	78,780	415,160	100,145	515,305	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				14,290,536.91		*17,637,380.65*		*21,891,869.62*	
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**14,290,537**	**3,346,844**	**17,637,381**	**4,254,489**	**21,891,870**	
				6,342,065.66		*7,827,377.44*		*9,715,497.42*	
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**6,342,066**	**1,485,312**	**7,827,377**	**1,888,120**	**9,715,497**	
				40.66		*50.18*		*62.29*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	103,751.00	TON	Earthwork Subcontractor	4,218,516	987,976	5,206,492	1,255,910	6,462,402	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	Earthwork Subcontractor	825,825	193,408	1,019,233	245,859	1,265,093	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	9,438.00	HR	Earthwork Subcontractor	943,800	221,038	1,164,838	280,982	1,445,820	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	4,719.00	EA	Earthwork Subcontractor	353,925	82,889	436,814	105,368	542,183	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				5,407,715.25		*6,674,202.16*		*8,284,153.21*	
SEA-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**5,407,715**	**1,266,487**	**6,674,202**	**1,609,951**	**8,284,153**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	23,055.00	LCY	Earthwork Subcontractor	1,603,475	375,534	1,979,009	477,377	2,456,386	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	34,584.00	TON	Earthwork Subcontractor	3,804,240	890,953	4,695,193	1,132,574	5,827,767	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				2,540,756.00		*3,135,801.06*		*3,892,218.99*	
SEA-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**2,540,756**	**595,045**	**3,135,801**	**756,418**	**3,892,219**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	6,289.00	EA	Earthwork Subcontractor	2,515,600	589,154	3,104,754	748,929	3,853,682	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	6,289.00	EA	Earthwork Subcontractor	25,156	5,892	31,048	7,489	38,537	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				8,501,735.72		*10,492,842.23*		*13,023,925.63*	
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**8,501,736**	**1,991,107**	**10,492,842**	**2,531,083**	**13,023,926**	
				4,218,984.52		*5,207,070.69*		*6,463,120.29*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**4,218,985**	**988,086**	**5,207,071**	**1,256,050**	**6,463,120**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	69,022.00	TON	Earthwork Subcontractor	2,806,435	657,267	3,463,701	835,514	4,299,216	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	Earthwork Subcontractor	549,325	128,652	677,977	163,542	841,519	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	6,278.00	HR	Earthwork Subcontractor	627,800	147,031	774,831	186,905	961,735	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	Earthwork Subcontractor	235,425	55,137	290,562	70,089	360,651	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				2,698,263.20		*3,330,196.44*		*4,133,506.43*	
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**2,698,263**	**631,933**	**3,330,196**	**803,310**	**4,133,506**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	11,504.00	LCY	Earthwork Subcontractor	800,103	187,384	987,487	238,202	1,225,689	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	17,256.00	TON	Earthwork Subcontractor	1,898,160	444,549	2,342,709	565,108	2,907,817	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				1,584,488.00		*1,955,575.09*		*2,427,298.91*	
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**1,584,488**	**371,087**	**1,955,575**	**471,724**	**2,427,299**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	3,922.00	EA	Earthwork Subcontractor	1,568,800	367,413	1,936,213	467,053	2,403,266	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	3,922.00	EA	Earthwork Subcontractor	15,688	3,674	19,362	4,671	24,033	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,483,485.72		*4,299,318.08*		*5,336,399.58*	
MC-SOIL Transportation and Offsite Disposal of	**1.00**	**EA**	**Earthwork**	**3,483,486**	**815,832**	**4,299,318**	**1,037,082**	**5,336,400**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Soil and Dewatered Sediment Removed from Margaret's Creek Area			**Subcontractor**						
				1,545,872.72		*1,907,916.11*		*2,368,143.64*	
MC-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**1,545,873**	**362,043**	**1,907,916**	**460,228**	**2,368,144**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	25,292.00	TON	Earthwork Subcontractor	1,028,373	240,845	1,269,218	306,161	1,575,378	
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	1,150.00	EA	Earthwork Subcontractor	201,250	47,133	248,383	59,915	308,298	
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	2,300.00	HR	Earthwork Subcontractor	230,000	53,866	283,866	68,474	352,340	
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	1,150.00	EA	Earthwork Subcontractor	86,250	20,200	106,450	25,678	132,128	
				1,318,281.00		*1,627,022.41*		*2,019,492.76*	
MC-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**1,318,281**	**308,741**	**1,627,022**	**392,470**	**2,019,493**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)	5,620.00	LCY	Earthwork Subcontractor	390,871	91,542	482,413	116,368	598,781	
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)	8,431.00	TON	Earthwork Subcontractor	927,410	217,199	1,144,609	276,103	1,420,712	
				619,332.00		*764,379.55*		*948,763.19*	
MC-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**619,332**	**145,048**	**764,380**	**184,384**	**948,763**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization (Note: Per Estimator, based on previous work)	1,533.00	EA	Earthwork Subcontractor	613,200	143,611	756,811	182,558	939,369	
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,533.00	EA	Earthwork Subcontractor	6,132	1,436	7,568	1,826	9,394	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT3-06 Site Restoration	**1.00**	**LS**	**Earthwork Subcontractor**	**8,265,706**	**1,935,828**	**10,201,535**	**2,460,814**	**12,662,349**	
(Note: Includes backfill of excavations, seawall reconstruction, and jetty reconstruction.)									
REST-01 Seawall Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**1,800,000**	**421,560**	**2,221,560**	**535,885**	**2,757,445**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes access provided by construction haul road built by others prior to the start of our work, assuming a triangular cross section with a 25 ft wide base, 15 ft high and 2200 ft long = 412,500 CF = 15,278 CY = 22,500 tons, assuming 2/3rds Corestone = 15,000 tons at $60 to $65 per ton and 1/3rd Capstone = 7,500 tons)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	7,500.00	TON	Earthwork Subcontractor	825,000	193,215	1,018,215	245,614	1,263,829	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				65.00		*80.22*		*99.57*	
USR REST-02 Reconstruction using Corestone	15,000.00	TON	Earthwork Subcontractor	975,000	228,345	1,203,345	290,271	1,493,616	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
REST-02 Jetty Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**586,630**	**137,389**	**724,019**	**174,648**	**898,667**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes barge access only, 4 ft high x 30 ft wide by 800 ft long = 96,000 CF = 3556 CY = 5333 tons, assuming all “Capstone”)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	5,333.00	TON	Earthwork Subcontractor	586,630	137,389	724,019	174,648	898,667	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				5,879,076.16		*7,255,955.80*		*9,006,237.46*	
REST-03 Backfill of Excavations	**1.00**	**EA**	**Earthwork Subcontractor**	**5,879,076**	**1,376,880**	**7,255,956**	**1,750,282**	**9,006,237**	
				28.00		*34.56*		*42.89*	
USR DREDG-03 Backfilling of Sediment Dredged	162,078.00	TON	Earthwork Subcontractor	4,538,184	1,062,843	5,601,027	1,351,080	6,952,106	
(Note: Vendor Quote from CCI on 12/13/2011. Unit cost includes material (clean beach sand), labor and equipment for placement from a barge.)									
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	Earthwork Subcontractor	944,342	221,165	1,165,507	281,144	1,446,651	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	Earthwork Subcontractor	236,432	55,372	291,805	70,389	362,194	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	Earthwork Subcontractor	160,117	37,500	197,617	47,669	245,286	
ALT4 Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil and Sediment, Monitored Natural Recovery, Institutional	**1.00**	**LS**	**Prime Contractor**	**51,797,394**	**11,784,198**	**63,581,592**	**15,394,883**	**78,976,475**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Controls and Long-Term Monitoring									
ALT4-01 General Conditions	**1.00**	**LS**	**Prime Contractor**	**1,204,064**	**0**	**1,204,064**	**290,444**	**1,494,508**	
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**Prime Contractor**	**1,017,810**	**0**	**1,017,810**	**245,516**	**1,263,326**	
				85.82		*85.82*		*106.52*	
FOP FA-PROJM Project Managers	2,167.00	HR	Prime Contractor	185,961	0	185,961	44,858	230,819	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				66.56		*66.56*		*82.62*	
FOP FC-ENGPE Engineers, Project	4,333.00	HR	Prime Contractor	288,411	0	288,411	69,570	357,981	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				67.98		*67.98*		*84.38*	
HNC FA-AGENS General Superintendent (P.M.)	4,333.00	HR	Prime Contractor	294,555	0	294,555	71,052	365,607	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, December 2011.)									
				34.99		*34.99*		*43.43*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	Prime Contractor	6,998	0	6,998	1,688	8,686	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				52.65		*52.65*		*65.35*	
FOP FC-FLDER Field Engineers	100.00	HR	Prime Contractor	5,265	0	5,265	1,270	6,535	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				54.20		*54.20*		*67.27*	
HNC FD-SAENG Safety Engineer	200.00	HR	Prime Contractor	10,840	0	10,840	2,615	13,454	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				159.00		*159.00*		*197.35*	
USR GENCON-01 Per Diem	1,420.00	DAY	Prime Contractor	225,780	0	225,780	54,463	280,243	
(Note: Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				186,254.42		*186,254.42*		*231,182.71*	
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**Prime Contractor**	**186,254**	**0**	**186,254**	**44,928**	**231,183**	
				306.02		*306.02*		*379.84*	
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	25.00	EA	Prime Contractor	7,651	0	7,651	1,845	9,496	
				98.98		*98.98*		*122.85*	
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	25.00	EA	Prime Contractor	2,474	0	2,474	597	3,071	
				85.60		*85.60*		*106.25*	
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	25.00	MO	Prime Contractor	2,140	0	2,140	516	2,656	
				90.95		*90.95*		*112.89*	
RSM 015213400120 Field Office Expense, office supplies, average	25.00	MO	Prime Contractor	2,274	0	2,274	548	2,822	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				160.50		*160.50*		*199.22*	
RSM 015213400160 Field Office Expense, field office lights & HVAC	25.00	MO	Prime Contractor	4,013	0	4,013	968	4,980	
				88.50		*88.50*		*109.85*	
HNC 015213201400 Toilet, portable, chemical, rent per month	50.00	MO	Prime Contractor	4,425	0	4,425	1,067	5,492	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	10,833.00	HR	Prime Contractor	132,282	0	132,282	31,909	164,191	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	Prime Contractor	366	0	366	88	455	
				80.25		*80.25*		*99.61*	
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	Prime Contractor	9,630	0	9,630	2,323	11,953	
				5,000.00		*5,000.00*		*6,206.10*	
USR CC-E-02-01 Small Tools Allowance	1.00	EA	Prime Contractor	5,000	0	5,000	1,206	6,206	
(Note: Allowance per CCI estimator)									
				0.75		*0.75*		*0.93*	
USR CC-E-02-02 Cell Phone Allowance	11,333.00	HR	Prime Contractor	8,500	0	8,500	2,050	10,550	
(Note: Sub bid cost per CCI estimator.)									
				7,500.00		*7,500.00*		*9,309.15*	
USR CC-E-02-03 Electrician	1.00	EA	Prime Contractor	7,500	0	7,500	1,809	9,309	
(Note: Sub bid cost per CCI estimator.)									
ALT4-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**Prime Contractor**	**1,884,378**	**441,321**	**2,325,700**	**561,005**	**2,886,705**	
(Note: Includes silt fencing along access roads and rental and installation of a temporary portable coffer dam during seawall demolition and reconstruction. Turbidity Curtains are included in the sediment dredging unit cost.)									
				164.53		*203.06*		*252.04*	
USR EC-04 Maintenance Crew	25.00	MO	Earthwork Subcontractor	4,113	963	5,077	1,225	6,301	
				1,836,603.77		*2,266,736.37*		*2,813,518.51*	
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**Dredging Subcontractor**	**1,836,604**	**430,133**	**2,266,736**	**546,782**	**2,813,519**	
				194,835.00		*240,465.36*		*298,470.41*	
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	Dredging Subcontractor	194,835	45,630	240,465	58,005	298,470	
(Note: Vendor Quote from Portadam on 11/18/2011)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				118,615.00		*146,394.63*		*181,707.95*	
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	Dredging Subcontractor	237,230	55,559	292,789	70,627	363,416	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				79,075.00		*97,594.37*		*121,136.08*	
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	Dredging Subcontractor	790,750	185,194	975,944	235,417	1,211,361	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				10,617.00		*13,103.50*		*16,264.33*	
USR COFFDAM-04 Installation Crew	36.00	DAY	Dredging Subcontractor	382,212	89,514	471,726	113,790	585,516	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				962.00		*1,187.30*		*1,473.70*	
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	Dredging Subcontractor	5,772	1,352	7,124	1,718	8,842	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				1,214.98		*1,499.53*		*1,861.25*	
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	Dredging Subcontractor	43,739	10,244	53,983	13,022	67,005	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				2,961.52		*3,655.10*		*4,536.79*	
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	Dredging Subcontractor	106,615	24,969	131,584	31,741	163,324	
				15.19		*18.74*		*23.27*	
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	Dredging Subcontractor	69,861	16,362	86,223	20,799	107,022	
				0.82		*1.01*		*1.26*	
USR COFFDAM-09 Sand Bag	4,600.00	EA	Dredging Subcontractor	3,780	885	4,665	1,125	5,791	
(Note: Vendor Quote from Uline on 12/14/2011. Unit cost is for 100 count bundle of 50 lbs bags (14 x 26"))									
				20.33		*25.09*		*31.14*	
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	Dredging Subcontractor	1,809	424	2,233	539	2,772	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean sand. Cost includes delivery to Old Bridge, NJ at Route 35.)									
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**Earthwork Subcontractor**	**41,373**	**9,690**	**51,062**	**12,317**	**63,380**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	Earthwork Subcontractor	15,174	3,554	18,727	4,517	23,245	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	27,120.00	LF	Earthwork Subcontractor	5,628	1,318	6,946	1,675	8,621	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	27,120.00	LF	Earthwork Subcontractor	20,572	4,818	25,389	6,124	31,514	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
				2,288.32		*2,824.25*		*3,505.52*	
EC-03 Silt Fencing Around the Perimeter of Containment Cells	**1.00**	**EA**	**Earthwork Subcontractor**	**2,288**	**536**	**2,824**	**681**	**3,506**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	1,500.00	LF	Earthwork Subcontractor	839	197	1,036	250	1,286	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	1,500.00	LF	Earthwork Subcontractor	311	73	384	93	477	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	1,500.00	LF	Earthwork Subcontractor	1,138	266	1,404	339	1,743	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
ALT4-03 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**Earthwork Subcontractor**	**10,611,310**	**2,485,169**	**13,096,479**	**3,159,133**	**16,255,612**	
				5,365,958.22		*6,622,665.63*		*8,220,185.04*	
SEA Seawall Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,365,958**	**1,256,707**	**6,622,666**	**1,597,519**	**8,220,185**	
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**3,941,599**	**923,123**	**4,864,722**	**1,173,468**	**6,038,190**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	Dredging Subcontractor	2,858,250	669,402	3,527,652	850,940	4,378,592	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	Dredging Subcontractor	842,231	197,251	1,039,482	250,744	1,290,225	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	Earthwork Subcontractor	37,390	8,757	46,147	11,132	57,279	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	Earthwork Subcontractor	55,342	12,961	68,303	16,476	84,779	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	5,295.00	LCY	Earthwork Subcontractor	28,661	6,712	35,374	8,533	43,907	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				119,724.78		*147,764.32*		*183,408.04*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**119,725**	**28,040**	**147,764**	**35,644**	**183,408**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	Earthwork Subcontractor	112,288	26,298	138,586	33,430	172,016	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	Earthwork Subcontractor	5,032	1,178	6,210	1,498	7,709	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				967,420.09		*1,193,989.87*		*1,482,004.11*	
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**967,420**	**226,570**	**1,193,990**	**288,014**	**1,482,004**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	Dredging Subcontractor	388,500	90,987	479,487	115,662	595,148	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	Dredging Subcontractor	469,470	109,950	579,420	139,768	719,188	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	Earthwork Subcontractor	20,842	4,881	25,724	6,205	31,929	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	Earthwork Subcontractor	68,537	16,051	84,589	20,405	104,993	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	59.00	LCY	Earthwork Subcontractor	319	75	394	95	489	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				19,750.70		*24,376.32*		*30,256.38*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**19,751**	**4,626**	**24,376**	**5,880**	**30,256**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	Earthwork Subcontractor	16,602	3,888	20,490	4,943	25,433	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	Earthwork Subcontractor	744	174	918	221	1,140	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				5,698.96		*7,033.66*		*8,730.31*	
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,699**	**1,335**	**7,034**	**1,697**	**8,730**	
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	Earthwork Subcontractor	1,523	357	1,879	453	2,332	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				4,176.38		*5,154.49*		*6,397.86*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**4,176**	**978**	**5,154**	**1,243**	**6,398**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	Earthwork Subcontractor	1,696	397	2,093	505	2,598	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	Earthwork Subcontractor	76	18	94	23	116	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				25,096.48		*30,974.08*		*38,445.65*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**25,096**	**5,878**	**30,974**	**7,472**	**38,446**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	Earthwork Subcontractor	18,056	4,229	22,284	5,375	27,660	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	Earthwork Subcontractor	802	188	990	239	1,228	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	Earthwork Subcontractor	2,809	658	3,466	836	4,303	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				3,430.31		*4,233.69*		*5,254.94*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**3,430**	**803**	**4,234**	**1,021**	**5,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	Earthwork Subcontractor	982	230	1,212	292	1,504	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	Earthwork Subcontractor	44	10	54	13	67	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				374,649.10		*462,391.92*		*573,930.10*	
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**374,649**	**87,743**	**462,392**	**111,538**	**573,930**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	Dredging Subcontractor	256,500	60,072	316,572	76,364	392,936	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	Dredging Subcontractor	75,582	17,701	93,283	22,502	115,785	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	Earthwork Subcontractor	3,356	786	4,142	999	5,141	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	Earthwork Subcontractor	15,682	3,673	19,354	4,669	24,023	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	9.00	LCY	Earthwork Subcontractor	49	11	60	15	75	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				23,481.08		*28,980.35*		*35,970.99*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**23,481**	**5,499**	**28,980**	**6,991**	**35,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	Earthwork Subcontractor	20,173	4,724	24,897	6,006	30,903	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	Earthwork Subcontractor	904	212	1,116	269	1,385	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				51,494.41		*63,554.40*		*78,885.00*	
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**51,494**	**12,060**	**63,554**	**15,331**	**78,885**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	440.00	LCY	Dredging Subcontractor	33,000	7,729	40,729	9,825	50,553	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	Dredging Subcontractor	9,724	2,277	12,001	2,895	14,896	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	Earthwork Subcontractor	432	101	533	129	662	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	Earthwork Subcontractor	2,297	538	2,835	684	3,518	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				6,041.57		*7,456.51*		*9,255.17*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**6,042**	**1,415**	**7,457**	**1,799**	**9,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	Earthwork Subcontractor	3,481	815	4,296	1,036	5,333	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	Earthwork Subcontractor	156	37	193	46	239	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				4,878,795.87		*6,021,409.87*		*7,473,894.35*	
JET Jetty Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**4,878,796**	**1,142,614**	**6,021,410**	**1,452,484**	**7,473,894**	
				746,663.43		*921,532.01*		*1,143,823.96*	
JET-07 Area 7 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**746,663**	**174,869**	**921,532**	**222,292**	**1,143,824**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	Dredging Subcontractor	552,000	129,278	681,278	164,338	845,616	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	Dredging Subcontractor	162,656	38,094	200,750	48,425	249,175	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	Earthwork Subcontractor	7,221	1,691	8,912	2,150	11,062	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				24,786.71		*30,591.76*		*37,971.10*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**24,787**	**5,805**	**30,592**	**7,379**	**37,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	Earthwork Subcontractor	21,422	5,017	26,439	6,378	32,817	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	Earthwork Subcontractor	960	225	1,185	286	1,471	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,634,162.57		*4,485,283.44*		*5,567,223.52*	
JET-08 Area 8 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**3,634,163**	**851,121**	**4,485,283**	**1,081,940**	**5,567,224**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	Dredging Subcontractor	2,715,750	636,029	3,351,779	808,516	4,160,295	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	Dredging Subcontractor	800,241	187,416	987,657	238,243	1,225,900	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	Earthwork Subcontractor	35,526	8,320	43,846	10,577	54,423	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	Earthwork Subcontractor	16,185	3,790	19,975	4,818	24,794	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	4,994.00	LCY	Earthwork Subcontractor	27,032	6,331	33,363	8,048	41,411	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				39,428.44		*48,662.58*		*60,400.96*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**39,428**	**9,234**	**48,663**	**11,738**	**60,401**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	Earthwork Subcontractor	35,436	8,299	43,735	10,550	54,285	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	Earthwork Subcontractor	1,588	372	1,960	473	2,433	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				497,969.87		*614,594.41*		*762,846.88*	
JET-10 Area 11 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**497,970**	**116,625**	**614,594**	**148,252**	**762,847**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	Dredging Subcontractor	346,500	81,150	427,650	103,158	530,808	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	Dredging Subcontractor	102,102	23,912	126,014	30,397	156,411	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	Earthwork Subcontractor	4,533	1,062	5,595	1,350	6,944	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	Earthwork Subcontractor	9,230	2,162	11,392	2,748	14,140	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				35,604.80		*43,943.45*		*54,543.49*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**35,605**	**8,339**	**43,943**	**10,600**	**54,543**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	Earthwork Subcontractor	31,776	7,442	39,218	9,460	48,679	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	Earthwork Subcontractor	1,424	334	1,758	424	2,181	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				366,556.27		*452,403.74*		*561,532.58*	
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				366,556.27		*452,403.74*		*561,532.58*	
MC-09 Area 9 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	Dredging Subcontractor	78,079	18,286	96,365	23,245	119,611	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	Earthwork Subcontractor	3,466	812	4,278	1,032	5,310	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	Earthwork Subcontractor	76,851	17,999	94,850	22,880	117,730	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	Earthwork Subcontractor	3,849	901	4,750	1,146	5,896	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-08 Slag for crew output.)									
				204,311.06		*252,160.71*		*312,986.91*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**204,311**	**47,850**	**252,161**	**60,826**	**312,987**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	Earthwork Subcontractor	193,247	45,258	238,505	57,532	296,037	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	Earthwork	8,660	2,028	10,688	2,578	13,266	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
			Prime Contractor						
ALT4-04 MNR	**1.00**	**LS**	**Other**	**173,267**	**0**	**173,267**	**77,970**	**251,237**	
(Note: Periodic Monitoring of Sediment and Surface Water for Monitored Natural Recovery of Areas 7, 11 and Margaret's Creek. Assumes a two person crew and a jon boat for the sampling. Semi-annual for first five years, and Annually for next 25 years.)									
ALT4-04-01 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**114,684**	**0**	**114,684**	**51,608**	**166,291**	
(Note: Assume semi-annual sampling and analysis of metals (total & dissolved) for the first five-years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	AE Contractor	26,421	0	26,421	11,889	38,310	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	480.00	HR	AE Contractor	59,816	0	59,816	26,917	86,733	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	AE Contractor	5,700	0	5,700	2,565	8,265	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	AE Contractor	1,184	0	1,184	533	1,717	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	AE Contractor	19,080	0	19,080	8,586	27,666	
(Note: Per GSA website on 11/23/2011)									
ALT4-04-02 Annual Sampling	**1.00**	**LS**	**AE Contractor**	**58,583**	**0**	**58,583**	**26,363**	**84,946**	
(Note: Assume annual sampling and analysis of metals (total & dissolved) for the next twenty five years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	AE Contractor	13,210	0	13,210	5,945	19,155	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	240.00	HR	AE Contractor	29,908	0	29,908	13,459	43,366	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	AE Contractor	2,850	0	2,850	1,283	4,133	
				4.00		*4.00*		*5.80*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	AE Contractor	592	0	592	266	858	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	AE Contractor	9,540	0	9,540	4,293	13,833	
(Note: Per GSA website on 11/23/2011)									
ALT4-05 Transportation of Contaminated Materials to Onsite Containment Cell	**1.00**	**LS**	**Earthwork Subcontractor**	**75,569**	**17,698**	**93,268**	**22,498**	**115,766**	
				7.88		*9.73*		*12.07*	
USR HAUL-MC-01 Transportation of Slag and Battery Casings from Seawall to Margaret's Creek Cells (Note: See Productivity Calculations)	5,363.00	LCY	Earthwork Subcontractor	42,272	9,900	52,172	12,585	64,757	
				5.84		*7.20*		*8.94*	
USR HAUL-WJ-01 Transportation of Slag and Battery Casings from Western Jetty to Western Jetty Containment Cell (Note: See Productivity Calculations)	4,994.00	LCY	Earthwork Subcontractor	29,148	6,826	35,974	8,678	44,652	
				5.84		*7.20*		*8.94*	
USR HAUL-MC-03 Transportation of Slag and Battery Casings from Margaret's Creek to Margaret's Creek Cells (Note: See Productivity Calculations)	711.00	LCY	Earthwork Subcontractor	4,150	972	5,122	1,235	6,357	
ALT4-06 Onsite Containtment Cell Construction	**1.00**	**LS**	**Prime Contractor**	**3,204,091**	**750,398**	**3,954,490**	**953,902**	**4,908,392**	
(Note: Common component for alternatives which include onsite containment.)									
CELL-A Onsite Cell A Near the Western Jetty	**1.00**	**LS**	**Earthwork Subcontractor**	**793,648**	**185,872**	**979,520**	**236,280**	**1,215,800**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**507,815**	**118,930**	**626,745**	**151,183**	**777,929**	
				46.01		*56.78*		*70.48*	
RSM 311313202040 Selective clearing and grubbing, 1-1/2 C.Y. excavator, 4" to 6" diameter, stump removal on site by hydraulic excavator	30.00	EA	Earthwork Subcontractor	1,380	323	1,704	411	2,114	
				18.05		*22.28*		*27.66*	
RSM 320130105910 Site maintenance, road & walk maintenance, asphaltic concrete paving, cold patch, 2" thick	334.00	SY	Earthwork Subcontractor	6,030	1,412	7,443	1,795	9,238	
				0.61		*0.75*		*0.93*	
RSM 320116715320 Cold milling asphalt paving, asphalt pavement, 1" to 3" deep, removal from concrete base, rip, load and sweep, excludes hauling	667.00	SY	Earthwork Subcontractor	404	95	499	120	620	
				500,000.00		*617,100.00*		*765,956.86*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR PREP-02 Sub Base Improvements	1.00	ACR	Earthwork Subcontractor	500,000	117,100	617,100	148,857	765,957	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**96,675**	**22,641**	**119,316**	**28,781**	**148,098**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,056.00	ECY	Earthwork Subcontractor	14,014	3,282	17,297	4,172	21,469	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	7,023.00	LCY	Earthwork Subcontractor	82,661	19,359	102,020	24,609	126,629	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**21,004**	**4,919**	**25,923**	**6,253**	**32,176**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	34,432.00	SF	Geosynthetic Subcontractor	21,004	4,919	25,923	6,253	32,176	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**39,527**	**9,257**	**48,785**	**11,768**	**60,552**	
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**8,273**	**1,938**	**10,211**	**2,463**	**12,674**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	Earthwork Subcontractor	5,065	1,186	6,251	1,508	7,758	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	Earthwork Subcontractor	247	58	305	73	378	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	Earthwork Subcontractor	219	51	270	65	335	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**31,254**	**7,320**	**38,574**	**9,305**	**47,878**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,105.00	LCY	Earthwork Subcontractor	29,559	6,923	36,481	8,800	45,281	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,105.00	LCY	Earthwork Subcontractor	1,695	397	2,092	505	2,597	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**12,346**	**2,891**	**15,237**	**3,675**	**18,913**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	21,576.00	SF	Geosynthetic Subcontractor	12,346	2,891	15,237	3,675	18,913	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**13,843**	**3,242**	**17,084**	**4,121**	**21,206**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	4,994.00	ECY	Earthwork Subcontractor	13,843	3,242	17,084	4,121	21,206	
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**23,657**	**5,540**	**29,197**	**7,043**	**36,240**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	41,344.00	SF	Geosynthetic Subcontractor	23,657	5,540	29,197	7,043	36,240	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**38,198**	**8,946**	**47,144**	**11,372**	**58,516**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**8,273**	**1,938**	**10,211**	**2,463**	**12,674**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control	600.00	LF	Earthwork	5,065	1,186	6,251	1,508	7,758	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40			Subcontractor						
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	Earthwork Subcontractor	247	58	305	73	378	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	Earthwork Subcontractor	219	51	270	65	335	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**29,925**	**7,008**	**36,933**	**8,909**	**45,842**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,058.00	LCY	Earthwork Subcontractor	28,302	6,628	34,930	8,426	43,355	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,058.00	LCY	Earthwork Subcontractor	1,623	380	2,003	483	2,486	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**20,259**	**4,745**	**25,003**	**6,031**	**31,034**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	41,344.00	SF	Geosynthetic Subcontractor	20,259	4,745	25,003	6,031	31,034	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**14,057**	**3,292**	**17,349**	**4,185**	**21,534**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	41,344.00	SF	Geosynthetic Subcontractor	14,057	3,292	17,349	4,185	21,534	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**2,187**	**512**	**2,700**	**651**	**3,351**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	114.00	ECY	Earthwork Subcontractor	316	74	390	94	484	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	159.00	LCY	Earthwork Subcontractor	1,871	438	2,310	557	2,867	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**4,081**	**956**	**5,036**	**1,215**	**6,251**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	41.00	LCY	Earthwork Subcontractor	1,316	308	1,624	392	2,016	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	29.00	ECY	Earthwork Subcontractor	80	19	99	24	123	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	41,344.00	SF	Earthwork Subcontractor	2,684	629	3,313	799	4,112	
CELL-B Onsite Cell B Near Margaret's Creek Area	**1.00**	**LS**	**Earthwork Subcontractor**	**2,385,381**	**558,656**	**2,944,037**	**710,161**	**3,654,198**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**2,024,315**	**474,095**	**2,498,410**	**602,666**	**3,101,076**	
				6,078.81		*7,502.47*		*9,312.22*	
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	4.00	ACR	Earthwork Subcontractor	24,315	5,695	30,010	7,239	37,249	
				500,000.00		*617,100.00*		*765,956.86*	
USR PREP-02 Sub Base Improvements	4.00	ACR	Earthwork Subcontractor	2,000,000	468,400	2,468,400	595,427	3,063,827	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**110,470**	**25,872**	**136,342**	**32,888**	**169,230**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,778.00	ECY	Earthwork Subcontractor	16,016	3,751	19,766	4,768	24,535	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	8,025.00	LCY	Earthwork Subcontractor	94,454	22,121	116,575	28,120	144,696	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**27,848**	**6,522**	**34,370**	**8,291**	**42,661**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	45,653.00	SF	Geosynthetic Subcontractor	27,848	6,522	34,370	8,291	42,661	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**53,957**	**12,637**	**66,594**	**16,064**	**82,658**	
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**10,117**	**2,369**	**12,486**	**3,012**	**15,498**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	800.00	LF	Earthwork Subcontractor	6,753	1,581	8,334	2,010	10,345	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	Earthwork Subcontractor	329	77	406	98	504	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	Earthwork Subcontractor	292	68	360	87	447	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**43,840**	**10,267**	**54,108**	**13,052**	**67,160**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,550.00	LCY	Earthwork Subcontractor	41,463	9,711	51,173	12,344	63,517	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,550.00	LCY	Earthwork Subcontractor	2,378	557	2,935	708	3,643	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**17,324**	**4,057**	**21,381**	**5,158**	**26,539**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	30,276.00	SF	Geosynthetic Subcontractor	17,324	4,057	21,381	5,158	26,539	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**16,836**	**3,943**	**20,779**	**5,012**	**25,791**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	6,074.00	ECY	Earthwork Subcontractor	16,836	3,943	20,779	5,012	25,791	
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**31,298**	**7,330**	**38,627**	**9,318**	**47,945**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	54,697.00	SF	Geosynthetic Subcontractor	31,298	7,330	38,627	9,318	47,945	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**49,686**	**11,637**	**61,323**	**14,792**	**76,115**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**10,117**	**2,369**	**12,486**	**3,012**	**15,498**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	800.00	LF	Earthwork Subcontractor	6,753	1,581	8,334	2,010	10,345	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
polyethylene pipe, 4" dia, SDR 21									
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	Earthwork Subcontractor	329	77	406	98	504	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	Earthwork Subcontractor	292	68	360	87	447	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**39,569**	**9,267**	**48,837**	**11,780**	**60,617**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,399.00	LCY	Earthwork Subcontractor	37,423	8,765	46,188	11,141	57,329	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,399.00	LCY	Earthwork Subcontractor	2,146	503	2,649	639	3,288	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**26,802**	**6,277**	**33,078**	**7,979**	**41,058**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	54,697.00	SF	Geosynthetic Subcontractor	26,802	6,277	33,078	7,979	41,058	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**18,597**	**4,355**	**22,952**	**5,537**	**28,489**	
				0.34		*0.42*		*0.52*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	54,697.00	SF	Geosynthetic Subcontractor	18,597	4,355	22,952	5,537	28,489	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**2,890**	**677**	**3,567**	**860**	**4,428**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	151.00	ECY	Earthwork Subcontractor	419	98	517	125	641	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	210.00	LCY	Earthwork Subcontractor	2,472	579	3,051	736	3,786	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**5,358**	**1,255**	**6,613**	**1,595**	**8,208**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	53.00	LCY	Earthwork Subcontractor	1,701	398	2,100	507	2,606	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	38.00	ECY	Earthwork Subcontractor	105	25	130	31	161	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	54,697.00	SF	Earthwork Subcontractor	3,551	832	4,383	1,057	5,440	
CELL-01 Groundwater Monitoring - Well Installation	**1.00**	**LS**	**Drilling Subcontractor**	**25,063**	**5,870**	**30,933**	**7,462**	**38,394**	
(Note: Assume 15 monitoring wells.)									
USR OM-02 Mobilization/Demobilization of Drill Rig	1.00	LS	Drilling Subcontractor	10,000	2,342	12,342	2,977	15,319	
(Note: Per Estimator)									
				40.21		*49.63*		*61.60*	
HTW 023223135112 Monitoring well construction, drilling, hollow stem auger, normal soil, 2" or less casing/screen, 4-1/4" ID x 8" OD auger	300.00	LF	Drilling Subcontractor	12,063	2,825	14,888	3,591	18,480	
				200.00		*246.84*		*306.38*	
USR OM-03 Well Completion	15.00	EA	Drilling Subcontractor	3,000	703	3,703	893	4,596	
(Note: Per Estimator)									
ALT4-07 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**Earthwork Subcontractor**	**26,275,758**	**6,153,783**	**32,429,541**	**7,822,654**	**40,252,195**	
				14,290,536.91		*17,637,380.65*		*21,891,869.62*	
SEA-SOIL Transportation and Offsite Disposal of	**1.00**	**EA**	**Earthwork**	**14,290,537**	**3,346,844**	**17,637,381**	**4,254,489**	**21,891,870**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Soil and Dewatered Sediment Removed from Seawall Areas			**Subcontractor**						
				6,342,065.66		*7,827,377.44*		*9,715,497.42*	
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**6,342,066**	**1,485,312**	**7,827,377**	**1,888,120**	**9,715,497**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	103,751.00	TON	Earthwork Subcontractor	4,218,516	987,976	5,206,492	1,255,910	6,462,402	
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	4,719.00	EA	Earthwork Subcontractor	825,825	193,408	1,019,233	245,859	1,265,093	
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	9,438.00	HR	Earthwork Subcontractor	943,800	221,038	1,164,838	280,982	1,445,820	
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	4,719.00	EA	Earthwork Subcontractor	353,925	82,889	436,814	105,368	542,183	
				5,407,715.25		*6,674,202.16*		*8,284,153.21*	
SEA-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**5,407,715**	**1,266,487**	**6,674,202**	**1,609,951**	**8,284,153**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)	23,055.00	LCY	Earthwork Subcontractor	1,603,475	375,534	1,979,009	477,377	2,456,386	
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)	34,584.00	TON	Earthwork Subcontractor	3,804,240	890,953	4,695,193	1,132,574	5,827,767	
				2,540,756.00		*3,135,801.06*		*3,892,218.99*	
SEA-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**2,540,756**	**595,045**	**3,135,801**	**756,418**	**3,892,219**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization (Note: Per Estimator, based on previous work)	6,289.00	EA	Earthwork Subcontractor	2,515,600	589,154	3,104,754	748,929	3,853,682	
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	6,289.00	EA	Earthwork Subcontractor	25,156	5,892	31,048	7,489	38,537	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				8,501,735.72		*10,492,842.23*		*13,023,925.63*	
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**8,501,736**	**1,991,107**	**10,492,842**	**2,531,083**	**13,023,926**	
				4,218,984.52		*5,207,070.69*		*6,463,120.29*	
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**4,218,985**	**988,086**	**5,207,071**	**1,256,050**	**6,463,120**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	69,022.00	TON	Earthwork Subcontractor	2,806,435	657,267	3,463,701	835,514	4,299,216	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	Earthwork Subcontractor	549,325	128,652	677,977	163,542	841,519	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	6,278.00	HR	Earthwork Subcontractor	627,800	147,031	774,831	186,905	961,735	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	3,139.00	EA	Earthwork Subcontractor	235,425	55,137	290,562	70,089	360,651	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				2,698,263.20		*3,330,196.44*		*4,133,506.43*	
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**2,698,263**	**631,933**	**3,330,196**	**803,310**	**4,133,506**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	11,504.00	LCY	Earthwork Subcontractor	800,103	187,384	987,487	238,202	1,225,689	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	17,256.00	TON	Earthwork Subcontractor	1,898,160	444,549	2,342,709	565,108	2,907,817	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				1,584,488.00		*1,955,575.09*		*2,427,298.91*	
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**1,584,488**	**371,087**	**1,955,575**	**471,724**	**2,427,299**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	3,922.00	EA	Earthwork Subcontractor	1,568,800	367,413	1,936,213	467,053	2,403,266	
(Note: Per Estimator, based on previous work)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	3,922.00	EA	Earthwork Subcontractor	15,688	3,674	19,362	4,671	24,033	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,483,485.72		*4,299,318.08*		*5,336,399.58*	
MC-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Margaret's Creek Area	**1.00**	**EA**	**Earthwork Subcontractor**	**3,483,486**	**815,832**	**4,299,318**	**1,037,082**	**5,336,400**	
				1,545,872.72		*1,907,916.11*		*2,368,143.64*	
MC-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**1,545,873**	**362,043**	**1,907,916**	**460,228**	**2,368,144**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	25,292.00	TON	Earthwork Subcontractor	1,028,373	240,845	1,269,218	306,161	1,575,378	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	1,150.00	EA	Earthwork Subcontractor	201,250	47,133	248,383	59,915	308,298	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	2,300.00	HR	Earthwork Subcontractor	230,000	53,866	283,866	68,474	352,340	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	1,150.00	EA	Earthwork Subcontractor	86,250	20,200	106,450	25,678	132,128	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				1,318,281.00		*1,627,022.41*		*2,019,492.76*	
MC-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**1,318,281**	**308,741**	**1,627,022**	**392,470**	**2,019,493**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	5,620.00	LCY	Earthwork Subcontractor	390,871	91,542	482,413	116,368	598,781	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	8,431.00	TON	Earthwork Subcontractor	927,410	217,199	1,144,609	276,103	1,420,712	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									
				619,332.00		*764,379.55*		*948,763.19*	
MC-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**619,332**	**145,048**	**764,380**	**184,384**	**948,763**	
				400.00		*493.68*		*612.77*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-16 Sampling and Testing for Waste Characterization	1,533.00	EA	Earthwork Subcontractor	613,200	143,611	756,811	182,558	939,369	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,533.00	EA	Earthwork Subcontractor	6,132	1,436	7,568	1,826	9,394	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT4-08 Site Restoration	**1.00**	**LS**	**Prime Contractor**	**8,265,706**	**1,935,828**	**10,201,535**	**2,460,814**	**12,662,349**	
(Note: Includes backfill of excavations, seawall reconstruction, and jetty reconstruction.)									
REST-01 Seawall Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**1,800,000**	**421,560**	**2,221,560**	**535,885**	**2,757,445**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes access provided by construction haul road built by others prior to the start of our work, assuming a triangular cross section with a 25 ft wide base, 15 ft high and 2200 ft long = 412,500 CF = 15,278 CY = 22,500 tons, assuming 2/3rds Corestone = 15,000 tons at $60 to $65 per ton and 1/3rd Capstone = 7,500 tons)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	7,500.00	TON	Earthwork Subcontractor	825,000	193,215	1,018,215	245,614	1,263,829	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				65.00		*80.22*		*99.57*	
USR REST-02 Reconstruction using Corestone	15,000.00	TON	Earthwork Subcontractor	975,000	228,345	1,203,345	290,271	1,493,616	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
REST-02 Jetty Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**586,630**	**137,389**	**724,019**	**174,648**	**898,667**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes barge access only, 4 ft high x 30 ft wide by 800 ft long = 96,000 CF = 3556 CY = 5333 tons, assuming all "Capstone")									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	5,333.00	TON	Earthwork Subcontractor	586,630	137,389	724,019	174,648	898,667	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				5,879,076.16		*7,255,955.80*		*9,006,237.46*	
REST-03 Backfill of Excavations	**1.00**	**EA**	**Earthwork Subcontractor**	**5,879,076**	**1,376,880**	**7,255,956**	**1,750,282**	**9,006,237**	
				28.00		*34.56*		*42.89*	
USR DREDG-03 Backfilling of Sediment Dredged	162,078.00	TON	Earthwork Subcontractor	4,538,184	1,062,843	5,601,027	1,351,080	6,952,106	
(Note: Vendor Quote from CCI on 12/13/2011. Unit cost includes material (clean beach sand), labor and equipment for placement from a barge.)									
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	Earthwork Subcontractor	944,342	221,165	1,165,507	281,144	1,446,651	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	Earthwork Subcontractor	236,432	55,372	291,805	70,389	362,194	
				2.77		*3.42*		*4.25*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	Earthwork Subcontractor	160,117	37,500	197,617	47,669	245,286	
ALT4-09 O&M	**1.00**	**LS**	**AE Contractor**	**103,249**	**0**	**103,249**	**46,462**	**149,711**	
OM-01 O&M of Onsite Containment Cell	**1.00**	**LS**	**AE Contractor**	**103,249**	**0**	**103,249**	**46,462**	**149,711**	
(Note: Common component for alternatives which include onsite containment, Alternatives 3 and 4.)									
OM-01-02 Annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**7,827**	**0**	**7,827**	**3,522**	**11,349**	
(Note: Assumed yearly quantities for annual sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	15.00	EA	AE Contractor	1,339	0	1,339	603	1,941	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	24.00	HR	AE Contractor	2,991	0	2,991	1,346	4,337	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	15.00	EA	AE Contractor	60	0	60	27	87	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	3.00	DAY	AE Contractor	954	0	954	429	1,383	
(Note: Per GSA website on 11/23/2011)									
OM-01-03 Quarterly Sampling per Year	**1.00**	**LS**	**AE Contractor**	**23,858**	**0**	**23,858**	**10,736**	**34,594**	
(Note: Assumed yearly quantities for quarterly sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	AE Contractor	5,356	0	5,356	2,410	7,766	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	96.00	HR	AE Contractor	11,963	0	11,963	5,383	17,347	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	AE Contractor	240	0	240	108	348	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	AE Contractor	3,816	0	3,816	1,717	5,533	
(Note: Per GSA website on 11/23/2011)									
OM-01-04 Semi-annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**13,171**	**0**	**13,171**	**5,927**	**19,097**	
(Note: Assumed yearly quantities for semi-annually sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	AE Contractor	2,678	0	2,678	1,205	3,883	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	48.00	HR	AE Contractor	5,982	0	5,982	2,692	8,673	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	AE Contractor	120	0	120	54	174	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	AE Contractor	1,908	0	1,908	859	2,767	
(Note: Per GSA website on 11/23/2011)									
OM-01-05 Quarterly Inspections per Year	**1.00**	**LS**	**AE Contractor**	**10,243**	**0**	**10,243**	**4,609**	**14,852**	
(Note: Assumed yearly quantities for quarterly inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	64.00	HR	AE Contractor	6,488	0	6,488	2,920	9,407	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	8.00	DAY	AE Contractor	1,272	0	1,272	572	1,844	
(Note: Per GSA website on 11/23/2011)									
OM-01-06 Semi-annual Inspections	**1.00**	**LS**	**AE Contractor**	**6,363**	**0**	**6,363**	**2,863**	**9,226**	
(Note: Assumed yearly quantities for semi-annual inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	32.00	HR	AE Contractor	3,244	0	3,244	1,460	4,704	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	4.00	DAY	AE Contractor	636	0	636	286	922	
(Note: Per GSA website on 11/23/2011)									
OM-01-01 Annual Inspections	**1.00**	**LS**	**AE Contractor**	**4,423**	**0**	**4,423**	**1,990**	**6,414**	
(Note: Assumed yearly quantities for annual inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	16.00	HR	AE Contractor	1,622	0	1,622	730	2,352	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	2.00	DAY	AE Contractor	318	0	318	143	461	
(Note: Per GSA website on 11/23/2011)									
				37,364.54		*37,364.54*		*54,178.59*	
OM-AN Annual for 30 years	**1.00**	**EA**	**AE Contractor**	**37,365**	**0**	**37,365**	**16,814**	**54,179**	
OM-01-08 Mowing and Snow Removal	**1.00**	**LS**	**AE Contractor**	**6,373**	**0**	**6,373**	**2,868**	**9,241**	
(Note: Assume One mowing and one snow clearing events per year. See QTO-02. Mowing is per SF, so is variable per alternative with the cell dimensions.)									
				58.27		*58.27*		*84.49*	
RSM 320190191670 Mowing, mowing brush, medium density, tractor with rotary mower	97.00	MSF	AE Contractor	5,652	0	5,652	2,543	8,196	
				90.09		*90.09*		*130.63*	
USR 320130200240 Snow removal, clearing, 1 C.Y., with wheeled skid steer loader	8.00	HR	AE Contractor	721	0	721	324	1,045	
(Note: MII English Cost Book 2010 - 320130200240 used for crew composition. Crew Output per hour.)									
OM-01-09 Leachate Pumping	**1.00**	**LS**	**AE Contractor**	**20,488**	**0**	**20,488**	**9,219**	**29,707**	
(Note: Assume leachate pumping requiredl every month. See QTO-02.)									
				186.36		*186.36*		*270.23*	
USR EW-07 Transport Water	48.00	HR	AE Contractor	8,945	0	8,945	4,025	12,971	
				120.23		*120.23*		*174.34*	
USR EW-DW-01 Dewatering (pumping)	96.00	HR	AE Contractor	11,542	0	11,542	5,194	16,736	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition and Crew Output.)									
OM-01-10 Erosion Repair	**1.00**	**LS**	**AE Contractor**	**5,111**	**0**	**5,111**	**2,300**	**7,411**	
(Note: Assume crew needed for erosion repair 4 days every year.)									
				159.72		*159.72*		*231.59*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR OM-01 Erosion Repair	32.00	HR	AE Contractor	5,111	0	5,111	2,300	7,411	
OM-01-07 Additional Inspections after Storm Events	**1.00**	**LS**	**AE Contractor**	**5,393**	**0**	**5,393**	**2,427**	**7,820**	
(Note: Assume additional inspections after storm events (1.5 per year). See QTO-02.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	AE Contractor	2,433	0	2,433	1,095	3,528	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	AE Contractor	477	0	477	215	692	
(Note: Per GSA website on 11/23/2011)									
ALT5 Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**Prime Contractor**	**32,943,076**	**7,341,862**	**40,284,938**	**9,787,160**	**50,072,098**	
ALT5-01 General Conditions	**1.00**	**LS**	**Prime Contractor**	**653,196**	**0**	**653,196**	**157,564**	**810,759**	
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**Prime Contractor**	**545,367**	**0**	**545,367**	**131,553**	**676,921**	
				85.82		*85.82*		*106.52*	
FOP FA-PROJM Project Managers	1,127.00	HR	Prime Contractor	96,714	0	96,714	23,329	120,043	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				66.56		*66.56*		*82.62*	
FOP FC-ENGPE Engineers, Project	2,253.00	HR	Prime Contractor	149,963	0	149,963	36,174	186,137	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				67.98		*67.98*		*84.38*	
HNC FA-AGENS General Superintendent (P.M.)	2,253.00	HR	Prime Contractor	153,157	0	153,157	36,945	190,102	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, December 2011.)									
				34.99		*34.99*		*43.43*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	Prime Contractor	6,998	0	6,998	1,688	8,686	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				52.65		*52.65*		*65.35*	
FOP FC-FLDER Field Engineers	100.00	HR	Prime Contractor	5,265	0	5,265	1,270	6,535	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				54.20		*54.20*		*67.27*	
HNC FD-SAENG Safety Engineer	200.00	HR	Prime Contractor	10,840	0	10,840	2,615	13,454	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				159.00		*159.00*		*197.35*	
USR GENCON-01 Per Diem	770.00	DAY	Prime Contractor	122,430	0	122,430	29,533	151,963	
(Note: Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				107,828.46		*107,828.46*		*133,838.85*	
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**Prime Contractor**	**107,828**	**0**	**107,828**	**26,010**	**133,839**	
				306.02		*306.02*		*379.84*	
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	13.00	EA	Prime Contractor	3,978	0	3,978	960	4,938	
				98.98		*98.98*		*122.85*	
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	13.00	EA	Prime Contractor	1,287	0	1,287	310	1,597	
				85.60		*85.60*		*106.25*	
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	13.00	MO	Prime Contractor	1,113	0	1,113	268	1,381	
				90.95		*90.95*		*112.89*	
RSM 015213400120 Field Office Expense, office supplies, average	13.00	MO	Prime Contractor	1,182	0	1,182	285	1,468	
				160.50		*160.50*		*199.22*	
RSM 015213400160 Field Office Expense, field office lights & HVAC	13.00	MO	Prime Contractor	2,087	0	2,087	503	2,590	
				88.50		*88.50*		*109.85*	
HNC 015213201400 Toilet, portable, chemical, rent per month	26.00	MO	Prime Contractor	2,301	0	2,301	555	2,856	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	5,633.00	HR	Prime Contractor	68,785	0	68,785	16,592	85,377	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	Prime Contractor	366	0	366	88	455	
				80.25		*80.25*		*99.61*	
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	Prime Contractor	9,630	0	9,630	2,323	11,953	
				5,000.00		*5,000.00*		*6,206.10*	
USR CC-E-02-01 Small Tools Allowance	1.00	EA	Prime Contractor	5,000	0	5,000	1,206	6,206	
(Note: Allowance per CCI estimator)									
				0.75		*0.75*		*0.93*	
USR CC-E-02-02 Cell Phone Allowance	6,133.00	HR	Prime Contractor	4,600	0	4,600	1,110	5,709	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Sub bid cost per CCI estimator.)									
				7,500.00		*7,500.00*		*9,309.15*	
USR CC-E-02-03 Electrician	1.00	EA	Prime Contractor	7,500	0	7,500	1,809	9,309	
(Note: Sub bid cost per CCI estimator.)									
ALT5-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**Prime Contractor**	**1,885,440**	**441,570**	**2,327,010**	**561,321**	**2,888,331**	
(Note: Includes silt fencing along access roads and rental and installation of a temporary portable coffer dam during seawall demolition and reconstruction. Turbidity Curtains are included in the sediment dredging unit cost.)									
				164.53		*203.06*		*252.04*	
USR EC-04 Maintenance Crew	13.00	MO	Earthwork Subcontractor	2,139	501	2,640	637	3,277	
				1,836,603.77		*2,266,736.37*		*2,813,518.51*	
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**Dredging Subcontractor**	**1,836,604**	**430,133**	**2,266,736**	**546,782**	**2,813,519**	
				194,835.00		*240,465.36*		*298,470.41*	
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	Dredging Subcontractor	194,835	45,630	240,465	58,005	298,470	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				118,615.00		*146,394.63*		*181,707.95*	
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	Dredging Subcontractor	237,230	55,559	292,789	70,627	363,416	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				79,075.00		*97,594.37*		*121,136.08*	
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	Dredging Subcontractor	790,750	185,194	975,944	235,417	1,211,361	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				10,617.00		*13,103.50*		*16,264.33*	
USR COFFDAM-04 Installation Crew	36.00	DAY	Dredging Subcontractor	382,212	89,514	471,726	113,790	585,516	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				962.00		*1,187.30*		*1,473.70*	
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	Dredging Subcontractor	5,772	1,352	7,124	1,718	8,842	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				1,214.98		*1,499.53*		*1,861.25*	
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	Dredging Subcontractor	43,739	10,244	53,983	13,022	67,005	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				2,961.52		*3,655.10*		*4,536.79*	
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	Dredging Subcontractor	106,615	24,969	131,584	31,741	163,324	
				15.19		*18.74*		*23.27*	
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	Dredging	69,861	16,362	86,223	20,799	107,022	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
				0.82		*1.01*		*1.26*	
USR COFFDAM-09 Sand Bag	4,600.00	EA	Dredging Subcontractor	3,780	885	4,665	1,125	5,791	
(Note: Vendor Quote from Uline on 12/14/2011. Unit cost is for 100 count bundle of 50 lbs bags (14 x 26"))									
				20.33		*25.09*		*31.14*	
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	Dredging Subcontractor	1,809	424	2,233	539	2,772	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean sand. Cost includes delivery to Old Bridge, NJ at Route 35.)									
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**Earthwork Subcontractor**	**41,373**	**9,690**	**51,062**	**12,317**	**63,380**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	Earthwork Subcontractor	15,174	3,554	18,727	4,517	23,245	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	27,120.00	LF	Earthwork Subcontractor	5,628	1,318	6,946	1,675	8,621	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	27,120.00	LF	Earthwork Subcontractor	20,572	4,818	25,389	6,124	31,514	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
				5,324.17		*6,571.09*		*8,156.17*	
EC-03 Silt Fencing Around the Perimeter of Containment Cells	**1.00**	**EA**	**Earthwork Subcontractor**	**5,324**	**1,247**	**6,571**	**1,585**	**8,156**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	3,490.00	LF	Earthwork Subcontractor	1,953	457	2,410	581	2,991	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	3,490.00	LF	Earthwork Subcontractor	724	170	894	216	1,109	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	3,490.00	LF	Earthwork Subcontractor	2,647	620	3,267	788	4,055	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
ALT5-03 Capping of Area 8	**1.00**	**LS**	**Geosynthetic Subcontractor**	**2,142,109**	**501,682**	**2,643,791**	**637,735**	**3,281,526**	
				3.21		*3.96*		*4.92*	
USR GEO-04 Reactive Core Mat with Organoclay and Apetite	81,608.00	SF	Geosynthetic Subcontractor	261,962	61,351	323,313	77,990	401,303	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Vendor Quote from CETCO on 12/11/22/2011 for material costs for 90,000SF of material. Roll Size 15' x 100'.)									
				593.85		*732.93*		*909.73*	
USR GEO-05 Triton Marine Mattress	628.00	EA	Geosynthetic Subcontractor	372,938	87,342	460,280	111,029	571,309	
(Note: Vendor Quote from CETCO on 12/11/22/2011 for material costs for 6.5' x 20' x 6" pre-fabricated, with tabs, no fabrick - includes braid and bodkins for closure. Assume an estimated quantity of 692 units per vendor.)									
				27.82		*34.34*		*42.62*	
USR GEO-06 3" to 6" Rip Rap Stone to fill Triton Marine Mattresses	1,904.00	TON	Geosynthetic Subcontractor	52,969	12,405	65,375	15,770	81,144	
(Note: Vendor Quote from CETCO on 12/11/22/2011 for material costs including delivery to Perth Amboy, NJ. Estimate 2100 tons of material.)									
				2,900.00		*3,579.18*		*4,442.55*	
USR GEO-07 Transportation of Reactive Core Mats	3.00	EA	Geosynthetic Subcontractor	8,700	2,038	10,738	2,590	13,328	
(Note: Vendor Quote from CETCO on 12/11/22/2011 for delivery of Reactive Core Mats to Perth Amboy, NJ. Assume estimated quanity of 3 loads per vendor.)									
				2,900.00		*3,579.18*		*4,442.55*	
USR GEO-08 Transportation of Marine Mattresses	6.00	EA	Geosynthetic Subcontractor	17,400	4,075	21,475	5,180	26,655	
(Note: Vendor Quote from CETCO on 12/11/22/2011 for delivery of Marine Mattresses to Perth Amboy, NJ. Assume estimated quanity of 6 loads per vendor.)									
				17.50		*21.60*		*26.81*	
USR GEO-09 Construction and Loading of Triton Marine Mattresses and Deploy the Mattresses and Reactive Core Mats from a barge.	81,608.00	SF	Geosynthetic Subcontractor	1,428,140	334,470	1,762,610	425,177	2,187,787	
(Note: Vendor Quote from CETCO on 12/11/22/2011.)									
			Prime Contractor						
ALT5-04 MNR	**1.00**	**LS**	**Other**	**173,267**	**0**	**173,267**	**77,970**	**251,237**	
(Note: Periodic Monitoring of Sediment and Surface Water for Monitored Natural Recovery of Areas 7, 11 and Margaret's Creek. Assumes a two person crew and a jon boat for the sampling. Semi-annual for first five years, and Annually for next 25 years.)									
ALT5-04-01 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**114,684**	**0**	**114,684**	**51,608**	**166,291**	
(Note: Assume semi-annual sampling and analysis of metals (total & dissolved) for the first five-years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	AE Contractor	26,421	0	26,421	11,889	38,310	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	480.00	HR	AE Contractor	59,816	0	59,816	26,917	86,733	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	AE Contractor	5,700	0	5,700	2,565	8,265	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	AE Contractor	1,184	0	1,184	533	1,717	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	AE Contractor	19,080	0	19,080	8,586	27,666	
(Note: Per GSA website on 11/23/2011)									
ALT5-04-02 Annual Sampling	**1.00**	**LS**	**AE Contractor**	**58,583**	**0**	**58,583**	**26,363**	**84,946**	
(Note: Assume annual sampling and analysis of metals (total & dissolved) for the next twenty five years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	AE Contractor	13,210	0	13,210	5,945	19,155	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	240.00	HR	AE Contractor	29,908	0	29,908	13,459	43,366	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	AE Contractor	2,850	0	2,850	1,283	4,133	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	AE Contractor	592	0	592	266	858	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	AE Contractor	9,540	0	9,540	4,293	13,833	
(Note: Per GSA website on 11/23/2011)									
ALT5-05 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**Prime Contractor**	**9,341,376**	**2,187,750**	**11,529,126**	**2,781,056**	**14,310,182**	
				5,366,174.22		*6,622,932.22*		*8,220,515.93*	
SEA Seawall Sector Site Activities	**1.00**	**EA**	**Prime Contractor Earthwork**	**5,366,174**	**1,256,758**	**6,622,932**	**1,597,584**	**8,220,516**	
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**Subcontractor**	**3,941,599**	**923,123**	**4,864,722**	**1,173,468**	**6,038,190**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	Dredging Subcontractor	2,858,250	669,402	3,527,652	850,940	4,378,592	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	Dredging Subcontractor	842,231	197,251	1,039,482	250,744	1,290,225	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	Earthwork Subcontractor	37,390	8,757	46,147	11,132	57,279	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	Earthwork Subcontractor	55,342	12,961	68,303	16,476	84,779	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	5,295.00	LCY	Earthwork Subcontractor	28,661	6,712	35,374	8,533	43,907	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				119,724.78		*147,764.32*		*183,408.04*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**119,725**	**28,040**	**147,764**	**35,644**	**183,408**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	Earthwork Subcontractor	112,288	26,298	138,586	33,430	172,016	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	Earthwork Subcontractor	5,032	1,178	6,210	1,498	7,709	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				967,420.09		*1,193,989.87*		*1,482,004.11*	
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**967,420**	**226,570**	**1,193,990**	**288,014**	**1,482,004**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	Dredging Subcontractor	388,500	90,987	479,487	115,662	595,148	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	Dredging Subcontractor	469,470	109,950	579,420	139,768	719,188	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	Earthwork Subcontractor	20,842	4,881	25,724	6,205	31,929	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	Earthwork Subcontractor	68,537	16,051	84,589	20,405	104,993	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	59.00	LCY	Earthwork Subcontractor	319	75	394	95	489	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				19,750.70		*24,376.32*		*30,256.38*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**19,751**	**4,626**	**24,376**	**5,880**	**30,256**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	Earthwork Subcontractor	16,602	3,888	20,490	4,943	25,433	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	Earthwork Subcontractor	744	174	918	221	1,140	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				5,698.96		*7,033.66*		*8,730.31*	
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,699**	**1,335**	**7,034**	**1,697**	**8,730**	
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	Earthwork Subcontractor	1,523	357	1,879	453	2,332	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				4,176.38		*5,154.49*		*6,397.86*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**4,176**	**978**	**5,154**	**1,243**	**6,398**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	Earthwork Subcontractor	1,696	397	2,093	505	2,598	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	Earthwork Subcontractor	76	18	94	23	116	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				25,096.48		*30,974.08*		*38,445.65*	
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**25,096**	**5,878**	**30,974**	**7,472**	**38,446**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	Earthwork Subcontractor	18,056	4,229	22,284	5,375	27,660	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	Earthwork Subcontractor	802	188	990	239	1,228	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	Earthwork Subcontractor	2,809	658	3,466	836	4,303	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				3,430.31		*4,233.69*		*5,254.94*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**3,430**	**803**	**4,234**	**1,021**	**5,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	Earthwork Subcontractor	982	230	1,212	292	1,504	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	Earthwork Subcontractor	44	10	54	13	67	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				374,865.10		*462,658.51*		*574,260.99*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**374,865**	**87,793**	**462,659**	**111,602**	**574,261**	
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	Dredging Subcontractor	*75.00* 256,500	60,072	*92.57* 316,572	76,364	*114.89* 392,936	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	Dredging Subcontractor	*22.10* 75,582	17,701	*27.28* 93,283	22,502	*33.86* 115,785	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	Earthwork Subcontractor	*0.94* 3,356	786	*1.16* 4,142	999	*1.45* 5,141	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	Earthwork Subcontractor	*4.30* 15,682	3,673	*5.31* 19,354	4,669	*6.59* 24,023	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	9.00	LCY	Earthwork Subcontractor	*5.41* 49	11	*6.68* 60	15	*8.29* 75	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	*23,697.08* **23,697**	**5,550**	*29,246.94* **29,247**	**7,055**	*36,301.88* **36,302**	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	Earthwork Subcontractor	*89.26* 20,173	4,724	*110.16* 24,897	6,006	*136.74* 30,903	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	*2,404.46* 2,404	563	*2,967.58* 2,968	716	*3,683.42* 3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
USR LABAN-SHIP-001 Overnight Sample Shipment	280.00	EA	Earthwork Subcontractor	*4.00* 1,120	262	*4.94* 1,382	333	*6.13* 1,716	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	*51,494.41* **51,494**	**12,060**	*63,554.40* **63,554**	**15,331**	*78,885.00* **78,885**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	440.00	LCY	Dredging Subcontractor	33,000	7,729	40,729	9,825	50,553	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	Dredging Subcontractor	9,724	2,277	12,001	2,895	14,896	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	Earthwork Subcontractor	432	101	533	129	662	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	Earthwork Subcontractor	2,297	538	2,835	684	3,518	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				6,041.57		*7,456.51*		*9,255.17*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**6,042**	**1,415**	**7,457**	**1,799**	**9,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	Earthwork Subcontractor	3,481	815	4,296	1,036	5,333	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	Earthwork Subcontractor	156	37	193	46	239	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,608,645.27		*4,453,790.00*		*5,528,133.22*	
JET Jetty Sector Site Activities	**1.00**	**EA**	**Prime Contractor**	**3,608,645**	**845,145**	**4,453,790**	**1,074,343**	**5,528,133**	
				746,663.43		*921,532.01*		*1,143,823.96*	
JET-07 Area 7 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**746,663**	**174,869**	**921,532**	**222,292**	**1,143,824**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	Dredging Subcontractor	552,000	129,278	681,278	164,338	845,616	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	Dredging Subcontractor	162,656	38,094	200,750	48,425	249,175	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	Earthwork Subcontractor	7,221	1,691	8,912	2,150	11,062	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				24,786.71		*30,591.76*		*37,971.10*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**24,787**	**5,805**	**30,592**	**7,379**	**37,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	Earthwork Subcontractor	21,422	5,017	26,439	6,378	32,817	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	Earthwork Subcontractor	960	225	1,185	286	1,471	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,364,011.97		*2,917,663.58*		*3,621,462.38*	
JET-08 Area 8 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**2,364,012**	**553,652**	**2,917,664**	**703,799**	**3,621,462**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	23,260.00	LCY	Dredging Subcontractor	1,744,500	408,562	2,153,062	519,362	2,672,423	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	23,260.00	LCY	Dredging Subcontractor	514,046	120,390	634,436	153,039	787,474	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	24,190.00	LCY	Earthwork Subcontractor	22,821	5,345	28,165	6,794	34,959	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	Earthwork Subcontractor	16,185	3,790	19,975	4,818	24,794	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	4,994.00	LCY	Earthwork Subcontractor	27,032	6,331	33,363	8,048	41,411	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				39,428.44		*48,662.58*		*60,400.96*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**39,428**	**9,234**	**48,663**	**11,738**	**60,401**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	Earthwork Subcontractor	35,436	8,299	43,735	10,550	54,285	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	Earthwork Subcontractor	1,588	372	1,960	473	2,433	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				497,969.87		*614,594.41*		*762,846.88*	
JET-10 Area 11 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**497,970**	**116,625**	**614,594**	**148,252**	**762,847**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	Dredging Subcontractor	346,500	81,150	427,650	103,158	530,808	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	Dredging Subcontractor	102,102	23,912	126,014	30,397	156,411	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	Earthwork Subcontractor	4,533	1,062	5,595	1,350	6,944	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	Earthwork Subcontractor	9,230	2,162	11,392	2,748	14,140	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				35,604.80		*43,943.45*		*54,543.49*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**35,605**	**8,339**	**43,943**	**10,600**	**54,543**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	Earthwork Subcontractor	31,776	7,442	39,218	9,460	48,679	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	Earthwork Subcontractor	1,424	334	1,758	424	2,181	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				366,556.27		*452,403.74*		*561,532.58*	
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**Prime Contractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				366,556.27		*452,403.74*		*561,532.58*	
MC-09 Area 9 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	Dredging Subcontractor	78,079	18,286	96,365	23,245	119,611	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	Earthwork Subcontractor	3,466	812	4,278	1,032	5,310	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	Earthwork Subcontractor	76,851	17,999	94,850	22,880	117,730	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	Earthwork Subcontractor	3,849	901	4,750	1,146	5,896	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-08 for crew output.)									
				204,311.06		*252,160.71*		*312,986.91*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**204,311**	**47,850**	**252,161**	**60,826**	**312,987**	
				89.26		*110.16*		*136.74*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	Earthwork Subcontractor	193,247	45,258	238,505	57,532	296,037	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	Earthwork Subcontractor	8,660	2,028	10,688	2,578	13,266	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT5-06 Transportation of Contaminated Materials to Onsite Containment Cell	**1.00**	**LS**	**Prime Contractor**	**607,701**	**0**	**607,701**	**146,590**	**754,290**	
				7.88		*7.88*		*9.78*	
USR HAUL-MC-01 Transportation of Slag and Battery Casings from Seawall to Margaret's Creek Cells	5,363.00	LCY	Prime Contractor	42,272	0	42,272	10,197	52,469	
(Note: See Productivity Calculations)									
				5.84		*5.84*		*7.24*	
USR HAUL-WJ-01 Transportation of Slag and Battery Casings from Western Jetty to Western Jetty Containment Cell	4,994.00	LCY	Prime Contractor	29,148	0	29,148	7,031	36,179	
(Note: See Productivity Calculations)									
				5.84		*5.84*		*7.24*	
USR HAUL-MC-03 Transportation of Slag and Battery Casings from Margaret's Creek to Margaret's Creek Cells	711.00	LCY	Prime Contractor	4,150	0	4,150	1,001	5,151	
(Note: See Productivity Calculations)									
				5.09		*5.09*		*6.32*	
USR HAUL-MC-02 Transportation of Soil from Seawall to Margaret's Creek Cells	88,824.00	LCY	Prime Contractor	452,083	0	452,083	109,051	561,134	
(Note: See Productivity Calculations)									
				2.64		*2.64*		*3.27*	
USR HAUL-WJ-02 Transportation of Soil from Western Jetty to Western Jetty Containment Cell	7,890.00	LCY	Prime Contractor	20,796	0	20,796	5,016	25,812	
(Note: See Productivity Calculations)									
				2.64		*2.64*		*3.27*	
USR HAUL-MC-04 Transportation of Soil from Margaret's Creek to Margaret's Creek Cells	22,481.00	LCY	Prime Contractor	59,253	0	59,253	14,293	73,546	
(Note: See Productivity Calculations)									
ALT5-07 Onsite Containtment Cell Construction	**1.00**	**LS**	**Prime Contractor**	**5,845,722**	**1,369,068**	**7,214,790**	**1,740,352**	**8,955,142**	
(Note: Common component for alternatives which include onsite containment.)									
CELL-A Onsite Cell #1 Near the Western Jetty	**1.00**	**LS**	**Earthwork Subcontractor**	**809,394**	**189,560**	**998,955**	**240,968**	**1,239,922**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork**	**507,815**	**118,930**	**626,745**	**151,183**	**777,929**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
				46.01		*56.78*		*70.48*	
RSM 311313202040 Selective clearing and grubbing, 1-1/2 C.Y. excavator, 4" to 6" diameter, stump removal on site by hydraulic excavator	30.00	EA	Earthwork Subcontractor	1,380	323	1,704	411	2,114	
				18.05		*22.28*		*27.66*	
RSM 320130105910 Site maintenance, road & walk maintenance, asphaltic concrete paving, cold patch, 2" thick	334.00	SY	Earthwork Subcontractor	6,030	1,412	7,443	1,795	9,238	
				0.61		*0.75*		*0.93*	
RSM 320116715320 Cold milling asphalt paving, asphalt pavement, 1" to 3" deep, removal from concrete base, rip, load and sweep, excludes hauling	667.00	SY	Earthwork Subcontractor	404	95	499	120	620	
				500,000.00		*617,100.00*		*765,956.86*	
USR PREP-02 Sub Base Improvements	1.00	ACR	Earthwork Subcontractor	500,000	117,100	617,100	148,857	765,957	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
			Earthwork						
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Subcontractor**	**96,675**	**22,641**	**119,316**	**28,781**	**148,098**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,056.00	ECY	Earthwork Subcontractor	14,014	3,282	17,297	4,172	21,469	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	7,023.00	LCY	Earthwork Subcontractor	82,661	19,359	102,020	24,609	126,629	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
			Geosynthetic						
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Subcontractor**	**21,004**	**4,919**	**25,923**	**6,253**	**32,176**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	34,432.00	SF	Geosynthetic Subcontractor	21,004	4,919	25,923	6,253	32,176	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
			Earthwork						
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Subcontractor**	**39,527**	**9,257**	**48,785**	**11,768**	**60,552**	
			Earthwork						
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Subcontractor**	**8,273**	**1,938**	**10,211**	**2,463**	**12,674**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	Earthwork Subcontractor	5,065	1,186	6,251	1,508	7,758	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	Earthwork Subcontractor	247	58	305	73	378	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	Earthwork Subcontractor	219	51	270	65	335	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**31,254**	**7,320**	**38,574**	**9,305**	**47,878**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,105.00	LCY	Earthwork Subcontractor	29,559	6,923	36,481	8,800	45,281	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,105.00	LCY	Earthwork Subcontractor	1,695	397	2,092	505	2,597	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**12,346**	**2,891**	**15,237**	**3,675**	**18,913**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	21,576.00	SF	Geosynthetic Subcontractor	12,346	2,891	15,237	3,675	18,913	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**29,589**	**6,930**	**36,519**	**8,809**	**45,328**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	10,675.00	ECY	Earthwork Subcontractor	29,589	6,930	36,519	8,809	45,328	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**23,657**	**5,540**	**29,197**	**7,043**	**36,240**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	41,344.00	SF	Geosynthetic Subcontractor	23,657	5,540	29,197	7,043	36,240	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**38,198**	**8,946**	**47,144**	**11,372**	**58,516**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**8,273**	**1,938**	**10,211**	**2,463**	**12,674**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	Earthwork Subcontractor	5,065	1,186	6,251	1,508	7,758	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	Earthwork Subcontractor	247	58	305	73	378	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	Earthwork Subcontractor	219	51	270	65	335	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork**	**29,925**	**7,008**	**36,933**	**8,909**	**45,842**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,058.00	LCY	Earthwork Subcontractor	28,302	6,628	34,930	8,426	43,355	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,058.00	LCY	Earthwork Subcontractor	1,623	380	2,003	483	2,486	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**20,259**	**4,745**	**25,003**	**6,031**	**31,034**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	41,344.00	SF	Geosynthetic Subcontractor	20,259	4,745	25,003	6,031	31,034	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**14,057**	**3,292**	**17,349**	**4,185**	**21,534**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	41,344.00	SF	Geosynthetic Subcontractor	14,057	3,292	17,349	4,185	21,534	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**2,187**	**512**	**2,700**	**651**	**3,351**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	114.00	ECY	Earthwork Subcontractor	316	74	390	94	484	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	159.00	LCY	Earthwork Subcontractor	1,871	438	2,310	557	2,867	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**4,081**	**956**	**5,036**	**1,215**	**6,251**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	41.00	LCY	Earthwork Subcontractor	1,316	308	1,624	392	2,016	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	29.00	ECY	Earthwork Subcontractor	80	19	99	24	123	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	41,344.00	SF	Earthwork Subcontractor	2,684	629	3,313	799	4,112	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
CELL-B Onsite Cell #2 Near Margaret's Creek Area	**1.00**	**LS**	**Earthwork Subcontractor**	**1,753,006**	**410,554**	**2,163,560**	**521,894**	**2,685,454**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**1,012,158**	**237,047**	**1,249,205**	**301,333**	**1,550,538**	
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	2.00	ACR	Earthwork Subcontractor	*6,078.81* 12,158	2,847	*7,502.47* 15,005	3,619	*9,312.22* 18,624	
USR PREP-02 Sub Base Improvements	2.00	ACR	Earthwork Subcontractor	*500,000.00* 1,000,000	234,200	*617,100.00* 1,234,200	297,714	*765,956.86* 1,531,914	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**171,232**	**40,102**	**211,334**	**50,978**	**262,312**	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	8,956.00	ECY	Earthwork Subcontractor	*2.77* 24,824	5,814	*3.42* 30,638	7,391	*4.25* 38,029	
USR EW-BF-02 Clean Fill for Backfill	12,439.00	LCY	Earthwork Subcontractor	*11.77* 146,407	34,289	*14.53* 180,696	43,587	*18.03* 224,283	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**57,210**	**13,399**	**70,609**	**17,032**	**87,641**	
USR GEO-02 LLDPE Geomembrane for Liner	93,787.00	SF	Geosynthetic Subcontractor	*0.61* 57,210	13,399	*0.75* 70,609	17,032	*0.93* 87,641	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**116,515**	**27,288**	**143,802**	**34,688**	**178,490**	
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**18,934**	**4,434**	**23,369**	**5,637**	**29,006**	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	Earthwork Subcontractor	*8.44* 14,350	3,361	*10.42* 17,710	4,272	*12.93* 21,982	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	Earthwork Subcontractor	*5.43* 2,415	566	*6.70* 2,980	719	*8.31* 3,699	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	Earthwork Subcontractor	*82.25* 329	77	*101.52* 406	98	*126.00* 504	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	Earthwork Subcontractor	292	68	360	87	447	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**97,580**	**22,853**	**120,433**	**29,051**	**149,484**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	3,450.00	LCY	Earthwork Subcontractor	92,288	21,614	113,901	27,475	141,376	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	3,450.00	LCY	Earthwork Subcontractor	5,293	1,240	6,532	1,576	8,108	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**38,584**	**9,036**	**47,620**	**11,487**	**59,107**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	67,431.00	SF	Geosynthetic Subcontractor	38,584	9,036	47,620	11,487	59,107	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**83,557**	**19,569**	**103,126**	**24,876**	**128,002**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	30,145.00	ECY	Earthwork Subcontractor	83,557	19,569	103,126	24,876	128,002	
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**64,079**	**15,007**	**79,087**	**19,077**	**98,164**	
				0.57		*0.71*		*0.88*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	111,988.00	SF	Geosynthetic Subcontractor	64,079	15,007	79,087	19,077	98,164	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**99,912**	**23,399**	**123,311**	**29,745**	**153,056**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**18,934**	**4,434**	**23,369**	**5,637**	**29,006**	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	Earthwork Subcontractor	*8.44* 14,350	3,361	*10.42* 17,710	4,272	*12.93* 21,982	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	Earthwork Subcontractor	*5.43* 2,415	566	*6.70* 2,980	719	*8.31* 3,699	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	Earthwork Subcontractor	*82.25* 329	77	*101.52* 406	98	*126.00* 504	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	Earthwork Subcontractor	*72.96* 292	68	*90.05* 360	87	*111.78* 447	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	*432.51* 433	101	*533.81* 534	129	*662.57* 663	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	*272.01* 272	64	*335.72* 336	81	*416.70* 417	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	*8.56* 9	2	*10.56* 11	3	*13.11* 13	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	*260.10* 260	61	*321.01* 321	77	*398.44* 398	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	*576.13* 576	135	*711.06* 711	172	*882.58* 883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**80,977**	**18,965**	**99,942**	**24,108**	**124,050**	
USR EW-BF-03 Drainage Sand	2,863.00	LCY	Earthwork Subcontractor	*26.75* 76,585	17,936	*33.01* 94,522	22,800	*40.98* 117,322	

(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	2,863.00	LCY	Earthwork Subcontractor	4,392	1,029	5,421	1,308	6,728	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**54,874**	**12,852**	**67,726**	**16,337**	**84,062**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	111,988.00	SF	Geosynthetic Subcontractor	54,874	12,852	67,726	16,337	84,062	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**38,076**	**8,917**	**46,993**	**11,336**	**58,329**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	111,988.00	SF	Geosynthetic Subcontractor	38,076	8,917	46,993	11,336	58,329	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**5,891**	**1,380**	**7,271**	**1,754**	**9,025**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	308.00	ECY	Earthwork Subcontractor	854	200	1,054	254	1,308	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	428.00	LCY	Earthwork Subcontractor	5,038	1,180	6,217	1,500	7,717	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**10,919**	**2,557**	**13,476**	**3,251**	**16,727**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	107.00	LCY	Earthwork Subcontractor	3,435	804	4,239	1,023	5,262	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	77.00	ECY	Earthwork Subcontractor	213	50	263	64	327	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	111,988.00	SF	Earthwork Subcontractor	7,271	1,703	8,974	2,165	11,138	
CELL-C Onsite Cell #3 Near Margaret's Creek Area	**1.00**	**LS**	**Earthwork Subcontractor**	**3,258,258**	**763,084**	**4,021,343**	**970,028**	**4,991,371**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**2,024,315**	**474,095**	**2,498,410**	**602,666**	**3,101,076**	
				6,078.81		*7,502.47*		*9,312.22*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	4.00	ACR	Earthwork Subcontractor	24,315	5,695	30,010	7,239	37,249	
				500,000.00		*617,100.00*		*765,956.86*	
USR PREP-02 Sub Base Improvements	4.00	ACR	Earthwork Subcontractor	2,000,000	468,400	2,468,400	595,427	3,063,827	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**214,042**	**50,129**	**264,171**	**63,723**	**327,894**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	11,195.00	ECY	Earthwork Subcontractor	31,031	7,267	38,298	9,238	47,536	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	15,549.00	LCY	Earthwork Subcontractor	183,012	42,861	225,873	54,485	280,358	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**100,153**	**23,456**	**123,609**	**29,817**	**153,426**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	164,185.00	SF	Geosynthetic Subcontractor	100,153	23,456	123,609	29,817	153,426	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**215,226**	**50,406**	**265,632**	**64,076**	**329,707**	
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**31,775**	**7,442**	**39,217**	**9,460**	**48,677**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	Earthwork Subcontractor	26,589	6,227	32,816	7,916	40,732	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	Earthwork Subcontractor	2,550	597	3,148	759	3,907	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	Earthwork Subcontractor	576	135	711	171	882	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	Earthwork Subcontractor	511	120	630	152	782	
				432.51		*533.81*		*662.57*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**183,451**	**42,964**	**226,415**	**54,616**	**281,031**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	6,486.00	LCY	Earthwork Subcontractor	173,501	40,634	214,134	51,653	265,788	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	6,486.00	LCY	Earthwork Subcontractor	9,950	2,330	12,281	2,962	15,243	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**72,541**	**16,989**	**89,530**	**21,596**	**111,127**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	126,776.00	SF	Geosynthetic Subcontractor	72,541	16,989	89,530	21,596	111,127	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**155,414**	**36,398**	**191,812**	**46,269**	**238,080**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	56,069.00	ECY	Earthwork Subcontractor	155,414	36,398	191,812	46,269	238,080	
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**111,848**	**26,195**	**138,042**	**33,299**	**171,341**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	195,470.00	SF	Geosynthetic Subcontractor	111,848	26,195	138,042	33,299	171,341	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**173,111**	**40,543**	**213,653**	**51,537**	**265,191**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork**	**31,775**	**7,442**	**39,217**	**9,460**	**48,677**	

Description	Quantity	UOM	Contractor Subcontractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	Earthwork Subcontractor	26,589	6,227	32,816	7,916	40,732	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	Earthwork Subcontractor	2,550	597	3,148	759	3,907	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	Earthwork Subcontractor	576	135	711	171	882	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	Earthwork Subcontractor	511	120	630	152	782	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**141,336**	**33,101**	**174,437**	**42,078**	**216,514**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	4,997.00	LCY	Earthwork Subcontractor	133,670	31,305	164,975	39,795	204,771	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	4,997.00	LCY	Earthwork Subcontractor	7,666	1,795	9,461	2,282	11,744	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic**	**95,780**	**22,432**	**118,212**	**28,515**	**146,727**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	195,470.00	SF	Geosynthetic Subcontractor	95,780	22,432	118,212	28,515	146,727	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**66,460**	**15,565**	**82,025**	**19,786**	**101,811**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	195,470.00	SF	Geosynthetic Subcontractor	66,460	15,565	82,025	19,786	101,811	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**10,269**	**2,405**	**12,674**	**3,057**	**15,731**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	537.00	ECY	Earthwork Subcontractor	1,488	349	1,837	443	2,280	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	746.00	LCY	Earthwork Subcontractor	8,780	2,056	10,837	2,614	13,451	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**19,100**	**4,473**	**23,573**	**5,686**	**29,260**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	188.00	LCY	Earthwork Subcontractor	6,035	1,413	7,448	1,797	9,245	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	135.00	ECY	Earthwork Subcontractor	374	88	462	111	573	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	195,470.00	SF	Earthwork Subcontractor	12,691	2,972	15,663	3,778	19,442	
CELL-01 Groundwater Monitoring - Well Installation	**1.00**	**LS**	**Drilling Subcontractor**	**25,063**	**5,870**	**30,933**	**7,462**	**38,394**	
(Note: Assume 15 monitoring wells.)									
USR OM-02 Mobilization/Demobilization of Drill Rig	1.00	LS	Drilling Subcontractor	10,000	2,342	12,342	2,977	15,319	
(Note: Per Estimator)									
				40.21		*49.63*		*61.60*	
HTW 023223135112 Monitoring well construction, drilling, hollow stem auger, normal soil, 2" or less casing/screen, 4-1/4" ID x 8" OD auger	300.00	LF	Drilling Subcontractor	12,063	2,825	14,888	3,591	18,480	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				200.00		*246.84*		*306.38*	
USR OM-03 Well Completion	15.00	EA	Drilling Subcontractor	3,000	703	3,703	893	4,596	
(Note: Per Estimator)									
ALT5-08 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**Earthwork Subcontractor**	**4,484,754**	**1,050,329**	**5,535,083**	**1,335,173**	**6,870,256**	
				374,264.02		*461,916.65*		*573,340.19*	
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**374,264**	**87,653**	**461,917**	**111,424**	**573,340**	
				311,644.02		*384,631.05*		*477,411.75*	
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**311,644**	**72,987**	**384,631**	**92,781**	**477,412**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	5,097.00	TON	Earthwork Subcontractor	207,244	48,537	255,781	61,699	317,480	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	Earthwork Subcontractor	40,600	9,509	50,109	12,087	62,196	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	464.00	HR	Earthwork Subcontractor	46,400	10,867	57,267	13,814	71,081	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	Earthwork Subcontractor	17,400	4,075	21,475	5,180	26,655	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				62,620.00		*77,285.60*		*95,928.44*	
SEA-SOIL-02 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**62,620**	**14,666**	**77,286**	**18,643**	**95,928**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	155.00	EA	Earthwork Subcontractor	62,000	14,520	76,520	18,458	94,979	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	155.00	EA	Earthwork Subcontractor	620	145	765	185	950	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				4,110,489.60		*5,073,166.26*		*6,296,915.43*	
WJ-SOIL Transportation and Offsite Disposal of	**1.00**	**EA**	**Earthwork**	**4,110,490**	**962,677**	**5,073,166**	**1,223,749**	**6,296,915**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
Soil and Dewatered Sediment Removed from Western Jetty Areas			**Subcontractor**						
				3,230,637.60		*3,987,252.93*		*4,949,058.08*	
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**3,230,638**	**756,615**	**3,987,253**	**961,805**	**4,949,058**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	52,860.00	TON	Earthwork Subcontractor	2,149,288	503,363	2,652,651	639,872	3,292,523	
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	2,403.00	EA	Earthwork Subcontractor	420,525	98,487	519,012	125,196	644,208	
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011.)	4,806.00	HR	Earthwork Subcontractor	480,600	112,557	593,157	143,081	736,238	
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility (Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)	2,403.00	EA	Earthwork Subcontractor	180,225	42,209	222,434	53,655	276,089	
				215,676.00		*266,187.32*		*330,397.02*	
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**215,676**	**50,511**	**266,187**	**64,210**	**330,397**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)	920.00	LCY	Earthwork Subcontractor	63,986	14,986	78,972	19,050	98,021	
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility (Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)	1,379.00	TON	Earthwork Subcontractor	151,690	35,526	187,216	45,160	232,376	
				664,176.00		*819,726.02*		*1,017,460.33*	
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**664,176**	**155,550**	**819,726**	**197,734**	**1,017,460**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization (Note: Per Estimator, based on previous work)	1,644.00	EA	Earthwork Subcontractor	657,600	154,010	811,610	195,777	1,007,386	
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,644.00	EA	Earthwork Subcontractor	6,576	1,540	8,116	1,958	10,074	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT5-09 Site Restoration	**1.00**	**LS**	**Prime Contractor**	**7,649,286**	**1,791,463**	**9,440,749**	**2,277,297**	**11,718,046**	
(Note: Includes backfill of excavations, seawall reconstruction, and jetty reconstruction.)									
REST-01 Seawall Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**1,800,000**	**421,560**	**2,221,560**	**535,885**	**2,757,445**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes access provided by construction haul road built by others prior to the start of our work, assuming a triangular cross section with a 25 ft wide base, 15 ft high and 2200 ft long = 412,500 CF = 15,278 CY = 22,500 tons, assuming 2/3rds Corestone = 15,000 tons at $60 to $65 per ton and 1/3rd Capstone = 7,500 tons)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	7,500.00	TON	Earthwork Subcontractor	825,000	193,215	1,018,215	245,614	1,263,829	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				65.00		*80.22*		*99.57*	
USR REST-02 Reconstruction using Corestone	15,000.00	TON	Earthwork Subcontractor	975,000	228,345	1,203,345	290,271	1,493,616	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
REST-02 Jetty Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**586,630**	**137,389**	**724,019**	**174,648**	**898,667**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes barge access only, 4 ft high x 30 ft wide by 800 ft long = 96,000 CF = 3556 CY = 5333 tons, assuming all “Capstone”)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	5,333.00	TON	Earthwork Subcontractor	586,630	137,389	724,019	174,648	898,667	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				5,262,656.16		*6,495,170.23*		*8,061,935.20*	
REST-03 Backfill of Excavations	**1.00**	**EA**	**Earthwork Subcontractor**	**5,262,656**	**1,232,514**	**6,495,170**	**1,566,765**	**8,061,935**	
				28.00		*34.56*		*42.89*	
USR DREDG-03 Backfilling of Sediment Dredged	140,063.00	TON	Earthwork Subcontractor	3,921,764	918,477	4,840,241	1,167,563	6,007,804	
(Note: Vendor Quote from CCI on 12/13/2011. Unit cost includes material (clean beach sand), labor and equipment for placement from a barge.)									
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	Earthwork Subcontractor	944,342	221,165	1,165,507	281,144	1,446,651	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	Earthwork Subcontractor	236,432	55,372	291,805	70,389	362,194	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	Earthwork Subcontractor	160,117	37,500	197,617	47,669	245,286	
ALT5-10 O&M	**1.00**	**LS**	**AE Contractor**	**160,227**	**0**	**160,227**	**72,102**	**232,329**	
OM-01 O&M of Onsite Containment Cell	**1.00**	**LS**	**AE Contractor**	**117,933**	**0**	**117,933**	**53,070**	**171,003**	
(Note: Common component for alternatives which include onsite containment.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
OM-01-02 Annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**7,827**	**0**	**7,827**	**3,522**	**11,349**	
(Note: Assumed yearly quantities for annual sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	15.00	EA	AE Contractor	1,339	0	1,339	603	1,941	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	24.00	HR	AE Contractor	2,991	0	2,991	1,346	4,337	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	15.00	EA	AE Contractor	60	0	60	27	87	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	3.00	DAY	AE Contractor	954	0	954	429	1,383	
(Note: Per GSA website on 11/23/2011)									
OM-01-03 Quarterly Sampling per Year	**1.00**	**LS**	**AE Contractor**	**23,858**	**0**	**23,858**	**10,736**	**34,594**	
(Note: Assumed yearly quantities for quarterly sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	AE Contractor	5,356	0	5,356	2,410	7,766	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	96.00	HR	AE Contractor	11,963	0	11,963	5,383	17,347	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	AE Contractor	240	0	240	108	348	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	AE Contractor	3,816	0	3,816	1,717	5,533	
(Note: Per GSA website on 11/23/2011)									
OM-01-04 Semi-annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**13,171**	**0**	**13,171**	**5,927**	**19,097**	
(Note: Assumed yearly quantities for semi-annually sampling. See QTO-03 for quantity breakdown and assumptions.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	AE Contractor	2,678	0	2,678	1,205	3,883	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	48.00	HR	AE Contractor	5,982	0	5,982	2,692	8,673	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	AE Contractor	120	0	120	54	174	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	AE Contractor	1,908	0	1,908	859	2,767	
(Note: Per GSA website on 11/23/2011)									
OM-01-05 Quarterly Inspections per Year	**1.00**	**LS**	**AE Contractor**	**10,243**	**0**	**10,243**	**4,609**	**14,852**	
(Note: Assumed yearly quantities for quarterly inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	64.00	HR	AE Contractor	6,488	0	6,488	2,920	9,407	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	8.00	DAY	AE Contractor	1,272	0	1,272	572	1,844	
(Note: Per GSA website on 11/23/2011)									
OM-01-06 Semi-annual Inspections	**1.00**	**LS**	**AE Contractor**	**6,363**	**0**	**6,363**	**2,863**	**9,226**	
(Note: Assumed yearly quantities for semi-annual inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	32.00	HR	AE Contractor	3,244	0	3,244	1,460	4,704	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	4.00	DAY	AE Contractor	636	0	636	286	922	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per GSA website on 11/23/2011)									
OM-01-01 Annual Inspections	**1.00**	**LS**	**AE Contractor**	**4,423**	**0**	**4,423**	**1,990**	**6,414**	
(Note: Assumed yearly quantities for annual inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	16.00	HR	AE Contractor	1,622	0	1,622	730	2,352	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	2.00	DAY	AE Contractor	318	0	318	143	461	
(Note: Per GSA website on 11/23/2011)									
				52,048.52		*52,048.52*		*75,470.36*	
OM-AN Annual for 30 years	**1.00**	**EA**	**AE Contractor**	**52,049**	**0**	**52,049**	**23,422**	**75,470**	
OM-01-08 Mowing and Snow Removal	**1.00**	**LS**	**AE Contractor**	**21,057**	**0**	**21,057**	**9,476**	**30,532**	
(Note: Assume One mowing and one snow clearing events per year. See QTO-02. Mowing is per SF, so is variable per alternative with the cell dimensions.)									
				58.27		*58.27*		*84.49*	
RSM 320190191670 Mowing, mowing brush, medium density, tractor with rotary mower	349.00	MSF	AE Contractor	20,336	0	20,336	9,151	29,487	
				90.09		*90.09*		*130.63*	
USR 320130200240 Snow removal, clearing, 1 C.Y., with wheeled skid steer loader	8.00	HR	AE Contractor	721	0	721	324	1,045	
(Note: MII English Cost Book 2010 - 320130200240 used for crew composition. Crew Output per hour.)									
OM-01-09 Leachate Pumping	**1.00**	**LS**	**AE Contractor**	**20,488**	**0**	**20,488**	**9,219**	**29,707**	
(Note: Assume leachate pumping requiredl every month. See QTO-02.)									
				186.36		*186.36*		*270.23*	
USR EW-07 Transport Water	48.00	HR	AE Contractor	8,945	0	8,945	4,025	12,971	
				120.23		*120.23*		*174.34*	
USR EW-DW-01 Dewatering (pumping)	96.00	HR	AE Contractor	11,542	0	11,542	5,194	16,736	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition and Crew Output.)									
OM-01-10 Erosion Repair	**1.00**	**LS**	**AE Contractor**	**5,111**	**0**	**5,111**	**2,300**	**7,411**	
(Note: Assume crew needed for erosion repair 4 days every year.)									
				159.72		*159.72*		*231.59*	
USR OM-01 Erosion Repair	32.00	HR	AE Contractor	5,111	0	5,111	2,300	7,411	
OM-01-07 Additional Inspections after Storm Events	**1.00**	**LS**	**AE Contractor**	**5,393**	**0**	**5,393**	**2,427**	**7,820**	
(Note: Assume additional inspections after storm events (1.5 per year). See QTO-02.)									
				2,483.18		*2,483.18*		*3,600.61*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	AE Contractor	2,433	0	2,433	1,095	3,528	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	AE Contractor	477	0	477	215	692	
(Note: Per GSA website on 11/23/2011)									
OM-02 O&M of Cap at Area 8	**1.00**	**LS**	**AE Contractor**	**42,294**	**0**	**42,294**	**19,032**	**61,326**	
(Note: Assume a two person crew and a jon boat for the sampling. Semi-annual for first five years, and Annually for next 25 years. Assume that once over 30 year O&M period that the Cap will need to be reinforced. Reinforecement involves placing a new cap above the no longer reactive cap already in place.)									
OM-02-01 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**27,399**	**0**	**27,399**	**12,330**	**39,729**	
(Note: Assume semiannual sampling and analysis of metals (total & dissolved) for the first five-years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	33.00	EA	AE Contractor	2,946	0	2,946	1,326	4,271	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	160.00	HR	AE Contractor	19,939	0	19,939	8,972	28,911	
(Note: Crew includes Rental Vehicle and Fuel Costs. Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	20.00	DAY	AE Contractor	1,900	0	1,900	855	2,755	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	33.00	EA	AE Contractor	132	0	132	59	191	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
OM-02-02 Annual Sampling	**1.00**	**LS**	**AE Contractor**	**14,895**	**0**	**14,895**	**6,703**	**21,597**	
(Note: Assume annual sampling and analysis of metals (total & dissolved) for the next twenty five years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	16.00	EA	AE Contractor	1,428	0	1,428	643	2,071	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	80.00	HR	AE Contractor	9,969	0	9,969	4,486	14,455	
(Note: Crew includes Rental Vehicle and Fuel Costs. Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				95.00		*95.00*		*137.75*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	10.00	DAY	AE Contractor	950	0	950	428	1,378	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	16.00	EA	AE Contractor	64	0	64	29	93	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
ALT6 Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	**1.00**	**LS**	**Prime Contractor**	**34,511,940**	**7,719,196**	**42,231,136**	**10,247,791**	**52,478,927**	
ALT6-01 General Conditions	**1.00**	**LS**	**Prime Contractor**	**653,196**	**0**	**653,196**	**157,564**	**810,759**	
GENCON-01 Project Dedicated Supervisory Staff and Equipment	**1.00**	**LS**	**Prime Contractor**	**545,367**	**0**	**545,367**	**131,553**	**676,921**	
				85.82		*85.82*		*106.52*	
FOP FA-PROJM Project Managers	1,127.00	HR	Prime Contractor	96,714	0	96,714	23,329	120,043	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				66.56		*66.56*		*82.62*	
FOP FC-ENGPE Engineers, Project	2,253.00	HR	Prime Contractor	149,963	0	149,963	36,174	186,137	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				67.98		*67.98*		*84.38*	
HNC FA-AGENS General Superintendent (P.M.)	2,253.00	HR	Prime Contractor	153,157	0	153,157	36,945	190,102	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, December 2011.)									
				34.99		*34.99*		*43.43*	
HNC FB-CLTYP Clerk, Typist, Bookkeeper & Receptionist	200.00	HR	Prime Contractor	6,998	0	6,998	1,688	8,686	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				52.65		*52.65*		*65.35*	
FOP FC-FLDER Field Engineers	100.00	HR	Prime Contractor	5,265	0	5,265	1,270	6,535	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				54.20		*54.20*		*67.27*	
HNC FD-SAENG Safety Engineer	200.00	HR	Prime Contractor	10,840	0	10,840	2,615	13,454	
(Note: Professional labor rates updated from Salary.com for Old Bridge, NJ, October 2011.)									
				159.00		*159.00*		*197.35*	
USR GENCON-01 Per Diem	770.00	DAY	Prime Contractor	122,430	0	122,430	29,533	151,963	
(Note: Sub Bid cost is for Per Diem, per GSA website on 11/23/2011, $159 per day.)									
				107,828.46		*107,828.46*		*133,838.85*	
GENCON-02 Temporary Construction Facilities and Equipment	**1.00**	**EA**	**Prime Contractor**	**107,828**	**0**	**107,828**	**26,010**	**133,839**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				306.02		*306.02*		*379.84*	
RSM 015213200450 Office Trailer, furnished, rent per month, 50' x 10', excl. hookups	13.00	EA	Prime Contractor	3,978	0	3,978	960	4,938	
				98.98		*98.98*		*122.85*	
RSM 015213201350 Storage Boxes, rent per month, 40' x 8'	13.00	EA	Prime Contractor	1,287	0	1,287	310	1,597	
				85.60		*85.60*		*106.25*	
RSM 015213400140 Field Office Expense, telephone bill; avg. bill/month, incl. long distance	13.00	MO	Prime Contractor	1,113	0	1,113	268	1,381	
				90.95		*90.95*		*112.89*	
RSM 015213400120 Field Office Expense, office supplies, average	13.00	MO	Prime Contractor	1,182	0	1,182	285	1,468	
				160.50		*160.50*		*199.22*	
RSM 015213400160 Field Office Expense, field office lights & HVAC	13.00	MO	Prime Contractor	2,087	0	2,087	503	2,590	
				88.50		*88.50*		*109.85*	
HNC 015213201400 Toilet, portable, chemical, rent per month	26.00	MO	Prime Contractor	2,301	0	2,301	555	2,856	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	5,633.00	HR	Prime Contractor	68,785	0	68,785	16,592	85,377	
				12.21		*12.21*		*15.16*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	30.00	HR	Prime Contractor	366	0	366	88	455	
				80.25		*80.25*		*99.61*	
RSM 024119230940 Selective demolition, rubbish handling, dumpster, alternate pricing method, rent per month, average for all sizes, includes one dump per week, cost to be added to demolition cost.	120.00	EA	Prime Contractor	9,630	0	9,630	2,323	11,953	
				5,000.00		*5,000.00*		*6,206.10*	
USR CC-E-02-01 Small Tools Allowance	1.00	EA	Prime Contractor	5,000	0	5,000	1,206	6,206	
(Note: Allowance per CCI estimator)									
				0.75		*0.75*		*0.93*	
USR CC-E-02-02 Cell Phone Allowance	6,133.00	HR	Prime Contractor	4,600	0	4,600	1,110	5,709	
(Note: Sub bid cost per CCI estimator.)									
				7,500.00		*7,500.00*		*9,309.15*	
USR CC-E-02-03 Electrician	1.00	EA	Prime Contractor	7,500	0	7,500	1,809	9,309	
(Note: Sub bid cost per CCI estimator.)									
ALT6-02 Sediment and Erosion Control Measures	**1.00**	**LS**	**Prime Contractor**	**1,885,440**	**441,570**	**2,327,010**	**561,321**	**2,888,331**	

(Note: Includes silt fencing along access roads and rental and installation of a temporary portable coffer dam during seawall demolition and reconstruction. Turbidity Curtains are included in the sediment

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
dredging unit cost.)									
				164.53		*203.06*		*252.04*	
USR EC-04 Maintenance Crew	13.00	MO	Earthwork Subcontractor	2,139	501	2,640	637	3,277	
				1,836,603.77		*2,266,736.37*		*2,813,518.51*	
EC-01 Temporary Portable Coffer Dam Construction/Rental	**1.00**	**EA**	**Dredging Subcontractor**	**1,836,604**	**430,133**	**2,266,736**	**546,782**	**2,813,519**	
				194,835.00		*240,465.36*		*298,470.41*	
USR COFFDAM-01 Monthly Rental (Month 1)	1.00	EA	Dredging Subcontractor	194,835	45,630	240,465	58,005	298,470	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				118,615.00		*146,394.63*		*181,707.95*	
USR COFFDAM-02 Monthly Rental (Month 2)	2.00	EA	Dredging Subcontractor	237,230	55,559	292,789	70,627	363,416	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				79,075.00		*97,594.37*		*121,136.08*	
USR COFFDAM-03 Monthly Rental (Month 3 and each thereafter)	10.00	EA	Dredging Subcontractor	790,750	185,194	975,944	235,417	1,211,361	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				10,617.00		*13,103.50*		*16,264.33*	
USR COFFDAM-04 Installation Crew	36.00	DAY	Dredging Subcontractor	382,212	89,514	471,726	113,790	585,516	
(Note: Vendor Quote from Portadam on 11/18/2011)									
				962.00		*1,187.30*		*1,473.70*	
USR COFFDAM-05 Installation Crew Travel Expenses	6.00	EA	Dredging Subcontractor	5,772	1,352	7,124	1,718	8,842	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				1,214.98		*1,499.53*		*1,861.25*	
USR COFFDAM-06 General Crew for Installation Assistance	36.00	DAY	Dredging Subcontractor	43,739	10,244	53,983	13,022	67,005	
(Note: Vendor Quote from Portadam on 11/18/2011.)									
				2,961.52		*3,655.10*		*4,536.79*	
USR COFFDAM-07 Lifting Rig Crew for Installation and Removal	36.00	DAY	Dredging Subcontractor	106,615	24,969	131,584	31,741	163,324	
				15.19		*18.74*		*23.27*	
USR COFFDAM-08 General Crew for Sand Bags	4,600.00	EA	Dredging Subcontractor	69,861	16,362	86,223	20,799	107,022	
				0.82		*1.01*		*1.26*	
USR COFFDAM-09 Sand Bag	4,600.00	EA	Dredging Subcontractor	3,780	885	4,665	1,125	5,791	
(Note: Vendor Quote from Uline on 12/14/2011. Unit cost is for 100 count bundle of 50 lbs bags (14 x 26"))									
				20.33		*25.09*		*31.14*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-BF-01 Clean Beach Sand for Backfill	89.00	LCY	Dredging Subcontractor	1,809	424	2,233	539	2,772	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean sand. Cost includes delivery to Old Bridge, NJ at Route 35.)									
EC-02 Silt Fencing Along Access Roads	**1.00**	**LS**	**Earthwork Subcontractor**	**41,373**	**9,690**	**51,062**	**12,317**	**63,380**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	27,120.00	LF	Earthwork Subcontractor	15,174	3,554	18,727	4,517	23,245	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	27,120.00	LF	Earthwork Subcontractor	5,628	1,318	6,946	1,675	8,621	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	27,120.00	LF	Earthwork Subcontractor	20,572	4,818	25,389	6,124	31,514	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
				5,324.17		*6,571.09*		*8,156.17*	
EC-03 Silt Fencing Around the Perimeter of Containment Cells	**1.00**	**EA**	**Earthwork Subcontractor**	**5,324**	**1,247**	**6,571**	**1,585**	**8,156**	
				0.56		*0.69*		*0.86*	
USR EC-01 Silt Fence, contractor grade including 2 in stakes	3,490.00	LF	Earthwork Subcontractor	1,953	457	2,410	581	2,991	
(Note: Vendor quote from hardwareandtools.com, 09/07/2011. Cost based on 3' x 100' roll.)									
				0.21		*0.26*		*0.32*	
USR EC-02 Silt Fence Removal	3,490.00	LF	Earthwork Subcontractor	724	170	894	216	1,109	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000). Assume that the silt fence removal output is double that of installation)									
				0.76		*0.94*		*1.16*	
USR EC-03 Silt Fence Installation	3,490.00	LF	Earthwork Subcontractor	2,647	620	3,267	788	4,055	
(Note: Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high (RS Means CostWorks 2011 - 31251 416 1000))									
ALT6-03 MNR	**1.00**	**LS**	**Prime Contractor Other**	**173,267**	**0**	**173,267**	**77,970**	**251,237**	
(Note: Periodic Monitoring of Sediment and Surface Water for Monitored Natural Recovery of Areas 7, 11 and Margaret's Creek. Assumes a two person crew and a jon boat for the sampling. Semi-annual for first five years, and Annually for next 25 years.)									
ALT6-03-01 Semi-annual Sampling	**1.00**	**LS**	**AE Contractor**	**114,684**	**0**	**114,684**	**51,608**	**166,291**	
(Note: Assume semi-annual sampling and analysis of metals (total & dissolved) for the first five-years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	296.00	EA	AE Contractor	26,421	0	26,421	11,889	38,310	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR STVISIT-01 Site Visit by Scientist	480.00	HR	AE Contractor	59,816	0	59,816	26,917	86,733	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	60.00	DAY	AE Contractor	5,700	0	5,700	2,565	8,265	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	296.00	EA	AE Contractor	1,184	0	1,184	533	1,717	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	60.00	DAY	AE Contractor	19,080	0	19,080	8,586	27,666	
(Note: Per GSA website on 11/23/2011)									
ALT6-03-02 Annual Sampling	**1.00**	**LS**	**AE Contractor**	**58,583**	**0**	**58,583**	**26,363**	**84,946**	
(Note: Assume annual sampling and analysis of metals (total & dissolved) for the next twenty five years. See QTO-01.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	148.00	EA	AE Contractor	13,210	0	13,210	5,945	19,155	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	240.00	HR	AE Contractor	29,908	0	29,908	13,459	43,366	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				95.00		*95.00*		*137.75*	
HTW 029110106124 Sample collection, field vehicles, boat rental, with motor	30.00	DAY	AE Contractor	2,850	0	2,850	1,283	4,133	
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	148.00	EA	AE Contractor	592	0	592	266	858	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	30.00	DAY	AE Contractor	9,540	0	9,540	4,293	13,833	
(Note: Per GSA website on 11/23/2011)									
ALT6-04 Removal and Handling of Contaminated Materials by Area	**1.00**	**LS**	**Prime Contractor**	**10,611,310**	**2,485,169**	**13,096,479**	**3,159,133**	**16,255,612**	
				5,365,958.22		*6,622,665.63*		*8,220,185.04*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
SEA Seawall Sector Site Activities	**1.00**	**EA**	**Prime Contractor**	**5,365,958**	**1,256,707**	**6,622,666**	**1,597,519**	**8,220,185**	
SEA-01 Area 1 Site Activities	**1.00**	**LS**	**Earthwork Subcontractor**	**3,941,599**	**923,123**	**4,864,722**	**1,173,468**	**6,038,190**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	38,110.00	LCY	Dredging Subcontractor	2,858,250	669,402	3,527,652	850,940	4,378,592	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	38,110.00	LCY	Dredging Subcontractor	842,231	197,251	1,039,482	250,744	1,290,225	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	39,634.00	LCY	Earthwork Subcontractor	37,390	8,757	46,147	11,132	57,279	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	12,867.00	BCY	Earthwork Subcontractor	55,342	12,961	68,303	16,476	84,779	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	5,295.00	LCY	Earthwork Subcontractor	28,661	6,712	35,374	8,533	43,907	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				119,724.78		*147,764.32*		*183,408.04*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**119,725**	**28,040**	**147,764**	**35,644**	**183,408**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	1,258.00	EA	Earthwork Subcontractor	112,288	26,298	138,586	33,430	172,016	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	1,258.00	EA	Earthwork Subcontractor	5,032	1,178	6,210	1,498	7,709	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				967,420.09		*1,193,989.87*		*1,482,004.11*	
SEA-02 Area 2 Site Activities	**1.00**	**EA**	**Earthwork**	**967,420**	**226,570**	**1,193,990**	**288,014**	**1,482,004**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	5,180.00	LCY	Dredging Subcontractor	388,500	90,987	479,487	115,662	595,148	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	21,243.00	LCY	Dredging Subcontractor	469,470	109,950	579,420	139,768	719,188	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	22,093.00	LCY	Earthwork Subcontractor	20,842	4,881	25,724	6,205	31,929	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	15,935.00	BCY	Earthwork Subcontractor	68,537	16,051	84,589	20,405	104,993	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	59.00	LCY	Earthwork Subcontractor	319	75	394	95	489	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				19,750.70		*24,376.32*		*30,256.38*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**19,751**	**4,626**	**24,376**	**5,880**	**30,256**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	186.00	EA	Earthwork Subcontractor	16,602	3,888	20,490	4,943	25,433	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	186.00	EA	Earthwork Subcontractor	744	174	918	221	1,140	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				5,698.96		*7,033.66*		*8,730.31*	
SEA-03 Area 3 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**5,699**	**1,335**	**7,034**	**1,697**	**8,730**	
				4.30		*5.31*		*6.59*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	354.00	BCY	Earthwork Subcontractor	1,523	357	1,879	453	2,332	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				4,176.38		*5,154.49*		*6,397.86*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**4,176**	**978**	**5,154**	**1,243**	**6,398**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	19.00	EA	Earthwork Subcontractor	1,696	397	2,093	505	2,598	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	19.00	EA	Earthwork Subcontractor	76	18	94	23	116	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				25,096.48		*30,974.08*		*38,445.65*	
SEA-04 Area 4 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**25,096**	**5,878**	**30,974**	**7,472**	**38,446**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	817.00	LCY	Earthwork Subcontractor	18,056	4,229	22,284	5,375	27,660	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	850.00	LCY	Earthwork Subcontractor	802	188	990	239	1,228	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	653.00	BCY	Earthwork Subcontractor	2,809	658	3,466	836	4,303	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				3,430.31		*4,233.69*		*5,254.94*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**3,430**	**803**	**4,234**	**1,021**	**5,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	11.00	EA	Earthwork Subcontractor	982	230	1,212	292	1,504	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	11.00	EA	Earthwork Subcontractor	44	10	54	13	67	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				374,649.10		*462,391.92*		*573,930.10*	
SEA-05 Area 5 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**374,649**	**87,743**	**462,392**	**111,538**	**573,930**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	3,420.00	LCY	Dredging Subcontractor	256,500	60,072	316,572	76,364	392,936	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,420.00	LCY	Dredging Subcontractor	75,582	17,701	93,283	22,502	115,785	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,557.00	LCY	Earthwork Subcontractor	3,356	786	4,142	999	5,141	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,646.00	BCY	Earthwork Subcontractor	15,682	3,673	19,354	4,669	24,023	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	9.00	LCY	Earthwork Subcontractor	49	11	60	15	75	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				23,481.08		*28,980.35*		*35,970.99*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**23,481**	**5,499**	**28,980**	**6,991**	**35,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	226.00	EA	Earthwork Subcontractor	20,173	4,724	24,897	6,006	30,903	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	226.00	EA	Earthwork Subcontractor	904	212	1,116	269	1,385	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				51,494.41		*63,554.40*		*78,885.00*	
SEA-06 Area 6 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**51,494**	**12,060**	**63,554**	**15,331**	**78,885**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	440.00	LCY	Dredging Subcontractor	33,000	7,729	40,729	9,825	50,553	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	440.00	LCY	Dredging Subcontractor	9,724	2,277	12,001	2,895	14,896	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	458.00	LCY	Earthwork Subcontractor	432	101	533	129	662	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	534.00	BCY	Earthwork Subcontractor	2,297	538	2,835	684	3,518	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				6,041.57		*7,456.51*		*9,255.17*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**6,042**	**1,415**	**7,457**	**1,799**	**9,255**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	39.00	EA	Earthwork Subcontractor	3,481	815	4,296	1,036	5,333	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	39.00	EA	Earthwork Subcontractor	156	37	193	46	239	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				4,878,795.87		*6,021,409.87*		*7,473,894.35*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
JET Jetty Sector Site Activities	**1.00**	**EA**	**Prime Contractor**	**4,878,796**	**1,142,614**	**6,021,410**	**1,452,484**	**7,473,894**	
				746,663.43		*921,532.01*		*1,143,823.96*	
JET-07 Area 7 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**746,663**	**174,869**	**921,532**	**222,292**	**1,143,824**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	7,360.00	LCY	Dredging Subcontractor	552,000	129,278	681,278	164,338	845,616	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	7,360.00	LCY	Dredging Subcontractor	162,656	38,094	200,750	48,425	249,175	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	7,654.00	LCY	Earthwork Subcontractor	7,221	1,691	8,912	2,150	11,062	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				24,786.71		*30,591.76*		*37,971.10*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**24,787**	**5,805**	**30,592**	**7,379**	**37,971**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	240.00	EA	Earthwork Subcontractor	21,422	5,017	26,439	6,378	32,817	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	240.00	EA	Earthwork Subcontractor	960	225	1,185	286	1,471	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				3,634,162.57		*4,485,283.44*		*5,567,223.52*	
JET-08 Area 8 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**3,634,163**	**851,121**	**4,485,283**	**1,081,940**	**5,567,224**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	36,210.00	LCY	Dredging Subcontractor	2,715,750	636,029	3,351,779	808,516	4,160,295	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	36,210.00	LCY	Dredging	800,241	187,416	987,657	238,243	1,225,900	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
			Subcontractor						
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	37,658.00	LCY	Earthwork Subcontractor	35,526	8,320	43,846	10,577	54,423	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	3,763.00	BCY	Earthwork Subcontractor	16,185	3,790	19,975	4,818	24,794	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	4,994.00	LCY	Earthwork Subcontractor	27,032	6,331	33,363	8,048	41,411	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-05 and PD-06 Slag for crew output.)									
				39,428.44		*48,662.58*		*60,400.96*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**39,428**	**9,234**	**48,663**	**11,738**	**60,401**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	397.00	EA	Earthwork Subcontractor	35,436	8,299	43,735	10,550	54,285	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	397.00	EA	Earthwork Subcontractor	1,588	372	1,960	473	2,433	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				497,969.87		*614,594.41*		*762,846.88*	
JET-10 Area 11 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**497,970**	**116,625**	**614,594**	**148,252**	**762,847**	
				75.00		*92.57*		*114.89*	
USR DREDG-01 Dredging of Sediment	4,620.00	LCY	Dredging Subcontractor	346,500	81,150	427,650	103,158	530,808	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, and site preparation.)									
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	4,620.00	LCY	Dredging Subcontractor	102,102	23,912	126,014	30,397	156,411	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	4,805.00	LCY	Earthwork Subcontractor	4,533	1,062	5,595	1,350	6,944	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	2,146.00	BCY	Earthwork Subcontractor	9,230	2,162	11,392	2,748	14,140	
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				35,604.80		*43,943.45*		*54,543.49*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**35,605**	**8,339**	**43,943**	**10,600**	**54,543**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	356.00	EA	Earthwork Subcontractor	31,776	7,442	39,218	9,460	48,679	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	356.00	EA	Earthwork Subcontractor	1,424	334	1,758	424	2,181	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				366,556.27		*452,403.74*		*561,532.58*	
MC Margaret's Creek Sector Site Activities	**1.00**	**EA**	**Prime Contractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				366,556.27		*452,403.74*		*561,532.58*	
MC-09 Area 9 Site Activities	**1.00**	**EA**	**Earthwork Subcontractor**	**366,556**	**85,847**	**452,404**	**109,129**	**561,533**	
				22.10		*27.28*		*33.86*	
USR DREDG-02 Stabilization of Soil (Wet)	3,533.00	LCY	Dredging Subcontractor	78,079	18,286	96,365	23,245	119,611	
(Note: Vendor quote from EQ Northeast, INC (CCI estimate) on 11/8/2011. Includes labor, equipment, materials (kiln dust) and transportation to shore from barge. Does not include transportation from shore to disposal location.)									
				0.94		*1.16*		*1.45*	
RSM EW-EX-03 Loading Dewatered Soil to Haul Trucks	3,674.00	LCY	Earthwork Subcontractor	3,466	812	4,278	1,032	5,310	
(Note: MII English Cost Book 2010 - 312323154060 (Borrow, common earth, 1-1/2 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted) used to develop crew composition and crew output; however, assume no borrow material cost.)									
				4.30		*5.31*		*6.59*	
USR EW-EX-01 Soil Excavation for Offsite and Onsite Disposal	17,868.00	BCY	Earthwork Subcontractor	76,851	17,999	94,850	22,880	117,730	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition. See Productivity Calculations)									
				5.41		*6.68*		*8.29*	
USR EW-EX-06 Excavation/Picking of Slag and Battery Casings for Onsite Disposal	711.00	LCY	Earthwork Subcontractor	3,849	901	4,750	1,146	5,896	
(Note: Hydraulic, crawler mounted with Grapple (thumb). See PD-08 for crew output.)									
				204,311.06		*252,160.71*		*312,986.91*	
Post Excavation Confirmation Sampling	**1.00**	**EA**	**Earthwork Subcontractor**	**204,311**	**47,850**	**252,161**	**60,826**	**312,987**	
				89.26		*110.16*		*136.74*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	2,165.00	EA	Earthwork Subcontractor	193,247	45,258	238,505	57,532	296,037	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				2,404.46		*2,967.58*		*3,683.42*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	Earthwork Subcontractor	2,404	563	2,968	716	3,683	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	2,165.00	EA	Earthwork Subcontractor	8,660	2,028	10,688	2,578	13,266	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT6-05 Transportation of Contaminated Materials to Onsite Containment Cell	**1.00**	**LS**	**Prime Contractor**	**607,701**	**0**	**607,701**	**146,590**	**754,290**	
				7.88		*7.88*		*9.78*	
USR HAUL-MC-01 Transportation of Slag and Battery Casings from Seawall to Margaret's Creek Cells	5,363.00	LCY	Prime Contractor	42,272	0	42,272	10,197	52,469	
(Note: See Productivity Calculations)									
				5.84		*5.84*		*7.24*	
USR HAUL-WJ-01 Transportation of Slag and Battery Casings from Western Jetty to Western Jetty Containment Cell	4,994.00	LCY	Prime Contractor	29,148	0	29,148	7,031	36,179	
(Note: See Productivity Calculations)									
				5.84		*5.84*		*7.24*	
USR HAUL-MC-03 Transportation of Slag and Battery Casings from Margaret's Creek to Margaret's Creek Cells	711.00	LCY	Prime Contractor	4,150	0	4,150	1,001	5,151	
(Note: See Productivity Calculations)									
				5.09		*5.09*		*6.32*	
USR HAUL-MC-02 Transportation of Soil from Seawall to Margaret's Creek Cells	88,824.00	LCY	Prime Contractor	452,083	0	452,083	109,051	561,134	
(Note: See Productivity Calculations)									
				2.64		*2.64*		*3.27*	
USR HAUL-WJ-02 Transportation of Soil from Western Jetty to Western Jetty Containment Cell	7,890.00	LCY	Prime Contractor	20,796	0	20,796	5,016	25,812	
(Note: See Productivity Calculations)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				2.64		*2.64*		*3.27*	
USR HAUL-MC-04 Transportation of Soil from Margaret's Creek to Margaret's Creek Cells (Note: See Productivity Calculations)	22,481.00	LCY	Prime Contractor	59,253	0	59,253	14,293	73,546	
ALT6-06 Onsite Containtment Cell Construction	**1.00**	**LS**	**Prime Contractor**	**5,845,722**	**1,369,068**	**7,214,790**	**1,740,352**	**8,955,142**	
(Note: Common component for alternatives which include onsite containment.)									
CELL-A Onsite Cell #1 Near the Western Jetty	**1.00**	**LS**	**Earthwork Subcontractor**	**809,394**	**189,560**	**998,955**	**240,968**	**1,239,922**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**507,815**	**118,930**	**626,745**	**151,183**	**777,929**	
				46.01		*56.78*		*70.48*	
RSM 311313202040 Selective clearing and grubbing, 1-1/2 C.Y. excavator, 4" to 6" diameter, stump removal on site by hydraulic excavator	30.00	EA	Earthwork Subcontractor	1,380	323	1,704	411	2,114	
				18.05		*22.28*		*27.66*	
RSM 320130105910 Site maintenance, road & walk maintenance, asphaltic concrete paving, cold patch, 2" thick	334.00	SY	Earthwork Subcontractor	6,030	1,412	7,443	1,795	9,238	
				0.61		*0.75*		*0.93*	
RSM 320116715320 Cold milling asphalt paving, asphalt pavement, 1" to 3" deep, removal from concrete base, rip, load and sweep, excludes hauling	667.00	SY	Earthwork Subcontractor	404	95	499	120	620	
				500,000.00		*617,100.00*		*765,956.86*	
USR PREP-02 Sub Base Improvements	1.00	ACR	Earthwork Subcontractor	500,000	117,100	617,100	148,857	765,957	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**96,675**	**22,641**	**119,316**	**28,781**	**148,098**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	5,056.00	ECY	Earthwork Subcontractor	14,014	3,282	17,297	4,172	21,469	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	7,023.00	LCY	Earthwork Subcontractor	82,661	19,359	102,020	24,609	126,629	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**21,004**	**4,919**	**25,923**	**6,253**	**32,176**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	34,432.00	SF	Geosynthetic Subcontractor	21,004	4,919	25,923	6,253	32,176	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**39,527**	**9,257**	**48,785**	**11,768**	**60,552**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**8,273**	**1,938**	**10,211**	**2,463**	**12,674**	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	Earthwork Subcontractor	*8.44* 5,065	1,186	*10.42* 6,251	1,508	*12.93* 7,758	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	*5.43* 1,194	280	*6.70* 1,473	355	*8.31* 1,829	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	Earthwork Subcontractor	*82.25* 247	58	*101.52* 305	73	*126.00* 378	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	Earthwork Subcontractor	*72.96* 219	51	*90.05* 270	65	*111.78* 335	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	*432.51* 433	101	*533.81* 534	129	*662.57* 663	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	*272.01* 272	64	*335.72* 336	81	*416.70* 417	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	*8.56* 9	2	*10.56* 11	3	*13.11* 13	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	*260.10* 260	61	*321.01* 321	77	*398.44* 398	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	*576.13* 576	135	*711.06* 711	172	*882.58* 883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**31,254**	**7,320**	**38,574**	**9,305**	**47,878**	
USR EW-BF-03 Drainage Sand	1,105.00	LCY	Earthwork Subcontractor	*26.75* 29,559	6,923	*33.01* 36,481	8,800	*40.98* 45,281	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,105.00	LCY	Earthwork Subcontractor	*1.53* 1,695	397	*1.89* 2,092	505	*2.35* 2,597	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**12,346**	**2,891**	**15,237**	**3,675**	**18,913**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	21,576.00	SF	Geosynthetic Subcontractor	12,346	2,891	15,237	3,675	18,913	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**29,589**	**6,930**	**36,519**	**8,809**	**45,328**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	10,675.00	ECY	Earthwork Subcontractor	29,589	6,930	36,519	8,809	45,328	
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**23,657**	**5,540**	**29,197**	**7,043**	**36,240**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	41,344.00	SF	Geosynthetic Subcontractor	23,657	5,540	29,197	7,043	36,240	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**38,198**	**8,946**	**47,144**	**11,372**	**58,516**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**8,273**	**1,938**	**10,211**	**2,463**	**12,674**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	600.00	LF	Earthwork Subcontractor	5,065	1,186	6,251	1,508	7,758	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	220.00	LF	Earthwork Subcontractor	1,194	280	1,473	355	1,829	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	3.00	EA	Earthwork Subcontractor	247	58	305	73	378	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	3.00	EA	Earthwork Subcontractor	219	51	270	65	335	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**29,925**	**7,008**	**36,933**	**8,909**	**45,842**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	1,058.00	LCY	Earthwork Subcontractor	28,302	6,628	34,930	8,426	43,355	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	1,058.00	LCY	Earthwork Subcontractor	1,623	380	2,003	483	2,486	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**20,259**	**4,745**	**25,003**	**6,031**	**31,034**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	41,344.00	SF	Geosynthetic Subcontractor	20,259	4,745	25,003	6,031	31,034	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**14,057**	**3,292**	**17,349**	**4,185**	**21,534**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	41,344.00	SF	Geosynthetic Subcontractor	14,057	3,292	17,349	4,185	21,534	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**2,187**	**512**	**2,700**	**651**	**3,351**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	114.00	ECY	Earthwork Subcontractor	316	74	390	94	484	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	159.00	LCY	Earthwork Subcontractor	1,871	438	2,310	557	2,867	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**4,081**	**956**	**5,036**	**1,215**	**6,251**	
				32.10		*39.62*		*49.17*	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
USR EW-BF-04 Topsoil	41.00	LCY	Earthwork Subcontractor	1,316	308	1,624	392	2,016	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	29.00	ECY	Earthwork Subcontractor	80	19	99	24	123	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	41,344.00	SF	Earthwork Subcontractor	2,684	629	3,313	799	4,112	
CELL-B Onsite Cell #2 Near Margaret's Creek Area	**1.00**	**LS**	**Earthwork Subcontractor**	**1,753,006**	**410,554**	**2,163,560**	**521,894**	**2,685,454**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**1,012,158**	**237,047**	**1,249,205**	**301,333**	**1,550,538**	
				6,078.81		*7,502.47*		*9,312.22*	
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	2.00	ACR	Earthwork Subcontractor	12,158	2,847	15,005	3,619	18,624	
				500,000.00		*617,100.00*		*765,956.86*	
USR PREP-02 Sub Base Improvements	2.00	ACR	Earthwork Subcontractor	1,000,000	234,200	1,234,200	297,714	1,531,914	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**171,232**	**40,102**	**211,334**	**50,978**	**262,312**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	8,956.00	ECY	Earthwork Subcontractor	24,824	5,814	30,638	7,391	38,029	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	12,439.00	LCY	Earthwork Subcontractor	146,407	34,289	180,696	43,587	224,283	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**57,210**	**13,399**	**70,609**	**17,032**	**87,641**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	93,787.00	SF	Geosynthetic Subcontractor	57,210	13,399	70,609	17,032	87,641	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**116,515**	**27,288**	**143,802**	**34,688**	**178,490**	
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**18,934**	**4,434**	**23,369**	**5,637**	**29,006**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to	1,700.00	LF	Earthwork Subcontractor	14,350	3,361	17,710	4,272	21,982	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
4 rows of slots, 4" dia, schedule 40									
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	Earthwork Subcontractor	2,415	566	2,980	719	3,699	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	Earthwork Subcontractor	329	77	406	98	504	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	Earthwork Subcontractor	292	68	360	87	447	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**97,580**	**22,853**	**120,433**	**29,051**	**149,484**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	3,450.00	LCY	Earthwork Subcontractor	92,288	21,614	113,901	27,475	141,376	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	3,450.00	LCY	Earthwork Subcontractor	5,293	1,240	6,532	1,576	8,108	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**38,584**	**9,036**	**47,620**	**11,487**	**59,107**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	67,431.00	SF	Geosynthetic Subcontractor	38,584	9,036	47,620	11,487	59,107	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**83,557**	**19,569**	**103,126**	**24,876**	**128,002**	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	30,145.00	ECY	Earthwork Subcontractor	*2.77* 83,557	19,569	*3.42* 103,126	24,876	*4.25* 128,002	
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**64,079**	**15,007**	**79,087**	**19,077**	**98,164**	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	111,988.00	SF	Geosynthetic Subcontractor	*0.57* 64,079	15,007	*0.71* 79,087	19,077	*0.88* 98,164	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**99,912**	**23,399**	**123,311**	**29,745**	**153,056**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**18,934**	**4,434**	**23,369**	**5,637**	**29,006**	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	1,700.00	LF	Earthwork Subcontractor	*8.44* 14,350	3,361	*10.42* 17,710	4,272	*12.93* 21,982	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	445.00	LF	Earthwork Subcontractor	*5.43* 2,415	566	*6.70* 2,980	719	*8.31* 3,699	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	4.00	EA	Earthwork Subcontractor	*82.25* 329	77	*101.52* 406	98	*126.00* 504	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	4.00	EA	Earthwork Subcontractor	*72.96* 292	68	*90.05* 360	87	*111.78* 447	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	*432.51* 433	101	*533.81* 534	129	*662.57* 663	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	*272.01* 272	64	*335.72* 336	81	*416.70* 417	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	*8.56* 9	2	*10.56* 11	3	*13.11* 13	
HTW 026610101619 H.D. polyethylene manholes,	1.00	EA	Earthwork	*260.10* 260	61	*321.01* 321	77	*398.44* 398	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
inlet/outlet, factory attached, 24"			Subcontractor						
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**80,977**	**18,965**	**99,942**	**24,108**	**124,050**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	2,863.00	LCY	Earthwork Subcontractor	76,585	17,936	94,522	22,800	117,322	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	2,863.00	LCY	Earthwork Subcontractor	4,392	1,029	5,421	1,308	6,728	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**54,874**	**12,852**	**67,726**	**16,337**	**84,062**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	111,988.00	SF	Geosynthetic Subcontractor	54,874	12,852	67,726	16,337	84,062	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**38,076**	**8,917**	**46,993**	**11,336**	**58,329**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	111,988.00	SF	Geosynthetic Subcontractor	38,076	8,917	46,993	11,336	58,329	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**5,891**	**1,380**	**7,271**	**1,754**	**9,025**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	308.00	ECY	Earthwork Subcontractor	854	200	1,054	254	1,308	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	428.00	LCY	Earthwork Subcontractor	5,038	1,180	6,217	1,500	7,717	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**10,919**	**2,557**	**13,476**	**3,251**	**16,727**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	107.00	LCY	Earthwork Subcontractor	3,435	804	4,239	1,023	5,262	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	77.00	ECY	Earthwork Subcontractor	213	50	263	64	327	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	111,988.00	SF	Earthwork Subcontractor	7,271	1,703	8,974	2,165	11,138	
CELL-C Onsite Cell #3 Near Margaret's Creek Area	**1.00**	**LS**	**Earthwork Subcontractor**	**3,258,258**	**763,084**	**4,021,343**	**970,028**	**4,991,371**	
CELL-01 Site Preparation	**1.00**	**LS**	**Earthwork Subcontractor**	**2,024,315**	**474,095**	**2,498,410**	**602,666**	**3,101,076**	
				6,078.81		*7,502.47*		*9,312.22*	
RSM 311110100200 Clearing & grubbing, medium trees, to 12" diameter, cut and chip	4.00	ACR	Earthwork Subcontractor	24,315	5,695	30,010	7,239	37,249	
				500,000.00		*617,100.00*		*765,956.86*	
USR PREP-02 Sub Base Improvements	4.00	ACR	Earthwork Subcontractor	2,000,000	468,400	2,468,400	595,427	3,063,827	
(Note: Vendor Quote on 12/8/2011 from Engineering Technologies for Ground Improvement (Vibroflotation))									
CELL-02 Construct Earthen Berm	**1.00**	**LS**	**Earthwork Subcontractor**	**214,042**	**50,129**	**264,171**	**63,723**	**327,894**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	11,195.00	ECY	Earthwork Subcontractor	31,031	7,267	38,298	9,238	47,536	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	15,549.00	LCY	Earthwork Subcontractor	183,012	42,861	225,873	54,485	280,358	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-03 Install LLDPE Liner	**1.00**	**LS**	**Geosynthetic Subcontractor**	**100,153**	**23,456**	**123,609**	**29,817**	**153,426**	
				0.61		*0.75*		*0.93*	
USR GEO-02 LLDPE Geomembrane for Liner	164,185.00	SF	Geosynthetic Subcontractor	100,153	23,456	123,609	29,817	153,426	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 80-mil average, 2-sided textured LLDPE. SF unit cost is for 45,000SF of material, approximately 1 cell.)									
CELL-04 Install Leachate Collection System	**1.00**	**LS**	**Earthwork Subcontractor**	**215,226**	**50,406**	**265,632**	**64,076**	**329,707**	
CELL-04-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**31,775**	**7,442**	**39,217**	**9,460**	**48,677**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	Earthwork Subcontractor	26,589	6,227	32,816	7,916	40,732	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	Earthwork Subcontractor	2,550	597	3,148	759	3,907	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	Earthwork Subcontractor	576	135	711	171	882	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	Earthwork Subcontractor	511	120	630	152	782	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-04-02 Sand Bedding	**1.00**	**LS**	**Earthwork Subcontractor**	**183,451**	**42,964**	**226,415**	**54,616**	**281,031**	
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	6,486.00	LCY	Earthwork Subcontractor	173,501	40,634	214,134	51,653	265,788	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	6,486.00	LCY	Earthwork Subcontractor	9,950	2,330	12,281	2,962	15,243	
CELL-05 Install Geotextile Below Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**72,541**	**16,989**	**89,530**	**21,596**	**111,127**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	126,776.00	SF	Geosynthetic Subcontractor	72,541	16,989	89,530	21,596	111,127	
CELL-06 Spread and Consolidate Contaminated Material	**1.00**	**LS**	**Earthwork Subcontractor**	**155,414**	**36,398**	**191,812**	**46,269**	**238,080**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	56,069.00	ECY	Earthwork Subcontractor	155,414	36,398	191,812	46,269	238,080	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Assume transportation of contaminated material to the cell is already factored into excavation costs.)									
CELL-07 Install Geotextile Above Consolidated Material	**1.00**	**LS**	**Geosynthetic Subcontractor**	**111,848**	**26,195**	**138,042**	**33,299**	**171,341**	
				0.57		*0.71*		*0.88*	
USR 313219161510 Geotextile soil stabilization, geotextile fabric, woven, heavy duty, 600 lb. tensile strength	195,470.00	SF	Geosynthetic Subcontractor	111,848	26,195	138,042	33,299	171,341	
CELL-08 Install Gas Ventilation System	**1.00**	**LS**	**Earthwork Subcontractor**	**173,111**	**40,543**	**213,653**	**51,537**	**265,191**	
CELL-08-01 Piping, Sumps and Manholes	**1.00**	**LS**	**Earthwork Subcontractor**	**31,775**	**7,442**	**39,217**	**9,460**	**48,677**	
				8.44		*10.42*		*12.93*	
HTW 026610101312 Landfill gas and leachate control systems, leachate and gas collection pipe, slotted PVC, 2 to 4 rows of slots, 4" dia, schedule 40	3,150.00	LF	Earthwork Subcontractor	26,589	6,227	32,816	7,916	40,732	
				5.43		*6.70*		*8.31*	
HTW 026610101415 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene pipe, 4" dia, SDR 21	470.00	LF	Earthwork Subcontractor	2,550	597	3,148	759	3,907	
				82.25		*101.52*		*126.00*	
HTW 026610101494 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, tees, 4" dia, SDR 21/SDR 26	7.00	EA	Earthwork Subcontractor	576	135	711	171	882	
				72.96		*90.05*		*111.78*	
HTW 026610101455 Landfill gas and leachate control systems, leachate and gas transfer pipe, high density polyethylene, 90 degree elbows, 4" dia, SDR 21	7.00	EA	Earthwork Subcontractor	511	120	630	152	782	
				432.51		*533.81*		*662.57*	
HTW 026610101633 H.D. polyethylene sumps, sump base, 48"	1.00	EA	Earthwork Subcontractor	433	101	534	129	663	
				272.01		*335.72*		*416.70*	
HTW 026610101636 H.D. polyethylene sumps, riser sump to base seal	1.00	EA	Earthwork Subcontractor	272	64	336	81	417	
				8.56		*10.56*		*13.11*	
HTW 026610101623 H.D. polyethylene manholes, inlet gasket, to attach leachate transport pipe, 4"	1.00	EA	Earthwork Subcontractor	9	2	11	3	13	
				260.10		*321.01*		*398.44*	
HTW 026610101619 H.D. polyethylene manholes, inlet/outlet, factory attached, 24"	1.00	EA	Earthwork Subcontractor	260	61	321	77	398	
				576.13		*711.06*		*882.58*	
HTW 026610101615 H.D. polyethylene manholes, manhole base, no outlets, 3' high x 4' dia, excludes outlets	1.00	EA	Earthwork Subcontractor	576	135	711	172	883	
CELL-08-02 Sand Bedding	**1.00**	**LS**	**Earthwork**	**141,336**	**33,101**	**174,437**	**42,078**	**216,514**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				26.75		*33.01*		*40.98*	
USR EW-BF-03 Drainage Sand	4,997.00	LCY	Earthwork Subcontractor	133,670	31,305	164,975	39,795	204,771	
(Note: Vendor Quote from KLK Construction Materials and Trucking on 11/21/2011 for certified clean drainage sand (ASTM C-33). Cost includes delivery to Old Bridge, NJ at Route 35.)									
				1.53		*1.89*		*2.35*	
RSM 312323131300 Backfill, bulk, up to 300' haul, dozer backfilling, excludes compaction	4,997.00	LCY	Earthwork Subcontractor	7,666	1,795	9,461	2,282	11,744	
CELL-09 Install LLDPE Cover	**1.00**	**LS**	**Geosynthetic Subcontractor**	**95,780**	**22,432**	**118,212**	**28,515**	**146,727**	
				0.49		*0.60*		*0.75*	
USR GEO-01 LLDPE Geomembrane for Cover	195,470.00	SF	Geosynthetic Subcontractor	95,780	22,432	118,212	28,515	146,727	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of 60-mil average, 2-sided textured LLDPE. SF unit cost is for 46,800SF of material, approximately 1 cell.)									
CELL-10 Install Geocomposite Layer	**1.00**	**LS**	**Geosynthetic Subcontractor**	**66,460**	**15,565**	**82,025**	**19,786**	**101,811**	
				0.34		*0.42*		*0.52*	
USR GEO-03 Geocomposite drainage net, geotextile fabric, heat bonded, both sides	195,470.00	SF	Geosynthetic Subcontractor	66,460	15,565	82,025	19,786	101,811	
(Note: Vendor Quote from GSE on 11/22/2011 for material costs, delivery and installation of FabriNet Geocomposite with 2 x 6 oz. / SY MARV. SF unit cost is for 45,000SF of material.)									
CELL-11 Spread Sandy Loam Material	**1.00**	**LS**	**Earthwork Subcontractor**	**10,269**	**2,405**	**12,674**	**3,057**	**15,731**	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	537.00	ECY	Earthwork Subcontractor	1,488	349	1,837	443	2,280	
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill	746.00	LCY	Earthwork Subcontractor	8,780	2,056	10,837	2,614	13,451	
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
CELL-12 Topsoil and Hydroseed	**1.00**	**LS**	**Earthwork Subcontractor**	**19,100**	**4,473**	**23,573**	**5,686**	**29,260**	
				32.10		*39.62*		*49.17*	
USR EW-BF-04 Topsoil	188.00	LCY	Earthwork Subcontractor	6,035	1,413	7,448	1,797	9,245	
(Note: Vendor Quote from Atak on 11/21/2011 for topsoil. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	135.00	ECY	Earthwork Subcontractor	374	88	462	111	573	
				0.06		*0.08*		*0.10*	
RSM 329219141000 Seeding athletic fields, seeding bluegrass, common with mulch and fertilizer, 4 lb. per M.S.F., hydro or air seeding	195,470.00	SF	Earthwork Subcontractor	12,691	2,972	15,663	3,778	19,442	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
CELL-01 Groundwater Monitoring - Well Installation	**1.00**	**LS**	**Drilling Subcontractor**	**25,063**	**5,870**	**30,933**	**7,462**	**38,394**	
(Note: Assume 15 monitoring wells.)									
USR OM-02 Mobilization/Demobilization of Drill Rig	1.00	LS	Drilling Subcontractor	10,000	2,342	12,342	2,977	15,319	
(Note: Per Estimator)									
				40.21		*49.63*		*61.60*	
HTW 023223135112 Monitoring well construction, drilling, hollow stem auger, normal soil, 2" or less casing/screen, 4-1/4" ID x 8" OD auger	300.00	LF	Drilling Subcontractor	12,063	2,825	14,888	3,591	18,480	
				200.00		*246.84*		*306.38*	
USR OM-03 Well Completion	15.00	EA	Drilling Subcontractor	3,000	703	3,703	893	4,596	
(Note: Per Estimator)									
ALT6-07 Transportation and Offsite Disposal of Excavated Materials	**1.00**	**LS**	**Earthwork Subcontractor**	**6,351,666**	**1,487,560**	**7,839,226**	**1,890,978**	**9,730,204**	
				374,264.02		*461,916.65*		*573,340.19*	
SEA-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Seawall Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**374,264**	**87,653**	**461,917**	**111,424**	**573,340**	
				311,644.02		*384,631.05*		*477,411.75*	
SEA-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**311,644**	**72,987**	**384,631**	**92,781**	**477,412**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	5,097.00	TON	Earthwork Subcontractor	207,244	48,537	255,781	61,699	317,480	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	Earthwork Subcontractor	40,600	9,509	50,109	12,087	62,196	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	464.00	HR	Earthwork Subcontractor	46,400	10,867	57,267	13,814	71,081	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	232.00	EA	Earthwork Subcontractor	17,400	4,075	21,475	5,180	26,655	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				62,620.00		*77,285.60*		*95,928.44*	
SEA-SOIL-02 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**62,620**	**14,666**	**77,286**	**18,643**	**95,928**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	155.00	EA	Earthwork Subcontractor	62,000	14,520	76,520	18,458	94,979	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	155.00	EA	Earthwork Subcontractor	620	145	765	185	950	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				5,977,402.01		*7,377,309.56*		*9,156,864.17*	
WJ-SOIL Transportation and Offsite Disposal of Soil and Dewatered Sediment Removed from Western Jetty Areas	**1.00**	**EA**	**Earthwork Subcontractor**	**5,977,402**	**1,399,908**	**7,377,310**	**1,779,555**	**9,156,864**	
				4,218,493.86		*5,206,465.12*		*6,462,368.64*	
WJ-SOIL-01 Transportation and Offsite Disposal of Non Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**4,218,494**	**987,971**	**5,206,465**	**1,255,904**	**6,462,369**	
				40.66		*50.18*		*62.29*	
USR DISP-NHZ-01 Soil Disposal at Non-Hazardous Waste Facility	69,021.00	TON	Earthwork Subcontractor	2,806,394	657,257	3,463,651	835,502	4,299,153	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				175.00		*215.99*		*268.08*	
USR HAUL-NHZ-03 Soil Transportation to Non-Hazardous Waste Facility	3,138.00	EA	Earthwork Subcontractor	549,150	128,611	677,761	163,489	841,250	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				100.00		*123.42*		*153.19*	
USR HAUL-NHZ-01 Live Load for Soil Transportation to Non-Hazardous Waste Facility	6,276.00	HR	Earthwork Subcontractor	627,600	146,984	774,584	186,845	961,429	
(Note: Vendor Quote from Midco Waste on 11/15/2011.)									
				75.00		*92.57*		*114.89*	
USR HAUL-NHZ-02 Liner for Soil Transportation to Non-Hazardous Waste Facility	3,138.00	EA	Earthwork Subcontractor	235,350	55,119	290,469	70,067	360,536	
(Note: Vendor Quote from Midco Waste on 11/15/2011. Cost per 20CY dumpster.)									
				847,484.15		*1,045,964.94*		*1,298,272.60*	
WJ-SOIL-02 Transportation and Offsite Disposal of Hazardous Soil	**1.00**	**EA**	**Earthwork Subcontractor**	**847,484**	**198,481**	**1,045,965**	**252,308**	**1,298,273**	
				69.55		*85.84*		*106.54*	
USR DISP-HZ-01 Soil Disposal at Hazardous Waste Facility	3,613.00	LCY	Earthwork Subcontractor	251,284	58,851	310,135	74,811	384,946	
(Note: Vendor Quote from Max Environmental on 11/14/2011 for soil treatment and disposal at Yukon, PA facility. Cost includes PA Hazardous Waste Fees.)									
				110.00		*135.76*		*168.51*	
USR HAUL-HZ-01 Transportation to Hazardous Waste Facility	5,420.00	TON	Earthwork Subcontractor	596,200	139,630	735,830	177,497	913,327	
(Note: Vendor Quote from Max Environmental on 11/14/2011. Cost includes transportation from NJ to Yukon, PA facility based on current diesel fuel. Each truck could can carry 22 tons.)									

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
				911,424.00		*1,124,879.50*		*1,396,222.93*	
WJ-SOIL-03 Waste Characterization	**1.00**	**EA**	**Earthwork Subcontractor**	**911,424**	**213,456**	**1,124,880**	**271,343**	**1,396,223**	
				400.00		*493.68*		*612.77*	
USR LABAN-16 Sampling and Testing for Waste Characterization	2,256.00	EA	Earthwork Subcontractor	902,400	211,342	1,113,742	268,657	1,382,399	
(Note: Per Estimator, based on previous work)									
				4.00		*4.94*		*6.13*	
USR LABAN-SHIP-001 Overnight Sample Shipment	2,256.00	EA	Earthwork Subcontractor	9,024	2,113	11,137	2,687	13,824	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
ALT6-08 Site Restoration	**1.00**	**LS**	**Prime Contractor**	**8,265,706**	**1,935,828**	**10,201,535**	**2,460,814**	**12,662,349**	
(Note: Includes backfill of excavations, seawall reconstruction, and jetty reconstruction.)									
REST-01 Seawall Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**1,800,000**	**421,560**	**2,221,560**	**535,885**	**2,757,445**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes access provided by construction haul road built by others prior to the start of our work, assuming a triangular cross section with a 25 ft wide base, 15 ft high and 2200 ft long = 412,500 CF = 15,278 CY = 22,500 tons, assuming 2/3rds Corestone = 15,000 tons at $60 to $65 per ton and 1/3rd Capstone = 7,500 tons)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	7,500.00	TON	Earthwork Subcontractor	825,000	193,215	1,018,215	245,614	1,263,829	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				65.00		*80.22*		*99.57*	
USR REST-02 Reconstruction using Corestone	15,000.00	TON	Earthwork Subcontractor	975,000	228,345	1,203,345	290,271	1,493,616	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
REST-02 Jetty Reconstruction	**1.00**	**LS**	**Earthwork Subcontractor**	**586,630**	**137,389**	**724,019**	**174,648**	**898,667**	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011. Assumes barge access only, 4 ft high x 30 ft wide by 800 ft long = 96,000 CF = 3556 CY = 5333 tons, assuming all “Capstone”)									
				110.00		*135.76*		*168.51*	
USR REST-01 Reconstruction using Capstone	5,333.00	TON	Earthwork Subcontractor	586,630	137,389	724,019	174,648	898,667	
(Note: Vendor Quote from Trevcon Construction Co on 11/29/2011.)									
				5,879,076.16		*7,255,955.80*		*9,006,237.46*	
REST-03 Backfill of Excavations	**1.00**	**EA**	**Earthwork Subcontractor**	**5,879,076**	**1,376,880**	**7,255,956**	**1,750,282**	**9,006,237**	
				28.00		*34.56*		*42.89*	
USR DREDG-03 Backfilling of Sediment Dredged	162,078.00	TON	Earthwork Subcontractor	4,538,184	1,062,843	5,601,027	1,351,080	6,952,106	
(Note: Vendor Quote from CCI on 12/13/2011. Unit cost includes material (clean beach sand), labor and equipment for placement from a barge.)									
				11.77		*14.53*		*18.03*	
USR EW-BF-02 Clean Fill for Backfill of Excavated Areas	80,233.00	LCY	Earthwork Subcontractor	944,342	221,165	1,165,507	281,144	1,446,651	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Vendor Quote from Atak on 11/17/2011 for certified clean fill. Cost includes delivery to Old Bridge, NJ at Route 35.)									
				0.09		*0.11*		*0.13*	
HNC 312213103010 Rough grading, open site, large area, 75 H.P., dozer	2,774,089.00	SF	Earthwork Subcontractor	236,432	55,372	291,805	70,389	362,194	
				2.77		*3.42*		*4.25*	
RSM 312323131700 Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	57,766.00	ECY	Earthwork Subcontractor	160,117	37,500	197,617	47,669	245,286	
ALT6-09 O&M	**1.00**	**LS**	**Prime Contractor**	**117,933**	**0**	**117,933**	**53,070**	**171,003**	
OM-01 O&M of Onsite Containment Cell	**1.00**	**LS**	**AE Contractor**	**117,933**	**0**	**117,933**	**53,070**	**171,003**	
(Note: Common component for alternatives which include onsite containment.)									
OM-01-02 Annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**7,827**	**0**	**7,827**	**3,522**	**11,349**	
(Note: Assumed yearly quantities for annual sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	15.00	EA	AE Contractor	1,339	0	1,339	603	1,941	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	24.00	HR	AE Contractor	2,991	0	2,991	1,346	4,337	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	15.00	EA	AE Contractor	60	0	60	27	87	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	3.00	DAY	AE Contractor	954	0	954	429	1,383	
(Note: Per GSA website on 11/23/2011)									
OM-01-03 Quarterly Sampling per Year	**1.00**	**LS**	**AE Contractor**	**23,858**	**0**	**23,858**	**10,736**	**34,594**	
(Note: Assumed yearly quantities for quarterly sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	60.00	EA	AE Contractor	5,356	0	5,356	2,410	7,766	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	96.00	HR	AE Contractor	11,963	0	11,963	5,383	17,347	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	60.00	EA	AE Contractor	240	0	240	108	348	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	12.00	DAY	AE Contractor	3,816	0	3,816	1,717	5,533	
(Note: Per GSA website on 11/23/2011)									
OM-01-04 Semi-annual Sampling per Year	**1.00**	**LS**	**AE Contractor**	**13,171**	**0**	**13,171**	**5,927**	**19,097**	
(Note: Assumed yearly quantities for semi-annually sampling. See QTO-03 for quantity breakdown and assumptions.)									
				89.26		*89.26*		*129.43*	
USR LABAN-02 Metals, Dissolved, EPA Method 6010, Field Filtered	30.00	EA	AE Contractor	2,678	0	2,678	1,205	3,883	
(Note: Vendor Quote: TestAmerica GSA, 4/27/2011)									
				124.62		*124.62*		*180.69*	
USR STVISIT-01 Site Visit by Scientist	48.00	HR	AE Contractor	5,982	0	5,982	2,692	8,673	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				4.00		*4.00*		*5.80*	
USR LABAN-SHIP-001 Overnight Sample Shipment	30.00	EA	AE Contractor	120	0	120	54	174	
(Note: Per Estimator, based on previous work. Assume $100 per shipment and 25 samples per shipment. Unit cost is per sample.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				318.00		*318.00*		*461.10*	
USR STVISIT-03 Per Diem for Site Visits (2 person crew)	6.00	DAY	AE Contractor	1,908	0	1,908	859	2,767	
(Note: Per GSA website on 11/23/2011)									
OM-01-05 Quarterly Inspections per Year	**1.00**	**LS**	**AE Contractor**	**10,243**	**0**	**10,243**	**4,609**	**14,852**	
(Note: Assumed yearly quantities for quarterly inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	64.00	HR	AE Contractor	6,488	0	6,488	2,920	9,407	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	8.00	DAY	AE Contractor	1,272	0	1,272	572	1,844	
(Note: Per GSA website on 11/23/2011)									
OM-01-06 Semi-annual Inspections	**1.00**	**LS**	**AE Contractor**	**6,363**	**0**	**6,363**	**2,863**	**9,226**	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: Assumed yearly quantities for semi-annual inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	32.00	HR	AE Contractor	3,244	0	3,244	1,460	4,704	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	4.00	DAY	AE Contractor	636	0	636	286	922	
(Note: Per GSA website on 11/23/2011)									
OM-01-01 Annual Inspections	**1.00**	**LS**	**AE Contractor**	**4,423**	**0**	**4,423**	**1,990**	**6,414**	
(Note: Assumed yearly quantities for annual inspections. See QTO-03 for quantity breakdown and assumptions.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	16.00	HR	AE Contractor	1,622	0	1,622	730	2,352	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	2.00	DAY	AE Contractor	318	0	318	143	461	
(Note: Per GSA website on 11/23/2011)									
				52,048.52		*52,048.52*		*75,470.36*	
OM-AN Annual for 30 years	**1.00**	**EA**	**AE Contractor**	**52,049**	**0**	**52,049**	**23,422**	**75,470**	
OM-01-08 Mowing and Snow Removal	**1.00**	**LS**	**AE Contractor**	**21,057**	**0**	**21,057**	**9,476**	**30,532**	
(Note: Assume One mowing and one snow clearing events per year. See QTO-02. Mowing is per SF, so is variable per alternative with the cell dimensions.)									
				58.27		*58.27*		*84.49*	
RSM 320190191670 Mowing, mowing brush, medium density, tractor with rotary mower	349.00	MSF	AE Contractor	20,336	0	20,336	9,151	29,487	
				90.09		*90.09*		*130.63*	
USR 320130200240 Snow removal, clearing, 1 C.Y., with wheeled skid steer loader	8.00	HR	AE Contractor	721	0	721	324	1,045	
(Note: MII English Cost Book 2010 - 320130200240 used for crew composition. Crew Output per hour.)									
OM-01-09 Leachate Pumping	**1.00**	**LS**	**AE Contractor**	**20,488**	**0**	**20,488**	**9,219**	**29,707**	
(Note: Assume leachate pumping requiredl every month. See QTO-02.)									
				186.36		*186.36*		*270.23*	
USR EW-07 Transport Water	48.00	HR	AE Contractor	8,945	0	8,945	4,025	12,971	
				120.23		*120.23*		*174.34*	
USR EW-DW-01 Dewatering (pumping)	96.00	HR	AE Contractor	11,542	0	11,542	5,194	16,736	

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost	C/O
(Note: CostWorks 2011 - 31231 642 5300 used to develop crew composition and Crew Output.)									
OM-01-10 Erosion Repair	**1.00**	**LS**	**AE Contractor**	**5,111**	**0**	**5,111**	**2,300**	**7,411**	
(Note: Assume crew needed for erosion repair 4 days every year.)									
				159.72		*159.72*		*231.59*	
USR OM-01 Erosion Repair	32.00	HR	AE Contractor	5,111	0	5,111	2,300	7,411	
OM-01-07 Additional Inspections after Storm Events	**1.00**	**LS**	**AE Contractor**	**5,393**	**0**	**5,393**	**2,427**	**7,820**	
(Note: Assume additional inspections after storm events (1.5 per year). See QTO-02.)									
				2,483.18		*2,483.18*		*3,600.61*	
USR REPRO-03 Sampling, Inspection and Site Visit Report Preparation	1.00	EA	AE Contractor	2,483	0	2,483	1,117	3,601	
(Note: Cost includes labor (engineer, PM, drafter and admin), and material reproduction costs. Allowance Per Previous Project Experience)									
				101.37		*101.37*		*146.99*	
USR STVISIT-01 Site Visit by Project Engineer	24.00	HR	AE Contractor	2,433	0	2,433	1,095	3,528	
(Note: Crew includes Rental Vehicle and Fuel Costs.)									
				159.00		*159.00*		*230.55*	
USR STVISIT-03 Per Diem for Site Visits	3.00	DAY	AE Contractor	477	0	477	215	692	
(Note: Per GSA website on 11/23/2011)									

Attachment A

Cost Estimate Assumptions, Wage Determinations and Calculations

CDM Smith	PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY: JN
	JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED: 5/24/2012
	CLIENT:	EPA			PAGE NO. : GA-01

Description: Project Description and General Project Assumptions. See individual QTO sheets for assumptions pertaining to each Alternative.

FS Alternatives

Below is the list of alternatives and the respective QTO Sheets.

Alternative 1	No Action	
Alternative 2	Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring	See QTO-01
Alternative 3	Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	See QTO-02
Alternative 4	Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	See QTO-03
Alternative 5	Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring	See QTO-04
Alternative 6	Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring	See QTO-05

Material Properties and Conversions for Quantity Take-Off Calculations

Assumed Material Properties from Means Heavy Construction Handbook, 1993

BCY - bank cubic yard - in place volume prior to excavation
LCY - loose cubic yards - volume after excavation
ECY - embankment cubic yards (aka compacted cubic yards) - volume after compaction

Common Earth Bulking Factor:	1.25	*Conversion from BCY to LCY*
Common Earth Compaction Factor:	0.9	*Conversion from BCY to ECY*
Common Earth Compaction Factor:	0.72	*Conversion from LCY to ECY*
Sand Bulking Factor:	1.12	*Conversion from BCY to LCY*
Sand Compaction Factor:	0.95	*Conversion from BCY to ECY*
Sand Compaction Factor:	0.85	*Conversion from LCY to ECY*
Density of Sand (dry), LB/LCY:	2,600	*Assumed*

Additional Material Property Assumptions

Slag and Battery Bulking Factor:	1	*Conversion from BCY to LCY*
Slag and Battery Compaction Factor:	1	*Conversion from BCY to ECY*
Slag and Battery Compaction Factor:	1	*Conversion from LCY to ECY*
Density of Contaminated Soil (Moist), TON/LCY:	1.5	*Assumed*
Density of Contaminated Sediment (Wet), TON/LCY:	1.7	*Assumed*
Density of Contaminated Slag/Battery Casings, TON/LCY:	4.3	*Assumed*

General Conversion Factors

Feet per Acre factor:	43,560
Gallons per CY factor:	201.97

Estimated Work Week and Work Day Duration

Days per work week, DY:	5
Hours per Shift, HR:	8
Hours per year, HR:	2,080

Description: MII Project Properties Mark-up Assumptions

Cost Estimate General Assumptions

This cost estimate was prepared using the Micro Computer Aided Cost Engineering System (MCACES) Second Generation (MII) software version 4.1, build 2. The cost estimate was not developed with the English 2010 Cost Book. Equipment costs were developed using the MII Equipment Region 1 2011 Library, updated with October 2011 fuel prices. Labor costs were developed using the Labor National 2010 Library, updated with local Davis-Bacon and professional labor rates from Salary.com. Material costs were developed using RS Means CostWorks 2011 materials costs and vendor quotes for New Brunswick, NJ (088).

This cost estimate assumes that all the necessary equipment, labor, and material will be available for the project because it is located in Old Bridge, NJ area. Equipment, labor, and materials would come from the nearby urban areas of Old Bridge, NJ

The cost estimate assumes standard contracting mechanisms and indirect costs typical of a design/bid approach. Use of alternative contracting and delivery mechanisms may impact overall construction costs.

Direct Cost Mark-up Assumptions

Productivity

Assume Productivity Default Mark-up of 100%

Overtime Pay

Assume overtime is paid for time outside of estimated work week and work day duration described in QTO-01

Monday through Saturday:	**1.5**
Sunday:	**2**

Sales Tax

Assume Adjustment/Tax Running % on Matl Costs

Equipment Adujstment Factor

Assume Adjustment/Tax Running % on EQ Costs

Cost index for Nov 2009 Equipment Library (1Q10):	713.29	*USACE Civil Works Construction Cost Index System*
Cost index for Current Estimate (1Q12):	765.03	*(CWCCIS), 31 March 2000 (Revised 30 September 2011)*
Equipment Adujstment Factor Escalation Mark-up:	**7%**	

Contractor Mark-up Assumptions

Job Office Overhead (JOOH) - Subcontractor

Assume running percent allowance with a default mark-up of 2%

JOOH - Prime

Assume captured under General Conditions. Includes project dedicated supervisory staff and equipment.

Home Office Overhead (HOOH) - Subcontractor

Assume running percent HOOH with a default mark-up of 10%

HOOH - Prime

Assume running percent HOOH with a default mark-up of 10%

Profit - Subcontractor

Assume running percent profit with a default mark-up of 10%

Profit

Assume running percent profit with a default mark-up of 8%

Description: MII Project Properties Mark-up Assumptions

General Liability

Assume direct percent miscellaneous mark-up with a default of 2%

Bond

Assume HTRW (other) Bond Table

CDM Smith	PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY: JN
	JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED: 5/24/2012
	CLIENT:	EPA			PAGE NO. : LB-01

Description: Determination of base wage rates for management and engineering personnel (i.e., project manager, civil engineer, etc.). Wage rates based on Salary.com salary estimates for Old Bridge, NJ obtained October 2011. Salary rates were used for hourly labor rate determination for the MII estimate.

Base Wage Rates for Management and Engineering Personnel, and Legal Personnel

Taxes, Insurance and Overhead

- Taxes, insurance, and overhead are included in the MII estimate for New Jersey and type of construction.

Escalation

Previous salary cost index (1Q12):	**765.03**	*Obtained from USACE Civil Works Construction Cost Index System (CWCCIS), 31 March 2000 (Revised 30 September 2011)*
Cost estimate prep cost index (1Q12):	**765.03**	

Hourly Wage Calculations

Number of work hours per year:	**2,080**	*52 weeks x 40 hours per week*
Benefits for Management and Engineering Personnel, %:	**28.5%**	*Average assumed benefits from Salary.com*
Bonus for Management and Engineering Personnel, %:	**1.5%**	*Average assumed bonus from Salary.com*

Labor Category	Salary	Base Salary (% of Total)	Bonuses (% of Total)	Hourly	Year	Source
Project Manager	$117,195	70.2%	3.7%	$56.34	2011	Salary.com
Engineer, Civil	$91,883	72.0%	0.6%	$44.17	2011	Salary.com
Engineer, Quality Control	$103,043	68.7%	4.5%	$49.54	2011	Salary.com
Engineer, Electrical	$100,364	71.9%	1.0%	$48.25	2011	Salary.com
Engineer, Mechanical	$98,260	71.8%	1.0%	$47.24	2011	Salary.com
Surveyor, Chief	$79,640	71.9%	0.0%	$38.29	2011	Salary.com
Surveyor	$54,389	69.6%	0.4%	$26.15	2011	Salary.com
Engineer, Field	$71,906	70.1%	1.5%	$34.57	2011	Salary.com
Engineer, Project	$90,898	69.1%	3.5%	$43.70	2011	Salary.com
Scientist	$73,869	71.2%	0.4%	$35.51	2011	Salary.com
Safety Engineer	$74,015	69.5%	2.2%	$35.58	2011	Salary.com
CAD Drafter	$48,269	68.1%	1.3%	$23.21	2011	Salary.com
Clerk, Typist, Bookkeeper	$47,772	68.1%	1.3%	$22.97	2011	Salary.com
General Superintendent	$92,837	68.1%	0.0%	$44.63	2011	Salary.com

Labor Category	Hourly	Benefits	Taxable Fringe	Taxable Fringe[1]
Project Manager	$56.34	$16.89	$16.89	$0.00
Engineer, Civil	$44.17	$13.24	$13.24	$0.00
Engineer, Quality Control	$49.54	$14.85	$14.85	$0.00
Engineer, Electrical	$48.25	$14.46	$14.46	$0.00
Engineer, Mechanical	$47.24	$14.16	$14.16	$0.00
Surveyor, Chief	$38.29	$11.48	$11.48	$0.00
Surveyor	$26.15	$7.84	$7.84	$0.00
Engineer, Field	$34.57	$10.36	$10.36	$0.00
Engineer, Project	$43.70	$13.10	$13.10	$0.00
Scientist	$35.51	$10.65	$10.65	$0.00
Safety Engineer	$35.58	$10.67	$10.67	$0.00
CAD Drafter	$23.21	$6.96	$6.96	$0.00
Clerk, Typist, Bookkeeper	$22.97	$6.89	$6.89	$0.00
General Superintendent	$44.63	$13.38	$13.38	$0.00

Notes:

1 - Non-taxable fringe is set at $0.00 in MII per the U.S. Army Corps of Engineers

Description: Determination of base wage rates for management and engineering personnel (i.e., project manager, civil engineer, etc.). Wage rates based on Salary.com salary estimates for Old Bridge, NJ obtained October 2011. Salary rates were used for hourly labor rate determination for the MII estimate.

Base Wage Rates for Management and Engineering Personnel, and Legal Personnel

Hourly Wage Calculations (continued)

Legal Labor[2]	Salary	Base Salary (% of Total)	Bonuses (% of Total)	Hourly	Year	Source
Environmental Lawyer	$247,095	66.7%	11.7%	$118.80	2011	Salary.com
Paralegal	$72,296	69.6%	2.1%	$34.76	2011	Salary.com

Legal Labor[2]	Hourly	Benefits	Taxable Fringe	Non-Tax Fringe[1]
Environmental Lawyer	$118.80	$39.56	$39.56	$0.00
Paralegal	$34.76	$10.57	$10.57	$0.00

Notes:

1 - Non-taxable fringe is set at $0.00 in MII per the U.S. Army Corps of Engineers

2 - Benefits and Taxable Fringe for Legal Labor are calculated separately from Engineering Personnel

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Description: Determination of base wage rates for general construction personnel (i.e., labor, equipment operators, etc.). Wage rates based on Davis-Bacon Heavy Construction (NJ62 - 30 September 2011) and Heavy Dredging Construction (NJ6 31 December 2010) for Middlesex County, New Jersey. When different hourly rates were presented for a labor category, the highest value was reported. Fringe rates were assumed as a percentage of the hourly wage because the Davis-Bacon determination did not set fringe rates for each labor category.

Base Wage Rates for General Construction Personnel

Taxes, Insurance and Overhead

- Taxes, insurance, and overhead are included in the MII estimate.

Escalation

Previous salary cost index (1Q12): 765.03

Cost estimate prep cost index (1Q12): 765.03

Obtained from USACE Civil Works Construction Cost Index System (CWCCIS), 31 March 2000 (Revised 30 September 2011)

Fringe Assumption

Estimated fringe based on percentage of hourly wage: **50%**

Labor Category	Hourly*	Fringe	Year	Source
General Laborer	$38.64	$19.32	2011	NJ62
Skilled Laborer	$39.48	$19.74	2011	NJ62
Equipment Operator, Crane/Shovel	$49.22	$24.61	2011	NJ62 Group 1 (Backhoe, Front End Loader greater than 5CY, Drill)
Equipment Operator, Heavy	$47.32	$23.66	2011	NJ62 Group 2 (Crane under 10 Tons, Front End Loader between 2 and 5CY)
Equipment Operator, Medium	$45.02	$22.51	2011	NJ62 Group 3 (Dozer, Front End Loader between 1 and 2CY)
Equipment Operator, Light	$43.07	$21.53	2011	NJ62 Group 4 (Roller, Front End Loader under 1CY)
Equipment Operator, Oiler	$41.02	$20.51	2011	NJ62 Group 5 (Oiler)
Truck Driver, Heavy	$39.60	$19.80	2011	NJ62
Truck Driver, Light	$39.42	$19.71	2011	NJ62
Rodmen (Reinforcing)	$41.21	$20.60	2011	NJ62
Cement Finisher	$44.40	$22.20	2011	NJ62
Sheet Metal Worker	$44.57	$22.28	2011	NJ62
Plumber	$43.53	$21.77	2011	NJ62
Class A - Heavy Dredging	$39.47	$19.73	2011	NJ6
Class B1 - Heavy Dredging	$34.19	$17.09	2011	NJ6
Class B2 - Heavy Dredging	$32.21	$16.10	2011	NJ6
Class C1(a) - Heavy Dredging	$30.66	$15.33	2011	NJ6
Class C1 - Heavy Dredging	$31.37	$15.68	2011	NJ6
Class C2 - Heavy Dredging	$30.35	$15.17	2011	NJ6
Class D(a) - Heavy Dredging	$24.52	$12.26	2011	NJ6
Class D - Heavy Dredging	$25.31	$12.65	2011	NJ6

CLASS A: Lead Dredgeman, Operator, Leverman, Licensed Tug Operator over 1000 HP

CLASS B1: Derrick Operator, Spider/Spill Barge Operator, Engineer, Electrician. Chief Welder, Cheif Mate, Fill Placer, Operator II, Maintenance Engineer, Licensed Boat Operator

CLASS B2: Licensed Boat Operator, Certified Welder.

CLASS C1: Mate, Drag Barge Operator, Steward, Assistant Fill Placer.

CLASS C1(a): Welder

CLASS C2: Boat Operator

CLASS D: Shoreman, Deckhand, Rodman, Scowman, Cook, Messman, Porter/Janitor.

CLASS D(a) Oiler

*Additional Premium for Hazardous Work = 20% *Assumption per NJ62 and NJ6*

Description: Determination of cost factors based on MII USACE Region 2 Equipment Library.

Equipment Assumptions

Fuels as of 10/27/2011

Electricity, Cents per Kilowatthour:	**14.46**	*U.S. Energy Information Administration/Electricity Monthly September 2011*
Gas Costs Per Gallon:	**3.513**	*Mid Grade from AAA's Daily Fuel Gauge Report*
Diesel Costs per Gallon (On-Road):	**3.728**	*Diesel from AAA's Daily Fuel Gauge Report*
Federal Motor Fuels Tax:	0.244	*U.S. Energy Information Administration/Petroleum Marketing Monthly October 2011*
New Jersey Motor Fuels Tax:	0.135	
Diesel Costs per Gallon (Off-Road):	**3.349**	

Factors

State Sales Tax:	**7%**	*NJ Department of Treasury, Division of Taxation*
Working Hours/Year, WHPY:	**1,360**	*USACE Construction Equipment Ownership and Operating Expense Schedule, Region I (EP 1110-1-8, Volume 1 Nov 2009)*
Labor Adjustment Factor:	**1.12**	
Cost Of Money:	**2.50%**	*Treasury Direct Interest Rate for 7/1/2011 to 12/31/2011*
Cost Of Money Disc:	**25**	*Assumed from MII USACE Region 2 Equipment Library*

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Description: Alternative 2 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations). All removed contaminated materials will be disposed of off site.

Alternative 2 - Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring

Five Year Site Review (GENERAL COMPONENT OF ALL SOIL CONTAMINATION ALTERNATIVES)

Assume General Component of Alternatives 2 through 6.

Site Visit	*Per Event*	
Environmental Engineer, DY:	3	
Environmental Engineer, HR:	24	
Five-Year Review Reporting		
Project Manager, HR:	40	
Environmental Engineer, HR:	120	
Quality Control Engineer, HR:	24	
CADD Drafter, HR:	40	
Administrative Clerk, HR:	40	
Environmental Scientist, HR:	160	
Reproduction Costs for Five-Year Site Review Reports:	$500	*Assumed allowance*

Institutional Controls

Assume General Component of Alternatives 2 through 6. Includes Deed Restriction/GW Use Restrictions, and Community Awareness Programs

Project Manager, HR:	20	*Assumed*
Environmental Engineer, HR:	40	*Assumed*
Environmental Lawyer, HR:	120	*Assumed*
Paralegal, HR:	60	*Assumed*
Admin, HR:	40	*Assumed*
Reproduction Costs, EA:	1	*Assumed*
Assumed number of Signs for Shoreline, EA:	18	*Per engineer*
Assumed number of Signs for Margaret's Creek Area, EA:	3	*Per engineer*
Assumed number of Signs for Beach Areas, EA:	4	*Per engineer*
Assumed number of Signs for project, EA:	**25**	*Per engineer*
Crew Hours per sign, HR:	2	*Assumed*
Total Crew Hours, HR:	**50**	

Mobilization and Demobilization/Decontamination

Assume General Component of Alternatives 2 through 6 because mobilization of dredge equipment, shore support and shore excavation equipment is expected for each alternative with dredging/excavation regardless of volumes for dredging/excavation. Assume Lump Sum capital cost from CCI estimator vendor quote.

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Description: Alternative 2 - Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Construction of Access Roads		
Assume General Component of Alternatives 2 through 6 because access roads for shore support and transportation of materials is expected for each alternative with dredging/excavation regardless of volumes for dredging/excavation. Assume Lump Sum capital cost from CCI estimator vendor quote.		
Width of Access Roads, LF:	10	*Assumed*
Thickness of Gravel, LF:	1	*Assumed*
Length of Access Road to Margaret's Creek, LF:	3,000	*Assumed*
Area for Access Road to Margaret's Creek, SF:	30,000	
Gravel for Access Road to Margaret's Creek, ECY:	1120	
Gravel for Access Road to Margaret's Creek, LCY:	1318	
Length Access Road to Bay, MILE:	2	*Assumed*
Area for Access Road to Bay, SF:	105,600	
Gravel for Access Road to Bay, ECY:	3,920	
Gravel for Access Road to Bay, LCY:	4,612	
Total Length of Access Roads, LF:	13,560	
Monitoring of Biota		
Assumed sampling frequency is semi-annually for the first 5 years.		
Semi-annual Sampling		
Assumed yearly quantities for annual samplings.		
Events per Year, EA:	2	
Assumed number of samples per event, EA:	6	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**12**	
Event Duration, DAY:	2	
Project Scientist Crew per event, DAY:	2	
Project Scientist Crew per year, DAY:	**4**	
Project Scientist, HR:	**32**	
Monitoring of Groundwater		
Assumed sampling frequency is quarterly for first two years, semi-annually for the next 3 years and yearly thereafter until the end of year 30		
Annual Sampling		
Assumed yearly quantities for annual samplings.		
Events per Year, EA:	1	
Assumed number of samples per event, EA:	21	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**21**	
Event Duration, DAY:	4	
Project Scientist Crew per event, DAY:	4	
Project Scientist Crew per year, DAY:	4	
Project Scientist, HR:	**32**	

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Monitoring of Groundwater (cont)		
Semi-annual Sampling		
Assumed yearly quantities for semi-annually sampling.		
Events per Year, EA:	2	
Assumed number of samples per event, EA:	15	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**30**	
Event Duration, DAY:	3	*Assumed*
Project Scientist Crew per event, DAY:	3	
Project Scientist Crew per year, DAY:	6	
Project Scientist, HR:	**48**	
Quarterly		
Assumed yearly quantities for quarterly sampling.		
Events per Year, EA:	4	
Assumed number of samples per event, EA:	15	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**60**	
Event Duration, DAY:	3	*Assumed*
Project Scientist Crew per event, DAY:	3	
Project Scientist Crew per year, DAY:	12	
Project Scientist, HR:	**96**	
Monitoring of Surface Water		
Assumed sampling frequency is quarterly for first two years, semi-annually for the next 3 years and yearly thereafter until the end of year 30		
Annual Sampling		
Assumed yearly quantities for annual sampling.		
Events per Year, EA:	1	
Assumed number of samples per event, EA:	10	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**10**	
Event Duration, DAY:	4	
Project Scientist Crew per event, DAY:	4	
Project Scientist Crew per year, DAY:	**4**	
Project Scientist, HR:	**32**	
Semi-annual Sampling		
Assumed yearly quantities for semi-annually sampling.		
Events per Year, EA:	2	
Assumed number of samples per event, EA:	10	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**20**	
Event Duration, DAY:	4	*Assumed*
Project Scientist Crew per event, DAY:	4	
Project Scientist Crew per year, DAY:	**8**	
Project Scientist, HR:	**64**	

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Quarterly Sampling		
Assumed yearly quantities for quarterly sampling.		
Events per Year, EA:	4	
Assumed number of samples per event, EA:	10	*Per engineer*
Analysis of Metals (total and dissolved) per Year, EA:	**40**	
Event Duration, DAY:	4	*Assumed*
Project Scientist Crew per event, DAY:	4	
Project Scientist Crew per year, DAY:	**16**	
Project Scientist, HR:	**128**	
General Conditions		
Anticipated Project Duration, MO:	24	*Assumed per CCI estimate*
Project Dedicated Supervisory Staff		
Project Manager, HR:	2,080	*Assumed per CCI estimate*
Project Engineer, HR:	4,160	*Assumed per CCI estimate*
General Superintendent, HR:	4,160	*Assumed per CCI estimate*
Admin, HR:	200	*Assumed per CCI estimate*
Field Engineer, HR:	100	*Assumed per CCI estimate*
Safety Engineer, HR:	200	*Assumed per CCI estimate*
Per Diem, DAY:	1,370	*Rounded up to nearest ten*
Temporary Construction Facilities and Dedicated Equipment		
Office Trailer, MO:	24	
Storage Box, MO:	24	
Phone, Office Supplies, Electricity, MO:	24	
Portable Toilet, MO:	48	*Assume two toilets per duration of office trailer use*
Truck for duration of project, EA:	2.5	*Assumed per CCI estimate*
Truck, HR:	10,400	
PM/Super Truck, HR:	30	*Assumed per CCI estimate*
Dumpster, EA:	120	*Assumed per CCI estimate (5 per month for 24 months)*
Cell Phone, HR:	10,900	*Assumed per CCI estimate*
Sediment and Erosion Control Measures		
Portable Coffer Dam Construction/Rental, Month 1, EA:	1	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 2, EA:	2	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 3+, EA:	10	*Per Engineer*
Installation Crew, DAY:	36	*Asumed per vendor*
Installation Crew Trips, EA:	6	*Asumed per vendor*
Sandbags, EA:	4,600	*Asumed per vendor*
Weight of Sand per Sandbag, LBS:	50	*Asumed per vendor*
Total Sand, LCY:	89	
Length of Silt Fencing along either side of Access Roads, LF:	27,120	

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Removal of Slag/Battery Casings, Excavation of Soil and Dredging of Sediment by Area

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Removal of Slag/Battery Casings											
Volume of Slag/Battery Casings, LCY:	**5,295**	**59**	**0**	**0**	**9**	**0**	**0**	**4,994**	**0**	**711**	***Per Engineer***
Excavation of Soil by Area											
Volume of Surface Soil, BCY:	11,131	3,085	354	0	3,646	534	0	2,935	0	15,042	*Per Engineer*
Volume of Surface Soil, LCY:	13,914	3,857	443	0	4,558	668	0	3,669	0	18,803	
Volume of Subsurface Soil, BCY:	1,736	12,850	0	653	0	0	0	828	2,146	2,826	*Per Engineer*
Volume of Subsurface Soil, LCY:	2,170	16,063	0	817	0	0	0	1,035	2,683	3,533	*Per Engineer*
Total Volume of Soil, BCY:	**12,867**	**15,935**	**354**	**653**	**3,646**	**534**	**0**	**3,763**	**2,146**	**17,868**	
Volume of Soil, LCY:	16,090	19,920	450	820	4,560	670	0	4,710	2,690	22,340	*Rounded up to tens*
Dredging of Sediment by Area											
Volume of Surface Sediment, BCY:	30,105	3,793	0	0	2,734	346	9,694	13,169	15,330	92,522	*Per Engineer*
Volume of Surface Sediment, LCY:	37,640	4,750	0	0	3,420	440	12,120	16,470	19,170	115,660	*Rounded up to tens*
Volume of Subsurface Sediment, BCY:	381	347	0	0	0	0	527	15,796	1,516	3,052	*Per Engineer*
Volume of Subsurface Sediment, LCY:	480	440	0	0	0	0	660	19,750	1,900	3,820	*Rounded up to tens*
Total Volume of Sediment, BCY:	30,486	4,140	0	0	2,734	346	10,221	28,965	16,846	95,574	
Total Volume of Sediment, LCY:	**38,110**	**5,180**	**0**	**0**	**3,420**	**440**	**12,780**	**36,210**	**21,060**	**119,470**	***Rounded up to tens***
Removal of Slag/Battery Casings, Excavation of Soil and Dredging of Sediment by Area (cont)											
Material Stabilization											
Subsurface Soil for Dewatering, LCY:	0	16,063	0	817	0	0	0	0	0	3,533	*Per Engineer*
Sediment for Dewatering, LCY:	38,110	5,180	0	0	3,420	440	12,780	36,210	21,060	119,470	
Total Volume of Wet Material for Dewatering, LCY:	**38,110**	**21,243**	**0**	**817**	**3,420**	**440**	**12,780**	**36,210**	**21,060**	**123,003**	
Percent of Drying Agent, %:	4%	*Per Engineer*									
Total Volume of Wet Material and Drying Agent, LCY:	**39,634**	**22,093**	**0**	**850**	**3,557**	**458**	**13,291**	**37,658**	**21,902**	**127,923**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	13,291	42,368	24,592	146,730	

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	Seawall Sector, Area 1	***Seawall Sector, Area 2***	***Seawall Sector, Area 3***	***Seawall Sector, Area 4***	***Seawall Sector, Area 5***	***Seawall Sector, Area 6***	***Jetty Sector, Area 7***	***Jetty Sector, Area 8***	***Jetty Sector, Area 11***	***Margaret's Creek Sector, Area 9***	***Comments***
Post Excavation Confirmation Sampling											
Assumed SF per confirmation sample at excavation area:		900	*Per engineer*								
Assumed LF of excavation perimeter per confirmation sample:		30	*Per engineer*								
Perimeter of Excavation for Sampling, LF:	19,184	2,459	401	50	3,898	753	2,821	4,646	3,649	16,397	*Per Engineer*
Surface Area of Excavation for Sampling, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	*Per Engineer*
Number of Samples, EA:	1,258	186	19	11	226	39	240	397	356	2,165	
Disposal Volumes by Area											
Volume of Slag/Battery Casings, LCY:	5,295	59	0	0	9	0	0	4,994	0	711	
Weight of Slag/Battery Casings, TON:	22,769	254	0	0	39	0	0	21,475	0	3,058	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	13,291	42,368	24,592	146,730	
Weight of Soil and Dewatered Sediment for Disposal, TON:	83,587	38,925	675	1,280	12,176	1,692	19,937	63,553	36,889	220,096	
Waste Characterization Sampling, EA:	3,800	1,769	31	58	553	77	906	2,889	1,677	10,004	*Assume 22 Tons per Haul Truck*
Estimated percent split by volume to Hazardous Landfill, %:	25%	25%	25%	25%	25%	25%	20%	20%	20%	25%	*Per Engineer*
Volume for disposal as Hazardous Waste, LCY:	13,931	6,487	113	213	2,029	282	2,658	8,474	4,918	36,683	
Weight for disposal as Hazardous Waste, TON:	20,897	9,731	169	320	3,044	423	3,987	12,711	7,378	55,024	
Volume for disposal as Non-Hazardous Waste, LCY:	41,793	19,462	338	640	6,088	846	10,633	33,895	19,674	110,048	
Weight for disposal as Non-Hazardous Waste, TON:	62,690	29,194	506	960	9,132	1,269	15,950	50,842	29,511	165,072	
Number of Truckloads to Non-Hazardous Landfill according to productivity, EA:	2,850	1,327	24	44	416	58	725	2,312	1,342	7,504	*Assume 22 Tons per Haul Truck*
Transportation to Non-Hazardous Landfill according to productivity, HR:	5,700	2,654	48	88	832	116	1,450	4,624	2,684	15,008	*Assume 2 hour cycle time*

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Disposal Volumes by Area (Summary)	**TOTALS**
Slag/Battery Casings Removed from Seawall Areas, LCY:	**5,363**
Slag/Battery Casings Removed from Seawall Areas, TON:	**23,062**
Slag/Battery Casings Removed from Margaret's Creek, LCY:	**711**
Slag/Battery Casings Removed from Margaret's Creek, TON:	**3,058**
Slag/Battery Casings Removed from Jetty Areas, LCY:	**4,994**
Slag/Battery Casings Removed from Jetty Areas, TON:	**21,475**
Waste Characterization Sampling from Seawall Areas, EA:	**6,289**
Non-Hazardous Soil from Seawall Areas, LCY:	69,166
Non-Hazardous Soil from Seawall Areas, TON:	**103,751**
Transportation,HR:	**9,438**
Number of Truckloads, EA:	**4,719**
Hazardous Soil from Seawall Areas, LCY:	**23,055**
Hazardous Soil from Seawall Areas, TON:	**34,584**
Waste Characterization Sampling from Margaret's Creek, EA:	**10,004**
Non-Hazardous Soil from Margaret's Creek, LCY:	110,048
Non-Hazardous Soil from Margaret's Creek, TON:	**165,072**
Transportation,HR:	**15,008**
Number of Truckloads, EA:	**7,504**
Hazardous Soil from Margaret's Creek, LCY:	**36,683**
Hazardous Soil from Margaret's Creek, TON:	**55,024**
Waste Characterization Sampling from Jetty Areas, EA:	**5,472**
Non-Hazardous Soil from Jetty Areas, LCY:	64,202
Non-Hazardous Soil from Jetty Areas, TON:	**96,303**
Transportation,HR:	**8,758**
Number of Truckloads, EA:	**4,379**
Hazardous Soil from Jetty Areas, LCY:	**16,050**
Hazardous Soil from Jetty Areas, TON:	**24,076**

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PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			PAGE NO. :	QTO-01

Description: Alternative 2 - Excavation/Dredging, Offsite Disposal, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Restoration Volumes by Area

	Seawall Sector, Area 1	***Seawall Sector, Area 2***	***Seawall Sector, Area 3***	***Seawall Sector, Area 4***	***Seawall Sector, Area 5***	***Jetty Sector, Area 6***	***Jetty Sector, Area 7***	***Jetty Sector, Area 8***	***Jetty Sector, Area 11***	***Margaret's Creek Sector, Area 9***	***TOTAL***
Weight of Sediment Dredged for Backfill, TON:	64,787	8,806	0	0	5,814	748	21,726	61,557	35,802	203,099	**402,339**
Volume of Excavated Soil for Backfill, ECY:	12,867	15,935	354	653	3,646	534	0	3,763	2,146	17,868	**57,766**
Volume of Excavated Soil for Backfill, LCY:	17,871	22,132	492	907	5,064	742	0	5,227	2,981	24,817	**80,233**
Surface Area of Excavated Soil for Backfill, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	**2,774,089**

Seawall Reconstruction using Capstone, TON:	**7,500**	*Per CCI Vendor Quote*
Seawall Reconstruction using Corestone, TON:	**15,000**	*Per CCI Vendor Quote*
Jetty Reconstruction using Capstone, TON:	**5,333**	*Per CCI Vendor Quote*
Wetland Restoration, AC:	**13.13**	*Per Engineer, only applies to Alternative 2*

CDM Smith	PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY: JN
	JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED: 5/24/2012
	CLIENT:	EPA			PAGE NO. : QTO-02

Description: Alternative 3 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations).
Alternative 3 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 3 involves offsite disposal. The areas for MNR will require long-term maintenance and monitoring. This sheet presents quantity take-off calculations for input to MII software.

Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Five Year Site Review (GENERAL COMPONENT OF ALL SOIL CONTAMINATION ALTERNATIVES)

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Institutional Controls

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Mobilization and Demobilization/Decontamination

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Access Road

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Monitoring of Groundwater and Surface Water

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

General Conditions

Reduction in Time compared to Alternative 2, MO:	6	
Anticipated Project Duration, MO:	18	
Project Dedicated Supervisory Staff		
Project Manager, HR:	1,560	*Assumed per CCI estimate*
Project Engineer, HR:	3,120	*Assumed per CCI estimate*
General Superintendent, HR:	3,120	*Assumed per CCI estimate*
Admin, HR:	200	*Per QTO-01*
Field Engineer, HR:	100	*Per QTO-01*
Safety Engineer, HR:	200	*Per QTO-01*
Per Diem, DAY:	1,040	*Rounded up to nearest ten*
Temporary Construction Facilities and Dedicated Equipment		
Office Trailer, MO:	18	
Storage Box, MO:	18	
Phone, Office Supplies, Electricity, MO:	18	
Portable Toilet, MO:	36	*Assume two toilets per duration of office trailer use*
Truck for duration of project, EA:	3	*Per QTO-01*
Truck, HR:	7,800	
PM/Super Truck, HR:	30	*Per QTO-01*
Dumpster, EA:	120	*Per QTO-01*
Cell Phone, HR:	8,300	*Assumed per CCI estimate*

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB
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CHECKED BY:	JN
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PAGE NO. :	QTO-02

Description: Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Sediment and Erosion Control Measures

Portable Coffer Dam Construction/Rental, Month 1, EA:	1	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 2, EA:	2	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 3+, EA:	10	*Per Engineer*
Installation Crew, DAY:	36	*Asumed per vendor*
Installation Crew Trips, EA:	6	*Asumed per vendor*
Sandbags, EA:	4,600	*Asumed per vendor*
Weight of Sand per Sandbag, LBS:	50	*Asumed per vendor*
Total Sand, LCY:	89	
Length of Silt Fencing along either side of Access Roads, LF:	27,120	

Removal of Slag/Battery Casings, Excavation of Soil and Dredging of Sediment by Area

Assume all contaminated material will be removed except sediment left in place for MNR in Areas (7,9 and 11); otherwise, volumes for removal of slag/battery casings, excavation of soil, dredging of sediment, material stabilization, and post excavation confirmation sampling will have the same quantities as presented for Alternative 2.

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
MNR											
Area of Surface Sediment, SF:	0	0	0	0	0	0	51,441	0	177,597	1,249,050	
Volume of Surface Sediment, BCY:	0	0	0	0	0	0	3,811	0	13,156	92,523	
Volume of Subsurface Sediment, BCY:	0	0	0	0	0	0	527	0	0	3,052	
Removal of Slag/Battery Casings											
Volume of Slag/Battery Casings, LCY:	**5,295**	**59**	**0**	**0**	**9**	**0**	**0**	**4,994**	**0**	**711**	
Excavation of Soil by Area											
Volume of Surface Soil, BCY:	11,131	3,085	354	0	3,646	534	0	2,935	0	15,042	
Volume of Surface Soil, LCY:	13,914	3,857	443	0	4,558	668	0	3,669	0	18,803	*Rounded up to ones*
Volume of Subsurface Soil, BCY:	1,736	12,850	0	653	0	0	0	828	2,146	2,826	
Volume of Subsurface Soil, LCY:	2,170	16,063	0	817	0	0	0	1,035	2,683	3,533	*Rounded up to ones*
Total Volume of Soil, BCY:	**12,867**	**15,935**	**354**	**653**	**3,646**	**534**	**0**	**3,763**	**2,146**	**17,868**	
Volume of Soil, LCY:	16,090	19,920	450	820	4,560	670	0	4,710	2,690	22,340	*Rounded up to tens*
Dredging of Sediment by Area											
Volume of Surface Sediment, BCY:	30,105	3,793	0	0	2,734	346	5,883	13,169	2,174	0	*Minus MNR*
Volume of Surface Sediment, LCY:	37,640	4,750	0	0	3,420	440	7,360	16,470	2,720	0	*Rounded up to tens*
Volume of Subsurface Sediment, BCY:	381	347	0	0	0	0	0	15,796	1,516	0	*Minus MNR*
Volume of Subsurface Sediment, LCY:	480	440	0	0	0	0	0	19,750	1,900	0	*Rounded up to tens*

CDM Smith	PROJECT: Raritan Bay FS	COMPUTED BY : AB	CHECKED BY: JN
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Description: Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Dredging of Sediment by Area											
Total Volume of Sediment, BCY:	30,486	4,140	0	0	2,734	346	5,883	28,965	3,690	0	
Total Volume of Sediment, LCY:	**38,110**	**5,180**	**0**	**0**	**3,420**	**440**	**7,360**	**36,210**	**4,620**	**0**	*Rounded up to tens*
Material Stabilization											
Subsurface Soil for Dewatering, LCY:	0	16,063	0	817	0	0	0	0	0	3,533	*Same as Alt 2*
Sediment for Dewatering, LCY:	38,110	5,180	0	0	3,420	440	7,360	36,210	4,620	0	
Total Volume of Wet Material for Dewatering, LCY:	**38,110**	**21,243**	**0**	**817**	**3,420**	**440**	**7,360**	**36,210**	**4,620**	**3,533**	
Percent of Drying Agent, %:	4%	*Per Engineer*									
Total Volume of Wet Material and Drying Agent, LCY:	**39,634**	**22,093**	**0**	**850**	**3,557**	**458**	**7,654**	**37,658**	**4,805**	**3,674**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	7,654	42,368	7,495	22,481	
Total Volume of Wet Material for Stabilization/Dewatering, LCY:	38,110	21,243	0	817	3,420	440	7,360	36,210	4,620	3,533	
Post Excavation Confirmation Sampling											
Assumed SF per confirmation sample at excavation area:		900	*Per engineer*								
Assumed LF of excavation perimeter per confirmation sample:		30	*Per engineer*								
Perimeter of Excavation for Sampling, LF:	19,184	2,459	401	50	3,898	753	2,821	4,646	3,649	16,397	*Same as Alt 2*
Surface Area of Excavation for Sampling, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	*Same as Alt 2*
Number of Samples, EA:	**1,258**	**186**	**19**	**11**	**226**	**39**	**240**	**397**	**356**	**2,165**	
Restoration Volumes by Area											
Weight of Sediment Dredged for Backfill, TON:	64,787	8,806	0	0	5,814	748	12,512	61,557	7,854	0	**162,078**
Volume of Excavated Soil for Backfill, ECY:	12,867	15,935	354	653	3,646	534	0	3,763	2,146	17,868	**57,766**
Volume of Excavated Soil for Backfill, LCY:	17,871	22,132	492	907	5,064	742	0	5,227	2,981	24,817	**80,233**
Surface Area of Excavate Soil for Backfill, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	**2,774,089**

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
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Description: Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Disposal Volumes by Area											
Volume of Slag/Battery Casings, LCY:	5,295	59	0	0	9	0	0	4,994	0	711	
Weight of Slag/Battery Casings, TON:	22,769	254	0	0	39	0	0	21,475	0	3,058	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	7,654	42,368	7,495	22,481	
Weight of Soil and Dewatered Sediment for Disposal, TON:	83,587	38,925	675	1,280	12,176	1,692	11,482	63,553	11,243	33,722	
Waste Characterization Sampling, EA:	3,800	1,769	31	58	553	77	522	2,889	511	1,533	*Assume 22 Tons per Haul Truck*
Estimated percent split by volume to Hazardous Landfill, %:	25%	25%	25%	25%	25%	25%	20%	20%	20%	25%	*Per Engineer*
Volume for disposal as Hazardous Waste, LCY:	13,931	6,487	113	213	2,029	282	1,531	8,474	1,499	5,620	
Weight for disposal as Hazardous Waste, TON:	20,897	9,731	169	320	3,044	423	2,296	12,711	2,249	8,431	
Volume for disposal as Non-Hazardous Waste, LCY:	41,793	19,462	338	640	6,088	846	6,124	33,895	5,996	16,861	
Weight for disposal as Non-Hazardous Waste, TON:	62,690	29,194	506	960	9,132	1,269	9,186	50,842	8,994	25,292	
Number of Truckloads to Non-Hazardous Landfill according to productivity, EA:	2,850	1,327	24	44	416	58	418	2,312	409	1,150	*Assume 22 Tons per Haul Truck*
Transportation to Non-Hazardous Landfill according to productivity, HR:	5,700	2,654	48	88	832	116	836	4,624	818	2,300	*Assume 2 hour cycle time*

Additional Restoration Quantities

Seawall Reconstruction using Capstone, TON:	**7,500**	*Per CCI Vendor Quote*
Seawall Reconstruction using Corestone, TON:	**15,000**	*Per CCI Vendor Quote*
Jetty Reconstruction using Capstone, TON:	**5,333**	*Per CCI Vendor Quote*

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Description: Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Offsite Disposal Volumes by Area (Summary)		
Slag/Battery Casings Removed from Seawall Areas, LCY:	**5,363**	
Slag/Battery Casings Removed from Seawall Areas, TON:	**23,062**	
Slag/Battery Casings Removed from Margaret's Creek, LCY:	**711**	
Slag/Battery Casings Removed from Margaret's Creek, TON:	**3,058**	
Slag/Battery Casings Removed from Jetty Areas, LCY:	**4,994**	
Slag/Battery Casings Removed from Jetty Areas, TON:	**21,475**	
Waste Characterization Sampling from Seawall Areas, EA:	**6,289**	*Assume 1 Sample per Truckload and 22 Tons per Truckload*
Non-Hazardous Soil from Seawall Areas, LCY:	69,166	
Non-Hazardous Soil from Seawall Areas, TON:	**103,751**	
Transportation,HR:	**9,438**	*Assume 2 hour cycle time*
Number of Truckloads, EA:	**4,719**	*Assume 22 Tons per Haul Truck*
Hazardous Soil from Seawall Areas, LCY:	**23,055**	
Hazardous Soil from Seawall Areas, TON:	**34,584**	
Waste Characterization Sampling from Margaret's Creek, EA:	**1,533**	*Assume 1 Sample per Truckload and 22 Tons per Truckload*
Non-Hazardous Soil from Margaret's Creek, LCY:	16,861	
Non-Hazardous Soil from Margaret's Creek, TON:	**25,292**	
Transportation,HR:	**2,300**	*Assume 2 hour cycle time*
Number of Truckloads, EA:	**1,150**	*Assume 22 Tons per Haul Truck*
Hazardous Soil from Margaret's Creek, LCY:	**5,620**	
Hazardous Soil from Margaret's Creek, TON:	**8,431**	
Waste Characterization Sampling from Jetty Areas, EA:	**3,922**	*Assume 1 Sample per Truckload and 22 Tons per Truckload*
Non-Hazardous Soil from Jetty Areas, LCY:	46,014	
Non-Hazardous Soil from Jetty Areas, TON:	**69,022**	
Transportation,HR:	**6,278**	*Assume 2 hour cycle time*
Number of Truckloads, EA:	**3,139**	*Assume 22 Tons per Haul Truck*
Hazardous Soil from Jetty Areas, LCY:	**11,504**	
Hazardous Soil from Jetty Areas, TON:	**17,256**	

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Description: Alternative 3 - Excavation/Dredging, Offsite Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Annual O&M for Areas with MNR

Assumes a two person crew and a jon boat for the sampling. Assume visual inspection will be with an underwater video camera. Semi-annual for first five years, and Annually for next 25 years.

	Area 9	***Area 7***	**Area 11**	**Totals**	**Comments**
Surface Area for MNR, SF:	1,249,050	51,441	177,597		*Per engineer*
Assumed SF of Cap per Surface Water sample for analysis of Metals (total and dissolved):	20,000	20,000	20,000		*Per engineer*
Assumed SF of Cap per Sediment sample for analysis of Metals (total and dissolved):	20,000	20,000	20,000		*Per engineer*
Analysis of Metals (total and dissolved) per event, EA:	125	5	18		
Semi-annual Sampling					
Sampling events per year, EA:	2	2	2		
Analysis of Metals (total and dissolved) per year, EA:	250	10	36	**296**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	20	20	20	**60**	
Project Scientist Crew per year, HR:	160	160	160	**480**	
Annual Sampling					
Sampling events per year, EA:	1	1	1		
Analysis of Metals (total and dissolved) per year, EA:	125	5	18	**148**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	10	10	10	**30**	
Project Scientist Crew per year, HR:	80	80	80	**240**	

CDM Smith	PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY: JN
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	CLIENT:	EPA			PAGE NO. : QTO-03

Description: Alternative 4 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations).

Alternative 4 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 4 involves on-site consolidation of all source material (slag and battery casings) at two (2) engineered containment cells (Cell B at Margaret's Creek and Cell A at Western Jetty) and offsite disposal of the remaining contaminated materials (soil and sediment). It is assumed that all slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell and the slag and battery casings excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cell. The engineered containment cells will require long-term maintenance and monitoring. This sheet presents quantity take-off calculations for input to MII software.

Alternative 4 - Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Five Year Site Review (GENERAL COMPONENT OF ALL SOIL CONTAMINATION ALTERNATIVES)

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Institutional Controls

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Mobilization and Demobilization/Decontamination

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Access Road

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Monitoring of Groundwater and Surface Water

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

General Conditions

Additional Time compared to Alternative 2, MO:	1	*Assume additional project duration for preparation of containment cell construction*
Anticipated Project Duration, MO:	25	

Project Dedicated Supervisory Staff

Project Manager, HR:	2,167	*Assumed per CCI estimate*
Project Engineer, HR:	4,333	*Assumed per CCI estimate*
General Superintendent, HR:	4,333	*Assumed per CCI estimate*
Admin, HR:	200	*Per QTO-01*
Field Engineer, HR:	100	*Per QTO-01*
Safety Engineer, HR:	200	*Per QTO-01*
Per Diem, DAY:	1,420	*Rounded up to nearest ten*

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB
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Description: Alternative 4 - Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Temporary Construction Facilities and Dedicated Equipment

Office Trailer, MO:	25	
Storage Box, MO:	25	
Phone, Office Supplies, Electricity, MO:	25	
Portable Toilet, MO:	50	*Assume two toilets per duration of office trailer use*
Truck for duration of project, EA:	3	*Per QTO-01*
Truck, HR:	10,833	
PM/Super Truck, HR:	30	*Per QTO-01*
Dumpster, EA:	120	*Per QTO-01*
Cell Phone, HR:	11,333	*Assumed per CCI estimate*

Sediment and Erosion Control Measures

Portable Coffer Dam Construction/Rental, Month 1, EA:	1	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 2, EA:	2	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 3+, EA:	10	*Per Engineer*
Installation Crew, DAY:	36	*Asumed per vendor*
Installation Crew Trips, EA:	6	*Asumed per vendor*
Sandbags, EA:	4,600	*Asumed per vendor*
Weight of Sand per Sandbag, LBS:	50	*Asumed per vendor*
Total Sand, LCY:	89	
Length of Silt Fencing along either side of Access Roads, LF:	27,120	
Length of Silt Fencing around the perimeter of Cells, LF:	1,500	

Removal of Slag/Battery Casings, Excavation of Soil and Dredging of Sediment by Area

Assume all contaminated material will be removed except sediment left in place for MNR in Areas (7,9 and 11).

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
MNR											
Area of Surface Sediment, SF:	0	0	0	0	0	0	51,441	0	177,597	1,249,050	
Volume of Surface Sediment, BCY:	0	0	0	0	0	0	3,811	0	13,156	92,523	
Volume of Subsurface Sediment, BCY:	0	0	0	0	0	0	527	0	0	3,052	
Removal of Slag/Battery Casings											
Volume of Slag/Battery Casings, LCY:	**5,295**	**59**	**0**	**0**	**9**	**0**	**0**	**4,994**	**0**	**711**	
Excavation of Soil by Area											
Volume of Surface Soil, BCY:	11,131	3,085	354	0	3,646	534	0	2,935	0	15,042	
Volume of Surface Soil, LCY:	13,914	3,857	443	0	4,558	668	0	3,669	0	18,803	*Rounded up to ones*

CDM Smith

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Description: Alternative 4 - Excavation/Dredging, On-Site Containment of Source Materials, Offsite Disposal of Soil And Sediment, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Excavation of Soil by Area											
Volume of Subsurface Soil, BCY:	1,736	12,850	0	653	0	0	0	828	2,146	2,826	
Volume of Subsurface Soil, LCY:	2,170	16,063	0	817	0	0	0	1,035	2,683	3,533	*Rounded up to ones*
Total Volume of Soil, BCY:	**12,867**	**15,935**	**354**	**653**	**3,646**	**534**	**0**	**3,763**	**2,146**	**17,868**	
Volume of Soil, LCY:	16,090	19,920	450	820	4,560	670	0	4,710	2,690	22,340	*Rounded up to tens*
Volume of Surface Sediment, BCY:	30,105	3,793	0	0	2,734	346	5,883	13,169	2,174	0	*Minus MNR*
Volume of Surface Sediment, LCY:	37,640	4,750	0	0	3,420	440	7,360	16,470	2,720	0	*Rounded up to tens*
Volume of Subsurface Sediment, BCY:	381	347	0	0	0	0	0	15,796	1,516	0	*Minus MNR*
Volume of Subsurface Sediment, LCY:	480	440	0	0	0	0	0	19,750	1,900	0	*Rounded up to tens*
Total Volume of Sediment, BCY:	30,486	4,140	0	0	2,734	346	5,883	28,965	3,690	0	
Total Volume of Sediment, LCY:	**38,110**	**5,180**	**0**	**0**	**3,420**	**440**	**7,360**	**36,210**	**4,620**	**0**	***Rounded up to tens***
Material Stabilization											
Subsurface Soil for Dewatering, LCY:	0	16,063	0	817	0	0	0	0	0	3,533	*Same as Alt 3*
Sediment for Dewatering, LCY:	38,110	5,180	0	0	3,420	440	7,360	36,210	4,620	0	
Total Volume of Wet Material for Dewatering, LCY:	**38,110**	**21,243**	**0**	**817**	**3,420**	**440**	**7,360**	**36,210**	**4,620**	**3,533**	
Percent of Drying Agent, %:	4%	*Per Engineer*									
Total Volume of Wet Material and Drying Agent, LCY:	**39,634**	**22,093**	**0**	**850**	**3,557**	**458**	**7,654**	**37,658**	**4,805**	**3,674**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	7,654	42,368	7,495	22,481	
Total Volume of Wet Material for Stabilization/Dewatering, LCY:	38,110	21,243	0	817	3,420	440	7,360	36,210	4,620	3,533	
Post Excavation Confirmation Sampling											
Assumed SF per confirmation sample at excavation area:		900	*Per engineer*								
Assumed LF of excavation perimeter per confirmation sample:		30	*Per engineer*								
Perimeter of Excavation for Sampling, LF:	19,184	2,459	401	50	3,898	753	2,821	4,646	3,649	16,397	*Same as Alt 2*
Surface Area of Excavation for Sampling, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	*Same as Alt 2*
Number of Samples, EA:	**1,258**	**186**	**19**	**11**	**226**	**39**	**240**	**397**	**356**	**2,165**	

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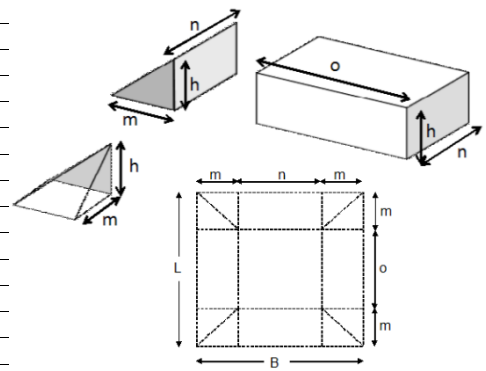
	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Restoration Volumes by Area											
Weight of Sediment Dredged for Backfill, TON:	64,787	8,806	0	0	5,814	748	12,512	61,557	7,854	0	**162,078**
Volume of Excavated Soil for Backfill, ECY:	12,867	15,935	354	653	3,646	534	0	3,763	2,146	17,868	**57,766**
Volume of Excavated Soil for Backfill, LCY:	17,871	22,132	492	907	5,064	742	0	5,227	2,981	24,817	**80,233**
Surface Area of Excavate Soil for Backfill, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	**2,774,089**

Onsite Containment Cell Construction

Assume cells are made up of two trapezoidal stockpiles with the each rectangular base equal to the footprint provided by the design engineer. The total height of the containment cell is the sum of the heights (h) of bottom stockpile and the top stockpile. The height of the berm is equal to half the total height.

Equations: *Volume = (1/3)*((2*m)^2)*h + 2*((1/2)*n*h*m) + 2*((1/2)*o*h*m) + n*h*o*

*Surface area = o*n + 2(sqrt(m^2 +h^2)*(L+o)/2) + 2(sqrt(m^2 +h^2)*(B+n)/2)*



	Onsite Cell B	**Onsite Cell A**	
Dimensions of Containment Cells			
Average Length, LF:	200	200	*Assumed per Figure*
Average Width, LF:	200	150	
Area of Footprint, SF:	146,000	30,000	*Assumed per Figure*
Perimeter, LF:	800	700	*Assumed per Figure*
Maximum Height, LF:	15	15	*Assumed per engineer, includes leachate, venting layer, base soil and topsoil layers*

	Horizontal		Vertical			
Slope:	2	to	1	=	50.0%	*Assumed*

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	Onsite Cell B		**Onsite Cell A**		
	Bottom	Top	Bottom	Top	
Length (L), LF:	200	200	200	200	
Width (B), LF:	200	200	150	150	
Maximum Height, LF:	7.5	7.5	7.5	7.5	
Height of Contaminated Material (h), LF:	6.5	4.5	6.5	4.5	*Excludes leachate, venting layer, base soil and topsoil layers*
m, LF:	13	9	13	9	
n, LF:	174	182	124	132	
o, LF:	174	182	174	182	
Capacity, CF:	227,665	164,286	166,890	121,311	
Capacity, CY:	8,433	6,085	6,182	4,493	
Max Capacity of Contaminated Material in Cell, CY:	**14,518**		**10,675**		
Approximate Surface Area of Cell Cover at Capacity, SF:	**42,075**		**31,803**		
Approximate Surface Area of Cell Liner at Capacity, SF:	**41,502**		**31,301**		

	Onsite Cell B	**Onsite Cell A**		
Site Preparation				
Clearing and Grubbing, SF:	146,000	30,000		
Ground improvement and/or Clearing and Grubbing, ACR:	**4**	**1**		
Selective Clearing and Grubbing, EA:	0	**30**	*Assume clearing of several bushes/trees in the area*	
Patching, SY:	0	**334**	*Assume patching asphalt footprint*	*10%*
Repave, SY:	0	**667**	*Assume repaving asphalt footprint*	*20%*
Construct Earthen Berm				
Height of Berm, LF:	7.5	7.5	*Assumed*	
Width of Berm, LF:	26	26		
Perimeter of Cell for Berm, LF:	800	700		
Volume of Soil for Berm, ECY:	**5,778**	**5,056**		
Volume of Soil for Berm, LCY:	**8,025**	**7,023**		
Install VLDPE Liner				
Assume an overlap of	*10%*	*10%*		
Install VLDPE Liner, SF:	45,653	34,432		

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	Onsite Cell B	Onsite Cell A	
Install Leachate Collection System			
Depth of Sand Bed, LF:	1	1	
Volume of Sand for Leachate System, CF:	30,276	21,576	*Assume leachate system only on the floor of the cell.*
Volume of Sand for Leachate System, ECY:	1,122	800	
Volume of Sand for Leachate System, LCY:	1,320	941	
Width of Entire Collection System of Pipes, LF:	200	150	
Distance between Pipes, LF:	50	50	*Per engineer*
Number of Pipe Segments, EA:	4	3	
Average Length of Pipe Segment, LF:	200	200	
Perforated Pipe Length, LF:	**800**	**600**	
Main Pipe length to Tank, LF:	**220**	**220**	*Assume additional 20 feet of width for piping to the tank*
Total Pipe Length, LF:	1,020	820	
Number of Tees, EA:	**4**	**3**	
Number of Elbows, EA:	**4**	**3**	
Pipe Diameter, IN:	**4**	**4**	*Assumed*
Pipe Diameter, LF:	0.34	0.34	
Volume of Pipe, CY:	3	3	
Total Volume of Sand for Leachate System, ECY:	**1,317**	**939**	
Total Volume of Sand for Leachate System, LCY:	**1,550**	**1,105**	
Install Geotextile as Barrier Layer.			
Surface Area for Getextile Barrier Layer, SF:	30,276	21,576	*Assume geotextile is just above the Leachate Collection System with a surface area equal to the floor of the cell.*
Spread and Consolidate Contaminated Materials			
Assume all Slag/Battery Material consolidated on-site, with Slag/Battery from Seawall and Margaret's Creek Sectors will be consolidated at the Onsite Cell B and the Slag/Battery from Western Jetty Sectors will be consolidated at the Onsite Cell A			
Max Capacity of Contaminated Material in Cell, ECY:	***14,518***	***10,675***	
Volume of Slag/Battery for Onsite Consolidation, LCY:	*6,074*	*4,994*	
Volume of Slag/Battery from Seawall, LCY:	**5,363**		
Volume of Slag/Battery from Margaret's Creek, LCY:	**711**		
Volume of Slag/Battery from Western Jetty, LCY:	**4,994**		
Install Geotextile as Barrier Layer.			
Surface Area for Getextile Barrier Layer, SF:	54,697	41,344	*Assume geotextile is just below the LLDPE and uses the same Surface Area of LLDPE Cap.*

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	Onsite Cell B	**Onsite Cell A**	
Install Gas Ventilation System			
Depth of Sand Bed, LF:	0.5	0.5	
Volume of Sand for Gas Venting Layer, CF:	27,349	20,672	*Assume gas ventilation system uses the same Surface Area of LLDPE Cap.*
Volume of Sand for Gas Venting Layer, ECY:	1,013	766	
Volume of Sand for Gas Venting Layer, LCY:	1,192	901	
Width of Entire Collection System of Pipes, LF:	200	150	
Distance between Pipes, LF:	50	50	*Per engineer*
Number of Pipe Segments, EA:	4	3	
Average Length of Pipe Segment, LF:	200	200	
Perforated Pipe Length, LF:	**800**	**600**	
Main Pipe length to Tank, LF:	**220**	**220**	*Assume additional 20 feet of width for piping to the tank*
Total Pipe Length, LF:	1,020	820	
Number of Tees, EA:	**4**	**3**	
Number of Elbows, EA:	**4**	**3**	
Pipe Diameter, IN:	**4**	**4**	
Pipe Diameter, LF:	0.34	0.34	
Volume of Pipe, CY:	3	3	
Total Volume of Sand for Gas Venting Layer, ECY:	**1,189**	**899**	
Total Volume of Sand for Gas Venting Layer, LCY:	**1,399**	**1,058**	
Install LLDPE Cap			
Assume an overlap of	30%	30%	
Surface Area for LLDPE Cap, SF:	**54,697**	**41,344**	
Install Geocomposite Drainage Layer			
Surface Area for Geocomposite Drainage Layer, SF:	54,697	41,344	*Assume geocomposite is just above the LLDPE and uses the same Surface Area of LLDPE Cap.*
Spread Base Soil (Sandy Loamy Material)			
Depth of Soil, LF:	2	2	
Volume of Sandy Loamy Material, CY:	4,052	3,063	*Assume soil surface area is the same Surface Area of LLDPE Cap.*
Volume of Sandy Loamy Material, ECY:	151	114	
Volume of Sandy Loamy Material, LCY:	210	159	
Topsoil and Hydroseed			
Depth of Soil, LF:	0.5	0.5	
Volume of Topsoil, CY:	1,013	766	*Assume soil surface area is the same Surface Area of LLDPE Cap.*
Volume of Topsoil, ECY:	38	29	
Volume of Topsoil, LCY:	53	41	
Hydroseed, SF:	54,697	41,344	

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	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Off-Site Disposal Volumes by Area											
Volume of Slag/Battery Casings, LCY:	0	0	0	0	0	0	0	0	0	0	
Weight of Slag/Battery Casings, TON:	0	0	0	0	0	0	0	0	0	0	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	7,654	42,368	7,495	22,481	
Weight of Soil and Dewatered Sediment for Disposal, TON:	83,587	38,925	675	1,280	12,176	1,692	11,482	63,553	11,243	33,722	
Waste Characterization Sampling, EA:	3,800	1,769	31	58	553	77	522	2,889	511	1,533	*Assume 22 Tons per Haul Truck*
Estimated percent split by volume to Hazardous Landfill, %:	25%	25%	25%	25%	25%	25%	20%	20%	20%	25%	*Per Engineer*
Volume for disposal as Hazardous Waste, LCY:	13,931	6,487	113	213	2,029	282	1,531	8,474	1,499	5,620	
Weight for disposal as Hazardous Waste, TON:	20,897	9,731	169	320	3,044	423	2,296	12,711	2,249	8,431	
Volume for disposal as Non-Hazardous Waste, LCY:	41,793	19,462	338	640	6,088	846	6,124	33,895	5,996	16,861	
Weight for disposal as Non-Hazardous Waste, TON:	62,690	29,194	506	960	9,132	1,269	9,186	50,842	8,994	25,292	
Number of Truckloads to Non-Hazardous Landfill according to productivity, EA:	2,850	1,327	24	44	416	58	418	2,312	409	1,150	*Assume 22 Tons per Haul Truck*
Transportation to Non-Hazardous Landfill according to productivity, HR:	5,700	2,654	48	88	832	116	836	4,624	818	2,300	*Assume 2 hour cycle time*

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Offsite Disposal Volumes by Area (Summary)

Slag/Battery Casings Removed from Seawall Areas, LCY:	0	
Slag/Battery Casings Removed from Seawall Areas, TON:	0	
Slag/Battery Casings Removed from Margaret's Creek, LCY:	0	
Slag/Battery Casings Removed from Margaret's Creek, TON:	0	
Slag/Battery Casings Removed from Jetty Areas, LCY:	0	
Slag/Battery Casings Removed from Jetty Areas, TON:	0	
Waste Characterization Sampling from Seawall Areas, EA:	**6,289**	*Assume 1 Sample per Truckload and 22 Tons per Truckload*
Non-Hazardous Soil from Seawall Areas, LCY:	69,166	
Non-Hazardous Soil from Seawall Areas, TON:	**103,751**	
Transportation,HR:	**9,438**	*Assume 2 hour cycle time*
Number of Truckloads, EA:	**4,719**	*Assume 22 Tons per Haul Truck*
Hazardous Soil from Seawall Areas, LCY:	**23,055**	
Hazardous Soil from Seawall Areas, TON:	**34,584**	
Waste Characterization Sampling from Margaret's Creek, EA:	**1,533**	*Assume 1 Sample per Truckload and 22 Tons per Truckload*
Non-Hazardous Soil from Margaret's Creek, LCY:	16,861	
Non-Hazardous Soil from Margaret's Creek, TON:	**25,292**	
Transportation,HR:	**2,300**	*Assume 2 hour cycle time*
Number of Truckloads, EA:	**1,150**	*Assume 22 Tons per Haul Truck*
Hazardous Soil from Margaret's Creek, LCY:	**5,620**	
Hazardous Soil from Margaret's Creek, TON:	**8,431**	
Waste Characterization Sampling from Jetty Areas, EA:	**3,922**	*Assume 1 Sample per Truckload and 22 Tons per Truckload*
Non-Hazardous Soil from Jetty Areas, LCY:	46,014	
Non-Hazardous Soil from Jetty Areas, TON:	**69,022**	
Transportation,HR:	**6,278**	*Assume 2 hour cycle time*
Number of Truckloads, EA:	**3,139**	*Assume 22 Tons per Haul Truck*
Hazardous Soil from Jetty Areas, LCY:	**11,504**	
Hazardous Soil from Jetty Areas, TON:	**17,256**	

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Annual O&M for Areas with MNR

Assumes a two person crew and a jon boat for the sampling. Assume visual inspection will be with an underwater video camera. Semi-annual for first five years, and Annually for next 25 years.

	Area 9	*Area 7*	Area 11	Totals	Comments
Surface Area for MNR, SF:	1,249,050	51,441	177,597		*Per engineer*
Assumed SF of Cap per Surface Water sample for analysis of Metals (total and dissolved):	20,000	20,000	20,000		*Per engineer*
Assumed SF of Cap per Sediment sample for analysis of Metals (total and dissolved):	20,000	20,000	20,000		*Per engineer*
Analysis of Metals (total and dissolved) per event, EA:	125	5	18		
Semi-annual Sampling					
Sampling events per year, EA:	2	2	2		
Analysis of Metals (total and dissolved) per year, EA:	250	10	36	**296**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	20	20	20	**60**	
Project Scientist Crew per year, HR:	160	160	160	**480**	
Annual Sampling					
Sampling events per year, EA:	1	1	1		
Analysis of Metals (total and dissolved) per year, EA:	125	5	18	**148**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	10	10	10	**30**	
Project Scientist Crew per year, HR:	80	80	80	**240**	

Onsite Cell Operation and Maintenance

Groundwater Monitoring - Well Installation

Assumed groundwater sampling frequency is quarterly for first two years, semi-annually for the next 3 years and yearly thereafter until the end of year 30

Number of Monitoring Wells, EA:	15	*Per engineer*
Depth, LF:	20	
Monitoring well construction, LF:	300	

Annual Sampling

Assumed yearly quantities for annual sampling.

Events per Year, EA:	1
Assumed number of samples per event, EA:	15
Analysis of Metals (total and dissolved) per Year, EA:	**15**
Event Duration, DAY:	3
Project Scientist Crew per event, DAY:	3
Project Scientist Crew per year, DAY:	3
Project Scientist per Year, HR:	**24**

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Onsite Cell Operation and Maintenance (continued)		
Semi-annual Sampling		
Assumed yearly quantities for semi-annually.		
Events per Year, EA:	2	
Assumed number of samples per event, EA:	15	
Analysis of Metals (total and dissolved) per Year, EA:	**30**	
Event Duration, DAY:	3	*Assumed*
Project Scientist Crew per event, DAY:	3	
Project Scientist Crew per year, DAY:	6	
Project Scientist per Year, HR:	**48**	
Quarterly Sampling		
Assumed yearly quantities for quarterly sampling.		
Events per Year, EA:	4	
Assumed number of samples per event, EA:	15	
Analysis of Metals (total and dissolved) per Year, EA:	**60**	
Event Duration, DAY:	3	*Assumed*
Project Scientist Crew per event, DAY:	3	
Project Scientist Crew per year, DAY:	12	
Project Scientist per Year, HR:	**96**	
Quarterly Inspections		
Assumed yearly quantities for quarterly inspections.		
Quarterly Inspections per Year, EA:	4	
Project Engineer per event, DAY:	2	*Assumed*
Project Engineer per year, HR:	**64**	
Semi-annual Inspections		
Assumed yearly quantities for quarterly inspections.		
Semi-annual Inspections per Year, EA:	2	
Project Engineer per event, DAY:	2	*Assumed*
Project Engineer per year, HR:	**32**	
Additional Inspections after Storm Events		
Assumed yearly quantities for inspections over duration of 30 years.		
Additional Inspections per Year, EA:	1.5	*Per engineer*
Project Engineer per event, DAY:	2	*Assumed*
Project Engineer per year, HR:	**24**	

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Onsite Cell Operation and Maintenance (continued)		
Leachate Pumping		
Leachate Pumping events per Year, EA:	12	*Assumed*
Tanker Truck per Event, HR:	4	*Assumed*
Driver per Event, HR:	4	
Pumping per Event, HR:	8	
Truck for Leachate Pumping per year, HR:	48	
Driver for Leachate Pumping per year, HR:	48	
Leachate Pumping per year, HR:	96	
Erosion Repair		
Erosion Repair per year, DAY:	4	*Assumed*
Erosion Repair per year, HR:	32	
Mowing and Snow Removal		
Snow Removal per year, EA:	1	*Per engineer*
Snow Removal per year, DAY:	1	*Assumed*
Snow Removal per year, HR:	8	
Mowing per year, EA:	1	*Per engineer*
Mowing, SF:	96,041	
Mowing per year, SF:	97,000	
Mowing per year, MSF:	97	
Additional Restoration Quantities		
Seawall Reconstruction using Capstone, TON:	**7,500**	*Per CCI Vendor Quote*
Seawall Reconstruction using Corestone, TON:	**15,000**	*Per CCI Vendor Quote*
Jetty Reconstruction using Capstone, TON:	**5,333**	*Per CCI Vendor Quote*

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Description: Alternative 5 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations).

Alternative 5 also includes capping of a select portion of the Western Jetty Area 8 and monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 5 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 2 and Cell 3 at Margaret's Creek and Cell 1 at Western Jetty). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells, cap and areas for MNR will require long-term maintenance and monitoring. This sheet presents quantity take-off calculations for input to MII software.

Alternative 5 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring

Five Year Site Review (GENERAL COMPONENT OF ALL SOIL CONTAMINATION ALTERNATIVES)

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Institutional Controls

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Mobilization and Demobilization/Decontamination

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Access Road

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Monitoring of Groundwater and Surface Water

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

General Conditions

Reduction in Time compared to Alternative 4, MO:	12	
Anticipated Project Duration, MO:	13	

Project Dedicated Supervisory Staff

Project Manager, HR:	1,127	*Assumed per CCI estimate*
Project Engineer, HR:	2,253	*Assumed per CCI estimate*
General Superintendent, HR:	2,253	*Assumed per CCI estimate*
Admin, HR:	200	*Per QTO-01*
Field Engineer, HR:	100	*Per QTO-01*
Safety Engineer, HR:	200	*Per QTO-01*
Per Diem, DAY:	770	*Rounded up to nearest ten*

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Description: Alternative 5 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Temporary Construction Facilities and Dedicated Equipment

Office Trailer, MO:	13	
Storage Box, MO:	13	
Phone, Office Supplies, Electricity, MO:	13	
Portable Toilet, MO:	26	*Assume two toilets per duration of office trailer use*
Truck for duration of project, EA:	3	*Per QTO-01*
Truck, HR:	5,633	
PM/Super Truck, HR:	30	*Per QTO-01*
Dumpster, EA:	120	*Per QTO-01*
Cell Phone, HR:	6,133	*Assumed per CCI estimate*

Sediment and Erosion Control Measures

Portable Coffer Dam Construction/Rental, Month 1, EA:	1	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 2, EA:	2	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 3+, EA:	10	*Per Engineer*
Installation Crew, DAY:	36	*Asumed per vendor*
Installation Crew Trips, EA:	6	*Asumed per vendor*
Sandbags, EA:	4,600	*Asumed per vendor*
Weight of Sand per Sandbag, LBS:	50	*Asumed per vendor*
Total Sand, LCY:	89	
Length of Silt Fencing along either side of Access Roads, LF:	27,120	
Length of Silt Fencing around the perimeter of Cells, LF:	3,490	

Removal of Slag/Battery Casings, Excavation of Soil and Dredging of Sediment by Area

Assume all contaminated material will be removed except soil and sediment beneath the Cap in Area 8 and sediment left in place for MNR in Areas (7,9 and 11).

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
MNR											
Area of Surface Sediment, SF:	0	0	0	0	0	0	51,441	0	177,597	1,249,050	
Volume of Surface Sediment, BCY:	0	0	0	0	0	0	3,811	0	13,156	92,523	
Volume of Subsurface Sediment, BCY:	0	0	0	0	0	0	527	0	0	3,052	
Capping											
Area of Surface Sediment, SF:	0	0	0	0	0	0	0	81,608	0	0	
Volume of Surface Sediment, BCY:	0	0	0	0	0	0	0	6,046	0	0	
Volume of Subsurface Sediment, BCY:	0	0	0	0	0	0	0	4,314	0	0	
Removal of Slag/Battery Casings											
Volume of Slag/Battery Casings, LCY:	**5,295**	**59**	**0**	**0**	**9**	**0**	**0**	**4,994**	**0**	**711**	

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Description: Alternative 5 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Excavation of Soil by Area											
Volume of Surface Soil, BCY:	11,131	3,085	354	0	3,646	534	0	2,935	0	15,042	
Volume of Surface Soil, LCY:	13,914	3,857	443	0	4,558	668	0	3,669	0	18,803	*Rounded up to ones*
Volume of Subsurface Soil, BCY:	1,736	12,850	0	653	0	0	0	828	2,146	2,826	
Volume of Subsurface Soil, LCY:	2,170	16,063	0	817	0	0	0	1,035	2,683	3,533	*Rounded up to ones*
Total Volume of Soil, BCY:	**12,867**	**15,935**	**354**	**653**	**3,646**	**534**	**0**	**3,763**	**2,146**	**17,868**	
Volume of Soil, LCY:	16,090	19,920	450	820	4,560	670	0	4,710	2,690	22,340	*Rounded up to tens*
Dredging of Sediment by Area											
Volume of Surface Sediment, BCY:	30,105	3,793	0	0	2,734	346	5,883	7,123	2,174	0	*Minus MNR and Capping*
Volume of Surface Sediment, LCY:	37,640	4,750	0	0	3,420	440	7,360	8,910	2,720	0	*Rounded up to tens*
Volume of Subsurface Sediment, BCY:	381	347	0	0	0	0	0	11,482	1,516	0	*Minus MNR and Capping*
Volume of Subsurface Sediment, LCY:	480	440	0	0	0	0	0	14,360	1,900	0	*Rounded up to tens*
Total Volume of Sediment, BCY:	30,486	4,140	0	0	2,734	346	5,883	18,605	3,690	0	
Total Volume of Sediment, LCY:	**38,110**	**5,180**	**0**	**0**	**3,420**	**440**	**7,360**	**23,260**	**4,620**	**0**	***Rounded up to tens***
Material Stabilization											
Subsurface Soil for Dewatering, LCY:	0	16,063	0	817	0	0	0	0	0	3,533	*Same as Alt 3*
Sediment for Dewatering, LCY:	38,110	5,180	0	0	3,420	440	7,360	23,260	4,620	0	
Total Volume of Wet Material for Dewatering, LCY:	**38,110**	**21,243**	**0**	**817**	**3,420**	**440**	**7,360**	**23,260**	**4,620**	**3,533**	
Percent of Drying Agent, %:	4%	*Per Engineer*									
Total Volume of Wet Material and Drying Agent, LCY:	**39,634**	**22,093**	**0**	**850**	**3,557**	**458**	**7,654**	**24,190**	**4,805**	**3,674**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	7,654	28,900	7,495	22,481	
Total Volume of Wet Material for Stabilization/Dewatering, LCY:	38,110	21,243	0	817	3,420	440	7,360	23,260	4,620	3,533	
Post Excavation Confirmation Sampling											
Assumed SF per confirmation sample at excavation area:		900	*Per engineer*								
Assumed LF of excavation perimeter per confirmation sample:		30	*Per engineer*								

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	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Perimeter of Excavation for Sampling, LF:	19,184	2,459	401	50	3,898	753	2,821	4,646	3,649	16,397	*Same as Alt 2*
Surface Area of Excavation for Sampling, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	*Same as Alt 2*
Number of Samples, EA:	**1,258**	**186**	**19**	**11**	**226**	**39**	**240**	**397**	**356**	**2,165**	
Restoration Volumes by Area											
Weight of Sediment Dredged for Backfill, TON:	64,787	8,806	0	0	5,814	748	12,512	39,542	7,854	0	**140,063**
Volume of Excavated Soil for Backfill, ECY:	12,867	15,935	354	653	3,646	534	0	3,763	2,146	17,868	**57,766**
Volume of Excavated Soil for Backfill, LCY:	17,871	22,132	492	907	5,064	742	0	5,227	2,981	24,817	**80,233**
Surface Area of Excavate Soil for Backfill, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	**2,774,089**

Construction and Deployment of Triton Marine Mattress and Reactive Core Mat for Cap at Area 8

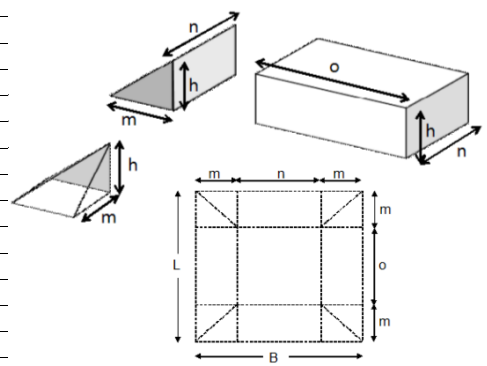
Area for Capping, SF:	81,608	
Troton Marine Mattress, SF:	130	*Per Vendor estimated quantity*
Troton Marine Mattress Thickness, LF:	0.5	*Per Vendor estimated quantity*
Triton Marine Mattresses, EA:	628	
Troton Marine Mattress, CY:	1,511	
RipRap for Triton Mattress, TON:	1,904	*Per Vendor estimated quantity*
Truckloads for transportation of Reactive Core Mats, EA:	3	*Per Vendor estimated quantity*
Truckloads for transportation of Marine Mattresses, EA:	6	*Per Vendor estimated quantity*

Onsite Containment Cell Construction

Assume cells are made up of two trapezoidial stockpiles with the each rectangular base equal to the footprint provided by the design engineer. The total height of the containment cell is the sum of the heights (h) of bottom stockpile and the top stockpile. The height of the berm is equal to half the total height.

Equations: *Volume = (1/3)*((2*m)^2)*h + 2*((1/2)*n*h*m) + 2*((1/2)*o*h*m) + n*h*o*

*Surface area = o*n + 2(sqrt(m^2+h^2)*(L+o)/2) + 2(sqrt(m^2+h^2)*(B+n)/2)*



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	Onsite Cell #3	Onsite Cell #2	Onsite Cell #1	
Dimensions of Containment Cells				
Average Length, LF:	450	425	200	*Assumed per Figure*
Average Width, LF:	325	195	150	
Area of Footprint, SF:	146,000	82,600	30,000	*Assumed per Figure*
Perimeter, LF:	1,550	1,240	700	*Assumed per Figure*
Maximum Height, LF:	15	15	15	*Assumed per engineer, includes leachate, venting layer, base soil and topsoil layers*

	Horizontal		Vertical			
Slope:	2	to	1	=	50.0%	*Assumed*

Onsite Containment Cell Construction (continued)

	Onsite Cell #3		Onsite Cell #2		Onsite Cell #1		
	Bottom	Top	Bottom	Top	Bottom	Top	
Length (L), LF:	450	450	425	425	200	200	
Width (B), LF:	325	325	195	195	150	150	
Maximum Height, LF:	7.5	7.5	7.5	7.5	7.5	7.5	
Height of Contaminated Material (h), LF:	6.5	4.5	6.5	4.5	6.5	4.5	*Excludes leachate, venting layer, base soil and topsoil layers*
m, LF:	13	9	13	9	13	9	
n, LF:	299	307	169	177	124	132	
o, LF:	424	432	399	407	174	182	
Capacity, CF:	886,603	627,224	487,763	348,314	166,890	121,311	
Capacity, CY:	32,838	23,231	18,066	12,901	6,182	4,493	
Max Capacity of Contaminated Material in Cell, CY:	**56,069**		**30,967**		**10,675**		
Approximate Surface Area of Cell Cover at Capacity, SF:	**150,361**		**86,144**		**31,803**		
Approximate Surface Area of Cell Liner at Capacity, SF:	**149,258**		**85,261**		**31,301**		

	Onsite Cell #3	Onsite Cell #2	Onsite Cell #1		
Site Preparation					
Clearing and Grubbing, SF:	146,000	82,600	30,000		
Ground improvement and/or Clearing and Grubbing, ACR:	**4**	**2**	**1**		
Selective Clearing and Grubbing, EA:	0	0	**30**	*Assume clearing of several bushes/trees in the area*	
Patching, SY:	0	0	**334**	*Assume patching asphalt footprint*	*10%*
Repave, SY:	0	0	**667**	*Assume repaving asphalt footprint*	*20%*

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	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Construct Earthen Berm				
Height of Berm, LF:	7.5	7.5	7.5	*Assumed*
Width of Berm, LF:	26	26	26	
Perimeter of Cell for Berm, LF:	1,550	1,240	700	
Volume of Soil for Berm, ECY:	**11,195**	**8,956**	**5,056**	
Volume of Soil for Berm, LCY:	**15,549**	**12,439**	**7,023**	
Install VLDPE Liner				
Assume an overlap of	*10%*	*10%*	*10%*	
Install VLDPE Liner, SF:	164,185	93,787	34,432	
Install Leachate Collection System				
Depth of Sand Bed, LF:	1	1	1	
Volume of Sand for Leachate System, CF:	126,776	67,431	21,576	*Assume leachate system only on the floor of the cell.*
Volume of Sand for Leachate System, ECY:	4,696	2,498	800	
Volume of Sand for Leachate System, LCY:	5,525	2,939	941	
Width of Entire Collection System of Pipes, LF:	325	195	150	
Distance between Pipes, LF:	50	50	50	*Per engineer*
Number of Pipe Segments, EA:	7	4	3	
Average Length of Pipe Segment, LF:	450	425	200	
Perforated Pipe Length, LF:	**3,150**	**1,700**	**600**	
Main Pipe length to Tank, LF:	**470**	**445**	**220**	*Assume additional 20 feet of width for piping to the tank*
Total Pipe Length, LF:	3,620	2,145	820	
Number of Tees, EA:	**7**	**4**	**3**	
Number of Elbows, EA:	**7**	**4**	**3**	
Pipe Diameter, IN:	**4**	**4**	**4**	*Assumed*
Pipe Diameter, LF:	0.34	0.34	0.34	
Volume of Pipe, CY:	12	7	3	
Total Volume of Sand for Leachate System, ECY:	**5,513**	**2,932**	**939**	
Total Volume of Sand for Leachate System, LCY:	**6,486**	**3,450**	**1,105**	
Install Geotextile as Barrier Layer.				*Assume geotextile is just above the Leachate Collection System with a surface area equal to the floor of the cell.*
Surface Area for Getextile Barrier Layer, SF:	126,776	67,431	21,576	

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Description: Alternative 5 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Capping, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Spread and Consolidate Contaminated Materials

All sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell #1 to the capacity of the containment cell and the remaining volumes will be disposed off-site. The contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek Cells #2 and #3 to the capacity of the containment cells and the remaining volumes will be disposed off-site.

	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Max Capacity of Contaminated Material in Cell, ECY:	*56,069*	*30,967*	*10,675*	
Total Slag/Battery Casings Removed, LCY:	*4,009*	*2,065*	*4,994*	*Estimated percent split by volume to Cell 3, %:* 66%
Total Slag/Battery Casings Removed, ECY:	*4,009*	*2,065*	*4,994*	*Per QTO-01 Calculations*
Total Soil and Dewatered Sediment Removed, LCY:	*75,704*	*38,999*	*44,050*	*Per QTO-01 Calculations*
Total Soil and Dewatered Sediment Removed, ECY:	*54,507*	*28,079*	*31,716*	*Per QTO-01 Calculations*
Total Material, LCY:	79,713	41,064	49,044	
Total Material, ECY:	58,515	30,144	36,710	
Volume of Slag/Battery for Onsite Consolidation, ECY:	4,009	2,065	4,994	*Assume all Slag/Battery Material consolidated on-site.*
Volume of Soil and Dewatered Sediment for Onsite Consolidation, ECY:	52,060	28,079	5,681	*Assume onsite consolidation to maximum cell capacity, and remaining volume is for offsite disposal.*
Total Volume for Onsite Disposal, ECY:	**56,069**	**30,145**	**10,675**	
Volume of Slag/Battery for Onsite Consolidation, LCY:	4,009	2,065	4,994	
Volume of Soil and Dewatered Sediment for Onsite Consolidation, LCY:	72,306	38,999	7,890	
Volume of Slag/Battery for Onsite Consolidation, LCY:	6,074		4,994	
Volume of Soil and Dewatered Sediment for Onsite Consolidation, LCY:	111,305		7,890	
	Sewall Sector	**Margaret's Creek Sector**	**Western Jetty Sector**	
Volume of Slag/Battery, LCY:	**5,363**	**711**	**4,994**	
Volume of Soil and Dewatered Sediment for Onsite Disposal, LCY:	**88,824**	**22,481**	**7,890**	*Assume all of Margaret's Creek Soil and Dewatered Sediment will be disposed of onsite at the Margaret's Creek Containment Cells.*
	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Volume of Slag/Battery for Offsite Disposal, LCY:	0		0	
Volume of Soil and Dewatered Sediment for Offsite Disposal, LCY:	3,398		36,159	
Install Geotextile as Barrier Layer.				
Surface Area for Getextile Barrier Layer, SF:	195,470	111,988	41,344	*Assume geotextile is just below the LLDPE and uses the same Surface Area of LLDPE Cap.*

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	Onsite Cell #3	Onsite Cell #2	Onsite Cell #1	
Install Gas Ventilation System				
Depth of Sand Bed, LF:	0.5	0.5	0.5	
Volume of Sand for Gas Venting Layer, CF:	97,735	55,994	20,672	
Volume of Sand for Gas Venting Layer, ECY:	3,620	2,074	766	*Assume gas ventilation system uses the same Surface Area of LLDPE Cap.*
Volume of Sand for Gas Venting Layer, LCY:	4,259	2,440	901	
Width of Entire Collection System of Pipes, LF:	325	195	150	
Distance between Pipes, LF:	50	50	50	*Per engineer*
Number of Pipe Segments, EA:	7	4	3	
Average Length of Pipe Segment, LF:	450	425	200	
Perforated Pipe Length, LF:	**3,150**	**1,700**	**600**	
Main Pipe length to Tank, LF:	**470**	**445**	**220**	*Assume additional 20 feet of width for piping to the tank*
Total Pipe Length, LF:	3,620	2,145	820	
Number of Tees, EA:	**7**	**4**	**3**	
Number of Elbows, EA:	**7**	**4**	**3**	
Install Gas Ventilation System (continued)				
Pipe Diameter, IN:	**4**	**4**	**4**	
Pipe Diameter, LF:	0.34	0.34	0.34	
Volume of Pipe, CY:	12	7	3	
Total Volume of Sand for Gas Venting Layer, ECY:	**4,247**	**2,433**	**899**	
Total Volume of Sand for Gas Venting Layer, LCY:	**4,997**	**2,863**	**1,058**	
Install LLDPE Cap				
Assume an overlap of	30%	30%	30%	
Surface Area for LLDPE Cap, SF:	**195,470**	**111,988**	**41,344**	
Install Geocomposite Drainage Layer				
Surface Area for Geocomposite Drainage Layer, SF:	**195,470**	**111,988**	**41,344**	*Assume geocomposite is just above the LLDPE and uses the same Surface Area of LLDPE Cap.*
Spread Base Soil (Sandy Loamy Material)				
Depth of Soil, LF:	2	2	2	
Volume of Sandy Loamy Material, CY:	14,479	8,295	3,063	
Volume of Sandy Loamy Material, ECY:	**537**	**308**	**114**	*Assume soil surface area is the same Surface Area of LLDPE Cap.*
Volume of Sandy Loamy Material, LCY:	**746**	**428**	**159**	
Topsoil and Hydroseed				
Depth of Soil, LF:	0.5	0.5	0.5	
Volume of Topsoil, CY:	3,620	2,074	766	
Volume of Topsoil, ECY:	**135**	**77**	**29**	*Assume soil surface area is the same Surface Area of LLDPE Cap.*
Volume of Topsoil, LCY:	**188**	**107**	**41**	
Hydroseed, SF:	**195,470**	**111,988**	**41,344**	

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Offsite Disposal Volumes by Area	**Sewall Sector**	**Margaret's Creek Sector**	**Western Jetty Sector**	
Volume of Slag/Battery Casings for Offsite Disposal, LCY:	**0**	**0**	**0**	
Weight of Slag/Battery Casings for Offsite Disposal, TON:	**0**	**0**	**0**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	*92,221*	*22,481*	*44,050*	
Volume of Slag/Battery for Offsite Disposal, LCY:	*0*		*0*	*Remaining Volume Removed after Waste Consolidation*
Volume of Soil and Dewatered Sediment for Offsite Disposal, LCY:	*3,398*		*36,159*	*Remaining Volume Removed after Waste Consolidation*
Total Volume of Soil and Dewatered Sediment for Offsite Disposal, LCY:	3,398	0	36,159	
Estimated percent split by volume to Hazardous Landfill, %:	25%	20%	20%	*Per Engineer*
Total Hazardous Volume of Soil and Dewatered Sediment, LCY:	23,055	4,496	8,810	
Total NonHazardous Volume of Soil and Dewatered Sediment, LCY:	69,166	17,985	35,240	
Waste Characterization Sampling, EA:	**155**	**0**	**1,644**	*Assume 1 Sample per Truckload and 22 Tons per Truckload for Offsite Disposal*
Volume for disposal as Non-Hazardous Waste, LCY:	**3,398**	**0**	**35,240**	*Assume the maximum amount of hazardous waste will be consolidated on-site*
Weight for disposal as Non-Hazardous Waste, TON:	**5,097**	**0**	**52,860**	
Number of Truckloads to Non-Hazardous Landfill according to productivity, EA:	**232**	**0**	**2,403**	*Assume 22 Tons per Haul Truck*
Transportation to Non-Hazardous Landfill according to productivity, HR:	**464**	**0**	**4,806**	*Assume 2 hour cycle time*
Volume for disposal as Hazardous Waste, LCY:	**0**	**0**	**920**	
Weight for disposal as Hazardous Waste, TON:	**0**	**0**	**1,379**	

Onsite Cell Operation and Maintenance

Assume Common Component of Alternatives 4 through 6. Mowing is per SF, so is variable across alternatives with the cell dimensions.

Mowing and Snow Removal

Snow Removal per year, EA:	1	*Per engineer*
Snow Removal per year, DAY:	1	*Assumed*
Snow Removal per year, HR:	8	
Mowing per year, EA:	1	*Per engineer*
Mowing, SF:	348,802	
Mowing per year, SF:	349,000	
Mowing per year, MSF:	349	

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Annual O&M of Cap at Area 8

Assume a two person crew and a jon boat for the sampling. Assume visual inspection will be with an underwater video camera. Semi-annual for first five years, and Annually for next 25 years

Surface Area of Cap, SF:	81,608	
Assumed SF of Cap per Surface Water sample for analysis of Metals (total and dissolved):	10,000	*Per engineer*
Assumed SF of Cap per Sediment sample for analysis of Metals (total and dissolved):	10,000	*Per engineer*
Analysis of Metals (total and dissolved) per event, EA:	16	
Semi-annual Sampling per Year		
Sampling events per year, EA:	2	
Analysis of Metals (total and dissolved) per year, EA:	**33**	
Event Duration, DAY:	10	*Assumed*
Project Scientist Crew per year, DAY:	**20**	
Project Scientist Crew per year, HR:	**160**	
Annual Sampling		
Sampling events per year, EA:	1	
Analysis of Metals (total and dissolved) per year, EA:	**16**	
Event Duration, DAY:	10	*Assumed*
Project Scientist Crew per year, DAY:	**10**	
Project Scientist Crew per year, HR:	**80**	

Annual O&M for Areas with MNR

Assumes a two person crew and a jon boat for the sampling. Assume visual inspection will be with an underwater video camera. Semi-annual for first five years, and Annually for next 25 years.

	Area 9	***Area 7***	**Area 11**	**Totals**	**Comments**
Surface Area for MNR, SF:	1,249,050	51,441	177,597		*Per engineer*
Assumed SF per Surface Water sample for analysis of Metals (total and dissolved):	20,000	20,000	20,000		*Per engineer*
Assumed SF of Cap per Sediment sample for analysis of Metals (total and dissolved):	20,000	20,000	20,000		*Per engineer*
Analysis of Metals (total and dissolved) per event, EA:	125	5	18		
Semi-annual Sampling					
Sampling events per year, EA:	2	2	2		
Analysis of Metals (total and dissolved) per year, EA:	250	10	36	**296**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	20	20	20	**60**	
Project Scientist Crew per year, HR:	160	160	160	**480**	

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	Area 9	*Area 7*	Area 11	Totals	Comments
Annual Sampling					
Sampling events per year, EA:	1	1	1		
Analysis of Metals (total and dissolved) per year, EA:	125	5	18	**148**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	10	10	10	**30**	
Project Scientist Crew per year, HR:	80	80	80	**240**	

Additional Restoration Quantities

Seawall Reconstruction using Capstone, TON:	**7,500**	*Per CCI Vendor Quote*
Seawall Reconstruction using Corestone, TON:	**15,000**	*Per CCI Vendor Quote*
Jetty Reconstruction using Capstone, TON:	**5,333**	*Per CCI Vendor Quote*

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Description: Alternative 6 includes common components (five year site reviews, institutional controls, mobilization, demobilization and decontamination, construction of access roads, and monitoring of groundwater and surface water) and alternative specific site activities, including removal of slag and battery casings; excavation of contaminated surface and subsurface soil; dredging of contaminated sediments; dewatering of sediment and applicable subsurface soils; post excavation confirmation sampling; disposal of contaminated materials; and site restoration (seawall and jetty reconstruction and backfilling excavations).

Alternative 6 also includes monitored natural recovery (MNR) of select portions of Areas 7, 9 and 11. Disposal of contaminated materials for Alternative 6 involves both offsite disposal and on-site consolidation at three (3) engineered containment cells (Cell 2 and Cell 3 at Margaret's Creek and Cell 1 at Western Jetty). It is assumed that all sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell to the capacity of the containment cell and the remaining volumes will be disposed off-site. The remaining contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek cells to the capacity of the containment cells and the remaining volumes will be disposed off-site. The engineered containment cells and areas for MNR will require long-term maintenance and monitoring. This sheet presents quantity take-off calculations for input to MII software.

Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring

Five Year Site Review (GENERAL COMPONENT OF ALL SOIL CONTAMINATION ALTERNATIVES)

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Institutional Controls

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Mobilization and Demobilization/Decontamination

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Access Road

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

Monitoring of Groundwater and Surface Water

Common Component for Alternatives 2, 3, 4, 5 and 6. See QTO-01.

General Conditions

Reduction in Time compared to Alternative 4, MO:	12	
Anticipated Project Duration, MO:	13	

Project Dedicated Supervisory Staff

Project Manager, HR:	1,127	*Assumed per CCI estimate*
Project Engineer, HR:	2,253	*Assumed per CCI estimate*
General Superintendent, HR:	2,253	*Assumed per CCI estimate*
Admin, HR:	200	*Per QTO-01*
Field Engineer, HR:	100	*Per QTO-01*
Safety Engineer, HR:	200	*Per QTO-01*
Per Diem, DAY:	770	*Rounded up to nearest ten*

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Temporary Construction Facilities and Dedicated Equipment

Office Trailer, MO:	13	
Storage Box, MO:	13	
Phone, Office Supplies, Electricity, MO:	13	
Portable Toilet, MO:	26	*Assume two toilets per duration of office trailer use*
Truck for duration of project, EA:	3	*Per QTO-01*
Truck, HR:	5,633	
PM/Super Truck, HR:	30	*Per QTO-01*
Dumpster, EA:	120	*Per QTO-01*
Cell Phone, HR:	6,133	*Assumed per CCI estimate*

Sediment and Erosion Control Measures

Portable Coffer Dam Construction/Rental, Month 1, EA:	1	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 2, EA:	2	*Per Engineer*
Portable Coffer Dam Construction/Rental, Month 3+, EA:	10	*Per Engineer*
Installation Crew, DAY:	36	*Asumed per vendor*
Installation Crew Trips, EA:	6	*Asumed per vendor*
Sandbags, EA:	4,600	*Asumed per vendor*
Weight of Sand per Sandbag, LBS:	50	*Asumed per vendor*
Total Sand, LCY:	89	
Length of Silt Fencing along either side of Access Roads, LF:	27,120	
Length of Silt Fencing around the perimeter of Cells, LF:	3,490	

Removal of Slag/Battery Casings, Excavation of Soil and Dredging of Sediment by Area

Assume all contaminated material will be removed except soil and sediment beneath the Cap in Area 8 and sediment left in place for MNR in Areas (7,9 and 11).

	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
MNR											
Area of Surface Sediment, SF:	0	0	0	0	0	0	51,441	0	177,597	1,249,050	
Volume of Surface Sediment, BCY:	0	0	0	0	0	0	3,811	0	13,156	92,523	
Volume of Subsurface Sediment, BCY:	0	0	0	0	0	0	527	0	0	3,052	
Removal of Slag/Battery Casings											
Volume of Slag/Battery Casings, LCY:	**5,295**	**59**	**0**	**0**	**9**	**0**	**0**	**4,994**	**0**	**711**	
Excavation of Soil by Area											
Volume of Surface Soil, BCY:	11,131	3,085	354	0	3,646	534	0	2,935	0	15,042	
Volume of Surface Soil, LCY:	13,914	3,857	443	0	4,558	668	0	3,669	0	18,803	*Rounded up to ones*

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	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Excavation of Soil by Area											
Volume of Subsurface Soil, BCY:	1,736	12,850	0	653	0	0	0	828	2,146	2,826	
Volume of Subsurface Soil, LCY:	2,170	16,063	0	817	0	0	0	1,035	2,683	3,533	*Rounded up to ones*
Total Volume of Soil, BCY:	**12,867**	**15,935**	**354**	**653**	**3,646**	**534**	**0**	**3,763**	**2,146**	**17,868**	
Volume of Soil, LCY:	16,090	19,920	450	820	4,560	670	0	4,710	2,690	22,340	*Rounded up to tens*
Dredging of Sediment by Area											
Volume of Surface Sediment, BCY:	30,105	3,793	0	0	2,734	346	5,883	13,169	2,174	0	*Minus MNR*
Volume of Surface Sediment, LCY:	37,640	4,750	0	0	3,420	440	7,360	16,470	2,720	0	*Rounded up to tens*
Volume of Subsurface Sediment, BCY:	381	347	0	0	0	0	0	15,796	1,516	0	*Minus MNR*
Volume of Subsurface Sediment, LCY:	480	440	0	0	0	0	0	19,750	1,900	0	*Rounded up to tens*
Total Volume of Sediment, BCY:	30,486	4,140	0	0	2,734	346	5,883	28,965	3,690	0	
Total Volume of Sediment, LCY:	**38,110**	**5,180**	**0**	**0**	**3,420**	**440**	**7,360**	**36,210**	**4,620**	**0**	***Rounded up to tens***
Material Stabilization											
Subsurface Soil for Dewatering, LCY:	0	16,063	0	817	0	0	0	0	0	3,533	*Same as Alt 3*
Sediment for Dewatering, LCY:	38,110	5,180	0	0	3,420	440	7,360	36,210	4,620	0	
Total Volume of Wet Material for Dewatering, LCY:	**38,110**	**21,243**	**0**	**817**	**3,420**	**440**	**7,360**	**36,210**	**4,620**	**3,533**	
Percent of Drying Agent, %:	4%	*Per Engineer*									
Total Volume of Wet Material and Drying Agent, LCY:	**39,634**	**22,093**	**0**	**850**	**3,557**	**458**	**7,654**	**37,658**	**4,805**	**3,674**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	55,724	25,950	450	853	8,117	1,128	7,654	42,368	7,495	22,481	
Total Volume of Wet Material for Stabilization/Dewatering, LCY:	38,110	21,243	0	817	3,420	440	7,360	36,210	4,620	3,533	
Post Excavation Confirmation Sampling											
Assumed SF per confirmation sample at excavation area:		900	*Per engineer*								
Assumed LF of excavation perimeter per confirmation sample:		30	*Per engineer*								
Perimeter of Excavation for Sampling, LF:	19,184	2,459	401	50	3,898	753	2,821	4,646	3,649	16,397	*Same as Alt 2*
Surface Area of Excavation for Sampling, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	*Same as Alt 2*
Number of Samples, EA:	**1,258**	**186**	**19**	**11**	**226**	**39**	**240**	**397**	**356**	**2,165**	

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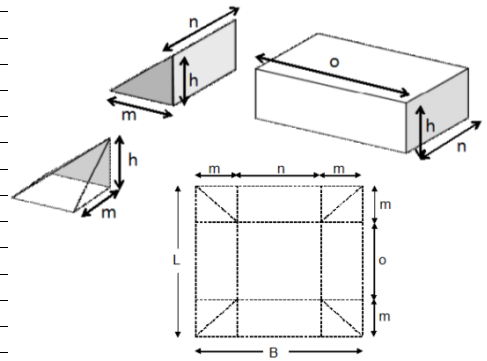
	Seawall Sector Area 1	***Seawall Sector Area 2***	***Seawall Sector Area 3***	***Seawall Sector Area 4***	***Seawall Sector Area 5***	***Seawall Sector Area 6***	***Jetty Sector Area 7***	***Jetty Sector Area 8***	***Jetty Sector Area 11***	***Margaret's Creek Sector Area 9***	***Comments***
Restoration Volumes by Area											
Weight of Sediment Dredged for Backfill, TON:	64,787	8,806	0	0	5,814	748	12,512	61,557	7,854	0	**162,078**
Volume of Excavated Soil for Backfill, ECY:	12,867	15,935	354	653	3,646	534	0	3,763	2,146	17,868	**57,766**
Volume of Excavated Soil for Backfill, LCY:	17,871	22,132	492	907	5,064	742	0	5,227	2,981	24,817	**80,233**
Surface Area of Excavate Soil for Backfill, SF:	556,671	92,838	4,768	7,742	86,109	11,859	130,859	217,382	210,149	1,455,712	**2,774,089**

Onsite Containment Cell Construction

Assume cells are made up of two trapezoidial stockpiles with the each rectangular base equal to the footprint provided by the design engineer. The total height of the containment cell is the sum of the heights (h) of bottom stockpile and the top stockpile. The height of the berm is equal to half the total height.

Equations: *Volume = (1/3)*((2*m)^2)*h + 2*((1/2)*n*h*m) + 2*((1/2)*o*h*m) + n*h*o*

*Surface area = o*n + 2(sqrt(m^2+h^2)*(L+o)/2) + 2(sqrt(m^2+h^2)*(B+n)/2)*



	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Dimensions of Containment Cells				
Average Length, LF:	450	425	200	*Assumed per Figure*
Average Width, LF:	325	195	150	
Area of Footprint, SF:	146,000	82,600	30,000	*Assumed per Figure*
Perimeter, LF:	1,550	1,240	700	*Assumed per Figure*
Maximum Height, LF:	15	15	15	*Assumed per engineer, includes leachate, venting layer, base soil and topsoil layers*

	Horizontal		Vertical			
Slope:	2	to	1	=	50.0%	*Assumed*

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Onsite Containment Cell Construction (continued)

	Onsite Cell #3		Onsite Cell #2		Onsite Cell #1		
	Bottom	Top	Bottom	Top	Bottom	Top	
Length (L), LF:	450	450	425	425	200	200	
Width (B), LF:	325	325	195	195	150	150	
Maximum Height, LF:	7.5	7.5	7.5	7.5	7.5	7.5	
Height of Contaminated Material (h), LF:	6.5	4.5	6.5	4.5	6.5	4.5	*Excludes leachate, venting layer, base soil and topsoil layers*
m, LF:	13	9	13	9	13	9	
n, LF:	299	307	169	177	124	132	
o, LF:	424	432	399	407	174	182	
Capacity, CF:	886,603	627,224	487,763	348,314	166,890	121,311	
Capacity, CY:	32,838	23,231	18,066	12,901	6,182	4,493	
Max Capacity of Contaminated Material in Cell, CY:	**56,069**		**30,967**		**10,675**		
Approximate Surface Area of Cell Cover at Capacity, SF:	**150,361**		**86,144**		**31,803**		
Approximate Surface Area of Cell Liner at Capacity, SF:	**149,258**		**85,261**		**31,301**		

	Onsite Cell #3	Onsite Cell #2	Onsite Cell #1		
Site Preparation					
Clearing and Grubbing, SF:	146,000	82,600	30,000		
Ground improvement and/or Clearing and Grubbing, ACR:	**4**	**2**	**1**		
Selective Clearing and Grubbing, EA:	0	0	**30**	*Assume clearing of several bushes/trees in the area*	
Patching, SY:	0	0	**334**	*Assume patching asphalt footprint*	*10%*
Repave, SY:	0	0	**667**	*Assume repaving asphalt footprint*	*20%*
Construct Earthen Berm					
Height of Berm, LF:	7.5	7.5	7.5	*Assumed*	
Width of Berm, LF:	26	26	26		
Perimeter of Cell for Berm, LF:	1,550	1,240	700		
Volume of Soil for Berm, ECY:	**11,195**	**8,956**	**5,056**		
Volume of Soil for Berm, LCY:	**15,549**	**12,439**	**7,023**		
Install VLDPE Liner					
Assume an overlap of	*10%*	*10%*	*10%*		
Install VLDPE Liner, SF:	**164,185**	**93,787**	**34,432**		

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	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Install Leachate Collection System				
Depth of Sand Bed, LF:	1	1	1	
Volume of Sand for Leachate System, CF:	126,776	67,431	21,576	*Assume leachate system only on the floor of the cell.*
Volume of Sand for Leachate System, ECY:	4,696	2,498	800	
Volume of Sand for Leachate System, LCY:	5,525	2,939	941	
Width of Entire Collection System of Pipes, LF:	325	195	150	
Distance between Pipes, LF:	50	50	50	*Per engineer*
Number of Pipe Segments, EA:	7	4	3	
Average Length of Pipe Segment, LF:	450	425	200	
Perforated Pipe Length, LF:	**3,150**	**1,700**	**600**	
Main Pipe length to Tank, LF:	**470**	**445**	**220**	*Assume additional 20 feet of width for piping to the tank*
Total Pipe Length, LF:	3,620	2,145	820	
Number of Tees, EA:	**7**	**4**	**3**	
Number of Elbows, EA:	**7**	**4**	**3**	
Pipe Diameter, IN:	4	4	4	*Assumed*
Pipe Diameter, LF:	0.34	0.34	0.34	
Volume of Pipe, CY:	12	7	3	
Total Volume of Sand for Leachate System, ECY:	5,513	2,932	939	
Total Volume of Sand for Leachate System, LCY:	**6,486**	**3,450**	**1,105**	
Install Geotextile as Barrier Layer.				*Assume geotextile is just above the Leachate Collection System with a surface area equal to the floor of the cell.*
Surface Area for Getextile Barrier Layer, SF:	**126,776**	**67,431**	**21,576**	
Spread and Consolidate Contaminated Materials				
All sediment, soil and slag and battery casings excavated from Western Jetty (Areas 7, 8 and 11) will be disposed of at the Western Jetty Cell #1 to the capacity of the containment cell and the remaining volumes will be disposed off-site. The contaminated materials excavated from Areas 1, 2, 3, 4, 5, 6 and 9 will be disposed of at the Margaret's Creek Cells #2 and #3 to the capacity of the containment cells and the remaining volumes will be disposed off-site.				
Max Capacity of Contaminated Material in Cell, ECY:	***56,069***	***30,967***	***10,675***	
Total Slag/Battery Casings Removed, LCY:	*4,009*	*2,065*	*4,994*	*Estimated percent split by volume to Cell 3, %:* 66%
Total Slag/Battery Casings Removed, ECY:	*4,009*	*2,065*	*4,994*	*Per QTO-01 Calculations*
Total Soil and Dewatered Sediment Removed, LCY:	*75,704*	*38,999*	*57,518*	*Per QTO-01 Calculations*
Total Soil and Dewatered Sediment Removed, ECY:	*54,507*	*28,079*	*41,413*	*Per QTO-01 Calculations*
Total Material, LCY:	79,713	41,064	62,512	
Total Material, ECY:	58,515	30,144	46,407	
Volume of Slag/Battery for Onsite Consolidation, ECY:	4,009	2,065	4,994	*Assume all Slag/Battery Material consolidated on-site.*
Volume of Soil and Dewatered Sediment for Onsite Consolidation, ECY:	52,060	28,079	5,681	*Assume onsite consolidation to maximum cell capacity, and remaining volume is for offsite disposal.*

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	CLIENT: EPA		PAGE NO. : QTO-05

Description: Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Spread and Consolidate Contaminated Materials (continued)				
	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Total Volume for Onsite Disposal, ECY:	**56,069**	**30,145**	**10,675**	
Volume of Slag/Battery for Onsite Consolidation, LCY:	4,009	2,065	4,994	
Volume of Soil and Dewatered Sediment for Onsite Consolidation, LCY:	72,306	38,999	7,890	
Volume of Slag/Battery for Onsite Consolidation, LCY:	**6,074**		**4,994**	
Volume of Soil and Dewatered Sediment for Onsite Consolidation, LCY:	**111,305**		**7,890**	
	Sewall Sector	**Margaret's Creek Sector**	**Western Jetty Sector**	
Volume of Slag/Battery, LCY:	**5,363**	**711**	**4,994**	
Volume of Soil and Dewatered Sediment for Onsite Disposal, LCY:	**88,824**	**22,481**	**7,890**	*Assume all of Margaret's Creek Soil and Dewatered Sediment will be disposed of onsite at the Margaret's Creek Containment Cells.*
	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Volume of Slag/Battery for Offsite Disposal, LCY:	0		0	
Volume of Soil and Dewatered Sediment for Offsite Disposal, LCY:	3,398		49,627	
Install Geotextile as Barrier Layer.				
Surface Area for Getextile Barrier Layer, SF:	**195,470**	**111,988**	**41,344**	*Assume geotextile is just below the LLDPE and uses the same Surface Area of LLDPE Cap.*
Install Gas Ventilation System				
Depth of Sand Bed, LF:	0.5	0.5	0.5	
Volume of Sand for Gas Venting Layer, CF:	97,735	55,994	20,672	
Volume of Sand for Gas Venting Layer, ECY:	3,620	2,074	766	*Assume gas ventilation system uses the same Surface Area of LLDPE Cap.*
Volume of Sand for Gas Venting Layer, LCY:	4,259	2,440	901	
Width of Entire Collection System of Pipes, LF:	325	195	150	
Distance between Pipes, LF:	50	50	50	*Per engineer*
Number of Pipe Segments, EA:	7	4	3	
Average Length of Pipe Segment, LF:	450	425	200	
Perforated Pipe Length, LF:	**3,150**	**1,700**	**600**	
Main Pipe length to Tank, LF:	**470**	**445**	**220**	*Assume additional 20 feet of width for piping to the tank*
Total Pipe Length, LF:	3,620	2,145	820	
Number of Tees, EA:	**7**	**4**	**3**	
Number of Elbows, EA:	**7**	**4**	**3**	

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Description: Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

	Onsite Cell #3	**Onsite Cell #2**	**Onsite Cell #1**	
Install Gas Ventilation System (continued)				
Pipe Diameter, IN:	**4**	**4**	**4**	
Pipe Diameter, LF:	0.34	0.34	0.34	
Volume of Pipe, CY:	12	7	3	
Total Volume of Sand for Gas Venting Layer, ECY:	4,247	2,433	899	
Total Volume of Sand for Gas Venting Layer, LCY:	**4,997**	**2,863**	**1,058**	
Install LLDPE Cap				
Assume an overlap of	30%	30%	30%	
Surface Area for LLDPE Cap, SF:	**195,470**	**111,988**	**41,344**	
Install Geocomposite Drainage Layer				
Surface Area for Geocomposite Drainage Layer, SF:	**195,470**	**111,988**	**41,344**	*Assume geocomposite is just above the LLDPE and uses the same Surface Area of LLDPE Cap.*
Spread Base Soil (Sandy Loamy Material)				
Depth of Soil, LF:	2	2	2	
Volume of Sandy Loamy Material, CY:	14,479	8,295	3,063	
Volume of Sandy Loamy Material, ECY:	**537**	**308**	**114**	*Assume soil surface area is the same Surface Area of LLDPE Cap.*
Volume of Sandy Loamy Material, LCY:	**746**	**428**	**159**	
Topsoil and Hydroseed				
Depth of Soil, LF:	0.5	0.5	0.5	
Volume of Topsoil, CY:	3,620	2,074	766	
Volume of Topsoil, ECY:	**135**	**77**	**29**	*Assume soil surface area is the same Surface Area of LLDPE Cap.*
Volume of Topsoil, LCY:	**188**	**107**	**41**	
Hydroseed, SF:	**195,470**	**111,988**	**41,344**	
Offsite Disposal Volumes by Area	**Sewall Sector**	**Margaret's Creek Sector**	**Western Jetty Sector**	
Volume of Slag/Battery Casings for Offsite Disposal, LCY:	**0**	**0**	**0**	
Weight of Slag/Battery Casings for Offsite Disposal, TON:	**0**	**0**	**0**	
Total Volume of Soil and Dewatered Sediment for Disposal, LCY:	*92,221*	*22,481*	*57,518*	
Volume of Slag/Battery for Offsite Disposal, LCY:	*0*		*0*	*Remaining Volume Removed after Waste Consolidation*
Volume of Soil and Dewatered Sediment for Offsite Disposal, LCY:	*3,398*		*49,627*	*Remaining Volume Removed after Waste Consolidation*
Total Volume of Soil and Dewatered Sediment for Offsite Disposal, LCY:	3,398	0	49,627	

CDM Smith	PROJECT: Raritan Bay FS	COMPUTED BY : AB	CHECKED BY: JN
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Description: Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Offsite Disposal Volumes by Area (continued)

	Sewall Sector	Margaret's Creek Sector	Western Jetty Sector	
Estimated percent split by volume to Hazardous Landfill, %:	25%	20%	20%	*Per Engineer*
Total Hazardous Volume of Soil and Dewatered Sediment, LCY:	23,055	4,496	11,504	
Total NonHazardous Volume of Soil and Dewatered Sediment, LCY:	69,166	17,985	46,014	
Waste Characterization Sampling, EA:	**155**	**0**	**2,256**	*Assume 1 Sample per Truckload and 22 Tons per Truckload for Offsite Disposal*
Volume for disposal as Non-Hazardous Waste, LCY:	**3,398**	**0**	**46,014**	*Assume the maximum amount of hazardous waste will be consolidated on-site*
Weight for disposal as Non-Hazardous Waste, TON:	**5,097**	**0**	**69,021**	
Number of Truckloads to Non-Hazardous Landfill according to productivity, EA:	**232**	**0**	**3,138**	*Assume 22 Tons per Haul Truck*
Transportation to Non-Hazardous Landfill according to productivity, HR:	**464**	**0**	**6,276**	*Assume 2 hour cycle time*
Volume for disposal as Hazardous Waste, LCY:	**0**	**0**	**3,613**	
Weight for disposal as Hazardous Waste, TON:	**0**	**0**	**5,420**	

Onsite Cell Operation and Maintenance

Assume Common Component of Alternatives 4 through 6. Mowing is per SF, so is variable across alternatives with the cell dimensions.

Mowing and Snow Removal

Snow Removal per year, EA:	1	*Per engineer*
Snow Removal per year, DAY:	1	*Assumed*
Snow Removal per year, HR:	8	
Mowing per year, EA:	1	*Per engineer*
Mowing, SF:	348,802	
Mowing per year, SF:	349,000	
Mowing per year, MSF:	349	

Annual O&M for Areas with MNR

Assumes a two person crew and a jon boat for the sampling. Assume visual inspection will be with an underwater video camera. Semi-annual for first five years, and Annually for next 25 years.

	Area 9	*Area 7*	Area 11	Totals	Comments
Surface Area for MNR, SF:	1,249,050	51,441	177,597		*Per engineer*
Assumed SF per Surface Water sample for analysis of Metals	20,000	20,000	20,000		*Per engineer*
Assumed SF of Cap per Sediment sample for analysis of Metals	20,000	20,000	20,000		*Per engineer*
Analysis of Metals (total and dissolved) per event, EA:	125	5	18		

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	CLIENT:	EPA			PAGE NO. : QTO-05

Description: Alternative 6 - Excavation/Dredging, On-Site Containment, Off-Site Disposal, Monitored Natural Recovery, Institutional Controls and Long-Term Monitoring. See Page 1 for full description of Alternative

Annual O&M for Areas with MNR (continue)

	Area 9	*Area 7*	Area 11	Totals	Comments
Semi-annual Sampling					
Sampling events per year, EA:	2	2	2		
Analysis of Metals (total and dissolved) per year, EA:	250	10	36	**296**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	20	20	20	**60**	
Project Scientist Crew per year, HR:	160	160	160	**480**	
Annual Sampling					
Sampling events per year, EA:	1	1	1		
Analysis of Metals (total and dissolved) per year, EA:	125	5	18	**148**	
Event Duration, DAY:	10	10	10		*Assumed*
Project Scientist Crew per year, DAY:	10	10	10	**30**	
Project Scientist Crew per year, HR:	80	80	80	**240**	

Additional Restoration Quantities

Seawall Reconstruction using Capstone, TON:	**7,500**	*Per CCI Vendor Quote*
Seawall Reconstruction using Corestone, TON:	**15,000**	*Per CCI Vendor Quote*
Jetty Reconstruction using Capstone, TON:	**5,333**	*Per CCI Vendor Quote*

CDM Smith

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JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	VQ-01

Description: Vendor Quotes via phone converstations for offsite disposal.

Vendor Quotes for Hazardous Waste Treatment and Disposal for Raritan Slag/Batteries and Soil

	Commercial Hazardous Waste Treatment and Disposal Facility	Location	Contact Person	Phone Number	Email	Status	Summer 2010 Comments	November 2011 Comments	November 2011 Cost of Slag Disposal (including trans) per CY	November 2011 Cost of Soil Disposal (including trans) per CY
1	Max Environmental http://www.maxenvironmental.com/	Pittsburgh, PA	Karl Churman	800-851-7845	kchurman@maxenvironmental.com		Spoke with Patrick Callahan (cell 410-507-3204) Possess new crush facility and have capability to handle the waste. Would require sample to determine the final treatment method and cost Estimated cost treatment $130 - 180/ton depending on the size of slag; rent a mobile crusher to crush slag to 3/8" $80 - 90/ton; Transportation: $75/ton	E-mail Quote - The cost range on the slag and batteries is $80 to $90 per cubic yard. This would include crushing of the slag and batteries, chemical stabilization and disposal at Yukon PA facility The soil would be $60 to $65 per yard for treatment and disposal. Both of these figures include PA Hazardous Waste Fees. Transportation from NJ would be between $2000 and $2400 per truck load based on current diesel fuel. Each truck could can carry 22 tons or ~11 yards of slag and ~15 yards of soils.	$285	$209
2	CWM Chemical Services, LLC - belongs to Waste Management Inc. http://www.wmsolutions.com/facilities/results.asp?state=NY	Model City, NY	Linda				Pat indicated that Model city facility cannot handle this waste. They cannot use micro-encapsulation for the slag. The lead concentration, more than 3,000 mg/L is too high for them to treat it. Model City will not be able to handle this high concentration. Received response from Pat Stauffer in 2010.	Spoke with Linda, and she confirmed that lead concentrations greater than 3,000 mg/L is too high for them to treat it. Model City will not be able to handle this high concentration.	Not available	Not available.
3	Chemical Waste Management - belongs to Waste Management Inc. http://www.wmsolutions.com/facilities/results.asp?state=AL	Emelle, AL	Susie Thomas	205-652-8154		Information sent to Susie via e-mail.	Alabama facility has a shredder that can reduce the size of slag. They are most likely able to accept this waste. Spoke with Paulin Goodwin, and awaiting follow up call, but never received.			
4	Chemical Waste Management - Lake Charles ---- belongs to Waste Management Inc. http://www.wmsolutions.com/facilities/results.asp?state=LA	Lake Charles, LA	Paige	800-963-4776			No response	Paige mentioned that Linda would be the person to contact for a quote.	Not available	Not available.
5	EnviroSafe	Oregon, OH	Alan Christy	440-899-7788; cell: 440-478-0599; or 800-537-0426	a.christy@envirosafeservices.com		EnviroSafe can handle small quantity. They have a crusher that can crush slag 8,000 ton/yr. Would require a sample to see if their equipment can crush the material. The facility can be accessed by truck or Norfolk Southern Railroad. Need a sample to see if they can handle before providing cost estimate.	Not available	Not available	Not available.

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB
JOB NO.:	74541	DATE :	2/2/2012
CLIENT:	EPA		

CHECKED BY:	JN
DATE CHECKED:	5/24/2012
WRKSHT NO.:	VQ-01

Description: Vendor Quotes via phone converstations for offsite disposal of Raritan nonhazardous soil and hazardous water from sediment dewatering.

Vendor Quotes for Hazardous Waste Treatment and Disposal for Raritan Slag/Batteries and Soil

6	Wayne Disposal Inc. Part of The Environmental Quality Company http://www.eqonline.com/Locations/Wayne-Disposal-Inc.aspx	Belleville, MI	Evan Altmann Damien Frederick	800-592-5489 Evan 516-506-1100 Damien 734-329-8016	evan.altmann@eqonline.com	Damien says that Evan is the person to contact. Left a message with Evan to return call.	Facility can be reached by truck or rail. Evan mentioned that the TCLP of more than 3,000 mg/L may be too high to treat at their facility. Would like to have samples to provide the final determination and cost Estimated Cost Lead Slag- High treat - $180 ton + $10/ ton Michigan Tax Transportation- Rail $102/ Ton- 100 Ton Minimum- Slag must be 2'x2'x2' or smaller Transportation- Trucking $ 115/ Ton- 22 Ton Minimum- Slag can be a slightly larger 3'x3'3'			
7	US Ecology Inc. http://www.americanecology.com/	Grandview, ID	Tim Curtain	973-694-7525			Not applicable	Phone Quote - Approximate cost for transporation (truck and rail) and disposal of slag/batteries and soil is $212 per cubic yard. This would include chemical stabilization and disposal at ID facility, union trucking with liner, and fuel surcharge (railroad) of $12. Sediment must pass the paint filter test. This cost is based on minimum of 1000 tons per day	$212	$212
8	US Ecology Inc.	Beatty, NV	Debbie Baker (Nevada facility)	1-800-239-3943	dbaker@usecology.com		US Ecology does not have crushing facility. Require sample to conduct treatability test to determine if they are able to treat it. $95/ton at the facility for treatment and disposal, assuming material sent is proper size.	Not applicable	Not applicable	Not applicable
9	US Ecology Texas	Robstown, TX	Alan Peterson (corporate)	1-800-242-3209	Not available					
10	Pinewood Site PS Kestrel Horizons LLC	Pinewood, SC	David Comen	864-288-6353	Spoke with Mr. David Comen in Summer of 2010. The landfill was closed in 2000.		Not applicable	Not applicable	Not applicable	Not applicable
11	Peoria Disposal Company, http://www.pdcarea.com	Peoria, IL	Darrel Woolery	314-378-4364	dwoolery@pdcarea.com; shendricks@hendricks	Information sent to Darrel via e-mail.	Trucking would be more economical than rail from NJ to the facility. Only accept size smaller than 2.5 inches or granular material for high lead concentrations. Facility is licensed to treat lead waste using micro-encapsulation. Uncertain if they can accept slag. Approximately $85/ton with high quantity, if material size meets their requirements and if they can accept slag.	Rail would be more economical at this time for the volumes considered.		
12	Safety Kleen http://www.safety-kleen.com/services/Pages/default.aspx	Plano, TX (corporate)	Dave Meyer	NJ Area 908-791-9600 Dave Meyer 908-296-5053	david.meyer@safety-kleen.com	Information sent to Dave via e-mail.				
13	Crystal Clean http://www.crystal-clean.com/main/products/ProductGroup.aspx?GroupId=3	Philidelphia District	Mary Ann Smith	General 877-938-7948 Mary Ann ext. 5929		MaryAnn will have John Sweaney, Manager of Philidelphia District give me a call				

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JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	VQ-01

Description: Vendor Quotes via phone converstations for offsite disposal of Raritan nonhazardous soil and hazardous water from sediment dewatering.

Vendor Quotes for NonHazardous Waste Disposal for Raritan Soil

	Waste Treatment and Disposal Facility	Location	Contact Person	Phone Number	Email	Status	November 2011 Comments	November 2011 Cost Estimate
1	Midco Waste http://www.midcowaste.com/Pages/IndustrialServices.aspx	New Brunswick, NJ	Ryan Repka	732-545-5867			Received a faxed quote from Ryan for roll-off dumpsters - 20 CY dumpsters, $175 per haul, $38 per ton disposal, Liner $75 per container (not necessary), and an additional Live Load fee of $100 per hour. For the total price per CY, the calculation uses material assumptions presented in QTO-01 and productivity assumptions presented in PD-03.	
2	Bridge Disposal http://www.bridgedisposal.com/industrial.html	Old Bridge, NJ	Ryan	732-727-0247		Left Message to receive quote		

Vendor Quotes for Hazardous Waste Disposal for Raritan Wastewater

	Waste Treatment and Disposal Facility	Location	Contact Person	Phone Number	Email	Status	November 2011 Comments	November 2011 Cost Estimate
1	Dupont http://www2.dupont.com/Clean_Water_Technologies/en_US/products/treatment_capabilities.html http://www2.dupont.com/Clean_Water_Technologies/en_US/assets/downloads/DuPont_Secure_Environmental_Treatment_Audit_Manual_Appendices_rev_0311_DSP_K09698.pdf	Deepwater, NJ	Gary Marshal	General 800-441-9359 Gary Marshal 856-237-6040		No longer in the business of accepting outside waste water for treatment	Dupont will stop accepting outside wastewater for treatment in March 2012. It is no longer accepting new contracts for wastewater treatment. Dupont was previously charging $0.40-$0.50 per gallon for metal contaminated water. Gary mentioned trying EQ (York, PA facility) or United (Meridan, CT facility).	$450
2	Environmental Quality http://www.eqonline.com/Locations/EQ-Pennsylvania.aspx	York, PA	Eric	(717) 846-1900 ext 217	Eric.miller@eqonline.com	Left Message with Eric		
3	United Water http://www.unitedwater.com/contact-us.aspx	Corporate Headquarters: Harrington Park, NJ		Corporate Headquarters: 201-767-9300		Left Message with Raymond Zwenski		

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JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	VQ-02

Description: Vendor Quotes via phone converstations for Clean Fill.

Vendor Quotes

	Company	Location	Contact Person	Phone Number	Email	Status	Material	November 2011 Cost per CY (including trans)	Comments
1	Atak Trucking http://www.ataktrucking.com/dirt	East Brunswick, NJ	Tommy Torocco	917-912-2900	NA		Common Fill		$10 per Ton including delivery to Old Bridge, NJ at Route 35
							Drainage Sand (ASTM C-33 Sand)	$24	$18.50 per Ton including delivery to Old Bridge, NJ
							Topsoil	$30	$30 per CY including delivery to Old Bridge, NJ
							Beach Sand		$13 per Ton including delivery to Old Bridge, NJ at Route 35
2	KLK Construction Materials and Trucking	South Plainfield, NJ		908-757-4434	NA		Drainage Sand	$25	$19.30 per Ton including delivery to Old Bridge, NJ
							Common Fill Dirt	$10-12	KLK does not currently have fill dirt available, but typical price is around $10-
							Topsoil	$23.60	$19.30 per CY plus $92/truck for delivery to Old Bridge, NJ (20 CY truck)
3	GSE Lining Technology, LLC	Houston, TX	Rod Kirch	800.435.2008		Spoke with Rod, and he will e-mail a quote	VLDPE Liner		

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-01

Description: Productivity determination calculations for removal of Access Road for all applicable Alternatives.

Productivity Determinations - Remove Access Road

Loading and Hauling

Excavator Productivity Determination			***Hauling Productivity Determination***			***Dozer Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Assumed Payload Capacity, LCY:**		**15**	**Hours per Shift, HR:**		8
Common Earth Bulking Factor:		1.25	**Work Efficiency, %:**		**90%**	**Work Efficiency, %:**		**90%**
Hours per Shift, HR:		8	**Average Distance for Haul, MI:**		**10**	**Slot Dozing Correction Factor:**		**1.20**
Bucket Fill Factor, %:		**80%**	**Average Speed, MPH:**		**55**	**Visibility Correction Factor:**		**1.0**
Work Efficiency, %:		**80%**	**Unloaded Haul Time, MIN:**		**11**	**Weight Correction Factor:**		**87%**
Operator Ability Correction Factor:		**0.9**	**Loaded Haul Time (20% additional time), MIN:**		**13**			
Bucket Size	CY	2	Payload Capacity	LCY/truck	15	Work Efficiency	%	90%
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8	Operator Type		Average
Bucket Payload	CY	1.6	Work Efficiency	%	90%	Operator Ability Correction Factor	Factor	0.75
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	147.1	Grade	% Slope	2%
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	6.1	Grade Factor		**0.9**
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**	Material Type		Hard to Drift
Dump Time	SEC	**3**	On Road Haul Time	MIN	13	Material Correction Factor	Factor	0.8
Swing Time Loaded	SEC	**6**	On Road Return Time	MIN	11	Slot Dozing Correction Factor	Factor	1.20
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	MIN/cycle	31.1	Visibility Correction Factor	Factor	1.0
Cycle Time	SEC/cycle	28	Cycle Time per Truck	HR/cycle	0.52	Weight Correction Factor	Factor	0.87
	MIN/cycle	0.47	Ideal Cycles Per Day	Cyc/Truck/DY	15	Combined Prod. Correction Factor	Factor	0.51
Ideal Loader Productivity	BCY/HR	163.5	Ideal Productivity per Truck	LCY/HR	28.1	Ideal Dozer Productivity	LCY/HR	**300.0**
Ideal Loader Productivity	LCY/HR	204.3	**Adjusted Productivity per Truck**	**LCY/HR**	**25.2**	Adjusted Dozer Productivity	LCY/HR	153.0
Adjusted Loader Productivity	BCY/HR	117.7						
Adjusted Loader Productivity	LCY/HR	147.1	Number of Haul Trucks Anticipated		**5**	Number of Dozers Anticipated		**1**
			Total Hauling Productivity	**LCY/HR**	**126.0**	**Total Dozer Productivity**	**LCY/HR**	**153**
Number of Excavators Anticipated		**1**		LCY/DY	1008.0		LCY/DY	1,224
Total Excavator Productivity	**BCY/HR**	**117.7**						
	BCY/DY	941.6	Volume to Haul	LCY	4,900	Volume	**LCY**	4,900
			Number of Truckloads	EA	330	Total Daily Hours	**HR**	33
Volume to Remove	BCY	3,920	Total Daily Hours	HR	39	Total Crew Hours	**HR**	33
Excavation Time	HR	34	Total Crew Hours	HR	195	Total Dozer Days	**DY**	5
	DY	5	Total Days	DY	5			
						Number of Hauling Days	DY	5.0
Hauling Time	DY	5	Excavating Time	DY	5			
	HR	40		HR	34	Number of Excavation Days	DY	5.0
Standby Time Anticipated		6.0	Standby Time Anticipated		0.0	Total Crew Hours for Dozer	HR	40
						Volume	LCY	4,900
Ratio of Standby Time to Equipment Time		**0.18**	**Ratio of Standby Time to Equipment Time**		**0.00**	**Implied productivity**	**LCY/HR**	**122.5**
						Standby Time Anticipated		0.0
						Ratio of Standby Time to Equipment Time		**0.00**

Summary	Number	Prod	Units	Standby
Excavator	1	117.7	BCY/HR	0.18
Laborer (Excavating)	1	HR/Excavator HR		
Highway Haul Trucks	5	5.0	LCY/HR	0.00
Dozer	1	122.5	ECY/HR	0.00
Laborer (Compact)	1	HR/Dozer HR		

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JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-02 Soil

Description: Productivity determination calculations for all contaminated soil for offsite disposal (Alternative 2). Includes excavation and hauling hazardous materials to offsite hazardous waste facility. Assume this productivity can applied for offsite disposal for all applicable alternatives.

Productivity Determinations - Soil to Offsite Disposal Facility

Loading and Hauling

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Assumed Payload Capacity, LCY:**		**15**
Common Earth Bulking Factor:		1.25	**Work Efficiency, %:**		**90%**
Hours per Shift, HR:		8	**Average Distance for Haul to Yukon, PA, MI:**		**350**
Bucket Fill Factor, %:		**80%**	**Average Speed, MPH:**		**55**
Work Efficiency, %:		**80%**	**Unloaded Haul Time, MIN:**		**382**
Operator Ability Correction Factor:		**0.9**	**Loaded Haul Time (20% additional time), MIN:**		**458**
Bucket Size	CY	2	Payload Capacity	LCY/truck	15
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	147.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	6.1
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	On Road Haul Time	MIN	458
Swing Time Loaded	SEC	**6**	On Road Return Time	MIN	382
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	MIN/cycle	847.1
Cycle Time	SEC/cycle	28	Cycle Time per Truck	HR/cycle	14.12
	MIN/cycle	0.47	Ideal Cycles Per Day	Cyc/Truck/DY	1
Ideal Loader Productivity	BCY/HR	163.5	Ideal Productivity per Truck	LCY/HR	1.9
Ideal Loader Productivity	LCY/HR	204.3	**Adjusted Productivity per Truck**	**LCY/HR**	**1.7**
Adjusted Loader Productivity	BCY/HR	117.7			
Adjusted Loader Productivity	LCY/HR	147.1	Number of Haul Trucks Anticipated		**30**
			Total Hauling Productivity	**LCY/HR**	**51.0**
Number of Excavators Anticipated		**1**		LCY/DY	408.0
Total Excavator Productivity	**BCY/HR**	**117.7**			
	BCY/DY	941.6	Volume to Haul	LCY	75,788
			Number of Truckloads	EA	5,060 *Rounded up to nearest ten*
Volume to Remove	BCY	60,631	Total Daily Hours	HR	1487
Excavation Time	HR	516	Total Crew Hours	HR	44610
	DY	65	Total Days	DY	186
Hauling Time	DY	186	Excavating Time	DY	65
	HR	1,488		HR	516
Standby Time Anticipated		972.0	Standby Time Anticipated		0.0
Ratio of Standby Time to Equipment Time		**1.89**	**Ratio of Standby Time to Equipment Time**		**0.00**

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	117.7	BCY/HR	1.89
Laborer (Excavating)	1	HR/Excavator HR		
Highway Haul Trucks	30	51.0	LCY/HR	0.00

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-02 Slag

Description: Productivity determination calculations for slag and battery casings for offsite disposal (Alternative 2). Includes excavation and hauling all materials to offsite hazardous waste facility. Assume this productivity can applied for offsite disposal for all applicable alternatives.

Productivity Determinations - Slag to Offsite Disposal Facility

Loading and Hauling

Excavator Productivity Determination			***Hauling Productivity Determination***			
Assumed Bucket Capacity, CY:		**2**	**Assumed Payload Capacity, LCY:**		**15**	
Slag and Battery Bulking Factor:		1	**Work Efficiency, %:**		**90%**	
Hours per Shift, HR:		8	**Average Distance for Haul to Yukon, PA, MI:**		**350**	
Bucket Fill Factor, %:		**80%**	**Average Speed, MPH:**		**55**	
Work Efficiency, %:		**80%**	**Unloaded Haul Time, MIN:**		**382**	
Operator Ability Correction Factor:		**0.9**	**Loaded Haul Time (20% additional time), MIN:**		**458**	
Bucket Size	CY	2	Payload Capacity	LCY/truck	15	
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8	
Bucket Payload	CY	1.6	Work Efficiency	%	90%	
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	47.1	
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	19.1	
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**	
Dump Time	SEC	**3**	On Road Haul Time	MIN	458	
Sort Slag Time	SEC	**60**	On Road Return Time	MIN	382	
Swing Time Loaded	SEC	**6**	Cycle Time per Truck	MIN/cycle	860.1	
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	HR/cycle	14.34	
Cycle Time	SEC/cycle	88	Ideal Cycles Per Day	Cyc/Truck/DY	1	
	MIN/cycle	1.47	Ideal Productivity per Truck	LCY/HR	1.9	
Ideal Loader Productivity	BCY/HR	65.4	**Adjusted Productivity per Truck**	**LCY/HR**	**1.7**	
Ideal Loader Productivity	LCY/HR	65.4				
Adjusted Loader Productivity	BCY/HR	47.1	Number of Haul Trucks Anticipated		**30**	
Adjusted Loader Productivity	LCY/HR	47.1	**Total Hauling Productivity**	**LCY/HR**	**51.0**	
				LCY/DY	408.0	
Number of Excavators Anticipated		**1**				
Total Excavator Productivity	**BCY/HR**	**47.1**	Volume to Haul	LCY	11,068	
	BCY/DY	376.8	Number of Truckloads	EA	740	*Rounded up to nearest ten*
			Total Daily Hours	HR	218	
Volume to Remove	BCY	11,068	Total Crew Hours	HR	6,540	
Excavation Time	HR	235	Total Days	DY	28	
	DY	30				
			Excavating Time	DY	30	
Hauling Time	DY	28		HR	235	
	HR	224				
			Standby Time Anticipated		17.0	
Standby Time Anticipated		0.0				
			Ratio of Standby Time to Equipment Time		**0.01**	
Ratio of Standby Time to Equipment Time		**0.00**				

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	47.1	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Highway Haul Trucks	30	51.0	LCY/HR	0.01

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-03

Description: Productivity determination calculations for soil onsite disposal (Alternative 5), which includes excavation and hauling soil to onsite containment cell. Assume this productivity can applied for onsite containment of soil removed from seawall areas for all applicable alternatives.

Productivity Determinations - Soil - Seawall Sector On Site Containment

Loading and Hauling

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Common Earth Bulking Factor:**		1.25
Common Earth Bulking Factor:		1.25	**Assumed Payload Capacity, LCY:**		**20**
Hours per Shift, HR:		8	**Hours per Shift, HR:**		8
Bucket Fill Factor, %:		**80%**	**Work Efficiency, %:**		**90%**
Work Efficiency, %:		**80%**	**Loaded Haul Time, MIN:**		**10**
Operator Ability Correction Factor:		**0.9**	**Unloaded Haul Time, MIN:**		**8**
Bucket Size	CY	2	Payload Capacity	LCY/truck	20
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	147.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	8.2
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	Haul Time	MIN	**10**
Swing Time Loaded	SEC	**6**	Return Time	MIN	**8**
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	MIN/cycle	27.2
Cycle Time	SEC/cycle	28	Cycle Time per Truck	HR/cycle	0.46
	MIN/cycle	0.47	Ideal Cycles Per Day	Cyc/Truck/DY	17
Ideal Loader Productivity	BCY/HR	163.5	Ideal Productivity per Truck	LCY/HR	42.5
Ideal Loader Productivity	LCY/HR	204.3	**Adjusted Productivity per Truck**	**LCY/HR**	**38.2**
Adjusted Loader Productivity	BCY/HR	117.7			
Adjusted Loader Productivity	LCY/HR	147.1	Number of Haul Trucks Anticipated		**4**
			Total Hauling Productivity	**LCY/HR**	**152.8**
Number of Excavators Anticipated		**1**		LCY/DY	1,222.4
Total Excavator Productivity	**BCY/HR**	**117.7**			
	BCY/DY	941.6	Volume to Haul	LCY	88,823
			Total Daily Hours	HR	582
Volume to Remove	BCY	71,059	Total Crew Hours	HR	2,328
Excavation Time	HR	604	Total Days	DY	73
	DY	76			
			Excavating Time	DY	76
Hauling Time	DY	73		HR	604
	HR	584			
			Standby Time Anticipated		22.0
Standby Time Anticipated		0.0			
			Ratio of Standby Time to Equipment Time		**0.01**
Ratio of Standby Time to Equipment Time		**0.00**			

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	117.7	BCY/HR	0.00
Dozer	1	117.7	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Off-road Haul Trucks	4.0	152.8	LCY/HR	0.01

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-04

Description: Productivity determination calculations for soil onsite disposal (Alternative 5), which includes excavation and hauling soil to onsite containment cell. Assume this productivity can applied for onsite containment of soil removed from Jetty areas for all applicable alternatives.

Productivity Determinations - Soil - Western Jetty On Site Containment

Loading and Hauling

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Common Earth Bulking Factor:**		1.25
Common Earth Bulking Factor:		1.25	**Assumed Payload Capacity, LCY:**		**20**
Hours per Shift, HR:		8	**Hours per Shift, HR:**		8
Bucket Fill Factor, %:		**80%**	**Work Efficiency, %:**		**90%**
Work Efficiency, %:		**80%**	**Loaded Haul Time, MIN:**		**10**
Operator Ability Correction Factor:		**0.9**	**Unloaded Haul Time, MIN:**		**8**
Bucket Size	CY	2	Payload Capacity	LCY/truck	20
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	147.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	8.2
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	Haul Time	MIN	**3**
Swing Time Loaded	SEC	**6**	Return Time	MIN	**2**
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	MIN/cycle	14.2
Cycle Time	SEC/cycle	28	Cycle Time per Truck	HR/cycle	0.24
	MIN/cycle	0.47	Ideal Cycles Per Day	Cyc/Truck/DY	33
Ideal Loader Productivity	BCY/HR	163.5	Ideal Productivity per Truck	LCY/HR	82.5
Ideal Loader Productivity	LCY/HR	204.3	**Adjusted Productivity per Truck**	**LCY/HR**	**74.2**
Adjusted Loader Productivity	BCY/HR	117.7			
Adjusted Loader Productivity	LCY/HR	147.1	Number of Haul Trucks Anticipated		**3**
			Total Hauling Productivity	**LCY/HR**	**222.6**
Number of Excavators Anticipated		**1**		LCY/DY	1,780.8
Total Excavator Productivity	**BCY/HR**	**117.7**			
	BCY/DY	941.6	Volume to Haul	LCY	7,890
			Total Daily Hours	HR	36
Volume to Remove	BCY	6,312	Total Crew Hours	HR	108
Excavation Time	HR	54	Total Days	DY	5
	DY	7			
			Excavating Time	DY	7
Hauling Time	DY	5		HR	54
	HR	40			
			Standby Time Anticipated		18.0
Standby Time Anticipated		0.0			
			Ratio of Standby Time to Equipment Time		**0.17**
Ratio of Standby Time to Equipment Time		**0.00**			

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	117.7	BCY/HR	0.00
Dozer	1	117.7	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Off-road Haul Trucks	3.0	222.6	LCY/HR	0.17

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PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-05

Description: Productivity determination calculations for slag onsite disposal (Alternative 5), which includes excavation and hauling slag and battery casings to onsite containment cell. Assume this productivity can applied for onsite containment of slag and battery casings removed from Sewall areas for all applicable alternatives.

Productivity Determinations - Slag - Seawall Sector On Site Containment

Loading and Hauling from Borrow Area

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Slag and Battery Bulking Factor:**		1
Slag and Battery Bulking Factor:		1	**Assumed Payload Capacity, LCY:**		**20**
Hours per Shift, HR:		8	**Hours per Shift, HR:**		8
Bucket Fill Factor, %:		**80%**	**Work Efficiency, %:**		**90%**
Work Efficiency, %:		**80%**	**Loaded Haul Time, MIN:**		**13**
Operator Ability Correction Factor:		**0.9**	**Unloaded Haul Time, MIN:**		**10**
Bucket Size	CY	2	Payload Capacity	LCY/truck	20
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	47.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	25.5
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	Haul Time	MIN	**10**
Sort Slag Time	SEC	**60**	Return Time	MIN	**8**
Swing Time Loaded	SEC	**6**	Cycle Time per Truck	MIN/cycle	44.5
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	HR/cycle	0.75
Cycle Time	SEC/cycle	88	Ideal Cycles Per Day	Cyc/Truck/DY	11
	MIN/cycle	1.47	Ideal Productivity per Truck	LCY/HR	27.5
Ideal Loader Productivity	BCY/HR	65.4	**Adjusted Productivity per Truck**	**LCY/HR**	**24.7**
Ideal Loader Productivity	LCY/HR	65.4			
Adjusted Loader Productivity	BCY/HR	47.1	Number of Haul Trucks Anticipated		**2**
Adjusted Loader Productivity	LCY/HR	47.1	**Total Hauling Productivity**	**LCY/HR**	**49.4**
				LCY/DY	395.2
Number of Excavators Anticipated		**1**			
Total Excavator Productivity	**BCY/HR**	**47.1**	Volume to Haul	LCY	5,363
	BCY/DY	376.8	Total Daily Hours	HR	109
			Total Crew Hours	HR	218
Volume to Remove	BCY	5,363	Total Days	DY	14
Excavation Time	HR	114			
	DY	15	Excavating Time	DY	15
				HR	114
Hauling Time	DY	14			
	HR	112	Standby Time Anticipated		5.0
Standby Time Anticipated		0.0	**Ratio of Standby Time to Equipment Time**		**0.03**
Ratio of Standby Time to Equipment Time		**0.00**			

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	47.1	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Off-road Haul Trucks	2.0	49.4	LCY/HR	0.03

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PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-06

Description: Productivity determination calculations for soil onsite disposal (Alternative 5), which includes excavation and hauling slag and battery casings to onsite containment cell. Assume this productivity can applied for onsite containment of slag and battery casings removed from Jetty areas for all applicable alternatives.

Productivity Determinations - Slag - Western Jetty On Site Containment

Loading and Hauling from Borrow Area

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Slag and Battery Bulking Factor:**		1
Slag and Battery Bulking Factor:		1	**Assumed Payload Capacity, LCY:**		**20**
Hours per Shift, HR:		8	**Hours per Shift, HR:**		8
Bucket Fill Factor, %:		**80%**	**Work Efficiency, %:**		**90%**
Work Efficiency, %:		**80%**	**Loaded Haul Time, MIN:**		**13**
Operator Ability Correction Factor:		**0.9**	**Unloaded Haul Time, MIN:**		**10**
Bucket Size	CY	2	Payload Capacity	LCY/truck	20
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	47.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	25.5
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	Haul Time	MIN	**3**
Sort Slag Time	SEC	**60**	Return Time	MIN	**2**
Swing Time Loaded	SEC	**6**	Cycle Time per Truck	MIN/cycle	31.5
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	HR/cycle	0.53
Cycle Time	SEC/cycle	88	Ideal Cycles Per Day	Cyc/Truck/DY	15
	MIN/cycle	1.47	Ideal Productivity per Truck	LCY/HR	37.5
Ideal Loader Productivity	BCY/HR	65.4	**Adjusted Productivity per Truck**	**LCY/HR**	**33.7**
Ideal Loader Productivity	LCY/HR	65.4			
Adjusted Loader Productivity	BCY/HR	47.1	Number of Haul Trucks Anticipated		**2**
Adjusted Loader Productivity	LCY/HR	47.1	**Total Hauling Productivity**	**LCY/HR**	**67.4**
				LCY/DY	539.2
Number of Excavators Anticipated		**1**			
Total Excavator Productivity	**BCY/HR**	**47.1**	Volume to Haul	LCY	4,994
	BCY/DY	376.8	Total Daily Hours	HR	75
			Total Crew Hours	HR	150
Volume to Remove	BCY	4,994	Total Days	DY	10
Excavation Time	HR	107			
	DY	14	Excavating Time	DY	14
				HR	107
Hauling Time	DY	10			
	HR	80	Standby Time Anticipated		32.0
Standby Time Anticipated		0.0	**Ratio of Standby Time to Equipment Time**		**0.22**
Ratio of Standby Time to Equipment Time		**0.00**			

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	47.1	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Off-road Haul Trucks	2.0	67.4	LCY/HR	0.22

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-07

Description: Productivity determination calculations for soil onsite disposal (Alternative 5), which includes excavation and hauling soil to onsite containment cell. Assume this productivity can applied for onsite containment of soil removed from Margaret's Creek areas for all applicable alternatives.

Productivity Determinations - Soil - Margaret's Creek Sector On Site Containment

Loading and Hauling

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Common Earth Bulking Factor:**		1.25
Common Earth Bulking Factor:		1.25	**Assumed Payload Capacity, LCY:**		**20**
Hours per Shift, HR:		8	**Hours per Shift, HR:**		8
Bucket Fill Factor, %:		**80%**	**Work Efficiency, %:**		**90%**
Work Efficiency, %:		**80%**	**Loaded Haul Time, MIN:**		**10**
Operator Ability Correction Factor:		**0.9**	**Unloaded Haul Time, MIN:**		**8**
Bucket Size	CY	2	Payload Capacity	LCY/truck	20
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	147.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	8.2
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	Haul Time	MIN	**3**
Swing Time Loaded	SEC	**6**	Return Time	MIN	**2**
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	MIN/cycle	14.2
Cycle Time	SEC/cycle	28	Cycle Time per Truck	HR/cycle	0.24
	MIN/cycle	0.47	Ideal Cycles Per Day	Cyc/Truck/DY	33
Ideal Loader Productivity	BCY/HR	163.5	Ideal Productivity per Truck	LCY/HR	82.5
Ideal Loader Productivity	LCY/HR	204.3	**Adjusted Productivity per Truck**	**LCY/HR**	**74.2**
Adjusted Loader Productivity	BCY/HR	117.7			
Adjusted Loader Productivity	LCY/HR	147.1	Number of Haul Trucks Anticipated		**3**
			Total Hauling Productivity	**LCY/HR**	**222.6**
Number of Excavators Anticipated		**1**		LCY/DY	1,780.8
Total Excavator Productivity	**BCY/HR**	**117.7**			
	BCY/DY	941.6	Volume to Haul	LCY	88,823
			Total Daily Hours	HR	400
Volume to Remove	BCY	71,059	Total Crew Hours	HR	1,200
Excavation Time	HR	604	Total Days	DY	50
	DY	76			
			Excavating Time	DY	76
Hauling Time	DY	50		HR	604
	HR	400			
			Standby Time Anticipated		204.0
Standby Time Anticipated		0.0			
			Ratio of Standby Time to Equipment Time		**0.17**
Ratio of Standby Time to Equipment Time		**0.00**			

Summary	**Number**	**Prod**	**Units**	**Standby**
Excavator	1	117.7	BCY/HR	0.00
Dozer	1	117.7	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Off-road Haul Trucks	3.0	222.6	LCY/HR	0.17

CDM Smith

PROJECT:	Raritan Bay FS	COMPUTED BY :	AB	CHECKED BY:	JN
JOB NO.:	74541	DATE :	2/2/2012	DATE CHECKED:	5/24/2012
CLIENT:	EPA			WRKSHT NO.:	PD-08

Description: Productivity determination calculations for slag onsite disposal (Alternative 5), which includes excavation and hauling slag and battery casings to onsite containment cell. Assume this productivity can applied for onsite containment of slag and battery casings removed from Margaret's Creek areas for all applicable alternatives.

Productivity Determinations - Slag - Margaret's Creek Sector On Site Containment

Loading and Hauling from Borrow Area

Excavator Productivity Determination			***Hauling Productivity Determination***		
Assumed Bucket Capacity, CY:		**2**	**Slag and Battery Bulking Factor:**		1
Slag and Battery Bulking Factor:		1	**Assumed Payload Capacity, LCY:**		**20**
Hours per Shift, HR:		8	**Hours per Shift, HR:**		8
Bucket Fill Factor, %:		**80%**	**Work Efficiency, %:**		**90%**
Work Efficiency, %:		**80%**	**Loaded Haul Time, MIN:**		**13**
Operator Ability Correction Factor:		**0.9**	**Unloaded Haul Time, MIN:**		**10**
Bucket Size	CY	2	Payload Capacity	LCY/truck	20
Bucket Fill Factor	%	80%	Hours per Shift	HR/DY	8
Bucket Payload	CY	1.6	Work Efficiency	%	90%
Work Efficiency	%	80%	Adjusted Loading Productivity	LCY/HR	47.1
Operator Ability Correction Factor		0.9	Load Time per Truck	MIN	25.5
Load Time	SEC	**15**	Dump and Manuever Time	MIN	**1.0**
Dump Time	SEC	**3**	Haul Time	MIN	**3**
Sort Slag Time	SEC	**60**	Return Time	MIN	**2**
Swing Time Loaded	SEC	**6**	Cycle Time per Truck	MIN/cycle	31.5
Swing Time Unloaded	SEC	**4**	Cycle Time per Truck	HR/cycle	0.53
Cycle Time	SEC/cycle	88	Ideal Cycles Per Day	Cyc/Truck/DY	15
	MIN/cycle	1.47	Ideal Productivity per Truck	LCY/HR	37.5
Ideal Loader Productivity	BCY/HR	65.4	**Adjusted Productivity per Truck**	**LCY/HR**	**33.7**
Ideal Loader Productivity	LCY/HR	65.4			
Adjusted Loader Productivity	BCY/HR	47.1	Number of Haul Trucks Anticipated		**2**
Adjusted Loader Productivity	LCY/HR	47.1	**Total Hauling Productivity**	**LCY/HR**	**67.4**
				LCY/DY	539.2
Number of Excavators Anticipated		**1**			
Total Excavator Productivity	**BCY/HR**	**47.1**	Volume to Haul	LCY	5,363
	BCY/DY	376.8	Total Daily Hours	HR	80
			Total Crew Hours	HR	160
Volume to Remove	BCY	5,363	Total Days	DY	10
Excavation Time	HR	114			
	DY	15	Excavating Time	DY	15
				HR	114
Hauling Time	DY	10			
	HR	80	Standby Time Anticipated		34.0
Standby Time Anticipated		0.0	**Ratio of Standby Time to Equipment Time**		**0.22**
Ratio of Standby Time to Equipment Time		**0.00**			

Summary	Number	Prod	Units	Standby
Excavator	1	47.1	BCY/HR	0.00
Laborer (Excavating)	1	HR/Excavator HR		
Off-road Haul Trucks	2.0	67.4	LCY/HR	0.22

Attachment B

Vendor Quotes

CDM Smith Telephone Call Report

CDM Smith

9200 Ward Parkway, Suite 500
Kansas City, MO - 64114
Tel: (816) 444-8270
Fax: (816) 523-2600

Project:	Raritan Bay	**Client:**	USEPA
Job No.	74541	**Date:**	February 13, 3:00 pm

☐ **Phone in** ☑ **Phone out** ☐ **Current Project** ☐ **Prospective Project/Marketing** ☐ **Administrative** ☐ **Other**

Made by/Received by: Justin Nielsen

Talked with: Columbia Analytical Services

Subject: Biota Analysis for Metals

Distribution:

- **Discussion:**

Company:
Columbia Analytical Services
1317 South 13th Ave
Kelso, WA 98626

Tel: (800) 695-7222

Metal Analysis for Aquatic Organisms:

- Price: **$130/sample**
- Price includes sample prep and homogenization

- **Action Required (what, who, when):**

CETCO®

Remediation Technologies 900 Northbrook Dr., Suite 320 Trevose, PA 19053
215.357.0630 800.527.9948 Fax 215.357.0945 **www.cetco.com**

December 7, 2011

CDM
Abby Broadstone
100 North Broadway, Ste 1120
St Louis, Mo 63102

RE: Revised Budgetary Estimate – Raritan bat Sub-aqueous Cap

Dear Abby:

On behalf of CETCO I am please to provide you with this revised budgetary estimate for purchase of materials and the deployment of same for your Raritan Bay project. This budgetary estimate is being revised form our previous email correspondence in order to clarify existing estimates and add estimates for additional scope items discussed during our 12-6-11 conference call.

Budgetary cost for materials:

Item	Budgetary Unit Cost	Estimated Quantity
*Reactive Core Mat (RCM) w/ Organoclay	$2.45/s.f.	90,000 s.f. or
RCM w/ Organoclay & Apetite	$3.00/s.f.	90,000 s.f.
Triton Marine Mattresses	$555.00/ea	692 units
*3" to 6" Rip Rap Stone (delivered)	$ 26.00/ton	2,100 tons or
Recycled Concrete (delivered)	$ 18.00/ton	2,100 tons
Transportation of RCM	$ 2,900/load	3
Transportation of Marine Mattresses	$ 2,900/load	6

*Both options were discussed

Budgetary Costs for labor:

Estimate to construct and load Triton Marine Mattresses and Deploy the Mattresses and RCM from a barge.	$17.50/s.f	90,000 s.f.

Remediation Technologies 900 Northbrook Dr., Suite 320 Trevose, PA 19053
215.357.0630 800.527.9948 Fax 215.357.0945 **www.cetco.com**

Assumptions:

- Pricing is based on performing the project as non-union.
- Pricing assumes current fuel surcharges for transportation.
- Pricing is based on a 10 hour work day.
- All transportation pricing assumes delivery to Perth Amboy NJ.
- Estimate is based on sight unseen information, confirmation of pricing will only happen after receipt of plan drawings and a site walk.
- Pricing assumes a staging area of at least 200' x 200' will be provided for construction of the marine mattresses.
- Price assumes staging area is within 5 miles of the deployment area.
- Apetite is only available six months out of the year as mentioned in previous correspondence.

Should you have any questions or comments please do not hesitate to contact me. Once again, thank you for the opportunity to provide this estimate.

Sincerely,

Matt Geary
Technical Sales Manager
CETCO Remediation Technologies

C: Chris Gurr

ENGINEERING TECHNOLOGIES
Consulting Engineers

3551 Lake Mary Blvd., Suite 210
Lake Mary, FL 32746
Phone: (407) 322-0500
Fax: (407) 322-0023

E/T Project Number: 11-191

December 8, 2011

Mr. Thomas Mathew
Project Manager
CDM Federal Programs Corporation
Raritan Plaza I, Raritan Center
Edison, New Jersey 80881

Re: Letter Report –Preliminary Foundation Condition Assessment
Containment Cells 1, 2 and 3
Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, New Jersey

Dear Mr. Mathew,

Per your request we reviewed the available subsurface investigation information for the purpose of our assessing the suitability of the subsurface conditions at the site to accommodate the construction of slag containment cells and the need for ground improvement measures if any.

It is our understanding that the containment cell construction at this site will include the construction of 20 to 25 foot high earthen berms along the perimeter of the containment area, and lining the cells with an impervious membrane. It is also our understanding that the cells will then be capped with an impervious liner upon filling of the cell.

Structurally speaking the satisfactory performance of such containment cells depends on the ability of the foundation material to support the cells without excessive settlement that may impair the performance of the lining system while also providing adequate support to the perimeter berms against shear failure of the exterior slopes of the berms.

Assessment of Foundation Conditions:

Available subsurface information is comprised of boring logs of several Standard Penetration Tests performed in the general vicinity of the proposed cell locations. The borings mostly extend to a depth of about 50 feet. The logs indicate that the sites are underlain by loose to medium dense fine sands.

A preliminary settlement analysis indicated that the foundation settlement of a 15 ft high containment cell can be expected to be in the range 4 to 8 inches. It is considered very likely that the settlement of the cell may not be uniform and it will vary from location to location.

A preliminary analysis of the stability of the exterior slopes of the berms suggests that if the slopes were built shallower than 2-horizontal to 1- vertical, the slopes will likely have sufficient factor-of-safety against slope failure. It is also noted that a sanitary force main exists between cells 2 and 3 within a 50 feet easement. A review of the subsurface conditions suggests the pipe line may experience some measurable settlement of approximately one half inch or less. The pipe

line can be expected to accommodate the effects of the expected settlement without any negative impact.

Conclusions and Recommendations:

Based on the evaluation of the preliminary subsurface information it can be concluded that the site may be suitable for use as a disposal site. At this time, although the preliminary subsurface investigation suggests that the site conditions may be suitable for the intended use, it is considered advisable that contingency funds be allocated for subsurface improvement if further explorations suggest the need for such improvements.

It is recommended that the following be considered:

1. Conduct further subsurface Standard Penetration Borings within the cell boundaries extending to depths of not less than 60 ft.

2. Conduct three Cone Penetration Tests per cell extending to depths of not less than 60 ft. or cone refusal

3. Conduct grain size distribution tests on select soil samples.

4. Plan to allocate funds for Ground Improvement (Vibfoflotation), at a rate of $500,000 per acre of cell area, in the event further evaluations indicate need for such improvements.

e/T Engineering Technologies, Inc. appreciates the opportunity to be of service to CDM Federal on this project. If you have any questions or need further information please call.

Very Truly Yours,
E/T ENGINEERING TECHNOLOGIES, INC.

12/16/4

Bilgin Erel, P.E.
President

	Task	Quantity	Units	Unit cost	Total	Duration
1	**Mobilization**	**1**	**LS**	**$ 100,000.00**	**$ 100,000.00**	**5 days**
2	**Site Set Up**	**1**	**LS**	**$ 26,500.00**	**$ 662,500.00**	**25 days**
	sediment stabilization basins (35%)			$ 9,275.00	$ 231,875.00	
	WWTSs (25%)			$ 6,625.00	$ 165,625.00	
	access road to bay, (25%)			$ 6,625.00	$ 165,625.00	
	turbidity curtains, etc. (15%)			$ 3,975.00	$ 99,375.00	
3	**Soil/Sediment Excavation/Mechanical Dredge**	**252,945**	**yards**	**$ 75.00**	**$ 18,970,875.00**	**400 days**
	Surface Soil				$ 1,758,712.40	
	Subsurface Soil				$ 1,441,887.39	
	Surface Sediment				$ 13,631,853.94	
	Subsurface Sediment				$ 2,138,353.86	
4	**Material Stabilization and Transport to nearby landfill**	**252,945**	**yards**	**$ 31.00**	**$ 7,841,295.00**	**400 days**
	Surface Soil				$ 726,934.46	
	Subsurface Soil				$ 595,980.12	
	Surface Sediment				$ 5,634,499.63	
	Subsurface Sediment				$ 883,852.93	
5	**Site Restoration**	**1**	**LS**	**$ 9,200,000.00**	**$ 9,200,000.00**	**400 days**
6	**Demobilization/Decontamination**	**20**	**days**	**$ 12,500.00**	**$ 250,000.00**	**20 days**
7	**Seawall reconstruction**	**1**	**ls**	**$ 1,800,000.00**	**$ 1,800,000.00**	**40 days**
8	**Jetty reconstruction**	**1**	**ls**	**$ 590,000.00**	**$ 590,000.00**	**20 days**
9	**Roadway construction**	**1**	**ls**	**$ 857,000.00**	**$ 857,000.00**	**15 days**
10	**Portadam Construction/Rental**	**1**	**year**	**$ 3,400,000.00**	**$ 3,400,000.00**	**1 year**
11	**General Conditions**	**24**	**months**	**$ 66,510.00**	**$ 1,596,240.00**	**24 months**
				Subtotal	**$ 45,267,910.00**	
12	**Contingency**			**25%**	**$ 11,316,977.50**	
	Total				**$ 56,584,887.50**	

Raritan Bay Slag Superfund Site
Old Bridge/Sayreville, NJ
Cost Item Descriptions

1. Mobilization: Costs associated with mobilizing equipment, material and labor to the site. Temporary facilities (project trailer), dumpsters, electrical connection to trailer, health and safety plan preparation.

2. Site Set Up: Costs associated with construction of the sedimentation basins needed for collection of material during shore based operations, construction of temporary water treatment systems to collect and treat decant from wet material that accumulates in the sedimentation basins, construction of an access road to the bay to allow equipment access to the shoreline and installation of turbidity curtains during dredging activities.

3. Soil/Sediment/Slag Excavation/Mechanical Dredge: Costs associated with excavation of soil, slag and battery casings located above the high tide water line via excavation and collection of slag and sediment via dredging below the high water table line.

4. Material Stabilization and Transport to Nearby Landfill Cell: Costs associated with stabilizing excavated and dredged material with drying agent (such as kiln dust) to absorb standing water and permit material to e trucked from sedimentation basin/bulkhead to landfill cell via over road trucks.

5. Site Restoration: costs associated with furnishing and installing material to replace the excavated and dredged material removed during project activities. Cost is based upon estimate of 252,945 yards of material to be removed. Seawall and jetty reconstruction costs (and associated material needed for reconstruction are not included in the site restoration costs as those costs are carried in separate cost items.

6. Demobilization/Decontamination: costs associated with decontamination of equipment, removal of sedimentation basins and removal of equipment and temporary facilities from the site after work is complete.

7. Seawall Reconstruction: costs associated with reconstruction of the seawall following removal of contaminated slag from the existing seawall. Volume estimate and cost to reconstruct is based upon removal of the entire existing seawall measuring 2200' (l) x 25' (w) x 15' (h). It is assumed the cross section is triangular with 25' being the base width.

8. Jetty reconstruction: costs associated with reconstruction of the jetty following removal of contaminated slag from the existing jetty. Volume estimate and cost to reconstruct is based upon removing the top four feet of the existing jetty along an area measuring 800' (l) x 30' (w).

9. Roadway Construction: costs associated with construction of a roadway extending from the Seawall area (Areas 1 – 4) to the Margaret's Creek land fill cell.

10. Portadam Construction/Rental: costs associated with the one year rental and costs to install a temporary dam along the bay side of the seawall. The Portadam will used to dam Raritan Bay in the area in front of the seawall and enable seawall removal and reconstruction.

11. General Conditions: costs associated with construction site management (a full time superintendent, project manager and senior project manager), per diem, and temporary site facilities for the duration of the project.

Customer Name: CDM
Attention: Jason Endraskojm

Date: November 18, 2011
Quote#: 274639
Project: Raritan Bay, Nj

Per your request, we are pleased to submit this quotation for the rental of an AmQuip Crane for the above referenced project based on your specifications.

Description: **60 Ton Rough Terrain Crane or equivalent**

Crane:
$8,000.00 per month (based on 160 hours availability, 1st Shift, Sunday)
$2,666.66 per week (based on 40 hours availability, 1st Shift, Sunday)
$666.66 per day (based on 8 hours availability, 1st Shift, Sunday)
$83.33 per hour OT Rate

Operator:
$880.00 per 8 hour day (1st shift Mon-Fri)
$165.00 per hour OT Rate (M-F after 8, Sat)
$220.00 per hour DT Rate (Sun & Holidays)

Freight/Permits: $800.00 each way
Fuel: $9.00 per hour (cust has option to fuel)

MINIMUM GUARANTEED
Rental Period: 1 Month

Expected Rental Period: 1 Month

Payment Terms: TBD

(Customer is responsible for ground conditions, interferences, rigging and rigging supervision.)

Travel time is considered work time and will be invoiced on a portal to portal basis at the rates above. The rental rates quoted are based on a guaranteed minimum rental period as stated above.

The expected rental period is a mutually agreed period of time that the equipment may be required for use in months beyond the minimum contractual period. This period allows the customer the use of equipment at the same rental rate and all commercial terms beyond the minimum.

Premium time will be charged when beginning prior to normal starting time or ending after normal ending time as well as all weekend work and holidays in accordance with the local union Collective Bargaining Agreement. The quote is subject to equipment availability and does not include taxes. It is the customer's responsibility to notify us if they or the jobsite is tax exempt. Failure to do so will result in the customer being responsible for payment of all applicable taxes. Crane cancellations must be made by 12 noon prior to the scheduled start date of the rental, and by 12 noon on Saturday for both Sunday and Monday rentals. On crawlers, conventional truck cranes, and hydraulic cranes 175 tons and above, crane cancellations must be made 24 hours prior to start date. The quote is valid for 30 days from the above date.

Lessee shall not be entitled to any abatement, deduction, reduction, set off, counterclaim, recoupment or defense against rent for any reason, including any non-working time of the equipment.

Jason , again thank you for giving AmQuip the opportunity to be of service to you. If you have any questions regarding this quote, please do not hesitate to contact us.

Sincerely,

AmQuip Crane Rental LLC

Dana Burns
Crane Rental Specialist

Customer Acceptance:

The undersigned as an authorized representative understands and accepts the prices and terms described.

_____
Signature

_____
Printed Name

J.CAMPOLI
& SONS
BUILDING CONTRACTORS

28 Milton Street
Cresskill, New Jersey 07626
201-568-1100 FAX 201-568-6706

April 20, 2011

Mr. Peter Connolly
CDM Constructors Inc.
25 Industrial Avenue
Chelmsford, Massachusetts 01824

RE: Remedial Paving Work@
WABC
Rte. 17 South
Lodi, N.J.

PROPOSAL

J. Campoli & Sons, Inc. will furnish all necessary labor, equipment, and materials to complete the above referenced project as further outlined below for the sum of: **$12,492.20 (Twelve Thousand, Four Hundred, Ninety Two Dollars and Twenty Cents).**

General Conditions:

- Workman's Compensation & Liability Insurance.
- Supervision and coordination of all trades by J. Campoli & Sons, Inc.
- Ongoing and final clean-up of all job related debris

Scope Of Work:

• Install 2-1/2" thick I-2 base and 1-1/2" thick I-5 surface course on prepared sub-base	364 s.y. @ 25.30	$ 9,209.20
• Remove existing pavement and replace with 2-1/2" thick I-2 Base and 1-1/2" thick I-5 surface course	98 s.y. @ 33.50	$ 3,283.00
	Total	**$12,492.20**

Alternate Specification

• Install 2" thick I-5 surface course on prepared sub-base	364 s.y. @ 14.05	$ 5,114.20
• Remove existing pavement and replace with 2" thick I-5 surface course	98 s.y. @ 22.25	$ 2,180.50
	Total Alternate	**$7,294.70**

Note:

Asphalt pricing is based on the current Asphalt Cement Index (April 2011= $ 545.00/Ton). Asphalt prices are not firm beyond index month quoted and are subject to change.

Not Included In This Proposal:

- Off-Hour Work.
- NJ Sales Tax (if applicable)
- Engineering or layout.
- Permits & Related Expediting.
- Asphalt Testing Services

Please feel free to contact me at your convenience to discuss any questions or concerns you may have regarding this proposal.

Sincerely,

Gary Reinfried
Project Manager
J. Campoli & Sons, Inc.

Agreed & Accepted:

Accepted By: CDM Constructors Inc. Date:

Accepted By: J. Campoli & Sons, Inc. Date: 4-20-2011

Jendrasko, Jason

From: Connolly, Peter
Sent: Friday, November 18, 2011 2:14 PM
To: Jendrasko, Jason
Subject: FW: Raritan Bay Dredging Project

From: Kevin Franklin [mailto:Kevin.Franklin@eqonline.com]
Sent: Tuesday, November 08, 2011 2:22 PM
To: Connolly, Peter
Subject: RE: Raritan Bay Dredging Project

Hi Pete,
I got my crew together today and discussed the Raritan Bay Dredging Project. We have come up with a "Budget " cost based on the 14 bullets you provided. We have suggested to sequence the project slightly different. The on-shore excavation to the low tide line would happen independently from the off shore mechanical dredging. We thought the equipment rental for such a limited work schedule off shore would not be cost effective. The production rate would be adjusted to approx. 300 yards per day.

The estimated cost based on this production and the equipment required is as follows.

Mobilization:	$80,000.00 5 days	$60,000.00
Site set-up:		
sediment stabilization basin, WWTS, access road, turbidity curtains, etc	$265,000.00 10 days	$265,000.00
Excavation/Mechanical dredge	$75.00 per yard. 37 days	$825,000.00
Sediment Stabilization and transportation to nearby dredge: 39 days	$31.00 per yard	$341,000.00
Debris T&D	$105.00 per yard	$36,750.00
Site Restoration	$ unknown	$TBD
De-mob/ decon	$ 95,000.00 10 days	$95,000.00

Total estimated Cost: Based on 11.000 yards: $1,642,750.00

Site restoration could be expensive for wetland replication and marine environment restoration. Having not seen the site there is some risk in these estimated cost . Access may be more difficult than expected. I have listed the schedule each task should require next to the cost. Debris disposal is assumed non-haz.

I hope this helps.

Kevin T. Franklin
Vice President
EQ Northeast, Inc.
Tel: 800-426-9878
Fax: 508-384-6151

>>> "Connolly, Peter" <ConnollyPJ@cdm.com> 11/8/2011 11:07 AM >>>

Thanks Kevin, I'll take costs as soon as you can provide.

Pete

R
From: Kevin Franklin [mailto:Kevin.Franklin@eqonline.com]
Sent: Tuesday, November 08, 2011 10:42 AM
To: Connolly, Peter
Subject: RE: Raritan Bay Dredging Project

Hi Pete,
IAM back in the office. I will start to price today. Can I will send you something by Friday ?
Kevi

Kevin T. Franklin
Vice President
EQ Northeast, Inc.
Tel: 800-426-9878
Fax: 508-384-6151n
>>> "Connolly, Peter" <ConnollyPJ@cdm.com> 11/3/2011 4:34 PM >>>
Kevin - I know this was long-winded and will take awhile to get through, but can you give me an idea when you could give me some pricing?

Thanks,

Pete

From: Connolly, Peter
Sent: Wednesday, November 02, 2011 5:13 PM
To: 'kevin.franklin@eqonline.com'
Subject: Raritan Bay Dredging Project

Kevin - good to talk with you yesterday about the Raritan Bay dredging project. As I explained, I am developing a feasibility study level cost estimate for the project. There are a lot of unknowns and assumptions to be made at this point, so the cost estimate will be a range with several caveats.

Below is a bulleted approach to the project based on my conversation with you and the available information I have of the site, feel free to edit as you see appropriate:

1. Collection of slag and battery casing material will be accomplished through a combination of shore-operated equipment (excavators with environmental buckets, supported by swamp mats) at low tide.
2. At high tide bay-operated equipment consisting of barge supported excavators equipped with environmental buckets feeding a dewatering hopper (believe you referred to it as a vibrating grizzly?).
3. A sediment basin will need to be constructed nearby to accept and treat the dredge material collected from shore operations. If the proper land mass for a sediment basin cannot be identified nearby, dredged material will be placed into dewatering bags. Assume an area will need to be constructed to fill and place the dewatering bags in order to collect and treat the decant water.
4. The shore activities will involve direct loading of dump trucks (sealed to prevent lose of sediment/water) for transport to sediment basin for dewatering.
5. Dredge material collected from the bay-based operations will be transported to a nearby bulkhead (I will contact Kinder Morgan for more information)
6. Dredge material hauled by barge to the bulkhead location will be solidified with kiln dust. Final product will consist of approximately 4% by wt of kiln dust and transported to the identified landfill cell.
7. Dredge material dewatered in the sediment basin will be hauled to landfill cell identified by project
8. Decant from dewatering operation at the sediment basin will be treated for lead and arsenic removal utilizing (?) treatment process - resin/carbon adsorption?
9. The bay operation will be divided into grids and the operating grid (where active dredging is taking place) will be cordoned off with a turbidity curtain to minimize mobilization of dredge fines (and associated lead and arsenic) into the bay. Turbidity curtain will not be moved until silt/sediment have settled down.
10. Anticipated that 11,000 yards of slag, 350 yards of battery casings and 10,000 yards of sediment (this volume is subject to change based upon forthcoming data) will require removal.
11. The majority of the slag and battery casing material is located between the high and low tide lines and may be easier collected from the shore operation.
12. The shoreline is populated with private residences, therefore homeowners own to the high tide water mark making access an issue.
13. Assumed production rate is 600 yards of dredge material collected per day. I assume this only accounts for collection of the dredge material and that dewatering, transport, solidification and transport to the landfill is not included in this production rate. What is a relative estimate for time needed for the dewatering /solidification processes?
14. Elevated levels of hydrogen sulfide generated during dredging operations will likely produce nuisance issues at a minimum and possibly H&S issues to workers. The addition to ferric chloride to the dredge material (at what point in the process) will mitigate the hydrogen sulfide. Worst case scenario from an H&S perspective is workers don level B PPE during dredging operations.

Kevin - please provide costs for the following:

Daily rate for shore based labor crew (operator(s) , laborers) equipped with excavator, swamp mats, environmental bucket, lined trucks for transport to sediment basin or dewatering bag staging area.

Daily rate for bay-side operation labor crew equipped with barge supported excavator, env bucket, barge supported dewatering hopper, bulkhead rental, kiln dust cost/ton,

Decant treatment costs of decant from sediment basin or dewatering bags.

Peter Connolly, P.E.
Principal | CDM | 25 Industrial Avenue | Chelmsford, MA 01824

P: 978.250.6727 x62704 | F: 978.250.8843 | C: 617.429.6697
www.cdm.com
connollypj@cdm.com

PORTADAM BUDGET QUOTATION

TO: **Jason Jendrasko - CDM**
PROJECT: **Raritan Bay**
LOCATION: **Sayreville, NJ**
DATE: **November 18, 2011**

This "site unseen" job quote is based on 2300 LF of 10 ft. high (max.) 3-sided Portadam cofferdam structure to be installed in 1 phase. Portadam will provide 2 inwater installation (hazmat) crews and customer must provide 2 laborers. Portadam estimates installation to take 20 - 22 days and removal to take 13 - 14 days with proper assistance by customer.

I. PORTADAM EQUIPMENT RENTAL RATES, one month minimum; LABOR EXTRA…

a) First month minimum rental period, including shipping... **$194,835 /Month**
b) Second month rental period… **$118,615 /Month**
c) Third month rental & each month thereafter... **$79,075 /Month**
d) Weekly rental will charged at 1/3rd of the monthly rate in effect after first month minimum rental.
e) Rental period begins upon delivery to site and continues without interruption for any reason until returned.
f) Alternate equipment requirements will be quoted upon request.
g) Customer is responsible for all state and local sales and use tax.

II. TECHNICAL ASSISTANCE LABOR; capable of inwater work...

a) Portadam installation crews onsite; standard 8 hour weekday... **$10,617 /Crewday**
b) Crew travel expenses; each roundtrip… **$962 /Per Trip**
c) OT, SAT, SUN & Holiday rates available upon request.
d) Any additional trade union or prevailing wage requirements will be for the customer's account.
e) Production estimates… **Est. Crewdays: 33 - 36 Install & Remove**
Est. Trips: 6 Trips

**Does not include contingencies for adverse weather or high water and are dependent on site suitability, access and assistance by customer.*

III. CUSTOMER MUST PROVIDE; at his own expense...

a) Clearing, access, loading, and offloading to installation point.
b) **2** laborers to assist with installation and removal.
c) Lifting rig services during installation and removal.
d) Sandbags (approx. #). **4600 /Sandbags (approx.)**
e) Structure maintenance, security & rental equipment insurance.
f) Initial dewatering & maintenance pumping to include all seepage, groundwater, overflow & precipitation.

Gerald Mann, National Sales Manager

This quotation is contingent on site conditions suitable for Portadam system use. Any agreement derived from this quotation must include our standard terms and conditions and payment terms. Call me if you have any questions.

BEASLEY FOREST PRODUCTS

NAME: Jason Endraskojm
CO NAME: CDM Constructors
ADDRESS:
PH & FAX: (978) 551-1656
E-MAIL: jendraskojm@cdm.com
SHIP TO Jason Endraskojm
CO NAME: CDM Constructors
ADDRESS:
Old Bridge, NJ

DATE Monday, November 21, 2011

BFP Address:
Mailing: P O Box 788
Shipping: 712 Uvalda Highway
Hazlehurst, Georgia 31539
BFP Phone: 912-375-5174
Fax: 912-375-9541
Website: WWW.BEASLEYCRANEMATS.COM
E-Mail: Sales@BeasleyForestProducts.com

Contact Person:

SALESPERSON	PAYMENT TERMS	QUOTE EXP.	SHIPPING
Grant	Net 30 with Credit Approval	Wednesday, December 21, 2011	**BFP**

QUANTITY	PRODUCT	DESCRIPTION	PRICE	TOTAL
300	8" x 4' x 14' Exposed Bolt	Mixed Hardwood - Delivered	$ 515.00	$ 154,500.00
300	12" x 4' x 14' Exposed Bolt	Mixed Hardwood - Delivered	$ 735.00	$ 220,500.00
			SUBTOTAL	$ 375,000.00
			SALES TAX	
			TOTAL	**$ 375,000.00**

Credit Card:
CC #:
Exp Date: Sec.Code:
Name on Card:
Billing Address:

Delivery Schedule:

PO #(Required):

Customer Signature:

The freight included in this quote will expire in 15 days. At the time of shipment freight will be adjusted to current market rates after customer approval.

Thank you for doing business with Beasley Forest Products!

Phone: 912-375-5174 WWW.BEASLEYCRANEMATS.COM Fax: 912-375-9541

ALL QUOTES EXPIRE AFTER 30 DAYS AND ARE SUBJECT TO PRIOR SALE.

Jendrasko, Jason

From: John Eckart <jeckart@trevcon.com>
Sent: Tuesday, November 29, 2011 4:29 PM
To: Jendrasko, Jason
Subject: RE: Raritan Bay Slag Superfund Site EPA/CDM

Jason – Sorry I wasn't able to get back to you by the 18th as you requested, but I had a bid due on Wednesday the 23rd which was occupying 100% of my time. Now that that bid is done, I was able to spend some time yesterday and today looking at your jetty and seawall. Without cross-sections of the jetty and the seawall it is a little difficult to estimate the cost of each, but for budgeting purposes you can use:

1. Jetty Restoration, assuming removals done by others prior to the start of our work and barge access only, 4 ft high x 30 ft wide by 800 ft long = 96,000 CF = 3556 CY = 5333 tons, assuming all "Capstone" at $100 to $110 per ton = $533,300 to $586,630.

2. Seawall Restoration, assuming removals done by others prior to the start of our work and access provided by construction haul road built by others prior to the start of our work, assuming a triangular cross section with a 25 ft wide base, 15 ft high and 2200 ft long = 412,500 CF = 15,278 CY = 22,500 tons, assuming 2/3rds Corestone = 15,000 tons at $60 to $65 per ton and 1/3rd Capstone = 7,500 tons at $100 to $110 per ton = total of $1,650,000 to $1,800,000.

I hope this helps. We would certainly be very interested in giving you firm prices for this work as soon as you have completed your design, drawings and specifications. We have done similar work for the NJ DEP within the last couple of years and have all the necessary equipment to get it done. Let us know when you've got your final design ready. Thanks!

JEE

From: Jendrasko, Jason [mailto:JendraskoJM@cdm.com]
Sent: Wednesday, November 16, 2011 11:48 AM
To: jeckart@trevcon.com
Cc: Connolly, Peter
Subject: FW: Raritan Bay Slag Superfund Site EPA/CDM

John,

As discussed on the phone, CDM is working on budgetary pricing for a project in Raritan Bay NJ with the EPA. We are looking for budgetary numbers for the re-construction of a jetty as well as a seawall. The jetty is 800'L x 30'W x 4' H and the seawall is 2200'L x 25'W x 15'H. You will need pricing to restore the top 4' of the jetty which will have already been demoed prior. The base of the jetty should still be in existence. The sea wall will also have been demoed and will have a portable dam around it with pumps to keep the area dry. The seawall will have a road running along it for construction access. The jetty will only be accessible by barge and you should budget for your own barge set up. I have attached drawings which show the project. You can find the western jetty in area 8 & 7 along the Cheesequake Creek inlet and the seawall along areas 1-4. Figure 4-19 shows the areas highlighted in orange. Please provide budgetary pricing by noon on Friday 11-18-11 via email to me. If you have any questions please do not hesitate to contact me.

Thank you,

Jason M Jendrasko, DBIA
CDM Constructors Inc.
25 Industrial Avenue

Chelmsford, Massachusetts 01824
cell: 978 551-1656
fax: 978 606-2737
email: jendraskojm@cdm.com

CDM Constructors Inc. **DATE:** 12/5/2011

PROJECT: USEPA

OWNER REP: Raritan Bay Slag Superfund

WORK ORDER

PROJECT NUMBER:

CDM LABOR

LABOR CLASS	No.	HRS	TOTAL HOURS	RATE	AMOUNT
					$ -
					$ -
PM	1	2080	2,080.0	56	$ 116,480.00
APM	1	4160	4,160.0	40	$ 166,400.00
Superintendent	1	4160	4,160.0	42	$ 174,720.00
Admin	1	200	200.0	30	$ 6,000.00
Field Expeditor	1	100	100.0	34	$ 3,400.00
Health and Safety officer	1	200	200.0	45	$ 9,000.00
		10400			
		10900			
TOTAL LABOR					$ 476,000.00

MATERIALS

DESCRIPTION	QTY	UNIT PRICE	AMOUNT
Safety Equipment			
TOTAL MATERIALS			$ -

ODCs

EQUIP	No.	HRS	TOTAL HOURS	RATE	AMOUNT
Truck and mileage	1	10400	10,400.0	11	$ 114,400.00
PM/APM/Super truck	30	hrs		9	$ 270.00
small tools	1		5,000.0		$ 5,000.00
Dumpster	24	mos		400	$ 9,600.00
Handy House	24	mos		300	$ 7,200.00
Hotel	1200	nights		150	$ 180,000.00
Per Diem	1200	days		65	$ 78,000.00
DSL/phone	24	mos		175	$ 4,200.00
Office supplies	24	mos		100	$ 2,400.00
Cell phone	10900	hrs		0.75	$ 8,175.00
Electricity	24	mos		125	$ 3,000.00
Office Trailer	**24**	**mos**		**400**	$ 9,600.00
TOTAL EQUIPMENT					$ 421,845.00

SUBCONTRACTOR

COMPANY	DESCRIPTION	AMOUNT
Electrician	1	$ 7,500.00
		$ -
TOTAL SUBCONTRACTOR		$ 7,500.00

TOTAL : LABOR:		Craft	$ -
Burden	36.23%		$ -
OH	15.11%		$ -
Craft Labor			$ -
Subtotal noncraft labor			$ 476,000.00
Burden	40.74%		$ 193,922.40
OH	30.81%		$ 206,403.09
		noncraft	
Total Labor Cost			$ 876,325.49
TOTAL : MATERIALS:			$ -
Tax			$ -
TOTAL : Equipment:			$ 421,845.00
SUBCONTRACTOR TOTAL:			$ -
Subtotal			$ 1,298,170.49
G&A	6.23%		$ 80,876.02
			$ 1,379,046.51
Insurance	0.75%		$ 10,342.85
Profit	15%		$ 206,856.98
WORK ORDER TOTAL:			**$ 1,596,246.34**

Description of Work:

CM costs to manage Raritan Bay Slag Superfund site

Anticipate 24 weeks of work

APPROVED BY:

Total plus risk of sub $ 1,596,246.34

Broadstone, Abby

From: Kevin Franklin [Kevin.Franklin@eqonline.com]
Sent: Monday, December 12, 2011 8:51 AM
To: Jendrasko, Jason
Subject: Breadown

Hi Jason,
Here is the breakdown of the items I expense in my budget. These items addressed the original SOW and not the expanded scope you have outlined in our telephone conversation.
Have great day,
Kevin Franklin

Mobilization:
2/ Cat 330 Excavators
1/Cat 320 Excavator w/ Environmental Bucket
2/ Office trailers
2/ tri axle trucks
75 Swamp Mats
2//900 ton hopper barges
turbidity curtain
flexy float screen
3000 tons of Concrete Kiln dust
training union workers

Site Preparation:
Flexy float screen 3" minus
construct one stabilization basin
Install sediment erosion control (on land)
Install turbidity curtain (off shore)
construct 800 LF of access road
geo fabric
550 yds. road base gravel
Grading dozer
2/days of crane
1/supervisor
4 laborers
2/teamsters
2/operators

Sediment Stabilization:
Cat 320 excavator W/mixing bucket
maintain of stabilization basin
dewatering
loading of on-site trucks
transportation to nearby disposal cell
1/operator
2/laborers
2/teamters

Kevin T. Franklin
Vice President
EQ Northeast, Inc.
Tel: 800-426-9878
Fax: 508-384-6151

Broadstone, Abby

From: Jendrasko, Jason
Sent: Monday, December 12, 2011 2:14 PM
To: Broadstone, Abby; Connolly, Peter
Cc: Schlebusch, Marc
Subject: RE: Raritan Bay Superfund Site Costing
Attachments: Breadown

Abby,

Please see attached email from EQ which shows the break out of what was included in some of our items. Also below are the items discussed on the phone today.

- Item 1: The LS number provided for mob is assuming we are dredging. If we do not dredge than you can remove the mob cost of the 2 900 ton hopper barges and the cost will be reduced by $10k. All other equipment is still required and will need to be mobilized.

- Item 2: The number provided for site prep is only for work done on land. The dredging has its own site prep which is included in the dredging number.

- Item 4: If you remove trucking from the stabilization number you can reduce the cost by $8.90/yard. The new cost would be $22.10/yard.

Thanks,
Jason

-----Original Message-----
From: Broadstone, Abby
Sent: Friday, December 09, 2011 10:28 AM
To: Jendrasko, Jason; Connolly, Peter
Cc: Schlebusch, Marc
Subject: RE: Raritan Bay Superfund Site Costing

Hi Jason,

I received your message. Let's reschedule for Monday morning. Marc and I have a group call at 10:30 CST, so can we push it up a half hour to 9:30am CST?

Thanks,
~abby

Abby R. Broadstone, P.E., LEED AP
Environmental Engineer
Camp Dresser & McKee Inc.
100 North Broadway Boulevard, Suite 1120 | St. Louis, MO | 63102
Phone: 314. 241.8510 ext.73034 | Cell: 314.704.5309 | Fax: 314.827.3034
Email: broadstonear@cdm.com | Web: www.cdm.com

-----Original Message-----
From: Jendrasko, Jason
Sent: Friday, December 09, 2011 8:31 AM
To: Broadstone, Abby; Connolly, Peter
Cc: Schlebusch, Marc
Subject: RE: Raritan Bay Superfund Site Costing

Abby,

Pete and I are still working with our subs to get further clarifications. We are still available to have a call today if you would like, however we would probably be able to offer you more information on Monday. If possible I would like to suggest rescheduling.

Thanks,

Jason M Jendrasko, DBIA
CDM Constructors Inc.
25 Industrial Avenue
Chelmsford, Massachusetts 01824
cell: 978 551-1656
fax: 978 606-2737
email: jendraskojm@cdm.com

-----Original Message-----
From: Broadstone, Abby
Sent: Wednesday, December 07, 2011 5:42 PM
To: Connolly, Peter
Cc: Schlebusch, Marc; Jendrasko, Jason
Subject: RE: Raritan Bay Superfund Site Costing

Sure. How does Friday at 10am CST (11am EST) sound to everyone?

Abby R. Broadstone, P.E., LEED AP
Environmental Engineer
Camp Dresser & McKee Inc.
100 North Broadway Boulevard, Suite 1120 | St. Louis, MO | 63102
Phone: 314. 241.8510 ext.73034 | Cell: 314.704.5309 | Fax: 314.827.3034
Email: broadstonear@cdm.com | Web: www.cdm.com

-----Original Message-----
From: Connolly, Peter
Sent: Wednesday, December 07, 2011 4:40 PM
To: Broadstone, Abby
Cc: Schlebusch, Marc; Jendrasko, Jason
Subject: Re: Raritan Bay Superfund Site Costing

Hi Abby

I am not available tomorrow, can we reschedule for Friday?

Pete

On Dec 7, 2011, at 5:35 PM, "Broadstone, Abby" <BroadstoneAR@cdm.com> wrote:

> When: Thursday, December 08, 2011 10:00 AM-11:00 AM (GMT-06:00) Central Time (US & Canada).
> Where: Call
>
> *~*~*~*~*~*~*~*~*~*~*
>
> Hi Everyone,
>
> Thanks in advance for your help with completing this FS estimate. I will conference call Marc, Jason and Peter to discuss Unit Cost breakdown of dredging costs. I would like further clarification/breakdown on certain Unit Costs so that I can apply them to different alternatives. I attempted to summarize talking points:
>
> Line Items #1 and 6 – What equipment are considered in this mob/demob cost? The mob/demob cost would be different across alternatives. For example one alternative assumes capping of all sediments near the Wester Jetty, and therefore, no dredging is needed for this 90,000SF area.
>
> Line item #2 – The cost for set-up is broken down by percentages for dredging 252,945 CY of material. This 252,945CY quantity will change depending on the alternative. I would like to discuss possibilities breaking out the turbidity curtains, and sediment stabilization basins as separate unit costs.
>
> Line item #3 – Please confirm that the unit cost for Excavation/Dredging ($75/CY) is for dredging only. I will use this unit cost for sediment excavation and I plan to cost shore based excavation of slag and soil (above the high tide) separately in MII.
>
> Line item #5 – Please confirm the site restoration unit cost you gave over the phone of $28/TON includes material (clean common fill), labor and equipment for placement of the material off the barge. If possible, I would like to update the material cost for the increased material cost for clean beach sand as opposed to common fill. I will use this unit cost for site restoration of the sediment excavation areas only. I will cost shore-based backfilling of common fill or beach sand as appropriate (above the high tide) separately in MII.
>
> Line item #4 – The unit cost is for material stabilization and transportation to the containment cell. Please separate out the transportation of the dewatered sediments to the cell because for other alternatives I need to cost highway transportation to a disposal facility as opposed to the onsite cell.
>
> Thanks,
>
> ~abby
>
> Abby R. Broadstone, P.E., LEED AP
> Environmental Engineer
> Camp Dresser & McKee Inc.
> 100 North Broadway Boulevard, Suite 1120 | St. Louis, MO | 63102
> Phone: 314. 241.8510 ext.73034 | Cell: 314.704.5309 | Fax: 314.827.3034
> Email: broadstonear@cdm.com<mailto:cookte@cdm.com> | Web: www.cdm.com<http://www.cdm.com>
>
>

Broadstone, Abby

From: Karl Churman [kchurman@maxenvironmental.com]
Sent: Monday, November 14, 2011 2:50 PM
To: Broadstone, Abby
Subject: MAX Env - lead waste

Abby,
Thanks for your call –
MAX has managed around millions of tons of lead waste and soil over the years. This has included the environmental clean ups associated with lead acid batteries and slags.

The cost range on the slag and batteries is $80 to $90 per cubic yard. This would include crushing of the slag and batteries, chemical stabilization and disposal at our Yukon PA facility
The soil would be $60 to $65 per yard for treatment and disposal. Both of these figures include PA Hazardous Waste Fees.

Transportation from NJ would be between $2000 and $2400 per truck load based on current diesel fuel. Each truck could can carry 22 tons or ~11 yards of slag and ~15 yards of soils.

If you need any additional clarification, please let me know. Before finalizing any pricing we would want to receive samples for treatability testing.

Karl R. Churman
Vice President Sales and Marketing
MAX Environmental Technologies, Inc.
412-343-4900
412-854-5536 (fax)
www.maxenvironmental.com

Join us on Social Media
Facebook LinkedIn

5 Industrial Drive, New Brunswick, NJ 08901
Phone 732-545-5867
Sales Fax 732-545-2109
Cell #: 732-619-7870

Midco Waste Systems
A Republic Services of NJ Company

Fax

Midco Waste Systems

REPUBLIC SERVICES

To:	CDM	**From:**	Ryan Repka
Fax:	314-827-3034	**Pages:**	2 including cover
Phone:	SAME	**Date:**	November 15, 2011
Re:		**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** x **Please Reply** ♻ **Please Recycle**

● **Comments:**

Abby,

Good morning. I appreciate you speaking with me yesterday in regards to your dumpster services. Midco Waste Systems has been providing quality refuse and recycling services for over 45 years in the Middlesex, Somerset, Union, and Mercer County areas and we look forward to working with you as well.

Attached you will find the proposal we discussed outlining the specifics from our conversation and what Midco can do for you.

I will be in touch with you in the next couple days, but should you have any questions in the meantime or need further information, please do not hesitate to call me.

Sincerely,

Ryan R. Repka

C&D Representative
Midco Waste Systems a Republic Services Co.
5 Industrial Drive S
New Brunswick, NJ 08901
Office: 732-565-5867
Cell: 732-619-7870
rrepka@republicservices.com
http://www.midcowaste.com

REPUBLIC SERVICES

Ryan Repka
C&D Representative
Midco Waste Systems a Republic Services Co.
5 Industrial Drive S
New Brunswick, NJ 08901
Office: 732-565-5867
Cell: 732-619-7870

Proposal for: CDM
County: Middlesex (Old Bridge)
Container Type: Roll-off Containers

Roll- off dumpster: Non Hazardous/Clean Soil (20,10 Cubic Yards)

- $175 Per Haul
- $38 Per Ton

Liner:	$75.00 *If needed*
Fuel and Environmental Fee:	$0
Rental Fee:	$0
Live Load:	$100.00 per hour after the 1st 30 minutes

Price excludes 7% sales tax
**** We charge solely based off tonnage, there are no overage fees!**

Midco Waste Systems

CLICK IMAGE(S) ABOVE TO ENLARGE

Poly Sandbag 14x26 White 100 pk.

Item# *PE00WT100*

Regular price: $76.80
Sale price: *$64.00*

Add to cart

Description

Great for temporary and one-time use projects, empty polypropylene sandbags are the most economical sandbag option. Fill each bag up to 50 lbs and seal with attached tie string. 1600 hr UV Protection will give this bag a life of six months in the sun. Used in flood protection, traffic control, erosion control, and as ballast, this bag is as versatile as it is affordable.

Request More Info Tell a Friend Bookmark Page

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Broadstone, Abby

From: Nielsen, Justin C.
Sent: Monday, December 05, 2011 1:49 PM
To: Broadstone, Abby
Subject: Raritan - FW: Russell Reid Inquiry Response for Justin Nielsen

Abby,

I just heard back from one of the wastewater disposal companies. See the below email. Russell Reid estimated transportation and disposal costs of wastewater at $.25/gallon.

Justin

From: Scott Withers [mailto:SWithers@russellreid.com]
Sent: Monday, December 05, 2011 12:51 PM
To: Nielsen, Justin C.
Subject: RE: Russell Reid Inquiry Response for Justin Nielsen

Good morning Justin,

We would need to run the wastewater itself for the local limits into the publicly owned treatment plant - Passaic Valley Sewerage Commissioners in Newark, NJ.

PVSC is the only plant we utilize that would accept wastewater from a superfund site and the rate is case by case based on viscosity and strength.

The EPA would be required to make the disposal inquiry with Russell Reid as the hauler and bill to entity. We are unable to ask PVSC to take Superfund or CERCLA wastewater.

Based on a disposal at PVSC that the EPA would secure, we can offer a rate for trucking and disposal. The T & D of a 5,000 gallon load from Oldbridge to PVSC would run around $ .25/gallon based on that quantity and project duration (one load one time).

Thanks

Scott Withers
Environmental Compliance Manager / Inside Sales Specialist
Russell Reid Company
Office: (732) 692-2447
Cell: (732) 539-6586
Fax: (732) 417-0367
swithers@russellreid.com
www.russellreid.com
Please consider the environment before printing this e-mail

Attachment C

MCACES MII Input Backup

EM 1110-2-1304
Civil Works Construction Cost Index System

Special Notice

Due to the volatility of the market, the index for CWBS - Feature Code 12, Navigation Ports and Harbors, has exhibited extreme ups and downs. It is necessary to smooth out the 4th quarter of 2006 and the 1st quarter of 2007 to reduce negative impacts on the calculation of escalation using Feature Code 12. If your project used Feature Code 12 to calculate escalation or index the project, you will need to revisit the calculations. This adjustment is reflected in the indexes in tables A-1 and A-2 in appendix A, revised 30 September 2007 and in future revised appendix A.

US Army Corps of Engineers®

EM 1110-2-1304
31 March 2000

Tables Revised as of 30 September 2011

Civil Works Construction Cost Index System (CWCCIS)

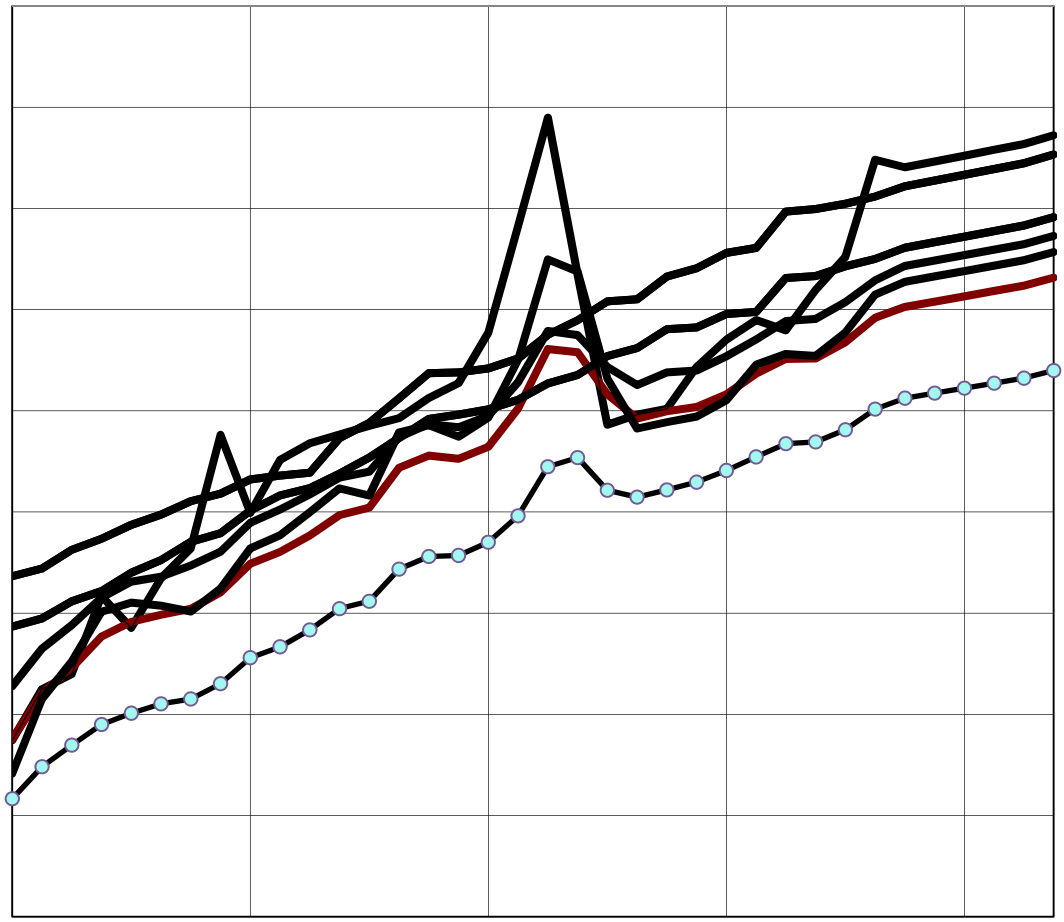


TABLE A-1, QUARTERLY COST INDEXES BY CWBS FEATURE CODE
Base Year 1967 = 100

CWBS - FEATURE CODES		Wt %	1Q10 2009 (Oct - Dec)	2Q10 2010 (Jan - Mar)	3Q10 2010 (Apr - Jun)	4Q10 2010 (Jul - Sep)	1Q11 2010 (Oct - Dec)	2Q11 2011 (Jan - Mar)	3Q11 2011 (Apr - Jun)	4Q11* 2011 (Jul - Sep)
02	RELOCATIONS	5%	715.45	727.79	733.68	732.86	741.60	751.70	756.65	759.30
03	RESERVOIRS	5%	778.06	780.49	798.39	799.72	802.29	805.88	810.95	813.79
04	DAMS	15%	708.05	715.18	723.36	723.26	729.81	740.20	746.49	749.10
05	LOCKS	2%	708.17	718.31	725.64	725.88	733.84	745.93	751.30	753.93
06	FISH & WILDLIFE FACILITIES	5%	696.93	707.21	712.33	711.42	718.73	730.44	735.53	738.10
07	POWER PLANT	10%	670.51	677.22	683.75	684.61	690.66	700.84	706.24	708.71
08	ROADS, RAILROADS & BRIDGES	10%	715.45	727.79	733.68	732.86	741.60	751.70	756.65	759.30
09	CHANNELS & CANALS	3%	726.21	727.34	738.67	740.12	745.50	749.61	758.35	761.00
10	BREAKWATER & SEAWALLS	5%	714.39	715.35	722.61	723.34	730.49	736.06	745.45	748.06
11	LEVEES & FLOODWALLS	5%	726.98	735.23	744.32	745.35	753.70	764.46	771.51	774.21
12	NAVIGATION PORTS & HARBORS	10%	735.18	744.79	739.80	759.65	775.94	824.07	820.30	823.17
13	PUMPING PLANT	5%	705.25	722.76	728.03	727.14	738.68	757.43	763.70	766.37
14	RECREATION FACILITIES	5%	705.25	722.76	728.03	727.14	738.68	757.43	763.70	766.37
15	FLOODWAY CONTROL & DIVERSION STRUCTURE	2%	696.93	707.21	712.33	711.42	718.73	730.44	735.53	738.10
16	BANK STABILIZATION	2%	731.87	734.65	743.86	745.72	751.63	754.97	760.48	763.14
17	BEACH REPLENISHMENT	2%	747.83	748.86	765.59	766.53	771.39	775.02	780.58	783.31
18	CULTURAL RESOURCE PRESERVATION	2%	705.25	722.76	728.03	727.14	738.68	757.43	763.70	766.37
19	BUILDINGS, GROUNDS & UTILITIES	5%	705.25	722.76	728.03	727.14	738.68	757.43	763.70	766.37
20	PERMANENT OPERATING EQUIPMENT	2%	705.25	722.76	728.03	727.14	738.68	757.43	763.70	766.37
COMPOSITE INDEX (WEIGHTED AVERAGE)		100%	713.39	722.89	729.23	731.19	739.86	754.65	759.71	762.37

Note: FY indicates data developed based on OMB projections.*

[1st QTR = 2 OCT THRU 31 DEC/1 JAN] [2nd QTR = 2 JAN THRU 31 MAR/ 1 APR] [3rd QTR = 2 APR THRU 30 JUN/ 1 JUL] [4th QTR = 2 JUL THRU 30 SEPT/ 1 OCT]

TABLE A-1, QUARTERLY COST INDEXES BY CWBS FEATURE CODE
Base Year 1967 = 100

CWBS - FEATURE CODES		Wt %	1Q12* 2011 (Oct - Dec)	2Q12* 2012 (Jan - Mar)	3Q12* 2012 (Apr - Jun)	4Q12* 2012 (Jul - Sep)	1Q13* 2012 (Oct - Dec)	2Q13* 2013 (Jan - Mar)	3Q13* 2013 (Apr - Jun)	4Q13* 2013 (Jul - Sep)
02	RELOCATIONS	5%	761.95	764.59	767.24	771.26	773.85	776.96	780.08	783.19
03	RESERVOIRS	5%	816.63	819.46	822.30	826.61	829.38	832.72	836.06	839.40
04	DAMS	15%	751.72	754.33	756.94	760.90	763.46	766.53	769.60	772.68
05	LOCKS	2%	756.56	759.19	761.82	765.80	768.38	771.47	774.56	777.65
06	FISH & WILDLIFE FACILITIES	5%	740.68	743.25	745.83	749.73	752.25	755.28	758.30	761.33
07	POWER PLANT	10%	711.18	713.66	716.13	719.88	722.29	725.20	728.11	731.01
08	ROADS, RAILROADS & BRIDGES	10%	761.95	764.59	767.24	771.26	773.85	776.96	780.08	783.19
09	CHANNELS & CANALS	3%	763.66	766.31	768.97	772.99	775.59	778.71	781.83	784.95
10	BREAKWATER & SEAWALLS	5%	750.67	753.28	755.89	759.84	762.39	765.46	768.53	771.60
11	LEVEES & FLOODWALLS	5%	776.91	779.61	782.31	786.40	789.05	792.22	795.40	798.57
12	NAVIGATION PORTS & HARBORS	10%	826.04	828.91	831.78	836.14	838.95	842.32	845.70	849.07
13	PUMPING PLANT	5%	769.05	771.72	774.39	778.44	781.06	784.20	787.35	790.49
14	RECREATION FACILITIES	5%	769.05	771.72	774.39	778.44	781.06	784.20	787.35	790.49
15	FLOODWAY CONTROL & DIVERSION STRUCTURE	2%	740.68	743.25	745.83	749.73	752.25	755.28	758.30	761.33
16	BANK STABILIZATION	2%	765.80	768.47	771.13	775.16	777.77	780.90	784.03	787.16
17	BEACH REPLENISHMENT	2%	786.04	788.78	791.51	795.65	798.32	801.54	804.75	807.96
18	CULTURAL RESOURCE PRESERVATION	2%	769.05	771.72	774.39	778.44	781.06	784.20	787.35	790.49
19	BUILDINGS, GROUNDS & UTILITIES	5%	769.05	771.72	774.39	778.44	781.06	784.20	787.35	790.49
20	PERMANENT OPERATING EQUIPMENT	2%	769.05	771.72	774.39	778.44	781.06	784.20	787.35	790.49
COMPOSITE INDEX (WEIGHTED AVERAGE)		100%	765.03	767.69	770.34	774.37	776.98	780.10	783.23	786.36

Note: FY indicates data developed based on OMB projections.*

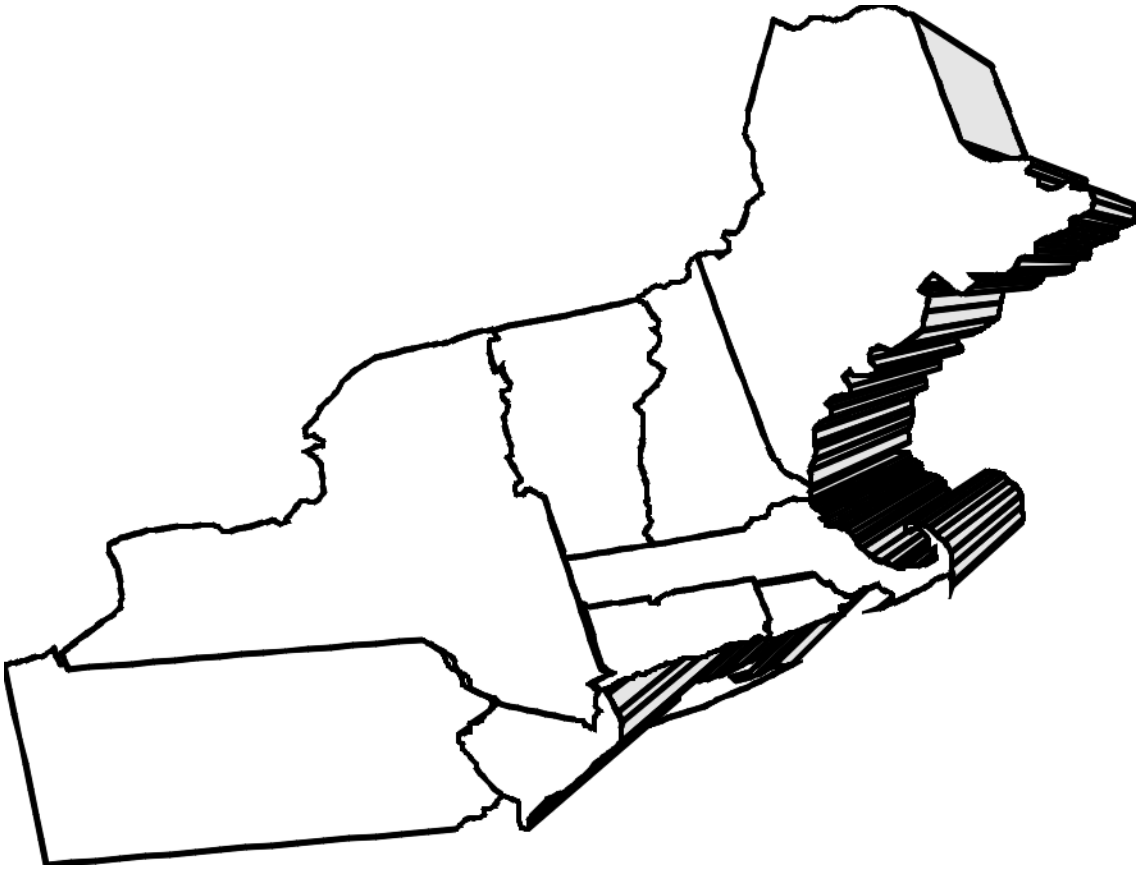
[1st QTR = 2 OCT THRU 31 DEC/1 JAN] [2nd QTR = 2 JAN THRU 31 MAR/ 1 APR] [3rd QTR = 2 APR THRU 30 JUN/ 1 JUL] [4th QTR = 2 JUL THRU 30 SEPT/ 1 OCT]

US Army Corps
of Engineers®

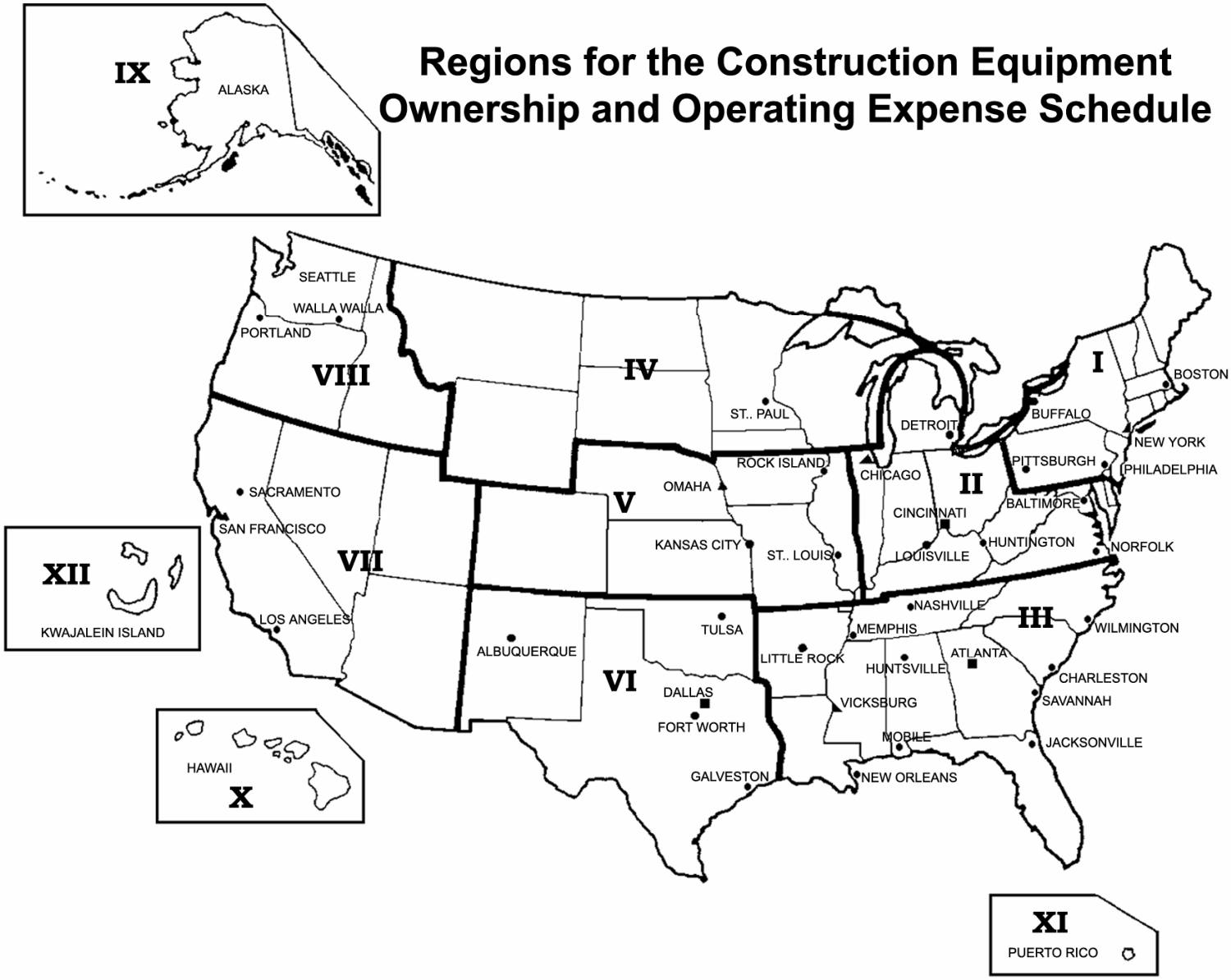
EP 1110-1-8
Volume 1
November 2009

Construction Equipment Ownership and Operating Expense Schedule

Region I



Regions for the Construction Equipment Ownership and Operating Expense Schedule



APPENDIX B AREA FACTORS

APPENDIX B

AREA FACTORS

NORTHEAST

Region: 1

Total State Sales or Import Tax Rate:	5.80%	
Working Hours Per Year (WHPY):	1,360	hrs/yr
Labor Adjustment Factor (LAF):	1.12	
Electricity Cost Per Kilowatt-Hour:	$0.142	/kW-Hr
Gasoline Cost Per Gallon:	$3.01	/gal
Diesel Cost Per Gallon (Off-Road Use):	$3.17	/gal
Diesel Cost Per Gallon (On-Road Use):	$3.71	/gal
Cost-of-Money Rate (Full Rate):	4.875%	
Cost-of-Money Rate (Adjusted):	3.900%	

Freight Rates

over	0	cwt	thru	240	$17.42
over	240	cwt	thru	300	$16.01
over	300	cwt	thru	400	$13.92
over	400	cwt	thru	500	$11.96
over	500	cwt	thru	700	$6.15
over	700	cwt	thru	800	$6.15
over	800	cwt	thru	99,999	$9.14

DOE/EIA-0226 (2011/09)

Electric Power Monthly
September 2011

With Data for June 2011

U.S. Energy Information Administration
Office of Electricity, Renewables & Uranium Statistics
U.S. Department of Energy
Washington, DC 20585

This report is available on the Web at:
http://www.eia.gov/cneaf/electricity/epm/epm_sum.html

This report was prepared by the U.S. Energy Information Administration (EIA), the statistical and analytical agency within the U.S. Department of Energy. By law, EIA's data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views in this report therefore should not be construed as representing those of the Department of Energy or other Federal agencies.

Table 5.6.A. Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, June 2011 and 2010

(Cents per Kilowatthour)

Census Division and State	Residential		Commercial[1]		Industrial[1]		Transportation[1]		All Sectors	
	Jun 2011	Jun 2010	Jun 2011	Jun 2010	Jun 2011	Jun 2010	Jun 2011	Jun 2010	Jun 2011	Jun 2010
New England	**16.27**	**16.34**	**14.73**	**14.83**	**13.28**	**13.24**	**7.74**	**8.00**	**14.93**	**14.99**
Connecticut	18.40	19.44	15.58	16.36	13.39	14.62	9.47	10.03	16.41	17.32
Maine	15.33	15.77	11.81	12.31	8.89	8.67	--	--	12.35	12.53
Massachusetts	15.37	14.63	15.34	14.78	14.49	14.09	6.18	6.05	15.03	14.46
New Hampshire	16.83	16.25	14.19	14.08	12.53	12.78	--	--	14.89	14.68
Rhode Island	14.05	16.53	13.21	13.64	11.79	12.23	14.29	13.91	13.36	14.56
Vermont	16.28	15.78	13.92	13.51	10.02	9.44	--	--	13.77	13.22
Middle Atlantic	**16.28**	**16.30**	**14.52**	**14.70**	**8.29**	**8.58**	**13.23**	**13.50**	**13.92**	**14.17**
New Jersey	16.00	16.88	14.46	15.22	12.26	12.72	11.60	12.86	14.84	15.66
New York	19.07	19.09	17.07	17.27	7.72	9.76	14.79	15.22	16.82	17.14
Pennsylvania	13.73	13.35	10.19	10.24	7.81	7.49	8.58	8.13	10.58	10.50
East North Central	**12.21**	**12.01**	**9.80**	**9.58**	**6.80**	**6.56**	**8.07**	**7.61**	**9.57**	**9.39**
Illinois	12.09	12.68	9.02	9.07	6.71	6.60	8.05	7.45	9.35	9.59
Indiana	10.21	9.47	8.85	8.21	6.42	5.86	10.12	9.04	8.24	7.65
Michigan	13.80	12.90	11.00	10.70	7.72	7.33	9.24	10.84	10.91	10.43
Ohio	12.02	12.10	9.69	9.70	6.26	6.39	6.82	8.96	9.32	9.41
Wisconsin	13.68	12.96	10.89	10.16	7.61	7.22	--	--	10.58	10.04
West North Central	**11.00**	**10.40**	**8.98**	**8.46**	**6.47**	**6.14**	**9.68**	**8.06**	**8.97**	**8.54**
Iowa	11.17	10.74	8.41	8.03	5.38	5.55	--	--	7.96	7.92
Kansas	11.02	10.21	9.15	8.32	7.01	6.18	--	--	9.33	8.53
Minnesota	11.40	10.83	9.12	8.87	6.92	6.48	9.47	7.69	9.10	8.76
Missouri	10.99	10.34	9.29	8.65	6.87	6.41	9.87	8.51	9.56	9.00
Nebraska	10.40	10.00	8.64	8.17	6.43	6.22	--	--	8.40	8.12
North Dakota	10.22	9.36	8.30	7.66	6.30	5.72	--	--	8.10	7.49
South Dakota	10.17	9.74	8.22	7.97	6.32	6.01	--	--	8.48	8.17
South Atlantic	**11.54**	**11.38**	**9.61**	**9.40**	**7.08**	**6.78**	**9.82**	**10.05**	**10.08**	**9.87**
Delaware	14.17	14.45	10.63	11.69	9.37	9.82	--	9.00	11.72	12.30
District of Columbia	14.12	14.33	13.11	14.04	8.98	8.39	11.25	11.23	13.18	13.89
Florida	11.82	11.72	9.93	9.82	9.18	8.90	8.55	8.79	10.89	10.77
Georgia	12.07	10.95	10.39	9.27	7.61	6.69	9.26	8.58	10.55	9.46
Maryland	13.72	15.19	11.58	11.94	9.18	9.36	9.86	10.65	12.26	13.10
North Carolina	10.26	10.22	8.10	8.20	6.07	6.29	7.06	7.44	8.72	8.70
South Carolina	10.87	10.85	9.51	9.12	6.11	5.78	--	--	9.00	8.72
Virginia	11.10	10.83	7.98	7.62	6.66	6.69	8.26	7.90	9.09	8.84
West Virginia	9.42	8.64	7.92	7.25	6.07	5.64	8.16	7.25	7.72	7.14
East South Central	**10.31**	**9.83**	**9.96**	**9.30**	**6.77**	**6.18**	**11.29**	**10.62**	**9.00**	**8.46**
Alabama	11.43	10.97	10.73	10.15	7.15	6.50	--	--	9.77	9.25
Kentucky	9.19	8.50	8.64	7.69	5.58	5.22	--	--	7.46	6.92
Mississippi	10.41	10.29	9.62	9.33	7.18	6.61	--	--	9.16	8.85
Tennessee	9.98	9.52	10.33	9.73	7.69	6.87	11.29	10.62	9.46	8.87
West South Central	**10.79**	**10.90**	**8.82**	**8.74**	**6.37**	**6.06**	**9.93**	**10.10**	**9.00**	**8.90**
Arkansas	9.41	9.37	7.73	7.70	6.10	5.88	11.84	11.91	7.82	7.71
Louisiana	9.48	8.80	8.71	8.09	6.28	5.47	8.53	9.86	8.25	7.52
Oklahoma	9.67	9.28	8.01	7.87	5.97	5.73	--	--	8.27	7.94
Texas	11.43	11.84	9.09	9.12	6.50	6.33	10.16	10.13	9.44	9.54
Mountain	**11.22**	**11.25**	**9.45**	**9.32**	**6.49**	**6.58**	**10.28**	**10.29**	**9.17**	**9.23**
Arizona	11.77	11.75	10.34	9.99	7.00	7.36	--	--	10.52	10.51
Colorado	11.99	11.92	10.19	10.04	7.41	7.14	10.42	10.94	9.96	9.93
Idaho	8.48	8.17	6.98	6.84	6.00	5.68	--	--	6.95	6.67
Montana	10.18	9.40	9.22	8.44	5.10	5.30	--	--	8.13	7.63
Nevada	11.55	12.42	8.72	9.69	7.37	8.53	9.52	10.12	9.11	10.23
New Mexico	11.53	11.29	9.36	9.09	6.31	5.98	--	--	9.07	8.85
Utah	9.29	9.13	8.06	7.96	5.64	5.64	10.27	9.42	7.60	7.57
Wyoming	9.47	9.11	7.99	7.57	5.19	4.87	--	--	6.44	6.11
Pacific Contiguous	**13.03**	**13.07**	**13.66**	**13.60**	**8.12**	**8.43**	**8.21**	**8.36**	**12.13**	**12.24**
California	15.32	15.56	15.75	15.71	11.83	11.86	8.19	8.41	14.85	14.92
Oregon	9.71	9.04	8.26	7.68	5.45	5.26	8.64	6.99	7.99	7.50
Washington	8.48	8.17	7.49	7.28	3.39	3.68	9.09	7.35	6.41	6.45
Pacific Noncontiguous	**29.33**	**24.13**	**25.65**	**21.10**	**25.91**	**20.12**	**--**	**--**	**26.84**	**21.69**
Alaska	18.27	16.79	15.77	14.59	15.04	14.18	--	--	16.36	15.17
Hawaii	35.84	28.36	33.48	26.14	29.85	22.16	--	--	32.87	25.33
U.S. Total	**12.06**	**11.95**	**10.77**	**10.61**	**7.21**	**7.00**	**11.16**	**11.36**	**10.37**	**10.23**

[1] See Technical notes for additional information on the Commercial, Industrial, and Transportation sectors.

Notes: • See Glossary for definitions. • Values for 2010 and 2011 are preliminary estimates based on a cutoff model sample. See Technical Notes for a discussion of the sample design for the Form EIA-826. • Utilities and energy service providers may classify commercial and industrial customers based on either NAICS codes or demands or usage falling within specified limits by rate schedule. • Changes from year to year in consumer counts, sales and revenues, particularly involving the commercial and industrial consumer sectors, may result from respondent implementation of changes in the definitions of consumers, and reclassifications. • Retail sales and net generation may not correspond exactly for a particular month for a variety of reasons (i.e., sales data may include imported electricity). • Net generation is for the calendar month while retail sales and associated revenue accumulate from bills collected for periods of time (28 to 35 days) that vary dependent upon customer class and consumption occurring in and outside the calendar month. • Totals may not equal sum of components because of independent rounding.

Source: U.S. Energy Information Administration, Form EIA-826, "Monthly Electric Sales and Revenue Report with State Distributions Report."

AAA's Daily Fuel Gauge Report *The most comprehensive nationwide fuel price survey available from any source.*

Prices Updated As Of: 10/27/2011 3:02:56 AM

NJ Metro Averages
**Prices Are In US Dollars Per Gallon.*

Atlantic-Cape May	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.297	$3.423	$3.563	$3.718
Yesterday	$3.305	$3.439	$3.568	$3.725
Week Ago	$3.350	$3.463	$3.583	$3.718
Month Ago	$3.392	$3.529	$3.660	$3.699
Year Ago	$2.702	$2.897	$3.007	$2.954

Highest Recorded Average Price:

Regular Unl.	$3.997	6/17/2008
Dsl.	$4.804	6/19/2008

Bergen-Passaic	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.356	$3.551	$3.699	$3.786
Yesterday	$3.361	$3.552	$3.694	$3.777
Week Ago	$3.385	$3.579	$3.714	$3.785
Month Ago	$3.460	$3.624	$3.778	$3.794
Year Ago	$2.727	$2.924	$3.035	$3.043

Highest Recorded Average Price:

Regular Unl.	$4.008	7/6/2008
Dsl.	$4.862	7/17/2008

Middlesex-Somerset-Hunterdon	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.326	$3.513	$3.638	$3.728
Yesterday	$3.335	$3.533	$3.653	$3.741
Week Ago	$3.368	$3.540	$3.661	$3.724
Month Ago	$3.419	$3.616	$3.734	$3.727
Year Ago	$2.746	$2.945	$3.056	$3.027

Highest Recorded Average Price:

Regular Unl.	$4.003	7/8/2008
Dsl.	$4.794	6/11/2008

Monmouth-Ocean	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.292	$3.460	$3.588	$3.744
Yesterday	$3.301	$3.461	$3.587	$3.741
Week Ago	$3.340	$3.483	$3.613	$3.736
Month Ago	$3.381	$3.546	$3.676	$3.745
Year Ago	$2.726	$2.923	$3.034	$3.006

Highest Recorded Average Price:

Regular Unl.	$3.990	7/9/2008
Dsl.	$4.812	6/17/2008

Newark	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.345	$3.545	$3.674	$3.761
Yesterday	$3.355	$3.555	$3.684	$3.756
Week Ago	$3.379	$3.571	$3.694	$3.759
Month Ago	$3.438	$3.626	$3.751	$3.760
Year Ago	$2.741	$2.939	$3.050	$3.020

Highest Recorded Average Price:

Regular Unl.	$4.004	7/8/2008

Dsl.	$4.818	6/11/2008		

Philadelphia (NJ Only)	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.279	$3.405	$3.529	$3.687
Yesterday	$3.290	$3.411	$3.523	$3.685
Week Ago	$3.334	$3.444	$3.566	$3.678
Month Ago	$3.351	$3.462	$3.584	$3.665
Year Ago	$2.698	$2.892	$3.002	$2.959

Highest Recorded Average Price:

Regular Unl.	$3.998	6/14/2008
Dsl.	$4.755	5/29/2008

Trenton	**Regular**	**Mid**	**Premium**	**Diesel**
Current	$3.376	$3.537	$3.661	$3.783
Yesterday	$3.385	$3.549	$3.669	$3.775
Week Ago	$3.411	$3.565	$3.684	$3.774
Month Ago	$3.444	$3.595	$3.748	$3.779
Year Ago	$2.750	$2.949	$3.061	$3.084

Highest Recorded Average Price:

Regular Unl.	$4.032	7/10/2008
Dsl.	$4.786	5/31/2008

Explanatory Notes

The Explanatory Notes contain descriptions of the survey forms, sampling frames, sample design, sampling variability, imputation and estimation, and other technical information concerning the surveys. You may obtain a complete set of the Explanatory Notes for the *Petroleum Marketing Monthly* through the following sources:

1) Visit the EIA Website, *Petroleum Marketing Annual*, Explanatory Notes

2) The National Energy Information Center on (202) 586-8800 or infoctr@eia.doe.gov.

Petroleum Administration for Defense (PAD) Districts

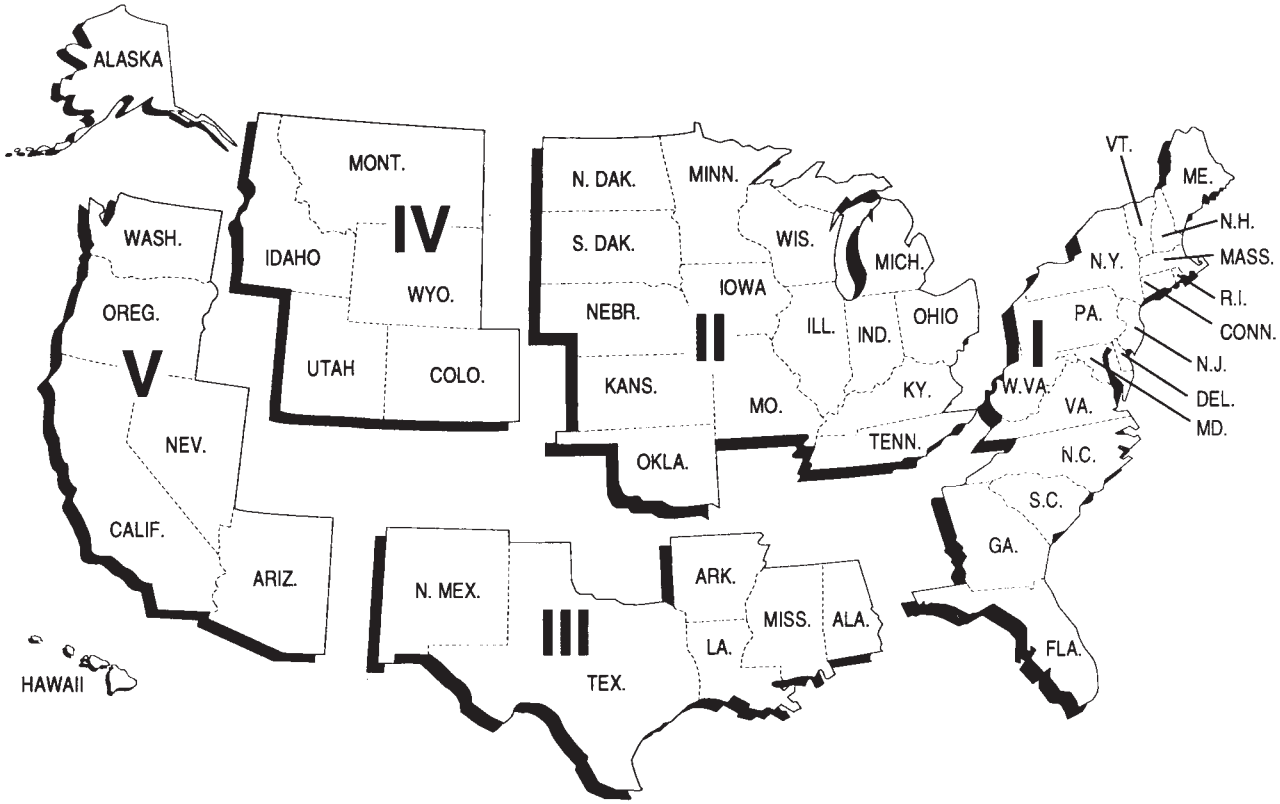


Table EN1. Federal and State Motor Fuels Taxes[1] (Cents per Gallon)

	Motor Gasoline	Diesel Fuel	Gasohol		Motor Gasoline	Diesel Fuel	Gasohol
Federal[2]	18.40	24.40	18.40	Mississippi[4]	18.00	18.00	18.00
Average State Tax	22.68	23.18	22.62	Missouri[4]	17.00	17.00	17.00
				Montana[4]	27.00	27.75	27.00
Alabama[4]	18.00	19.00	18.00	Nebraska	26.30	26.30	26.30
Alaska[5]	8.00	8.00	8.00	Nevada[4]	23.00	27.00	23.00
Arizona	18.00	18.00	18.00	New Hampshire	19.63	19.63	19.63
Arkansas	21.50	22.50	21.50	New Jersey[3]	10.50	13.50	10.50
California[3,4]	35.70	13.00	35.70	New Mexico	18.90	22.90	18.90
Colorado	22.00	20.50	22.00	New York[3,4]	25.05	23.25	25.05
Connecticut[3]	25.00	46.20	25.00	North Carolina	35.00	35.00	35.00
Delaware	23.00	22.00	23.00	North Dakota	23.00	23.00	23.00
District of Columbia	23.50	23.50	23.50	Ohio	28.00	28.00	28.00
Florida[4]	16.20	29.60	16.20	Oklahoma	17.00	14.00	17.00
Georgia[3,4]	7.50	7.50	7.50	Oregon[4]	30.00	30.00	30.00
Hawaii[3,4]	17.00	17.00	17.00	Pennsylvania	31.20	38.10	31.20
Idaho	25.00	25.00	25.00	Rhode Island	32.00	32.00	32.00
Illinois[3,4]	19.00	21.50	19.00	South Carolina[4]	16.00	16.00	16.00
Indiana[3]	18.00	16.00	18.00	South Dakota	24.00	24.00	22.60
Iowa[3]	21.00	22.50	19.00	Tennessee	21.40	18.40	21.40
Kansas	24.00	26.00	24.00	Texas	20.00	20.00	20.00
Kentucky	26.40	23.40	26.40	Utah	24.50	24.50	24.50
Louisiana	20.00	20.00	20.00	Vermont[3]	25.00	29.00	25.00
Maine	30.00	31.20	30.00	Virginia[3]	17.50	17.50	17.50
Maryland	23.50	24.25	23.50	Washington[4]	37.50	37.50	37.50
Massachusetts	21.00	21.00	21.00	West Virginia	32.20	32.20	32.20
Michigan[3]	19.00	15.00	19.00	Wisconsin	32.90	32.90	32.90
Minnesota	28.00	28.00	28.00	Wyoming	14.00	14.00	14.00

[1] This figure lists rates of general application (including, but not limited to, excise taxes, environmental taxes, special taxes, and inspection fees), exclusive of county and local taxes. Rates are also exclusive of any State taxes based on gross or net receipts. The State rates are effective July 1, 2011.

[2] The Federal tax on motor gasoline and diesel fuel increased to 18.4 and 24.4 cents, respectively, on October 1, 1997. The Federal tax on gasohol increased to 18.4 cents on January 1, 2005.

[3] Additional State taxes are levied as follows: California: 2.25 percent sales tax on gasoline, 9.12 percent sales tax on diesel fuel; Connecticut: 7.0 percent gross earnings tax; Georgia:4 percent Prepaid State Tax; Hawaii: 4 percent gross income tax, $1.05 per barrel Environmental Response, Energy, and Food Security Tax; Illinois: 6.25 percent sales tax (suspended for the period beginning July 1, 2000, and ending December 31, 2000); Indiana: 7 percent sales tax (suspended for the period between July 1, 2000 and September 15, 2000); Iowa: 1.0 cent per gallon Environmental Protection Charge; Michigan: 6 percent sales tax; New Jersey: gross receipts tax of 4 cents per gallon for on-highway use fuels; New York: 8.0 cents per gallon State sales tax in addition to local sales taxes; Virginia: 2 percent sales tax in areas where mass transit systems exist; Vermont: Motor Fuels Transportation Infrastructure Assessment Fee (subject to change on a quarterly basis for gasoline and 3.0 cents per gallon on diesel fuel).

[4] Local option taxes (LOTS) are allowed. In Florida, the State assesses a State Comprehensive Enhanced Transportation System (SCETS) tax on gasoline which is two-thirds of each county's rate. In addition, the State collects a "ninth cent tax" and a second local tax. These taxes add an unweighted average of 15.2 cents to the gasoline State tax. In Hawaii, LOTS are as follows: Honolulu: 16.5 cents per gallon; Maui: 16.0 cents per gallon; Hawaii: 8.8 cents per gallon; Kauai: 13.0 cents per gallon. In Nevada, additional county taxes on gasoline range from 5 to 10 cents per gallon.

[5] The State of Alaska suspended its motor fuels taxes on all fuel types and uses for a period of one year beginning September 1, 2008 and ending August 31, 2009.

TreasuryDirect®

Prompt Payment Act Interest Rate

Renegotiation Board Interest Rate; **Prompt Payment Act Interest Rate**; **Contract Dispute Act Interest Rate**

Although the Renegotiation Board is no longer in existence, other federal agencies are required to use interest rates computed under the criteria established by the Renegotiation Act of 1971 (P.L. 92-41). For example, the Contract Dispute Act of 1978 (P.L. 95-563) and the Prompt Payment Act (P.L. 97-177) provide for interest due on claims at a rate established by the Secretary of the Treasury pursuant to 31 U.S.C. § 3902(a).

For the period beginning July 1, 2011 and ending December 31, 2011, the rate of interest applicable for the purpose of the cited sections is 2.500% (2.500 per centum) per annum. The rate of interest was published in the Federal Register Volume 76, Number 127, page 38742 on Friday, July 1, 2011.

(Updated July 1, 2011)

Previous Rates

Period	Rate	Federal Register
Jan 11 - Jun 11	2-5/8%	Vol. 75 #249, 12/29/10, page 82146
Jul 10 - Dec 10	3-1/8%	Vol. 75 #125, 06/30/10, page 37881
Jan 10 - Jun 10	3-1/4%	Vol. 74 #250, 12/31/09, pages 69379-69380
Jul 09 - Dec 09	4-7/8%	Vol. 74 #126, 07/02/09, page 31794
Jan 09 - Jun 09	5-5/8%	Vol. 73 #250, 12/30/08, pages 79977-79978
Jul 08 - Dec 08	5-1/8%	Vol. 73 #127, 07/01/08, page 37529
Jan 08 - Jun 08	4-3/4%	Vol. 72 #249, Monday, 12/31/07, page 74408
Jul 07 - Dec 07	5-3/4%	Vol. 72 #125, Friday, 06/29/07, pages 35742-35743
Jan 07 - Jun 07	5-1/4%	Vol. 71 #250, Friday, 12/29/06, pages 78513-78514
Jul 06 - Dec 06	5-3/4%	Vol. 71 #126, Friday, 06/30/06, pages 37638-37639
Jan 06 - Jun 06	5-1/8%	Vol. 70 #247, Tuesday, 12/27/05, page 76497
Jul 05 - Dec 05	4-1/2%	Vol. 70 #126, Friday, 07/01/05, page 38253
Jan 05 - Jun 05	4-1/4%	Vol. 69 #250, Thursday, 12/30/04, pages 78522-78523
Jul 04 - Dec 04	4-1/2%	Vol. 69 #124, Tuesday, 06/29/04, pages 38952-38953
Jan 04 - Jun 04	4%	Vol. 68 #249, Tuesday, 12/30/03, page 75317
Jul 03 - Dec 03	3-1/8%	Vol. 68 #126, Tuesday, 07/01/03, page 39185
Jan 03 - Jun 03	4-1/4%	Vol. 67 #247, Tuesday, 12/24/02, page 78566
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Jan 02 - Jun 02	5-1/2%	Vol. 66 #249, Friday, 12/28/01, page 67366
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Jan 84 - Jun 84	12-3/8%	Vol. 48 # 249, Tuesday, 12/27/83, page 57044
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Jan 83 - Jun 83	11-1/4%	Vol. 47 # 247, Thursday, 12/23/82, page 57388
Jul 82 - Dec 82	15-1/2%	Vol. 47 # 123, Friday, 6/25/82, page 27654
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Jul 80 - Dec 80	10-1/2%	Vol. 45 # 126, Friday, 6/27/80, page 43515
Jan 80 - Jun 80	12-1/4%	Vol. 45 # 8, Friday, 1/11/80, page 2456

Sales and Use Tax (N.J.S.A.54:32B-1 et seq.)
Overview

Description

Sales and Use Tax applies to receipts from retail sale, rental, or use of tangible personal property or digital property; retail sale of producing, fabricating, processing, installing, maintaining, repairing, and servicing tangible personal property or digital property; maintaining, servicing, or repairing real property; certain direct-mail services; tattooing, tanning, and massage services; investigation and security services; information services; limousine services; sales of restaurant meals and prepared food; rental of hotel and motel rooms; certain admission charges; certain membership fees; parking charges; storage services; sales of magazines and periodicals; delivery charges; and telecommunications services, except as otherwise provided in the Sales and Use Tax Act.

A compensating use tax is also imposed when taxable goods and services are purchased and New Jersey sales tax is either not collected or is collected at a rate less than New Jersey's sales tax rate. The use tax is due when such goods, or the goods on which taxable services are performed, come into New Jersey. If sales tax was paid to another state, the use tax is only due if the tax was paid at a rate less than New Jersey's rate.

All persons required to collect the tax must file a Business Registration Application (Form NJ-REG). Each registrant's authority to collect the sales tax is certified by a Certificate of Authority issued by the Division, which must be prominently displayed at each place of business to which it applies.

Major exemptions include: sales of newspapers; magazines and periodicals sold by subscription and membership periodicals; casual sales except motor vehicles and registered boats; clothing; farm supplies and equipment; flags of New Jersey and the United States; unprepared food and food ingredients purchased for human consumption; food sold in school cafeterias; prescription and certain nonprescription drugs and other medical aids; motor fuels; textbooks; professional and personal services unless otherwise taxable under the Act; real estate sales; tangible personal property used in research and development; production machinery and equipment.

The Sales and Use Tax Act was amended, effective October 1, 2005, to conform New Jersey's law to the requirements of the Streamlined Sales and Use Tax Agreement

(SSUTA), which is a multi-state effort to simplify and modernize the collection and administration of sales and use taxes. The adoption of the SSUTA resulted in significant changes in New Jersey's tax policy and administration, including uniform product definitions and changes in the taxability of specific items. In addition, the SSUTA

provided for the creation of a new central registration system, certain amnesty provisions, and minor changes in the treatment of exemption certificates.

Rate

The rate of tax is 7% on taxable sales occurring on or after July 15, 2006. Formerly, the tax rate was 6%.

Disposition of Revenues

Revenues are deposited in the State Treasury for general State use.

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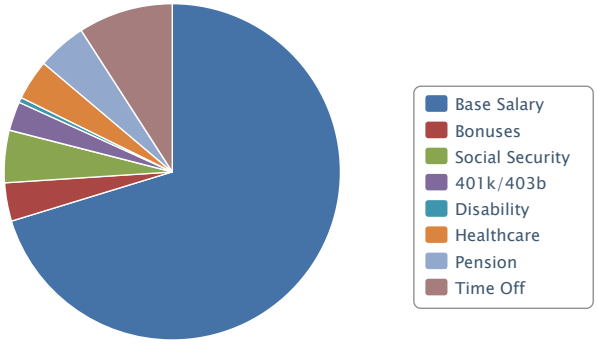

Core Compensation	Median	% of Total
Base Salary	$117,195	70.2%
Bonuses	$6,175	3.7%
Value of Benefits		
Social Security	$8,410	5.0%
401K/403B	$4,688	2.8%
Disability	$864	0.5%
Healthcare	$6,507	3.9%
Pension	$7,896	4.7%
Time Off	$15,184	9.1%
Total Compensation	**$166,920**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

Value of Benefits indicates the employer's expected contribution and paid time off.

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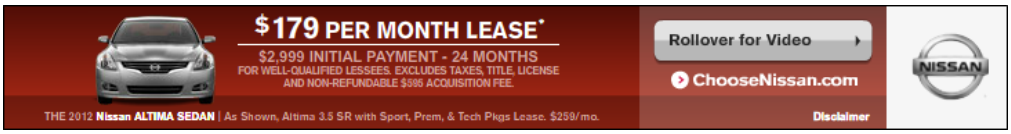

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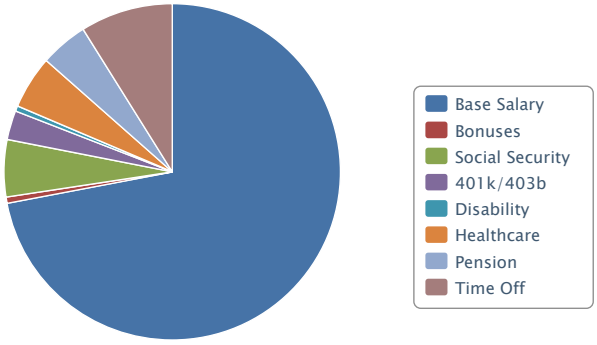
Civil Engineer III



Core Compensation	Median	% of Total
Base Salary	$91,883	72.0%
Bonuses	$722	0.6%
Value of Benefits		
Social Security	$7,084	5.5%
401K/403B	$3,519	2.8%
Disability	$648	0.5%
Healthcare	$6,507	5.1%
Pension	$5,927	4.6%
Time Off	$11,398	8.9%
Total Compensation	**$127,688**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

Value of Benefits indicates the employer's expected contribution and paid time off.

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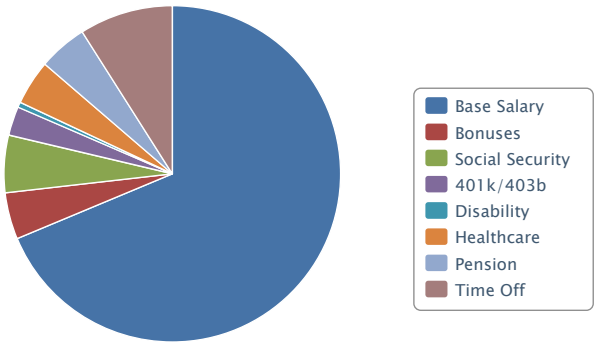

Core Compensation	Median	% of Total
Base Salary	$103,043	68.7%
Bonuses	$6,707	4.5%
Value of Benefits		
Social Security	$8,213	5.5%
401K/403B	$4,171	2.8%
Disability	$768	0.5%
Healthcare	$6,507	4.3%
Pension	$7,024	4.7%
Time Off	$13,508	9.0%
Total Compensation	**$149,941**	**100%**

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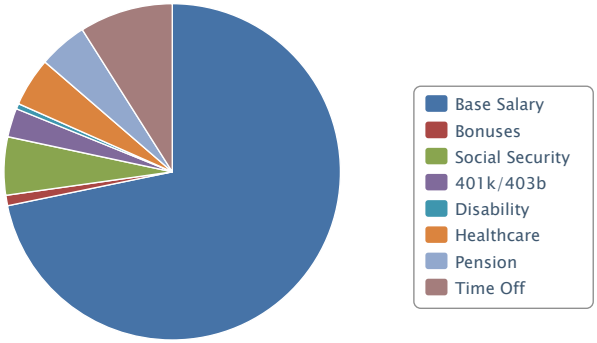

Core Compensation	Median	% of Total
Base Salary	$100,364	71.9%
Bonuses	$1,409	1.0%
Value of Benefits		
Social Security	$7,786	5.6%
401K/403B	$3,867	2.8%
Disability	$712	0.5%
Healthcare	$6,507	4.7%
Pension	$6,513	4.7%
Time Off	$12,526	9.0%
Total Compensation	**$139,685**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

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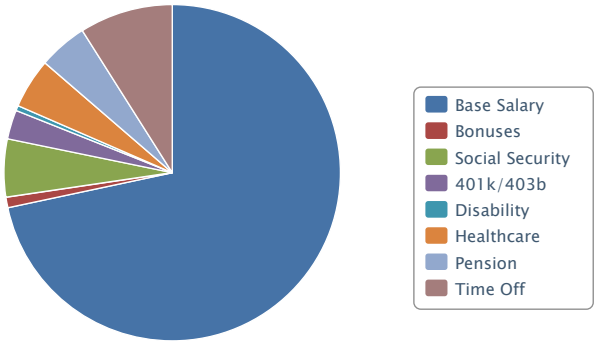

Core Compensation	Median	% of Total
Base Salary	$98,260	71.8%
Bonuses	$1,370	1.0%
Value of Benefits		
Social Security	$7,622	5.6%
401K/403B	$3,786	2.8%
Disability	$697	0.5%
Healthcare	$6,507	4.8%
Pension	$6,376	4.7%
Time Off	$12,262	9.0%
Total Compensation	**$136,881**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

Value of Benefits indicates the employer's expected contribution and paid time off.

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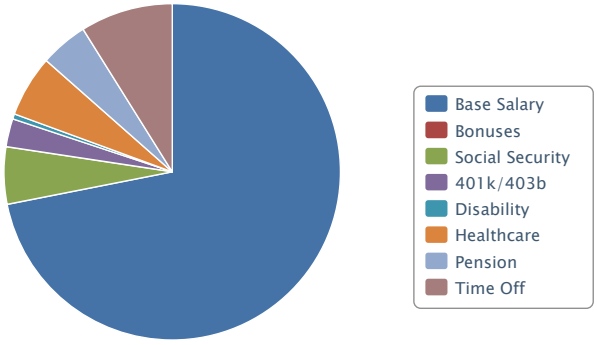

Core Compensation	Median	% of Total
Base Salary	$79,640	71.9%
Bonuses	$0	0.0%
Value of Benefits		
Social Security	$6,092	5.5%
401K/403B	$3,026	2.7%
Disability	$557	0.5%
Healthcare	$6,507	5.9%
Pension	$5,097	4.6%
Time Off	$9,802	8.9%
Total Compensation	**$110,722**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

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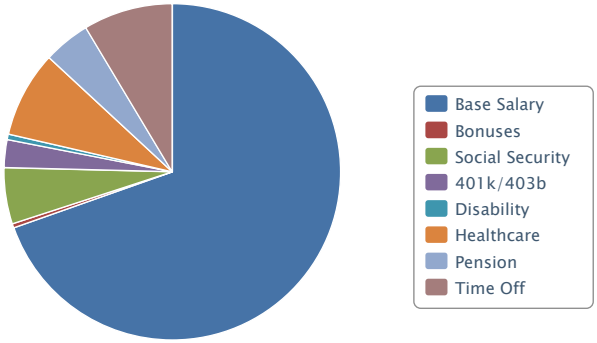

Core Compensation	Median	% of Total
Base Salary	$54,389	69.6%
Bonuses	$323	0.4%
Value of Benefits		
Social Security	$4,185	5.4%
401K/403B	$2,079	2.7%
Disability	$383	0.5%
Healthcare	$6,507	8.3%
Pension	$3,502	4.5%
Time Off	$6,734	8.6%
Total Compensation	**$78,102**	**100%**

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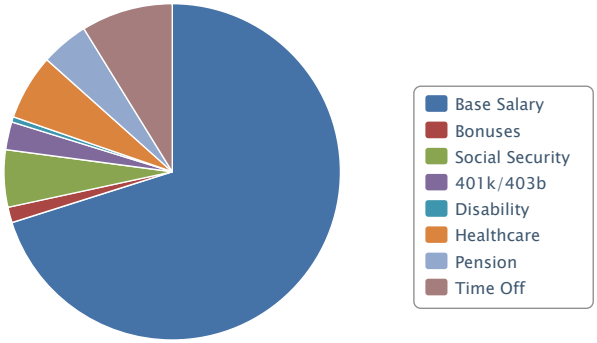

Core Compensation	Median	% of Total
Base Salary	$71,906	70.1%
Bonuses	$1,538	1.5%
Value of Benefits		
Social Security	$5,618	5.5%
401K/403B	$2,791	2.7%
Disability	$514	0.5%
Healthcare	$6,507	6.3%
Pension	$4,700	4.6%
Time Off	$9,039	8.8%
Total Compensation	**$102,614**	**100%**

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Value of Benefits indicates the employer's expected contribution and paid time off.

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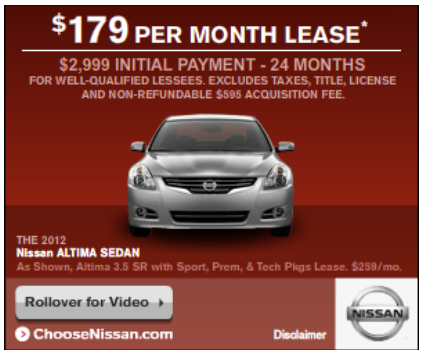

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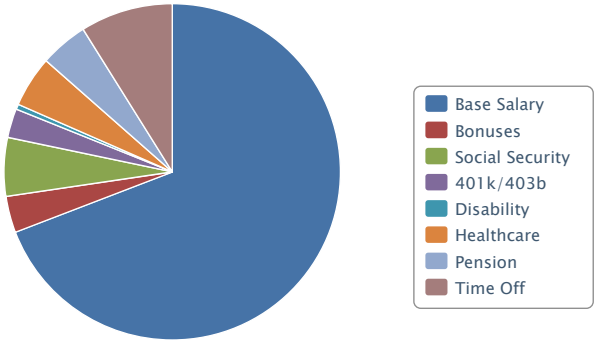

Core Compensation	Median	% of Total
Base Salary	$90,898	69.1%
Bonuses	$4,647	3.5%
Value of Benefits		
Social Security	$7,309	5.6%
401K/403B	$3,631	2.8%
Disability	$669	0.5%
Healthcare	$6,507	4.9%
Pension	$6,115	4.6%
Time Off	$11,759	8.9%
Total Compensation	**$131,535**	**100%**

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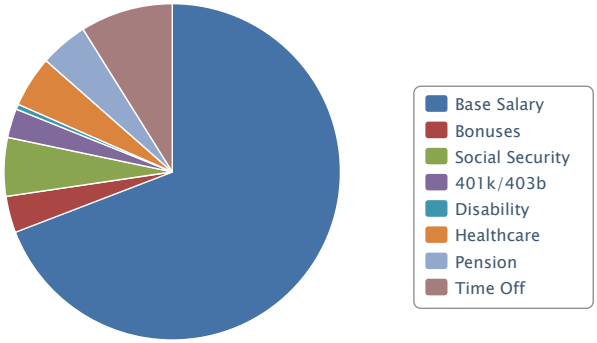

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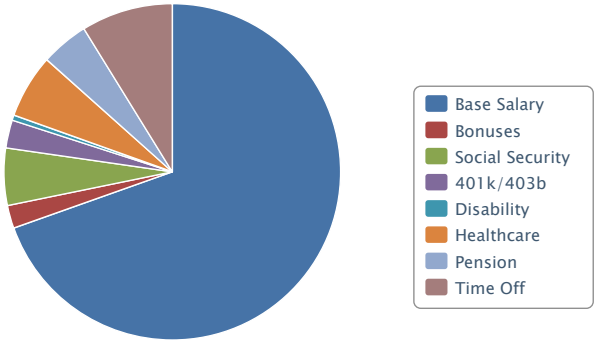

Core Compensation	Median	% of Total
Base Salary	$74,015	69.5%
Bonuses	$2,353	2.2%
Value of Benefits		
Social Security	$5,842	5.5%
401K/403B	$2,902	2.7%
Disability	$535	0.5%
Healthcare	$6,507	6.1%
Pension	$4,888	4.6%
Time Off	$9,399	8.8%
Total Compensation	**$106,440**	**100%**

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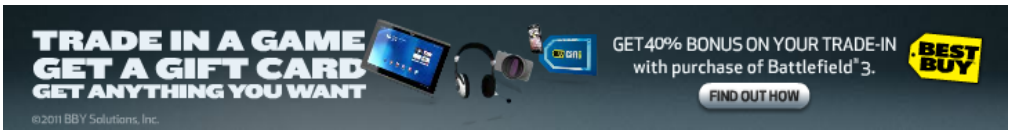

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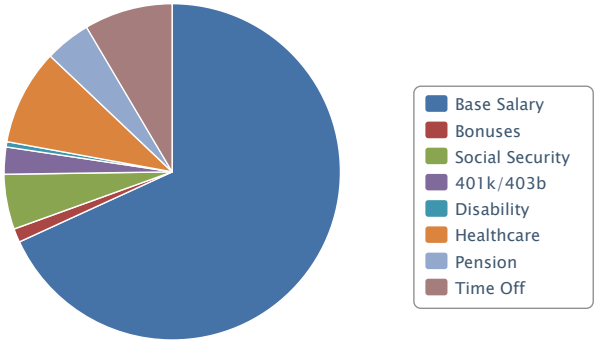
CAD Drafter



Core Compensation	Median	% of Total
Base Salary	$48,269	68.1%
Bonuses	$889	1.3%
Value of Benefits		
Social Security	$3,761	5.3%
401K/403B	$1,868	2.6%
Disability	$344	0.5%
Healthcare	$6,507	9.2%
Pension	$3,146	4.4%
Time Off	$6,050	8.5%
Total Compensation	**$70,834**	**100%**

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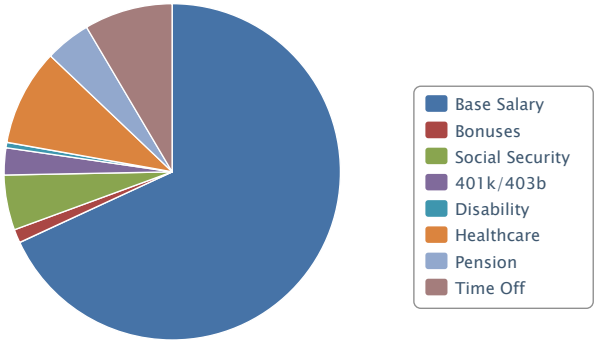
Administrative Assistant II



Core Compensation	Median	% of Total
Base Salary	$47,772	68.1%
Bonuses	$889	1.3%
Value of Benefits		
Social Security	$3,723	5.3%
401K/403B	$1,849	2.6%
Disability	$341	0.5%
Healthcare	$6,507	9.3%
Pension	$3,114	4.4%
Time Off	$5,989	8.5%
Total Compensation	$70,184	100%

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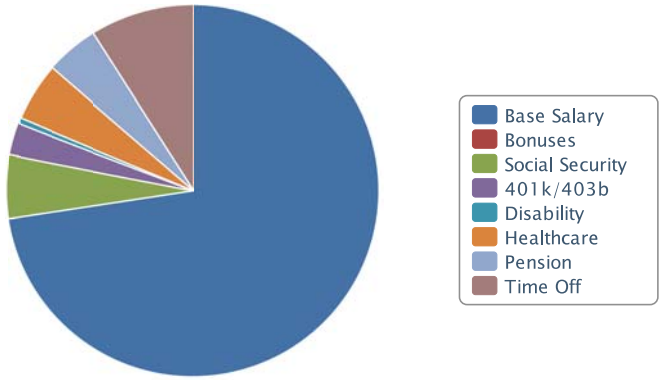
Field Superintendent - Construction



Core Compensation	Median	% of Total
Base Salary	$92,837	72.5%
Bonuses	$0	0.0%
Value of Benefits		
Social Security	$7,102	5.5%
401K/403B	$3,528	2.8%
Disability	$650	0.5%
Healthcare	$6,507	5.1%
Pension	$5,942	4.6%
Time Off	$11,426	8.9%
Total Compensation	**$127,991**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

Value of Benefits indicates the employer's expected contribution and paid time off.

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Job Description: Construction Manager Reports to: Sr. Construction Manager Dept: Installation Salary Range: 60,000 ❓ 82,000 DOE Class: Exempt SUMMARY: Oversees ...

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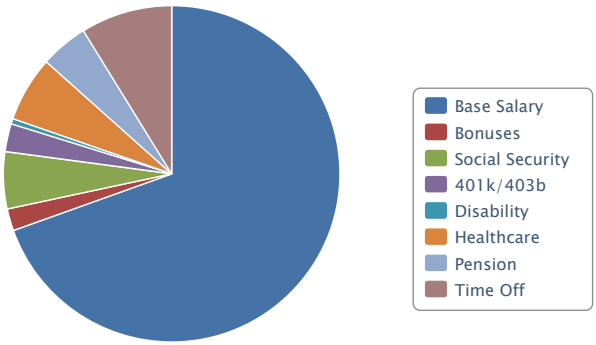
Paralegal III



Core Compensation	Median	% of Total
Base Salary	$72,296	69.6%
Bonuses	$2,132	2.1%
Value of Benefits		
Social Security	$5,694	5.5%
401K/403B	$2,828	2.7%
Disability	$521	0.5%
Healthcare	$6,507	6.3%
Pension	$4,763	4.6%
Time Off	$9,160	8.8%
Total Compensation	**$103,902**	**100%**

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Value of Benefits indicates the employer's expected contribution and paid time off.

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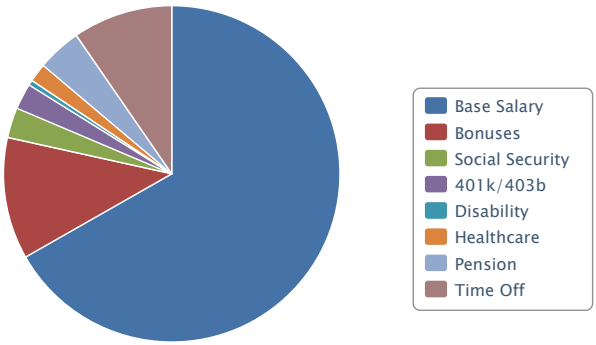
Top Litigation Executive



Core Compensation	Median	% of Total
Base Salary	$247,095	66.7%
Bonuses	$43,464	11.7%
Value of Benefits		
Social Security	$10,835	2.9%
401K/403B	$9,310	2.5%
Disability	$2,034	0.5%
Healthcare	$6,507	1.8%
Pension	$15,680	4.2%
Time Off	$35,761	9.6%
Total Compensation	**$370,686**	**100%**

Core Compensation is based on averages for this job and does not reflect personal factors used to determine your projected salary range.

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Construction Type: Heavy Dredging

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Modification Number	Publication Date
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1	07/16/2010
2	12/31/2010

* ENGI0025-001 10/01/2009

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CLASS C1	$ 26.14	8.05+a+b
CLASS C2	$ 25.29	8.05+a+b
CLASS D(a)	$ 20.43	8.05+a+b
CLASS D	$ 21.09	8.05+a+b

CLASSIFICATIONS:

CLASS A: Lead Dredgeman, Operator, Leverman, Licensed Tug Operator over 1000 HP
CLASS B1: Derrick Operator, Spider/Spill Barge Operator, Engineer, Electrician. Chief Welder, Cheif Mate, Fill Placer, Operator II, Maintenance Engineer, Licensed Boat Operator
CLASS B2: Licensed Boat Operator, Certified Welder.
CLASS C1: Mate, Drag Barge Operator, Steward, Assistant Fill Placer.
CLASS C1(a): Welder.

CLASS C2: Boat Operator
CLASS D: Shoreman, Deckhand, Rodman, Scowman, Cook, Messman, Porter/Janitor.
CLASS D(a) Oiler.

PREMIUMS: Additional 20% for hazardous material work

FOOTNOTES APPLICABLE TO ABOVE CRAFTS:

a. PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.'s Birthday, Memorial Day, Good Friday, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day

b. VACATION: Eight percent (8%) of the straight time rate, multiplied by the total hours worked.

INCENTIVE PAY: (Add to Hourly Rate)

Operator (NCCCO License/Certification) $0.50 Licensed Tug Operator over 1000 HP (Assigned as Master) (USCG licensed Master of Towing Vessels (MOTV) $1.00;
Licensed Boat Operator (Assigned as lead boat captain) USCG licensed boat operator $0.50;
Engineer (QMED and Tankerman endorsement or licensed engineer (USCG) $0.50
Oiler (QMED and Tankerman endorsement (USCG) $0.50; All classifications (Tankerman endorsement only) USCG $0.25;
Deckhand or Mate (AB with Lifeboatman endorsement (USCG) $0.50; All classifications (lifeboatman endorsement only (USCG) $0.25; Welder (ABS certification) $0.50

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

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* a survey underlying a wage determination
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With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

General Decision Number: NJ100062 09/30/2011 NJ62

Superseded General Decision Number: NJ20080062

State: New Jersey

Construction Type: Heavy

County: Middlesex County in New Jersey.

HEAVY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	03/12/2010
1	03/19/2010
2	03/26/2010
3	05/07/2010
4	06/04/2010
5	07/09/2010
6	09/03/2010
7	09/10/2010
8	10/08/2010
9	03/04/2011
10	06/03/2011
11	06/10/2011
12	08/05/2011
13	09/02/2011
14	09/16/2011
15	09/30/2011

BRNJ0004-001 05/01/2011

	Rates	Fringes
BRICKLAYER (Cement Mason).....	$ 36.70	24.97

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* CARP0006-014 05/01/2011

	Rates	Fringes
CARPENTER.....	$ 39.70	55%

The first sixty feet at the regular rate, 10% per hour additional for each additional fifty feet thereafter.

CARP0715-007 05/01/2011

	Rates	Fringes
Millwright.....	$ 40.49	55%

Work of erection and dismantling of elevators and towers, such as concrete conveyors and temporary material elevators, scaffolding or other structures to be used as scaffolding inside or outside of buildings: the first sixty feet at the regular rate, 10% per hour additional for each additional fifty feet thereafter.

CARP1456-013 05/01/2008

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                                    Rates          Fringes

CARPENTER (Dock Builder)
     Concrete form work..........$ 37.00            27.02
     All other work..............$ 37.00            32.90

  Work on land pile driving, floating marine construction and
  the construction of wharves, while handling and working
  with creosote and creosote-impregnated products: $.25 per
  hour additional.

  Work on hazardous/toxic/contaminated waste removal, on a
  hazardous/toxic/contaminated waste site, where the worker
  comes into contact with hazardous/toxic/contaminated waste
  material, and when A, B or C personal protective equipment
  is required and used for respiratory, skin or eye
  protection: 20% per hour additional.
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 ELEC0456-010 05/31/2010

                                    Rates          Fringes

ELECTRICIAN
     Cable splicer...............$ 48.84           60.25%
     Electrician.................$ 46.04           59.75%

  Work on line voltage of 440 volts and over: 10% per hour
  additional.

  Work from trusses, scaffolds and ladders 40 ft. or more from
  the ground or floor; or under air pressure; or over
  conveyors or moving equipment or machinery: 10% per hour
  additional.
-----------------------------------------------------------------
 ENGI0825-021 07/01/2010

                                    Rates          Fringes

  Power equipment operators:
     GROUP 1.....................$ 41.02            25.75
     GROUP 2.....................$ 39.43            25.75
     GROUP 3.....................$ 37.52            25.75
     GROUP 4.....................$ 35.89            25.75
     GROUP 5.....................$ 34.18            25.75

Hazardous waste removal work:
  Work on a state or federally designated hazardous waste site,
  where the worker is in direct contact with hazardous
  material, and when personal protective equipment is
  required for respiratory, skin and eye protection: 20% per
  hour additional.


PAID HOLIDAYS:
  New Year's Day, Washington's Birthday observed, Memorial Day,
  Independence Day, Labor Day, Presidential Election Day,
  Veteran's Day, Thanksgiving Day and Christmas Day; provided
  1) that the worker works three of the preceding five work
  days before the holiday; or, the work day before the
  holiday and the work day after the holiday; and, 2) that
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the worker works the work day before and the work day after the holiday.

DEFINITION OF GROUPS:

GROUP 1:
Backhoe, Including Backhoe Track; Boom; Concrete Paving Machine; Crane (all types, including overhead and straddle traveling type); Drill (down-the-hole drill, rotary drill, self-propelled hydraulic drill, self-powered drill); Elevating Grader; Excavator; Front End Loader (5 cu. yd. and over); Piledriver (length of boom, including length of leads, shall determine premium rate applicable)

GROUP 2:
Backhoe Loader Combo; Concrete Pumper; Grader/Blade (Finish); Hoist; Hydraulic Crane, 10 Tons and under; Front End Loader (2 cu. yd. but less than 5 cu. yd.); Scraper; Side Boom

GROUP 3:
Asphalt Spreader; Bulldozer; Compressor(2 or 3) (in Battery) (within 100 ft.); Crusher; Forklift; Front End Loader (1 cu. yd. and over but less than 2 cu. yd.); Lull; Mechanic; Paver, Asphalt; Roller, Blacktop; Tractor;

GROUP 4:
Broom; Compressor (Single); Farm Tractor; Front End Loader (under 1 cu. yd.); Roller, Grade; Pump

GROUP 5:
Oiler

IRON0011-011 07/01/2009

MIDDLESEX COUNTY (Northern Half of County)

	Rates	Fringes
Ironworkers:		
Reinforcing	$ 34.34	35.60
Structural, Ornamental, Rigger	$ 37.14	35.60

IRON0068-016 07/01/2011

MIDDLESEX COUNTY (Southern Half of County)

	Rates	Fringes
Ironworker		
Reinforcing	$ 32.35	18.78
Structural, Ornamental, Rigger	$ 34.35	18.78

Hazardous waste removal work, on a state or federally designated hazardous waste site, where the worker is required to wear Level A, B or C personal protection: $3.00 per hour additional.

LABO0172-009 03/01/2011

	Rates	Fringes
Laborers:		
Common or General Laborer;		
Landsacpe Laborer, Power		
Tool Operator.....	$ 32.20	21.55
Pipelayer.....	$ 32.90	21.55

Hazardous waste removal work:
Work on a state or federally designated hazardous waste site, where the worker is required to wear Level A, B or C personal protection: $3.00 per hour additional.

Work on a state or federally designated hazardous waste site, where the worker is not required to wear Level A, B, or C personal protection: $1.00 per hour additional.

PAID HOLIDAYS:
New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day; provided that the worker works three days for the same employer within a period of ten working days consisting of five working days before and five working days after the day upon which the holiday falls or is observed.

LABO0222-013 05/01/2009

	Rates	Fringes
LABORER		
MASON TENDER:		
Cement/Concrete.....	$ 28.55	19.42

PAIN0711-023 05/01/2009

	Rates	Fringes
Painters:		
Work on bridges (Major Bridges Designed for Commercial Navigation).....	$ 46.50	19.13

PAIN0711-024 11/01/2008

	Rates	Fringes
Painters:		
New Construction		
Brush and roller.....	$ 34.47	16.14
Spray.....	$ 37.92	16.14
Steel.....	$ 35.81	16.30
Repaint work, on projects on which no major alterations occur.		
Brush and roller.....	$ 26.67	13.80

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      Spray.......................$ 29.34            13.80
      Steel.......................$ 27.74            13.93
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* PLUM0009-028 09/01/2011

MIDDLESEX COUNTY (does not include the Boroughs of Dunellen and
Middlesex; Township of Piscataway; Borough of South Plainfield)


                                  Rates          Fringes

PIPEFITTER.......................$ 42.38            30.80
     Service and Repair..........$ 33.28            18.03
PLUMBER..........................$ 43.53            26.65
     Service and Repair..........$ 33.28            18.03
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 PLUM0024-021 05/01/2011

MIDDLESEX COUNTY (Boroughs of Dunellen and Middlesex; Township
of Piscataway; Borough of South Plainfield)


                                  Rates          Fringes

PLUMBER..........................$ 46.31            28.09
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 PLUM0475-021 05/01/2011

MIDDLESEX COUNTY (Boroughs of Dunellen and Middlesex; Township
of Piscataway; Borough of South Plainfield)


                                  Rates          Fringes

PIPEFITTER.......................$ 48.94            25.30
-----------------------------------------------------------------
 TEAM0469-008 05/01/2008

                                  Rates          Fringes

  Truck drivers:
     Dump Truck; Flatbed Truck...$ 33.00           19.185
     Off the Road Truck; Pickup
     Truck.......................$ 32.85           19.185

Hazardous waste removal work:
  Work on a state or federally designated hazardous waste site,
  where the worker is in direct contact with hazardous
  material, and when personal protective equipment is
  required for respiratory, skin and eye protection: $3.00
  per hour additional.

  Work on a state or federally designated hazardous waste
  site, in a zone requiring Level A personal protection for
  any workers other than the truck driver: $3.00 per hour
  additional.

  Work on a state or federally designated hazardous waste site
  where the worker is not working in a zone requiring Level
  A, B or C personal protection: $1.00 per hour additional.
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PAID HOLIDAYS:
New Year's Day, President's Day, Decoration Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day.

VACATION PAY CREDIT:
Workers working or receiving pay for 80 days within a year receive one week paid vacation (48 hours); 125 days receive two weeks paid vacation (96 hours); 145 days receive 15 days paid vacation (120 hours); 15 years seniority and 145 days receive 4 weeks paid vacation (160 hours).

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