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FINAL
HAZARD RANKING SYSTEM DOCUMENTATION PACKAGE
RARITAN BAY SLAG
OLD BRIDGE TOWNSHIP AND SAYREVILLE, NEW JERSEY

CERCLIS ID NO.: NJN000206276

Volume 1 of 2
(Documentation Record + References 1-31)

Contract No. EP-S5-06-04
Work Assignment No. 523
Document Control No. 523-2A-ADOH

March 2009

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Prepared by:
Weston Solutions, Inc.
Edison, NJ 08837

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HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: Raritan Bay Slag

Contact Persons

Site Investigation:
Nick Magriples (732) 906-6930
U.S. Environmental Protection Agency
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Documentation Record:
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Edison, NJ

Pathways, Components, or Threats Not Scored

The Surface Water Migration Pathway produces an overall score above the minimum required for the site to qualify for the National Priorities List; the Ground Water, Soil Exposure, and Air Migration Pathways were not scored because the listing decision is not significantly affected by those pathways.

HRS DOCUMENTATION RECORD

Name of Site: Raritan Bay Slag — Date Prepared: March 2009

EPA ID No.: NJN000206276 (Ref. 3, p. 1)

EPA Region: 2

Street Address of Site*: Bayview Drive, Old Bridge, New Jersey 08879
Old Spye Road; north of Route 35 overpass, Sayreville, New Jersey 08879

The Laurence Harbor Seawall (i.e., Source 1) is part of the Old Bridge Waterfront Park, located along Bayview Drive in Old Bridge Township, New Jersey (Ref. 7, p. 1; 12, p. 3). The western jetty of the Cheesequake Inlet (i.e., Source 2) is located on Old Spye Road , north of the Route 35 overpass in Sayreville, New Jersey (Ref. 4, Figure 1, Figure 2, Figure 4; 12, pp. 3, 4). Both sources have the zip code of 08879 (Ref. 12, p.3).

County and State: Middlesex County, NJ

General Location in the State: Central New Jersey - Raritan Bay's southern shoreline between the western jetty at the Cheesequake Creek Inlet and Margaret's Creek

Topographic Map: Source #1: Keyport, New Jersey – New York
Source #2: South Amboy, New Jersey – New York

Location	Source No.	USGS Quadrangle	Latitude	Longitude
Laurence Harbor Seawall	1	Keyport, NJ-NY	40° 27′ 52.52″ North	-74° 15′28.86″ West
Western Jetty - Cheesequake Creek Inlet	2	South Amboy, NJ – NY	40° 27′ 28.22″ North	-74° 14′ 26.07″ West

Reference Points: Latitude and Longitude coordinates were measured from the approximate centers of the Laurence Harbor Seawall (i.e., Source 1) and the western jetty of the Cheesequake Creek Inlet (i.e., Source 2) (Ref. 5; 6; 11).

* The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area where the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, placed, or otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

Scores

Ground Water Pathway	Not Scored
Surface Water Pathway	100.00
Soil Exposure Pathway	Not Scored
Air Pathway	Not Scored
HRS SITE SCORE	50.00

WORKSHEET FOR COMPUTING HRS SITE SCORE
RARITAN BAY SLAG

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	Not Scored	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100.00	10,000.00
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100.00	10,000.00
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	Not Scored	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	10,000.00	
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release		
1. Observed Release	550	550
2. Potential to Release by Overland Flow		
2a. Containment	10	not scored
2b. Runoff	25	not scored
2c. Distance to Surface Water	25	not scored
2d. Potential to Release by Overland Flow [lines 2a (2b+2c)]	500	not scored
3. Potential to Release by Flood		
3a. Containment (Flood)	10	not scored
3b. Flood Frequency	50	not scored
3c. Potential to Release by Flood (lines 3a x 3b)	500	not scored
4. Potential to Release (lines 2d+3c)	500	not scored
5. Likelihood of Release	550	550
Waste Characteristics		
6. Toxicity/Mobility	*	10,000
7. Hazardous Waste Quantity	*	100
8. Waste Characteristics	100	32
Targets		
9. Nearest Intake	50	0
10. Population		
10a. Level I Concentrations	**	0
10b. Level II Concentrations	**	0
10c. Potential Contamination	**	0
10d. Population (lines 10a+10b+10c)	**	0
11. Resources	5	5
12. Targets (lines 9+10d+11)	**	5
13. DRINKING WATER THREAT SCORE ([lines 5 x 8 x 12]/82,500)	100	1.06

* Maximum value applies to waste characteristics category.

** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	550
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+07
16. Hazardous Waste Quantity	*	100
17. Waste Characteristics	1,000	180
Targets		
18. Food Chain Individual	50	45
19. Population		
19a. Level I Concentrations	**	0
19b. Level II Concentrations	**	0.06
19c. Potential Human Food Chain Contamination	**	0
19d. Population (lines 19a+19b+19c)	**	0.06
20. Targets (lines 18+19d)	**	45.06
21. HUMAN FOOD CHAIN THREAT SCORE ([lines 14 x 17 x 20]/82,500)	100	54.07

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	550
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	*	5.00E+07
24. Hazardous Waste Quantity	*	100
25. Waste Characteristics	1,000	100
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0
26b. Level II Concentrations	**	105
26c. Potential Contamination	**	not scored
26d. Sensitive Environments (lines 26a+26b+26c)	**	105
27. Targets (line 26d)	**	105
28. ENVIRONMENTAL THREAT SCORE ([lines 22 x 25 x 27]/82,500)	60	60
29. WATERSHED SCORE (lines 13 + 21 + 28)	100	100
30. SW: OVERLAND/FLOOD COMPONENT SCORE (S_{of})	100	100
SURFACE WATER MIGRATION PATHWAY SCORE (S_{sw})	100	100

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

REFERENCES

Reference Number	Description of the Reference
1.	U.S. Environmental Protection Agency (EPA), Revised Hazard Ranking System, Final Rule, 40 CFR 300, Federal Register Volume 55, No. 241, page 51532 et seq., December 14, 1990. [137 pp.]
2.	EPA, Superfund Chemical Data Matrix, SCDM Data Version: 1/27/04, excerpts, from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm, January 28, 2004. [8 pp.]
3.	EPA, Superfund Information Systems, Superfund Site Information, Raritan Bay Slag. From http://cfpub.epa.gov/; Accessed and printed on October 7, 2008. [2 pages]
4.	WESTON, Figure 1: Site Location Map, October 2008; Figure 2: Study Area Map, Raritan Bay Slag, Old Bridge Township and Sayreville, Middlesex County, New Jersey, October 2008; Figure 3: 15-Mile Surface Water Pathway Map, Raritan Bay Slag, Old Bridge / Sayerville, NJ, February 5, 2009; Figure 4: Zoning Map; Borough of Sayerville, Middlesex County, New Jersey, December 1999. [4 pp.]
5.	U.S. Department of the Interior Geological Survey (USGS), 7.5-Minute Series (Topographic) Quadrangle for: "South Amboy, NJ-NY", 1995. [1 p.]
6.	U.S. Department of the Interior Geological Survey (USGS), 7.5-Minute Series (Topographic) Quadrangle for: "Keyport, NJ-PA", 1995. [1 p.]
7.	Kropp, Irene, New Jersey Department of Environmental Protection (NJDEP), Site Remediation and Waste Management, Letter to Susan Janowiak, EPA, Emergency and Remedial Response Division, Subject: Removal Action Site Consideration for Lead Contamination along Laurence Harbor Seawall, April 24, 2008. [3 pp.]
8.	Foerter, Dennis, WESTON, Project Note to Raritan Bay Slag File, Subject: NJDEP Surface Soil Sampling Along Old Bridge Waterfront Park Walkway; with attached references, October 1, 2008. [58 pp.]
9.	WESTON, Field Log Books 523-4E-ACUQ, RST2-02-F-0674, RST2-02-F-0675, and RST2-02-F-0676, Raritan Bay Slag; with attached photo documentation, Field Activities conducted by WESTON from August 21, 2008 through January 16, 2009. [68 pp.]
10.	Foerter, Dennis. WESTON, Project Note to Raritan Bay Slag File, Subject: Raritan Bay Tides, February 5, 2009. [2 pp.]
11.	Foerter, Dennis, WESTON, Project Note to Raritan Bay Slag File, Subject, Latitude and Longitude and Source Area Calculations, Raritan Bay Slag, December 23, 2008. [2 pp.]
12.	Hagstrom Map Company, Inc., Street Map, Middlesex County, New Jersey, excerpts, 2001. [4 pp.]
13.	Foerter, Dennis, WESTON, Project Note to Raritan Bay Slag File, Subject: National Estuary Program – New York – New Jersey Harbor; with attached references, October 13, 2008. [11 pp.]
14.	Foerter, Dennis, WESTON, Project Note to Raritan Bay Slag File, Subject: Sensitive Environments, October 14, 2008. [13 pp.]

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Reference Number	Description of the Reference
15.	Foerter, Dennis, WESTON, Region 2 SAT, Telecon Note to Raritan Bay Slag, Subject: NJDEP 2007 Soil Sampling Events, October 14, 2008. [1 p.]
16.	Foerter, Dennis, WESTON, Project Note to Raritan Bay Slag File, Subject: EPA Investigation conducted in September 2008, January 12, 2009. [2 pp. and 2 Figures]
17.	Morales, Julissa, WESTON, Sampling Trip Report, Raritan Bay Slag Site, DCN No. RST2-02-F-0708, W.O. No., 20401.032.010.2064, Case No. 37836. October 15, 2008. [68 pp.]
18.	EPA Hazardous Waste Support Section. Record of Communication and attached CLP Data Assessment, Subject: CLP [Inorganic] Data Package for Quality Assurance Review, Site: Raritan Bay Slag, Case #: 37836, SDG # MB52W5 and MB5341. October 2, 2008. [29 pp.]
19.	Middlesex County, Parks and Recreation, Old Bridge Waterfront Park. From http://www.co.middlesex.nj.us/parksrecreation/old.asp; Accessed and printed on September 26, 2008. [2 pp.]
20.	GPO Access, Electronic Code of Federal Regulations (e-CFR) Title 4-: Protection of Environment, Part 261 – Identification and Listing of Hazardous Waste, Subpart C – Characteristics of Hazardous Waste. From http://ecfr.gpoaccess.gov/; Accessed and printed on December 5, 2008. [6 pp.]
21.	Foerter Dennis. WESTON, Project Note to Raritan Bay Slag File, Subject: Sample Quantitation Limits – Raritan Bay Slag Site, February 5, 2009. [70 pp.]
22.	EPA Hazardous Waste Support Section. Record of Communication and attached CLP Data Assessment, Subject: CLP [Inorganic] Data Package for Quality Assurance Review, Site: Raritan Bay Slag, Case #: 37836, SDG # MB5347, MB5351, MB5356, and MB5395. September 26, 2008. [77 pp.]
23.	EPA Hazardous Waste Support Section. Record of Communication and attached CLP Data Assessment, Subject: CLP [Inorganic] Data Package for Quality Assurance Review, Site: Raritan Bay Slag, Case #: 37836, SDG # MB5319, MB5336, and MB53A9. September 29, 2008. [80 pp.]
24.	EPA Hazardous Waste Support Section. Record of Communication and attached CLP Data Assessment, Subject: CLP [Inorganic] Data Package for Quality Assurance Review, Site: Raritan Bay Slag, Case #: 37836, SDG # MB53A0, MB52W6, and MB52Y7. September 26, 2008. [72 pp.]
25.	EPA Hazardous Waste Support Section. Record of Communication and attached CLP Data Assessment, Subject: CLP [Inorganic] Data Package for Quality Assurance Review, Site: Raritan Bay Slag, Case #: 37836, SDG # MB52Y1, MB53C6, MB53H6, and MB53L6. October 2, 2008. [78 pp.]
26.	Foerter, Dennis, Weston, Project Note Project Note to Raritan Bay Slag File, Subject: Grain Size Data for Sediment Samples – Raritan Bay Slag, January 12, 2009. [183 pp.]
27.	NOAA, Nautical Chart 12324, Intercoastal Waterway, New Jersey Sandy Hook to Little Egg Harbor. From http://www.charts.noaa.gov/OnLineViewer/12324.shtml; Accessed and printed on January 12, 2009. [6 pages]

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Reference Number	Description of the Reference
28.	Foerter, Dennis, Weston, Project Note to Raritan Bay Slag File, Subject: Qualified Data – Raritan Bay Slag, January 6, 2009. [2 pp.]
29.	EPA, Using Qualified Data to Document an Observed Release and Observed Contamination, Quick Reference Fact Sheet, EPA 540-F-94-028, OSWER 9285.7-14FS, PB94-963311, November 1996. [18 pp.]
30.	New Jersey Department of Environmental Protection, Site Investigation Report for Old Bridge Township - Margarets Creek Property, April 18, 2007. [4 pp.]
31.	Advanced GeoServices Corp. for NL Industries, Draft Remedial Action Workplan, Block 1, Lot 54.11 Township of Old Bridge, Middlesex County, New Jersey, May 2008. [24 pp.]
32.	STL Burlington, Sample Data Packages, SDG 119110 and 119099, April 2007. [2,138 pp.]
33.	New Jersey Department of Environmental Protection, Critical Habitat Map for Margarets Creek Property (undated). [1 p.]
34.	New Jersey Department of Environmental Protection, Critical Habitat Map for Margarets Creek Property indicating Black Crowned Night Heron habitat (undated). [1 p.]

INTRODUCTION

The Raritan Bay Slag site (EPA ID No. NJN000206276) consists of three areas of lead-contaminated slag deposition located along the southern shore of the Raritan Bay in Old Bridge Township and Sayreville, Middlesex County, New Jersey (Ref. 3, p. 1; 4, Figure 1, Figure 2, Figure 4; 7, p. 1; 12, pp. 3-4; 31, p. 10; 33, p. 1). The first area is the location of the Laurence Harbor seawall located adjacent to the Old Bridge Waterfront Park in the Laurence Harbor section of Old Bridge Township, Middlesex County, New Jersey (Ref. 4, Figure 1, Figure 2; 12, p. 3). The second area consists of the western jetty extending from the Cheesequake Creek Inlet into Raritan Bay. This jetty is located in Sayreville, Middlesex County, New Jersey (Ref. 4, Figure 1, Figure 2, Figure 4; 12, pp. 3, 4). The third area is roughly 47 acres in size and is defined by Margaret's Creek and its associated sensitive environments (Ref. 31 p. 6; 33, p.1).

Background information indicates that in September 1972, the New Jersey Department of Environmental Protection (NJDEP) was advised by a local government official that lead-bearing waste material was being disposed of along the Laurence Harbor beachfront on Raritan Bay. NJDEP background information indicates that by a letter from NL Industries, Inc. (NL) to NJDEP (dated December 1972), NL acknowledged that slag which consists of non-recoverable low yield metallic waste from blast furnace and blast furnace rubble was disposed of by Liberty Trucking Company at their property in Madison Township, Route 35, New Jersey. Madison Township is currently known as Old Bridge Township. NL used battery plates from lead/acid storage batteries as the principal feed material for the blast furnace located at its plant in Perth Amboy, New Jersey (Ref. 7, pp. 2).

On May 23, 2007 and July 24, 2007, NJDEP conducted soil sampling events along the southern shoreline of the Raritan Bay adjacent to the Old Bridge Waterfront Park. Analytical results from these sampling events indicated the presence of lead at concentrations as high as 142,000 parts per million, which is above the state's unrestricted use and restricted use Soil Cleanup Criteria (Ref. 7, p. 2; 8, pp. 1-58). NJDEP described the waste material associated with the Laurence Harbor seawall as consisting of various materials including large pieces of rust-colored slag. Other waste (i.e., slag) materials associated with the low-yield metallic waste from blast furnace and blast furnace rubble included finer grained "nuggets" as well as battery casing fragments of various sizes (Ref. 7, p. 2). NJDEP officials stated that it is possible that some of the finer waste materials comprising the Laurence Harbor Seawall may have been included in the soil samples (Ref. 15, p. 1). In addition, materials such as battery casing chips, refractory bricks, and slag are found in Margaret's Creek (Ref. 30, p. 3; 31 pp. 6, 10).

Old Bridge officials worked with NJDEP to notify the public in writing about health concerns for the lead waste material and restrict access through signage and some fencing. However, due to physical constraints, it was not practical to completely fence off contaminated areas and access to these areas remained a concern. On April 24, 2008, NJDEP referred the site to the U.S. Environmental Protection Agency (EPA) Emergency and Remedial Response Division for removal action consideration (Ref. 7, pp. 1-3). NJDEP's concern was that limited site access restrictions previously implemented at the site would not adequately protect human health and the environment for an extended time due to the uncontrolled lead contamination that remains on the seawall and on a portion of the public beach, both part of Waterfront Park and along the Raritan Bay in Laurence Harbor portion of Old Bridge (Ref. 7, pp. 1-2).

In September 2008, EPA conducted a sampling investigation of the site. During field activities, several portions of the Laurence Harbor seawall, and at least the top portion of the western jetty of the Cheesequake Creek Inlet, were observed to consist of slag materials. Battery casing fragments were also noted in both areas. During field activities, the Raritan Bay was observed to come in contact with the slag in both locations during high tide (Ref. 16, pp. 1, 2). During the September 2008 EPA investigation, surface and subsurface soil, surface water and sediment samples were collected in the area of the Laurence Harbor seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 17, pp. 1, 5-13). Analytical results from extracts of waste/soil samples (analyzed for Toxicity Characteristic Leaching Procedure metals) collected from the Laurence Harbor seawall and the western jetty of Cheesequake Creek Inlet indicated the presence of lead at concentrations above the Resource Conservation and Recovery Act (RCRA) regulatory level of 5 milligrams per liter (Ref. 17, pp. 5, 7, 8, 13, Figure 2; 16, p. 1; 18, pp. 2-9, 14; 20, p. 5). Analytical results from sediment samples (analyzed for Target Analyte List (TAL) metals) collected from Raritan Bay indicated the presence of lead at concentrations significantly above concentrations detected in selected background samples in the areas of the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 17, pp. 1, 8-12, Figure 2; 22, pp. 6, 7, 9-12, 15, 57-61, 64, 65; 23, pp. 30-40, 63-65; 24, pp. 2-13; 25, pp. 15, 16).

Observed releases to surface water by direct observation are documented through the direct contact of the Raritan Bay with lead-contaminated slag associated with the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 9, pp. 2, 4, 5, 7, 8, 10, 11, 12; 16, p. 1). In addition, analytical data from sediment samples collected in September 2008 indicate observed releases through chemical analysis to the Raritan Bay from lead-contaminated slag associated with the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 17, pp. 8-12; 22, pp. 6, 7, 10-12, 15, 58-61, 64, 65; 23, pp. 30-39, 63-65; 24, pp. 2-13; 25, pp. 15, 16). The Raritan Bay is known to be used as a fishery and a sensitive environment (i.e., a sensitive area identified under the National Estuary Program; and, a state-designated water body for the maintenance of aquatic life) (Ref. 9, pp. 3-5; 13, pp. 1-11; 14, pp. 1-13). The Raritan Bay, and more particularly Old Bridge Waterfront Park in Middlesex County, is also a designated recreation area; swimming and fishing activities were observed in the vicinity of the Laurence Harbor seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 16, p. 2; 19, p. 1). Other nearby receptors include approximately 0.13 mile of emergent wetland frontage located along the eastern portion of the Laurence Harbor seawall (Ref. 4, Figure 2). Margaret's Creek is enveloped by wetlands, and is habitat for state threatened species: the Black-Crowned Night Heron (Ref. 30, p. 4; 34, p. 1)

There may be additional areas along the southern shoreline of Raritan Bay where the seawall consists of slag materials similar to those observed on the Laurence Harbor seawall and western jetty of the Cheesequake Inlet. EPA is unable to evaluate these areas at this time (Ref. 16, p. 2).

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

Number of the source: 1

Name and description of the source: Slag Waste Pile – Laurence Harbor Seawall

Source Type: Pile

Source 1 consists of the Laurence Harbor seawall located on the southern shoreline of the Raritan Bay (Ref. 4, Figures 1 and 2). Background information indicates that in September 1972, the NJDEP was advised by a local government official that lead-bearing waste material was being disposed of along the Laurence Harbor beachfront on Raritan Bay. NJDEP background information indicates that by a letter from NL Industries, Inc. (NL) to NJDEP (dated December 1972), NL acknowledged that slag which consists of non-recoverable low yield metallic waste from blast furnace and blast furnace rubble are disposed of by Liberty Trucking Company at their property in Madison Township, Route 35, New Jersey. Madison Township is currently known as Old Bridge Township. NL used battery plates from lead/acid storage batteries as the principal feed material for the blast furnace located at its plant in Perth Amboy, New Jersey (Ref. 7, p. 2).

On May 23, 2007 and July 24, 2007, NJDEP conducted soil sampling events along the southern shoreline of the Raritan Bay adjacent to the Old Bridge Waterfront Park. Analytical results from these sampling events indicated the presence of lead at concentrations as high as 142,000 parts per million, which is above the state's unrestricted use and restricted used Soil Cleanup Criteria (Ref. 7, p. 2; 8, pp. 1-57). NJDEP described the waste material associated with the Laurence Harbor seawall as consisting of various materials including large pieces of rust-colored slag. Other waste (i.e., slag) materials associated with the low-yield metallic waste from blast furnace and blast furnace rubble included finer grained "nuggets" as well as battery casing fragments of various sizes. NJDEP officials stated that it is possible that some of the finer waste materials comprising the Laurence Harbor Seawall may have been included in the soil samples (Ref. 15, p. 1).

In September 2008, EPA conducted a sampling investigation of the site. Waste/soil samples were collected from the Laurence Harbor Seawall (Ref. 17, pp. 5, 8, Figure 2; 9, pp. 14-16, 23, 25-29; 16, p. 1). Selected samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals (Ref. 17, pp. 1, 13). Analytical results from extracts of samples collected from the seawall indicated the presence of lead at concentrations above the RCRA regulatory level of 5 milligrams per liter (mg/L) (Ref. 17, pp. 5, 13, Figure 2; 18, pp. 7, 8, 9; 20, p. 5).

Location of the source, with reference to a map of the site:

The slag waste pile composing the Laurence Harbor seawall (i.e., Source 1) is located along the southern shoreline of the Raritan Bay, immediately west of Margaret's Creek's discharge point to Raritan Bay (Ref. 4, Figures 1 and 2; 9, p. 5).

Containment

Release to surface water via overland migration:

Based on observations made during field activities conducted by EPA in September 2008, there are no containment features associated with the Laurence Harbor Seawall. No maintained engineered cover, a liner or a run-on control system and runoff management system were observed (Ref. 16, p. 1). In addition, slag materials were observed to be in direct contact with Raritan Bay during high tide, resulting in source 1 being located in surface water (Ref. 9, pp. 4, 10, 11, 12; 16, p. 1). In addition, analytical results from the TCLP samples collected from the Laurence Harbor Seawall indicate that lead in the waste is likely to migrate from the source (Ref. 17, pp. 5, 8, 13; 18, pp. 2, 5, 6; 20, p. 5). Based on an evaluation of the above conditions, an overland flow containment factor of 10 is assigned (Ref. 1, p. 51609).

Release to surface water via overland migration flood:

During field activities conducted by EPA in September 2008, no features were present to suggest that containment at the Laurence Harbor Seawall is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by flood. Therefore, a flood containment factor of 10 is assigned (Ref. 1, p. 51611; 16, p. 1).

2.4.1 Hazardous Substances

In September 2008, EPA conducted a sampling investigation of the site. Soil samples were collected directly from the Laurence Harbor Seawall. Soil samples were collected and submitted for TCLP metals and mercury analyses; leachate from these samples were generated by EPA Method SW-846 1311 (i.e., TCLP) as modified in Modification Reference Number 1454.1. The leachate was then analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) as per Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) ILM05.4 (Ref. 18, pp. 28, 29). Analytical results from samples collected from the seawall indicated the presence of lead at concentrations above the RCRA regulatory level of 5 mg/L (Ref. 17, pp. 5, 13, Figure 2; 18, pp. 7, 8, 9; 20, p. 5).

Hazardous Substance	Evidence	Reference(s)
Lead	TCLP soil samples, EPA, September 2008:	
	S01A (31,500 ug/L)	17, pp. 5, 13, 16, 33; 18, p. 7
	S02A (11,100 ug/L)	17, pp. 5, 13, 16, 33; 18, p. 8
	S03A (28,700 ug/L)	17, pp. 5, 13, 16, 33; 18, p. 9

Notes:

ug/L – micrograms per liter

Sample concentrations in parentheses

RCRA regulatory level for lead is 5 milligrams per liter (i.e., 5,000 ug/L) (Ref. 20, p. 5)

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

The information available is not sufficient to evaluate Tier A source hazardous waste quantity; therefore, hazardous constituent quantity is not scored (NS).

Hazardous Constituent Quantity (C) Value: NS

2.4.2.1.2 Hazardous Wastestream Quantity

The information available is not sufficient to evaluate Tier B source hazardous waste quantity; therefore, hazardous wastestream quantity is not scored (NS).

Hazardous Wastestream Quantity (W) Value: NS

2.4.2.1.3 Volume

The information available is not sufficient to evaluate Tier C source hazardous waste quantity; therefore, volume (V) is assigned a value of 0 (Ref. 1, p. 51591, Section 2.4.2.1.3).

Volume (V) Value: 0

2.4.2.1.4 Area

Source 1 is a waste pile containing lead-contaminated slag deposited within portions of the Laurence Harbor seawall along the southern shoreline of Raritan Bay (Ref. 4, Figures 1 and 2). This source is characterized by the presence of slag materials within the Laurence Harbor seawall. Based on analytical results from samples collected during the sampling event conducted by EPA in September 2008, it is apparent that lead contamination is present (Ref. 17, p. 5, Figure 2; 18, pp. 7, 8, 9; 20, p. 5). The estimated area surface area under the seawall is 64,324 square feet (ft^2) (Ref. 4, Figure 2; 11, p. 1). The source type is Pile, so the area value is divided by 13 to obtain the assigned value, as shown below (Ref. 1, p. 51591, Section 2.4.2.1.4, Table 2-5).

Area of source (ft^2): 64,324

Area (A) Assigned Value: (64,324)/(13) = 4,948

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 1 is 4,948 for Tier D - Area (Ref. 1, p. 51591, Section 2.4.2.1.5).

Source Hazardous Waste Quantity Value: 4,948

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

Number of the source: 2

Name and description of the source: Slag Waste Pile – Western Jetty of Cheesequake Creek Inlet

Source Type: Pile

Source 2 consists of the western jetty of the Cheesequake Creek Inlet, which extends into Raritan Bay. The source also includes slag materials extending west from the jetty along the southern shoreline of Raritan Bay (Ref. 4, Figures 1and 2; 9, p. 5). During field activities conducted by EPA in September 2008, the western jetty of the Cheesequake Creek Inlet was noted to contain slag material similar to that deposited along the Laurence Harbor seawall (i.e., Source 1). Battery casing fragments were also noted on the jetty (Ref. 16, p. 1). During field activities, the Raritan Bay was observed to come in direct contact with the slag contained within the western jetty of the Cheesequake Creek Inlet during high tide (Ref. 9, pp. 2, 7, 8; 16, p. 1).

In September 2008, EPA conducted a sampling investigation of the site. Waste/soil samples were collected from the western jetty of the Cheesequake Creek Inlet (Ref. 17, pp. 5, 7, 8, Figure 2; 9, pp. 14-16, 24; 16, p. 1). Selected samples were analyzed for TCLP metals (Ref. 17, pp. 1, 13). Analytical results from samples collected from the western jetty indicated the presence of lead at concentrations above the RCRA regulatory level of 5 mg/L (Ref. 17, pp. 5, 7, 8, 13, Figure 2; 18, pp. 2-6; 20, p. 5).

Location of the source, with reference to a map of the site:

The slag waste pile composing the western jetty of the Cheesequake Creek Inlet (i.e., Source 2) is located at the discharge point of Cheesequake Creek into Raritan Bay (Ref. 4, Figures 1 and 2; 9, pp. 2, 5).

Containment

Release to surface water via overland migration and/or flood:

Based on observations made during field activities conducted by EPA in September 2008, there are no containment features associated with the western jetty of the Cheesequake Creek Inlet. No maintained engineered cover, a liner or a run-on control system and runoff management system were observed (Ref. 16, p. 1). In addition, slag materials from the jetty were observed to be in direct contact with Raritan Bay during high tide, resulting in the source being located in surface water (Ref. 9, pp. 2, 7, 8; 16, p. 1). Analytical results from the TCLP samples collected from western jetty of the Cheesequake Creek Inlet indicate that lead in the waste is likely to migrate from the source. Based on an evaluation of the above conditions, an overland flow containment factor of 10 is assigned (Ref. 1, p. 51609).

Release to surface water via flood:

During field activities conducted by EPA in September 2008, no features were observed which would suggest that containment at the western jetty of the Cheesequake Creek Inlet is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by flood (Ref. 16, p. 1). Therefore, a flood containment factor of 10 is assigned (Ref. 1, p. 51611).

2.4.1 Hazardous Substances

In September 2008, EPA conducted a sampling investigation of the site. Soil samples were collected directly from the western jetty of the Cheesequake Creek Inlet as well as from areas of slag deposits located immediately west of the jetty along the Raritan Bay's southern shoreline (Ref. 17, pp. 5, 7, 8, Figure 2). Waste/soil samples were collected and submitted for TCLP metals and mercury analyses; leachate from these samples was generated by EPA Method SW-846 1311 (i.e., TCLP) as modified in Modification Reference Number 1454.1 (Ref. 9, pp. 14-16, 24; 17, p. 13; 18, pp. 28, 29). The leachate was then analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) as per Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) ILM05.4 (Ref. 18, pp. 28, 29). Analytical results from samples collected in these areas indicated the presence of lead at concentrations above the RCRA regulatory level of 5 milligrams per liter (mg/L) (Ref. 17, pp. 5, 7, 8, 13, Figure 2; 18, pp. 2-6; 20, p. 5).

Hazardous Substance	Evidence	Reference(s)
Lead	TCLP soil samples, EPA, September 2008:	
	S07A (930,000 ug/L)	17, pp. 5, 13, 16, 49; 18, p. 2
	S97 (561,000 ug/L)	17, pp. 8, 13_16, 51; 18, p. 5
	S98 (1,230,000 ug/L)	17, pp. 8, 13, 16, 52; 18, p. 6
	S59A (10,300 ug/L)	17, pp. 7, 13, 16, 53; 18, p. 3
	S60A (723,000 ug/L)	17, pp. 7, 13, 16, 53; 18, p. 4

Notes:

ug/L – micrograms per liter

Sample concentrations in parentheses

RCRA regulatory level for lead is 5 milligrams per liter (i.e., 5,000 ug/L) (Ref. 20, p. 5)

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

The information available is not sufficient to evaluate Tier A source hazardous waste quantity; therefore, hazardous constituent quantity is not scored (NS).

Hazardous Constituent Quantity (C) Value: NS

2.4.2.1.2 Hazardous Wastestream Quantity

The information available is not sufficient to evaluate Tier B source hazardous waste quantity; therefore, hazardous wastestream quantity is not scored.

Hazardous Wastestream Quantity (W) Value: NS

2.4.2.1.3 Volume

The information available is not sufficient to evaluate Tier C source hazardous waste quantity; therefore, volume (V) is assigned a value of 0 (Ref. 1, p. 51591, Section 2.4.2.1.3).

Volume (V) Value: 0

2.4.2.1.4 Area

Source 2 is a waste pile containing lead-contaminated slag which composes the western jetty of the Cheesequake Creek Inlet (Ref. 4, Figures 1 and 2; 9, pp. 2, 5). This source is characterized by the presence of slag materials within the western jetty of the Cheesequake Creek Inlet and the shoreline of the Raritan Bay immediately west of the jetty (Ref. 4, p. 2). Based on analytical results from samples collected from the EPA sampling event in September 2008, it is apparent that lead contamination is present (Ref. 17, pp. 5, 7, 8, Figure 2; 18, pp. 2, 3, 4, 5, 6; 20, p. 5). The estimated land surface area under the pile is 29,690 square feet (ft^2) (Ref. 4, Figure 2; 11, p. 1). The source type is Pile, so the area value is divided by 13 to obtain the assigned value, as shown below (Ref. 1, p. 51591, Section 2.4.2.1.4, Table 2-5).

Area of source (ft^2): 29,690

Area (A) Assigned Value: (29,690)/(13) = 2,283.84

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 2 is 2,283.84 for Tier D - Area (Ref. 1, p. 51591, Section 2.4.2.1.5).

Source Hazardous Waste Quantity Value: 2,283.84

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source Number	Source Hazardous Waste Quantity Value	Containment: Ground Water	Containment: Surface Water	Containment: Air Gas	Containment: Air Particulate
1	4,948	NS	10*	NS	NS
2	2,283.84	NS	10*	NS	NS

NS = Not Scored

* Overland flow containment and flood containment factors are 10 for all sources.

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 *Definition of Hazardous Substance Migration Path for Overland/Flood Component*

The site consists of two source areas located within one watershed (i.e., Raritan Bay). Both sources are located along the southern shoreline of the Raritan Bay (Ref. 4, Figures 1 and 2; 9, p. 5). The sources being evaluated under this package consist of waste piles associated with the Laurence Harbor seawall (i.e., Source 1), and the western jetty of the Cheesequake Creek Inlet (i.e., Source 2). The sources are located along the southern shoreline of Raritan Bay; approximately 0.8 mile of shoreline separates the sources. Although these sources are separated, the sources have overlapping target distance limits (Ref 4, Figure 3). Based on analytical data from the EPA sampling investigation conducted in September 2008, it is evident that releases of lead from both waste sources are impacting the watershed simultaneously. The Raritan Bay is tidally influenced in the area of both sources, with tidal cycles occurring approximately every 6 hours (Ref. 9, pp. 16-29; 10, pp. 1-2; 16, p. 1). Salinity measurements for Raritan Bay indicated a brackish water environment in the areas of the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 9, p. 6). Presented below is information related to each waste source, including the probable point of entry from each source to surface water and surface water targets surface water targets impacted by each source.

Source 1 – Laurence Harbor Seawall

The PPE to surface water from Source 1 (i.e., PPE1) is represented by the interface between the Raritan Bay and the slag materials associated with the Laurence Harbor seawall, which extends along the southern shoreline of Raritan Bay between Laurence Parkway and Margaret's Creek (Ref. 9, pp. 4, 5, 10, 11, 12; 16, p. 1).

Based on analytical data from the September 2008 sampling investigation, there is an observed release of lead, by direct observation and chemical analysis, from Source 1 to the Raritan Bay. The Raritan Bay is considered a fishery at the Laurence Harbor seawall. Species fished for consumption in the immediate area of the seawall include striped bass and blue fish (Ref. 9, pp. 3, 4, 5). The annual production of fish taken from Raritan Bay is unknown but estimated to be greater than 0. The Raritan Bay is part of the New York-New Jersey Estuary, which is a sensitive area identified under the National Estuary Program (Ref. 13, pp. 1-11). Raritan Bay is also classified by NJDEP as a Class FW2-NT/SE1 surface water at the Laurence Harbor seawall; this connotes an area for the protection and maintenance of aquatic life (Ref. 14, pp. 1-13).

Source 2 – Western Jetty of the Cheesequake Creek Inlet

The PPE to surface water from Source 2 (i.e., PPE2) is represented by the interface between the Raritan Bay and the slag materials associated with the western jetty of the Cheesequake Creek Inlet, and the attached slag materials extending west along the southern shoreline of Raritan Bay. Slag portions of this jetty were also observed to be in direct contact with Raritan Bay (Ref. 9, pp. 2, 7, 8; 16, p. 1).

Based on analytical data from the September 2008 sampling investigation, there is an observed release of lead, by direct observation and chemical analysis, from Source 2 to the Raritan Bay. Raritan Bay is considered a fishery at the western jetty of the Cheesequake Creek Inlet. Species fished for consumption in the area of the jetty include striped bass and blue fish (Ref. 9, pp. 3, 4, 5). The annual production of fish taken from Raritan Bay is unknown but estimated to be greater than 0. The Raritan Bay is part of the New York-New Jersey Estuary, which is a sensitive area identified under the National Estuary Program (Ref. 13, pp. 1-11). Raritan Bay is also classified by NJDEP as a Class FW2-NT/SE1 surface water at the jetty; this connotes an area for the protection and maintenance of aquatic life (Ref. 14, pp. 1-13).

Since there are observed releases from each source to the Raritan Bay by direct observation and chemical analysis, source-specific scoresheets were generated in the evaluation of this site. These source-specific scoresheets, on a line by line basis, refer to the relevant page in the HRS documentation record where the values were determined. Since observed releases to surface water from both sources has resulted in the maximum score for the surface water migration pathway, potential targets were not scored. Individual score sheets for each waste source are presented in Appendix A.

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release

Based on analytical data from the EPA sampling investigation conducted in September 2008, there are observed releases to the Raritan Bay from each source (i.e., Source 1 and Source 2). Observed releases from each source are documented via direct observation and chemical analysis.

Direct Observation by Direct Contact

Basis for Direct Observation – Source 1 (Laurence Harbor Seawall)

During the EPA sampling investigation conducted in September 2008, several portions of the Laurence Harbor seawall were observed to consist of slag materials. Battery casing fragments were also noted within the materials in the seawall (Ref 9, p. 4). During field activities, the Raritan Bay was observed to come in contact with the slag materials associated with the Laurence Seawall during high tide (Ref. 9, pp. 4, 5, 10, 11, 12; 16, p. 1).

Analytical results of leachate from waste/soil samples collected from the Laurence Harbor seawall (analyzed for TCLP metals) indicated the presence of lead at concentrations above the RCRA regulatory level of 5 milligrams per liter (mg/L). Specifically, waste/samples RBS-S01A, RBS-S02A, and RBS-S03A exceeded the RCRA regulatory limit for lead (Ref. 17, pp. 5, 13; 18, pp. 7-9; 20, p. 5). Sample locations RBS-S01A and S03A were observed to be submerged in Raritan Bay during high tide on 16 January 2009 (Ref. 9, pp. 13, 15, 16, 23).

Basis for Direct Observation – Source 2 (Western Jetty - Cheesequake Creek Inlet)

During the EPA sampling investigation conducted in September 2008, the top portion of the western jetty of the Cheesequake Creek Inlet was observed to consist of slag materials. The southern shoreline of the Raritan Bay extending west from the jetty was also observed to consist of slag materials (Ref. 9, p. 18). During field activities, the Raritan Bay was observed to come in contact with the slag materials associated with the western jetty of the Cheesequake Creek Inlet during high tide. (Ref. 9, pp. 2, 3, 7, 8; 16, p. 1).

Analytical results of leachate from waste/soil samples collected from the Laurence Harbor Seawall (analyzed for TCLP metals) indicated the presence of lead at concentrations above the RCRA regulatory level of 5 milligrams per liter (mg/L) (Ref. 20, p. 5). Specifically, waste/soil samples RBS-S07A, RBS-S97, RBS-S98, RBS-S59A, and RBS-60A exceeded the regulatory limit for lead (Ref. 17, pp. 5, 7, 8, 13; 18, pp. 2-6). Sample locations RBS-S07A, RBS-S59A, and RBS-S60A were observed to be submerged within Raritan Bay during high tide on 16 January 2009 (Ref. 9, pp. 13, 15-17, 24, 25).

Chemical Analysis

Based on analytical results from sediment samples collected during the EPA sampling investigation conducted in September 2008, there are observed releases by chemical analyses to surface water from Source 1 (i.e., Laurence Harbor seawall) and Source 2 (western jetty of Cheesequake Creek Inlet). A discussion of observed releases from each source is presented below:

Source 1 – Laurence Harbor Seawall

Sediment samples collected by EPA in September 2008 indicate an observed release by chemical analysis to the surface water pathway. Sediment samples collected from Raritan Bay adjacent to the Laurence Harbor Seawall indicated concentrations (greater than three times the background concentrations) of lead (Ref. 17, pp. 8-12, Figure 2; 22, pp. 6, 7, 9-12, 15, 57-61, 64, 65; 23, pp. 30-39, 63, 64, 65; 24, pp. 2-13). Sediment samples were analyzed for Target Analyte List (TAL) metals and grain size (Ref. 17, p. 1). The resulting analytical data were validated according to EPA Region 2 Data Validation Standard Operating Procedures (SOP) (Ref. 22, pp. 70-77; 23, pp. 74-80; 24, pp. 63-72). Background sediment samples were collected from the Raritan Bay from locations east and west of the Laurence Harbor seawall (Ref. 17, Figure 2).

Sample Similarity:

Background and release samples were collected for the same analytical parameters within the same timeframe (i.e., September 2008), from identical depths (i.e., 0-3 inches) and from the same body of water (i.e., Raritan Bay) (Ref. 17, pp. 1, 8-12, Figure 2). In addition, the background and release sediment samples listed consisted of mostly course-grained materials (i.e., sands and gravels) with little organic materials (i.e., silt and clay) (Ref. 26, pp. 10-21, 38, 40-42, 45, 46, 108, 109, 111, 158-173). Due to the similarities between background and release samples, the analytical results are considered to be similar for the purpose of this HRS Documentation Record.

Source 2 – Western Jetty of Cheesequake Creek Inlet

Sediment samples collected by EPA in September 2008 indicate an observed release by chemical analysis to the surface water pathway. Sediment samples collected from Raritan Bay adjacent to western jetty of the Cheesequake Creek Inlet indicated concentrations (greater than three times the background concentrations) of lead (Ref. 17, pp. 10-12; 23, pp. 31, 63-65; 25, pp. 8-12, 15, 16). Sediment samples were analyzed for Target Analyte List (TAL) metals and grain size (Ref. 17, p. 1). The resulting analytical data were validated according to EPA Region 2 Data Validation Standard Operating Procedures (SOP) (Ref. 23, pp. 74-80; 25, pp. 70-78). Background sediment samples were collected from the Raritan Bay from locations east and west of the western jetty of the Cheesequake Creek Inlet (Ref. 17, Figure 2).

Sample Similarity:

Background and release samples were collected for the same analytical parameters within the same timeframe (i.e., September 2008), from identical depths (i.e., 0-3 inches) and from the same body of water (i.e., Raritan Bay) (Ref. 17, pp. 1, 8-12, Figure 2). Background samples RBS-SED84, RBS-SED85, RBS-SED86, RBS-SED52, and RBS-SED 64 are similar to release sediment samples RBS-SED58 and RBS-SED60 since these samples consisted of mostly course-grained materials (i.e., sands and gravels) with little organic materials (i.e., silt and clay). In addition, background sample RBS-SED63 is similar to release samples RBS-SED56, RBS-SED57 and RBS-SED59 since these samples consisted of higher percentages of silt and clay (Ref. 26, pp. 68-72, 74, 75, 107-110, 184, 185). Due to the similarities between background and release samples, the analytical results are considered to be similar for the purpose of this HRS Documentation Record.

Hazardous Substances in the Release (Chemical Analysis)

Background Concentrations (Source 1 – Laurence Harbor Seawall)

Sample ID	Sampling Location	Depth	Date	Reference(s)
RBS-SED01	Raritan Bay, east of Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 8, Figure 2
RBS-SED02	Raritan Bay, east of Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 8, Figure 2
RBS-SED13	Raritan Bay, east of Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 9, Figure 2
RBS-SED84	Raritan Bay, west of Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 11, Figure 2
RBS-SED85	Raritan Bay, west of Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 11, Figure 2

Sample ID	Hazardous Substance	Conc (mg/kg)	Adjusted CRQL (mg/kg) *	Reference(s)
RBS – SED01	Lead	9.2 J (9.2)	1.23	17, p. 8, 16, 64; 22, p. 6; 21, pp. 2, 7, 39, 40; 28, pp. 1-2
RBS – SED02	Lead	7.3 J (7.3)	1.24	17, p. 8, 16, 64; 22, p. 7; 21, pp. 2, 7, 39, 40; 28, pp. 1-2
RBS – SED13	Lead	11.5 J (11.5)	1.24	17, p. 9, 16, 65; 22, p. 12; 21, pp. 2, 8, 39, 40; 28, pp. 1-2
RBS – SED84	Lead	2.1	1.23	17, p. 11, 16, 40; 23, p. 64; 21, pp. 2, 10, 22, 24
RBS – SED85	Lead	2.4	1.18	17, p. 11, 16, 40; 23, p. 65; 21, pp. 2, 10, 22, 24

J – Estimated concentration; if required , adjusted concentration in parentheses (Ref. 28, pp. 1-2; 29, pp. 1-18)

* Contract-Required Quantitation Limit, adjusted to account for percent solids (Ref. 21, p. 1)

Contaminated Samples (Source 1 – Laurence Harbor Seawall)

Since the highest background sample concentration is 11.5 mg/kg, sediment samples with lead concentrations significantly (i.e., greater than 3 times) above the highest background sample concentration were considered contaminated. Therefore, sediment samples with concentrations (or adjusted qualified sample concentrations) greater than 34.5 mg/kg, were included as contaminated samples:

Sample ID	Sampling Location	Depth	Date	Reference(s)
RBS-SED04	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 8, Figure 2
RBS-SED05	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 8, Figure 2
RBS-SED06	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 8, Figure 2
RBS-SED07	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 8, Figure 2
RBS-SED16	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/10/08	17, p. 9, Figure 2
RBS-SED17	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED18	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED08	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 8, Figure 2
RBS-SED19	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED09	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED20	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED10	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9; Figure 2

Sample ID	Sampling Location	Depth	Date	Reference(s)
RBS-SED11	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED21	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 8, Figure 2
RBS-SED22	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED23	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED12	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED24	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED26	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED25	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED81	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/11/08	17, p. 11, Figure 2
RBS-SED82	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/11/08	17, p. 11, Figure 2
RBS-SED83	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/11/08	17, p. 11, Figure 2
RBS-SED87	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 12, Figure 2
RBS-SED88	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 12, Figure 2
RBS-SED33	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 10, Figure 2
RBS-SED34	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 10, Figure 2
RBS-SED35	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 10, Figure 2
RBS-SED30	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED31	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED32	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED27	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED28	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2
RBS-SED29	Raritan Bay, near Laurence Harbor Seawall	0 to 3 inches	9/12/08	17, p. 9, Figure 2

Sample ID	Hazardous Substance	Conc (mg/kg)	Adjusted CRQL(mg/kg) *	Reference(s)
RBS-SED04	Lead	60.9 J (42.29)	1.34	17, p. 8, 16, 64; 22, p. 9; 21, pp. 2, 7, 39, 40; 28, pp. 1-2
RBS-SED05	Lead	135 J (93.75)	1.35	17, p. 8, 16, 64; 22, p. 10; 21, pp. 2, 7, 39, 40; 28, pp. 1-2
RBS-SED06	Lead	252 J (175)	1.33	17, p. 8, 16, 64; 22, p. 11; 21, pp. 2, 7, 39, 40; 28, pp. 1-2
RBS-SED07	Lead	5,860	3.33	17, p. 8, 16, 41; 23, p. 30; 21, pp. 2, 7, 17, 18
RBS-SED16	Lead	107 J (74.3)	1.29	17, p. 9, 16, 65; 22, p. 15; 21, pp. 2, 8, 39, 40; 28, pp. 1-2
RBS-SED17	Lead	75.7	1.42	17, p. 9, 16, 42; 23, p. 36; 21, pp. 2, 8, 17, 18
RBS-SED18	Lead	186	1.60	17, p. 9, 16, 42; 23, p. 37; 21, pp. 2, 8, 17, 19
RBS-SED08	Lead	861	1.29	17, p. 8, 16, 41; 23, p. 31; 21, pp. 2, 7, 17, 18
RBS-SED19	Lead	93.5	1.50	17, p. 9, 16, 42; 23, p. 38; 21, pp. 2, 8, 17, 19
RBS-SED09	Lead	403	1.23	17, p. 9, 16, 41; 23, p. 32; 21, pp. 2, 8, 17, 18
RBS-SED20	Lead	58.2	1.52	17, p. 9, 16, 42; 23, p. 39; 21, pp. 2, 8, 17-19
RBS-SED10	Lead	326	1.24	17, p. 9, 41, Figure 2; 23, p. 33; 21, pp. 2, 8, 17, 18

Sample ID	Hazardous Substance	Conc (mg/kg)	Adjusted CRQL(mg/kg) *	Reference(s)
RBS-SED11	Lead	441	1.41	17, p. 9, 16, 41; 23, p. 34; 21, pp. 2, 8, 17, 18
RBS-SED21	Lead	48.1	1.31	17, p. 9, 16, 42; 23, p. 40; 21, pp. 2, 8, 17, 19
RBS-SED22	Lead	53.6 J (37.2)	1.29	17, p. 9, 16, 43; 22, p. 57; 21, pp. 2, 8, 53, 54; 28, pp. 1-2
RBS-SED23	Lead	90.7 J (63)	1.43	17, p. 9, 16, 43; 22, p. 58; 21, pp. 2, 8, 53, 54; 28, pp. 1-2
RBS-SED12	Lead	660	1.20	17, p. 9, 16, 42; 23, p. 35; 21, pp. 2, 8, 17, 18
RBS-SED24	Lead	79.4 J (55.1)	1.38	17, p. 9, 16, 43; 22, p. 59; 21, pp. 2, 8, 53, 54; 28, pp. 1-2
RBS-SED26	Lead	525 J (364.6)	1.39	17, p. 9, 16, 43; 22, p. 61; 21, pp. 2, 8, 53, 54; 28, pp. 1-2
RBS-SED25	Lead	458 J (318)	1.17	17, p. 9, 16, 43; 22, p. 60; 21, pp. 2, 8, 53, 54; 28, pp. 1-2
RBS-SED81	Lead	463	1.27	17, p. 11, 16, 31; 24, p. 11; 21, pp. 2, 10, 56, 57
RBS-SED82	Lead	422	1.39	17, p. 11, 16, 31; 24, p. 12; 21, pp. 2, 10, 56, 57
RBS-SED83	Lead	318	1.31	17, p. 11, 16, 32; 24, p. 13; 21, pp. 2, 10, 56, 58
RBS-SED87	Lead	1,110 J (763.9)	1.27	17, p. 12, 16, 43; 22, p. 64; 21, pp. 2, 11, 53, 54; 28, pp. 1-2
RBS-SED88	Lead	1,440 J (1,000)	1.40	17, p. 12, 16, 43; 22, p. 65; 21, pp. 2, 11, 53, 54; 28, pp. 1-2
RBS-SED33	Lead	533	1.18	17, p. 10, 16, 31; 24, p. 8; 21, pp. 2, 9, 56, 57
RBS-SED34	Lead	307	1.45	17, p. 10, 16, 31; 24, p. 9; 21, pp. 2, 9, 56, 57
RBS-SED35	Lead	304	1.46	17, p. 10, 16, 31; 24, p. 10; 21, pp. 2, 9, 56, 57
RBS-SED30	Lead	530	1.16	17, p. 9, 16, 31; 24, p. 5; 21, pp. 2, 8, 56, 57
RBS-SED31	Lead	280	1.45	17, p. 9, 16, 31; 24, p. 6; 21, pp. 2, 8, 56.57
RBS-SED32	Lead	318	1.43	17, p. 9, 16, 31; 24, p. 7; 21, pp. 2, 8, 56, 57
RBS-SED27	Lead	311	1.24	17, p. 9, 16, 31; 24, p. 2; 21, pp. 2, 8, 56. 57
RBS-SED28	Lead	394	1.38	17, p. 9, 16, 31; 24, p. 3; 21, pp. 2, 8, 56, 57
RBS-SED29	Lead	200	1.30	17, p. 9, 16, 31; 24, p. 4; 21, pp. 2, 8, 56, 57

J – Estimated concentration; if required, adjusted concentration in parentheses (Ref. 28, pp. 1, 2; 29, pp. 1-18)

* Contract-Required Quantitation Limit, adjusted to account for percent solids (Ref. 21, p. 1)

Background Concentrations (Source 2 – Western Jetty of Cheesequake Creek Inlet)

Sample ID	Sampling Location	Depth	Date	Reference(s)
RBS-SED84	Raritan Bay, east of western jetty	0 to 3 inches	9/12/08	17, p. 11, Figure 2
RBS-SED85	Raritan Bay, east of western jetty	0 to 3 inches	9/12/08	17, p. 11, Figure 2
RBS-SED86	Raritan Bay, east of western jetty	0 to 3 inches	9/12/08	17, p. 11, Figure 2
RBS-SED52	Raritan Bay, east of western jetty	0 to 3 inches	9/12/08	17, p. 10, Figure 2
RBS-SED63	Raritan Bay, west of western jetty	0 to 3 inches	9/15/08	17, p. 11, Figure 2
RBS-SED64	Raritan Bay, west of western jetty	0 to 3 inches	9/15/08	17, p. 11, Figure 2

Sample ID	Hazardous Substance	Conc (mg/kg)	Adjusted CRQL (mg/kg) *	Reference(s)
RBS – SED84	Lead	2.1	1.23	17, p. 11, 16, 40; 23, p. 64; 21, pp. 2, 10, 22, 24
RBS – SED85	Lead	2.4	1.18	17, p. 11, 16, 40; 23, p. 65; 21, pp. 2, 10 22, 24
RBS – SED86	Lead	7.3	1.23	17, p. 11, 16, 42; 23, p. 31; 21, pp. 2, 10, 17, 19
RBS – SED52	Lead	2.3	1.15	17, p. 10, 16, 40; 23, p. 63; 21, pp. 3, 9, 22, 23
RBS – SED63	Lead	36.3	1.36	17, p. 11, 16, 53; 25, p. 15; 21, pp. 3, 10, 27, 29
RBS – SED64	Lead	29.6	1.37	17, p. 11, 16, 53; 25, p. 16; 21, pp. 3, 10, 27, 29

* CRQL - Contract-Required Quantitation Limit, adjusted to account for percent solids (Ref. 21, p. 1)

Contaminated Samples (Source 2 – Western Jetty of Cheesequake Creek Inlet)

Since the highest background sample concentration is 36.3 mg/kg, sediment samples with lead concentrations significantly (i.e., greater than 3 times) above the highest background sample concentration were considered contaminated. Therefore, sediment samples with concentrations (or adjusted qualified sample concentrations) greater than 108 mg/kg, were included as contaminated samples:

Sample ID	Sampling Location	Depth	Date	Reference(s)
RBS-SED56	Raritan Bay, adjacent to western jetty	0 to 3 inches	9/15/08	17, p. 10, Figure 2
RBS-SED57	Raritan Bay, adjacent to western jetty	0 to 3 inches	9/15/08	17, p. 11, Figure 2
RBS-SED58	Raritan Bay, adjacent to western jetty	0 to 3 inches	9/15/08	17, p. 11, Figure 2
RBS-SED59	Raritan Bay, adjacent to western jetty	0 to 3 inches	9/15/08	17, p. 11, Figure 2
RBS-SED60	Raritan Bay, adjacent to western jetty	0 to 3 inches	9/15/08	17, p. 11, Figure 2

Sample ID	Hazardous Substance	Conc (mg/kg)	Adjusted CRQL (mg/kg) *	Reference(s)
RBS – SED56	Lead	1,770 J (1,770)	9.62	17, p. 10, 16, 41; 25, p. 8; 21, pp. 3, 9. 27, 28; 28, pp. 1-2
RBS – SED57	Lead	2,150	1.92	17, p. 11, 16, 41; 25, p. 9; 21, pp. 3, 10, 27, 28
RBS – SED58	Lead	542	1.66	17, p. 11, 16, 41; 25, p. 10; 21, pp. 3, 10, 27, 28
RBS – SED59	Lead	251 J (251)	2.13	17, p. 11, 16, 53; 25, p. 11; 21, pp. 3, 10, 27, 28; 28, pp. 1-2
RBS – SED60	Lead	197	1.75	17, p. 11, 16, 53; 25, p. 12; 21, pp. 3, 10, 27, 28

J – Estimated concentration; if required, adjusted concentration in parentheses (Ref. 28, pp. 1, 2; 29, pp. 1-18)
* CRQL - Contract-Required Quantitation Limit, adjusted to account for percent solids (Ref. 21, p. 1)

Attribution (chemical analysis):

Source 1 – Laurence Harbor Seawall

Background information indicates that in September 1972, NJDEP was advised by a local government official that lead-bearing waste material was being disposed of along the Laurence Harbor beachfront on Raritan Bay. NJDEP background information indicates that by a letter from NL Industries, Inc. (NL) to NJDEP (dated December 1972), NL acknowledged that slag consisting of non-recoverable low yield metallic waste from blast furnace and blast furnace rubble are disposed of by Liberty Trucking Company at their property in Madison Township, Route 35, New Jersey. Madison Township is currently known as Old Bridge Township. NL used battery plates from lead/acid storage batteries as the principal feed material for the blast furnace located at its plant in Perth Amboy, New Jersey (Ref. 7, pp. 2).

On May 23, 2007 and July 24, 2007, NJDEP conducted soil sampling events along the southern shoreline of the Raritan Bay adjacent to the Old Bridge Waterfront Park. Analytical results from these sampling events indicated the presence of lead at concentrations as high as 142,000 parts per million, which is above the state's unrestricted use and restricted use Soil Cleanup Criteria (Ref. 7, p. 2; 8, pp. 1-57). NJDEP described the waste material associated with the Laurence Harbor seawall as consisting of various materials including large pieces of rust-colored slag. Other waste (i.e., slag) materials associated with the low-yield metallic waste from blast furnace and blast furnace rubble included finer grained "nuggets" as well as battery casing fragments of various sizes. NJDEP officials stated that it is possible that some of the finer waste materials comprising the Laurence Harbor Seawall may have been included in the soil samples (Ref. 15, p. 1).

Based on TCLP results for lead in waste samples collected from the Laurence Harbor seawall, and lead concentrations being detected in sediment samples at concentrations significantly above concentrations detected in background samples located east and west of the seawall, it is evident that the Raritan Bay is being impacted by slag deposits associated with the Laurence Harbor seawall. (See Section 2.4.1, p. 13, and Section 4.1.2.1.1, p. 20 of this documentation record.)

Source 2 – Western Jetty of Cheesequake Creek Inlet

During field activities conducted by EPA in September 2008, the western jetty of the Cheesequake Creek Inlet was noted to contain slag material similar to that deposited along the Laurence Harbor seawall (i.e., Source 1). Battery casing fragments were also noted on the jetty (Ref. 16, p. 1). During field activities, the Raritan Bay was observed to come in direct contact with the slag contained within the western jetty of the Cheesequake Creek Inlet during high tide (Ref. 9, pp. 2, 4, 7, 8; 16, p. 1).

Based on TCLP results for lead in waste samples collected from the western jetty of the Cheesequake Creek Inlet, and lead concentrations being detected at concentrations significantly above concentrations detected in background sediment samples collected from Raritan Bay at locations east and west of the jetty, it is evident that Raritan Bay is being impacted

by releases of lead associated with the western jetty of the Cheesequake Creek Inlet. (See Section 2.4.1, p. 16, and Section 4.1.2.1.1, p. 20, of this documentation record.)

Hazardous Substances Released (Source 1):

Lead (by direct observation and chemical analyses)

Hazardous Substances Released (Source 2):

Lead (by direct observation and chemical analyses)

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Observed Release Factor Value: 550

4.1.2.2 WASTE CHARACTERISTICS

4.1.2.2.1 Toxicity/Persistence

Hazardous Substance*	Source No.	Toxicity Factor Value	Persistence** Factor Value	Toxicity/ Persistence Factor Value (Table 4-12)	Reference
Lead	1, 2 OR	10,000	1	10,000	2, p. BI-8

OR – Observed Release

* Lead is documented in the observed releases by direct observation and chemical analysis.
** The persistence factor value for Rivers also applies to coastal tidal waters. See HRS Table 4-10 and HRS Section 4.1.2.2.1.2 (Ref. 1, p. 51612).

Toxicity/Persistence Factor Value: 10,000

4.1.2.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity (HWQ) Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	4,948	no
2	2,283.84	no
Sum of Values:	7,232	

(rounded to nearest integer as specified in HRS Section 2.4.2.2 [Ref. 1, p. 51591])

The sum of values for source hazardous waste quantity factor values as determined in Section 2.4.2.2 of the documentation record corresponds to a value of 100 in Table 2-6 of the HRS (Ref. 1, p. 51591). In addition, since surface water targets are subject to Level II contamination, then either the value of Table 2-6 or a value of 100 is assigned, whichever is greater (Ref. 1, p. 51592). Therefore, the hazardous waste quantity factor value of 100 is assigned.

4.1.2.2.3 Waste Characteristics Factor Category Value

One hazardous substance (i.e., lead) associated with waste sources that have a surface water pathway containment factor greater than 0 for the Raritan Bay watershed corresponds to the maximum toxicity/persistence factor value (10,000) (Ref. 1, pp. 51613, 51617; Section 4.1.2.2.1 Toxicity/Persistence of this HRS documentation record).

Toxicity/persistence factor value
X hazardous waste quantity factor value = 10,000 x 100 = 1×10^6

The product corresponds to the Waste Characteristics Factor Category Value of 32 in Table 2-7 of the HRS (Ref. 1, pp. 51592).

Hazardous Waste Quantity Factor Value: 100
Waste Characteristics Factor Category Value: 32

4.1.2.3 DRINKING WATER TARGETS

Level I Concentrations

Sample ID: Not Applicable (N/A)
Sample Medium: N/A
Location: N/A
Reference: N/A

Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark
N/A	N/A	N/A	N/A

Reference for Benchmarks:

Most Distant Level I Sample

Sample ID: N/A
Distance from the probable point of entry: N/A
Reference: N/A

Most Distant Level II Sample

Sample ID: N/A
Distance from the probable point of entry: N/A
Reference: N/A

4.1.2.3.1 Nearest Intake

Location of Nearest Drinking Water Intake: None
Distance from the probable point of entry: N/A
Reference: N/A

Potential Contamination:

Type of surface water body: N/A

Dilution Weight: NA

Nearest Intake Factor Value: Not Scored (NS)

4.1.2.3.2 **Population**

4.1.2.3.2.2 Level I Concentration

Intake	Distance Along the In-water Segment from the Probable Point of Entry	Population	References
Not Scored	N/A	N/A	N/A

Population Served by Level I Intakes:

Level I Population Factor Value: NS

4.1.2.3.2.3 Level II Concentration

Intake	Distance Along the In-water Segment from the Probable Point of Entry	Population	References
Not Scored	N/A	N/A	N/A

Level II Population Factor Value: NS

4.1.2.3.2.4 Potential Contamination

Since a maximum score of 100.00 was achieved for the surface water migration pathway, potential contamination was not scored for the Drinking Water component.

Intake	Average Annual Flow (cfs)	Population Served	References
N/A	N/A	N/A	N/A

Type of Surface Water Body	Total Population	Dilution-Weighted Population (Table 4-14)
N/A	N/A	N/A

Dilution-Weighted Population Served by Potentially Contaminated Intakes:

Potential Contamination Factor Value: NS

4.1.2.3.3 **Resources**

HRS section 4.1.2.3.3 describes the evaluation of resources associated with impacted watersheds. The in- water segment of Raritan Bay adjacent to Old Bridge Waterfront Park qualifies as a major or designated water recreation area, excluding drinking water use (Ref 1, p. 51617). Old Bridge Waterfront Park extends from Cheesequake Creek to Margaret's Creek (Ref. 19, p. 1). Middlesex County has designated Old Bridge Waterfront Park as a water recreation area, appropriate for fishing activities; additionally, fishing and swimming activities were observed in Raritan Bay within the Old Bridge Waterfront Park, which is in the immediate area of the Laurence Harbor Seawall (i.e., Source 1) and near the western jetty of the Cheesequake Creek Inlet (i.e., Source 2) (Ref. 16, p. 2; 19, pp. 1-2). Old Bridge Waterfront Park is within the in-water segment of the hazardous substance migration pathway for both sources.

Resources Factor Value: 5

4.1.3.2 Human Food Chain Threat - Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Hazardous Substance*	Source Numbers	Toxicity Factor Value	Persistence Factor Value**	Salt Water Food Chain Bioaccumulation Factor Value***	Toxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-16)	Reference
Lead	1, 2 OR	10,000	1	5,000	5.0×10^7	2, p. BI-8

OR – Observed Release

* Lead is documented in the observed releases by direct observation and chemical analysis.

** The persistence factor value for Rivers also applies to coastal tidal waters. See HRS Table 4-10 and HRS Section 4.1.2.2.1.2 (Ref. 1, p. 51612).

*** Average salinity measurements for Raritan Bay collected by Weston in October 2008 during high tide indicated a brackish water environment (Ref. 9, p. 6). In accordance with Section 4.1.3.2.1.3 of Reference 1, if the fishery being evaluated is located in brackish water, the higher of the salt water or fresh water bioaccumulation potential factor values of a hazardous substance may be assigned (Ref. 1, p. 51617). Therefore, the salt water bioaccumulation potential factor for lead is assigned.

Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^7

4.1.3.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity (HWQ) Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	4,948	no
2	2,283.84	no
Sum of Values:	7,232	

(rounded to nearest integer as specified in HRS Section 2.4.2.2 [Ref. 1, p. 51591])

The sum of values for source hazardous waste quantity factor values as determined in Section 2.4.2.2 of the documentation record corresponds to a value of 100 in Table 2-6 of the HRS (Ref. 1, p. 51591). In addition, since surface water targets are subject to Level II contamination, then either the value of Table 2-6 or a value of 100 is assigned, whichever is greater (Ref. 1, p. 51592).

4.1.3.2.3 Waste Characteristics Factor Category Value

One hazardous substance (i.e., lead) associated with each source that have a surface water pathway containment factor greater than 0 for the Raritan Bay watershed corresponds to the maximum toxicity/persistence factor value (10,000) and bioaccumulation factor value (5,000), as shown previously (Ref. 1, pp. 51613; Ref. 2, p. BI-8).

(Toxicity/persistence factor value) x (hazardous waste quantity factor value) = $10{,}000 \times 100 = 1 \times 10^6$

(Toxicity/persistence factor value x hazardous waste quantity factor value) x (bioaccumulation potential factor value) = $(1 \times 10^6) \times (5{,}000) = 5 \times 10^9$

The product corresponds to the Waste Characteristics Factor Category Value of 180 in Table 2-7 of the HRS (Ref. 1, pp. 51592).

Hazardous Waste Quantity Assigned Value: 100
Waste Characteristics Factor Category Value: 180

4.1.3.3 Human Food Chain Threat-Targets

Actual Food Chain Contamination

The HRS states that a fishery (or portion of a fishery) within the target distance limit of the watershed subject to actual contamination can be considered if hazardous substances have bioaccumulation potential factor values of 500 or greater and are present in the observed release to the watershed (Ref. 1, p. 51620).

In September 2008, EPA conducted a sampling investigation along the southern shoreline of the Raritan Bay adjacent to the Old Bridge Waterfront Park (i.e., Source 1) and the western jetty of the Cheesequake Creek Inlet (Source 2). Analytical results from these sampling events indicated the presence of lead at concentrations significantly above background (Ref. 17, pp. 8-12, 16; 22, pp. 6, 7, 10-12, 15, 58-61, 64, 65; 23, pp. 30-39, 63-65; 24, pp. 2-13; 25, pp. 8-12, 15, 16).

Source 1 (Laurence Harbor Seawall)

Sample ID	Hazardous Substance	Bioaccumulation Potential Factor Value	Reference
RBS-SED04	Lead	5,000	17, pp. 8, 16, 64; 22, p. 9;
RBS-SED05	Lead	5,000	17, pp. 8, 16, 64; 22, p. 10
RBS-SED06	Lead	5,000	17, pp. 8, 16, 64; 22, p. 11
RBS-SED07	Lead	5,000	17, pp. 8, 16, 41; 23, p. 30
RBS-SED16	Lead	5,000	17, pp. 9, 16, 65; 22, p. 15
RBS-SED17	Lead	5,000	17, pp. 9, 16, 42; 23, p. 36
RBS-SED18	Lead	5,000	17, pp. 9, 16, 42; 23, p. 37
RBS-SED08	Lead	5,000	17, pp. 8, 16, 41; 23, p. 31
RBS-SED19	Lead	5,000	17, pp. 9, 16, 42; 23, p. 38
RBS-SED09	Lead	5,000	17, pp. 9, 16, 41; 23, p. 32
RBS-SED20	Lead	5,000	17, pp. 9, 16, 42; 23, p. 39
RBS-SED10	Lead	5,000	17, pp. 9, 16, 41; 23, p. 33
RBS-SED11	Lead	5,000	17, pp. 9, 16, 41; 23, p. 34
RBS-SED21	Lead	5,000	17, pp. 9, 16, 42; 23, p. 40
RBS-SED22	Lead	5,000	17, pp. 9, 16, 43; 22, p. 57
RBS-SED23	Lead	5,000	17, pp. 9, 16, 43; 22, p. 58
RBS-SED12	Lead	5,000	17, pp. 9, 16, 42; 23, p. 35
RBS-SED24	Lead	5,000	17, pp. 9, 16, 43; 22, p. 59
RBS-SED26	Lead	5,000	17, pp. 9, 16, 43; 22, p. 61
RBS-SED25	Lead	5,000	17, pp. 9, 16, 43; 22, p. 60
RBS-SED81	Lead	5,000	17, pp. 11, 16, 31; 24, p. 11
RBS-SED82	Lead	5,000	17, pp. 11, 16, 31; 24, p. 12
RBS-SED83	Lead	5,000	17, pp. 11, 16, 32; 24, p. 13
RBS-SED87	Lead	5,000	17, pp. 12, 16, 43; 22, p. 64
RBS-SED88	Lead	5,000	17, pp. 12, 16, 43; 22, p. 65
RBS-SED33	Lead	5,000	17, pp. 10, 16, 31; 24, p. 8
RBS-SED34	Lead	5,000	17, pp. 10, 16, 31; 24, p. 9
RBS-SED35	Lead	5,000	17, pp. 10, 16, 31; 24, p. 10
RBS-SED30	Lead	5,000	17, pp. 9, 16, 31; 24, p. 5
RBS-SED31	Lead	5,000	17, pp. 9, 16, 31; 24, p. 6
RBS-SED32	Lead	5,000	17, pp. 9, 16, 31; 24, p. 7
RBS-SED27	Lead	5,000	17, pp. 9, 16, 31; 24, p. 2
RBS-SED28	Lead	5,000	17, pp. 9, 16, 31; 24, p. 3
RBS-SED29	Lead	5,000	17, pp. 9, 16, 31; 24, p. 4

Source 2 (Western Jetty – Cheesequake Creek Inlet)

Sample ID	Hazardous Substance	Bioaccumulation Potential Factor Value	Reference
RBS-SED56	Lead	5,000	17, pp. 10, 16, 41; 25, p. 8
RBS-SED57	Lead	5,000	17, pp. 11, 16, 41; 25, p. 9
RBS-SED58	Lead	5,000	17, pp. 11, 16, 41; 25, p. 10
RBS-SED59	Lead	5,000	17, pp. 11, 16, 53; 25, p. 11
RBS-SED60	Lead	5,000	17, pp. 11, 16, 53; 25, p. 12

Closed Fisheries

None

Benthic Tissue

None

Level I Concentrations

None

Level II Concentrations

None

Level II Fisheries

Source 1 - Raritan Bay
Source 2 - Raritan Bay

Samples for Observed Release

Source 1 – Laurence Harbor Seawall

Sample ID	Distance from PPE*	Hazardous Substance	Bioaccumulation Potential Factor Value**
S01A	0 feet	Lead	5,000
S02A	0 feet	Lead	5,000
S03A	0 feet	Lead	5,000

Source 2 – Western Jerry of Cheesequake Creek Inlet

Sample ID	Distance from PPE*	Hazardous Substance	Bioaccumulation Potential Factor Value**
S07A	0 feet	Lead	5,000
S97	0 feet	Lead	5,000
S98	0 feet	Lead	5,000
S59A	0 feet	Lead	5,000
S60A	0 feet	Lead	5,000

(Ref. 1, pp. 51617, 51618; 2, p. BI-8; 4, Figure 2; 17, pp. 5, 7, 8; 18, pp. 2-9)

* An observed release to surface water by direct observation is documented through the direct contact of the Raritan Bay with lead-contaminated slag associated with the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet (Ref. 9, pp. 2, 4, 5, 7, 8, 10, 11, 12; 16, p. 1). Therefore, the distance from the PPE is evaluated as 0 feet.

** Average salinity measurements for Raritan Bay collected by Weston in October 2008 during high tide indicated a brackish water environment (Ref. 9, p. 6). In accordance with Section 4.1.3.2.1.3 of Reference 1, if the fishery being evaluated is located in brackish water, the higher of the salt water or fresh water bioaccumulation potential factor values of a hazardous substance may be assigned (Ref. 1, p. 51617). Therefore, the salt water bioaccumulation potential factor for lead is assigned.

4.1.3.3.1 Food Chain Individual

Source 1 – Laurence Harbor Seawall

Sample ID: RBS-SED09, RBS-SED10, RBS-SED11, RBS-SED12, RBS-SED19, RBS-SED20, RBS-SED21, RBS-SED22, RBS-SED23,

Hazardous Substance: Lead
Bioaccumulation Potential: 5,000

(Ref. 2, p. BI-8; 17, pp. 9, 16, 41-43; 22, pp. 32-35, 38-40, 57-58)

Source 2 – Western Jetty of the Cheesequake Creek Inlet

Sample ID: Source 2 – RBS-SED27, RBS-SED28, RBS-SED29, RBS-SED30, RBS-SED31, RBS-SED32, RBS-SED35

Hazardous Substance: Lead
Bioaccumulation Potential: 5,000

(Ref. 2, p. BI-8; 17, pp. 9-10, 16, 31; 24, pp. 2-7, 10)

Identity of Fishery	Type of Surface Water Body	Dilution Weight	Reference(s)
Source 1 - Raritan Bay	Coastal Tidal Water (flow and depth not applicable)	0.00001	1, p. 51613; Ref. 4, Figures 1 and 2; 9, pp. 3, 4, 5
Source 2 - Raritan Bay	Coastal Tidal Water (flow and depth not applicable)	0.00001	1, p. 51613; Ref. 4, Figures 1 and 2; 9, pp. 4, 5, 9

There are two Level II observed releases of lead, which has a bioaccumulation factor of 500 or greater, to two separate fisheries associated with the Raritan Bay, (Ref. 1, p. 51620; 2, p. BI-8; 9, pp. 3, 4, 5). Therefore, the food chain individual factor is assigned the value of 45 (Ref. 1, p. 51592, 51620). Since the territorial sea boundary is located in the at the northern point of area of Sandy Hook, which is approximately 12 miles east of Sources 1 and 2, the Raritan Bay fisheries are considered to be in coastal tidal waters (Ref. 4, Figure 3; 27, pp. 3, 5).

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Food Chain Individual Factor Value: 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

The Level I Concentrations Factor Value is 0 because there are no fisheries subject to Level I concentrations (Ref. 1, pp. 51620, 51621).

Level I Concentrations Factor Value: 0

4.1.3.3.2.2 Level II Concentrations

Actual Contamination of the Raritan Bay is documented through the observed release of lead to the Raritan Bay from both sources (Source 1 and Source 2) via direct observation and chemical analysis. (See Section 4.1.2.1.1 of this documentation record.) Raritan Bay is a fished for consumption in the immediate area of Sources 1 and 2.

Source	Identity of Fishery	Annual Production (pounds)	Surface Water Body	Reference	Human Food Chain Population Value
1	Raritan Bay	>1	Coastal Tidal Water	1, p. 51621; 9, pp. 3-5, 10-12 15, 23, 26; 17, pp. 5, 8-12, 16; 18, pp. 7-9; 22, pp. 6, 7, 9-12, 15, 57-61, 65; 23, pp. 30-40; 24, pp. 2-13; 27, pp. 3, 5	0.03
2	Raritan Bay	>1	Coastal Tidal Water	1, p. 51621; 9, pp. 2, 3, 7, 8, 15, 17, 19, 24, 25; 17, pp. 5, 7, 10, 11, 16; 18, pp. 2-6; 23, pp. 64-65; 25, pp. 8-12, 15, 16; 27, pp. 3, 5	0.03

Level II Concentrations Factor Value: 0.06

4.1.3.3.2.3 Potential Human Food Chain Contamination

Identity of Fishery	Annual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Population Value (P_i)	Dilution Weight (D_i)	$P_i x D_i$

Because a maximum score of 100.00 was achieved for the surface water migration pathway without considering potential fishery production within the 15-mile TDL, Potential Human Food Chain Contamination was not scored.

Sum of $P_i \times D_i$: NS
(Sum of $P_i \times D_i$)/10: NS

Potential Human Food Chain Contamination Factor Value: NS

4.1.4.2 Environmental Threat - Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substance*	Source Numbers	Ecotoxicity Factor Value	Persistence Factor Value**	Fresh Water Bioaccumulation Factor Value***	Ecotoxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-21)	Reference
Lead	1, 2, OR	1,000	1	50,000	5.0×10^7	2, p. BI-8

OR – Observed Release

* Lead is documented in the observed releases by direct observation and chemical analysis.

** The persistence factor value for Rivers also applies to coastal tidal waters. See HRS Table 4-10 and HRS Section 4.1.2.2.1.2 (Ref. 1, p. 51612).

*** Average salinity measurements for Raritan Bay collected by Weston in October 2008 during high tide indicated a brackish water environment (Ref. 9, p. 6). In accordance with Section 4.1.3.2.1.3 of Reference 1, if the fishery being evaluated is located in brackish water, the higher of the salt water or fresh water bioaccumulation potential factor values of a hazardous substance may be assigned (Ref. 1, p. 51617). Therefore, the fresh water bioaccumulation potential factor for lead is assigned.

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^7

4.1.4.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity (HWQ) Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	4,948	no
2	2,283.84	no
Sum of Values:	7,232	

(rounded to nearest integer as specified in HRS Section 2.4.2.2 [Ref. 1, p. 51591])

The sum of values for source hazardous waste quantity factor values as determined in Section 2.4.2.2 of the documentation record corresponds to a value of 100 in Table 2-6 of the HRS (Ref. 1, p. 51591). Since surface water targets are subject to Level II contamination, then either the value of Table 2-6 or a value of 100 is assigned, whichever is greater (Ref. 1, p. 51592). Therefore, the hazardous waste quantity factor value of 100 is assigned.

4.1.4.2.3 Waste Characteristics Factor Category Value

One hazardous substance (i.e., lead) associated with waste sources that have a surface water pathway containment factor greater than 0 for the Raritan Bay watershed corresponds to the maximum ecotoxicity/persistence factor value (1,000) and bioaccumulation factor value (5,000), as shown previously.

(Ecotoxicity/persistence factor value) x (hazardous waste quantity factor value) = 1,000 x 100 = 1×10^5

(Ecotoxicity/persistence factor value x hazardous waste quantity factor value) x (bioaccumulation potential factor value) = $(1 \times 10^5) \times (50{,}000) = 5 \times 10^9$

The product corresponds to the maximum Waste Characteristics Factor Category Value of 180 in Table 2-7 of the HRS (Ref. 1, pp. 51592, 51620).

Hazardous Waste Quantity Factor Value: *100*
Waste Characteristics Factor Category Value: 180

4.1.4.3 Environmental Threat - Targets

Actual Contamination of the Raritan Bay is documented through the observed release of lead to the Raritan Bay from both sources (Source 1 and Source 2) via direct observation and chemical analysis. Raritan Bay is part of the New York-New Jersey Harbor Estuary, which is a sensitive area identified under the National Estuary Program (Ref. 13, pp. 1-11). Raritan Bay is also used for the protection and maintenance of aquatic life (Ref. 14, pp. 1-13).

Level I Concentrations
N/A

Level II Concentrations – Source 1
Sample ID: RBS-S01A, RBS-S02A, RBS-S03A
Sample Medium: Soil/waste
Distance from PPE1: 0 feet

Ref. 17, p. 5; 18, pp. 7, 8, 9

Level II Concentrations – Source 2
Sample ID: RBS-S07A, RBS-S59A, RBS- S60A, RBS-S97, RBS-S98,
Sample Medium: Soil/waste
Distance from PPE2: 0 feet

Ref. 17, pp. 5, 7, 8, 16; 18, pp. 2, 3, 4, 5, 6

Hazardous Substance	Hazardous Substance Concentration
Lead (Source 1)	High Concentration: 31,500 ug/L
Lead (Source 2)	High Concentration: 1,230,000 ug/L

ug/L – micrograms per liter

Ref. 17, p. 5; 18, pp. 6, 7

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

No Level I concentrations were documented. The Level I Concentrations Factor Value is 0 (Ref. 1, p. 51625).

Level I Concentrations Factor Value: 0

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

The entire Raritan Bay, including its interface with Source 1 and Source 2, is part of the New York-New Jersey Harbor Estuary. The New York-New Jersey Harbor Estuary is a sensitive area identified under the National Estuary Program (Ref. 13, pp. 1-11). The entire drainage of Raritan Bay, including its interface with Source 1 and Source 2, is also a state-designated water body for the maintenance of aquatic life (Ref. 14, pp. 1-13).

Sensitive Environment	Distance from PPE to Sensitive Environment	Reference	Sensitive Environment Value(s)
NY-NJ Harbor Estuary (Sensitive Area identified under National Estuary Program)	0.00 mile*	1, p. 51624; 13, pp. 1-11	100
Raritan Bay (State designated area for protection or maintenance of aquatic life)	0.00 mile*	1, p. 51624; 14, pp. 1-13	5

* Raritan Bay is considered a sensitive environment at its interface with sources 1 and 2; therefore, the distance to each source's respective PPE is considered to be 0.00 mile.

Sum of Sensitive Environments Value: 105

Wetlands

Wetland	Wetland Frontage	Reference(s)
N/A		

Total Wetland Frontage: N/A
Wetland Value: 0

Sum of Sensitive Environments Value + Wetland Value: 0

Level II Concentrations Factor Value: 105

4.1.4.3.1.3 Potential Contamination

Since a maximum score of 100.00 was achieved for the surface water migration pathway, the Potential Contamination Factor Value was not scored (NS).

Potential Contamination Factor Value: NS

4.2 OTHER POSSIBLE CONTAMINATED SURFACE WATERS

The Margaret's Creek area is characterized by elevated levels of lead (Ref. 30, p. 4; 32). The area is approximately 47 acres in size and is owned by the Township of Old Bridge (Ref. 31, p. 6). The predominantly tidal marsh area shows evidence of at least 20 acres of fill material (Ref. 31, p. 9). The NJDEP conducted a site investigation of the area in December 2006 and determined that only minor amounts of non-soil materials were encountered at only one of eleven test pits dug using a skid steer backhoe; test pits were dug to native material (Ref. 30, p. 2).

Lead source material was evident throughout Margaret's Creek, including large amounts of what appeared to be shredded automotive battery casings, brick - including refractory brick, and slag, which suggest the disposal of industrial waste (Ref. 30, p. 3). The NJDEP representatives, on March 4, 2007, collected samples in areas devoid of vegetation in which refractory brick, slag, and other materials were evident (Ref. 30, p. 3).

Lead was detected in those March 2007 samples in concentrations ranging from 701 ppm to 146,000 ppm, with an average concentration on 50,482 ppm (Ref. 30, p. 4; 32).

An observed release by direct observation of lead could most likely be established based on the observation of lead-containing material within and still in contact with the wetlands (Ref. 31). Materials similar in nature to those found at the seawall and western jetty have been found at Margaret's Creek as well, and similar environmental releases have been demonstrated based on the information previously presented in earlier parts of this HRS documentation record.

Margaret's Creek is situated adjacent to sensitive environments, including HRS eligible wetlands, and habitat for state threatened species: the Black Crowned Night Heron (Refs. 6, p. 1; 11, p. 2; 30, p. 4; 33, p. 1; 34, p. 1).

APPENDIX A

SOURCE-SPECIFIC SCORESHEETS

The Raritan Bay Slag site contains two areas of waste deposition along the southern shoreline of the Raritan Bay. Since there are two separate observed releases to the Raritan Bay by direct observation (i.e., one from each source), source-specific scoresheets were generated in the evaluation of this site. These source-specific scoresheets, on a line by line basis, refer to the relevant page in the HRS documentation record where the values were determined and show that even if the two sources were evaluated independently, they both would qualify for listing.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG – SOURCE 1 (LAURENCE HARBOR SEAWALL)

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	MAXIMUM VALUE	VALUE ASSIGNED	HRS DOCUMENTATION RECORD PAGE
Likelihood of Release			
1. Observed Release	550	550	pp. 21-24, 26-27
2. Potential to Release by Overland Flow			
2a. Containment	10	not scored	
2b. Runoff	25	not scored	
2c. Distance to Surface Water	25	not scored	
2d. Potential to Release by Overland Flow [lines 2a (2b+2c)]	500	not scored	
3. Potential to Release by Flood			
3a. Containment (Flood)	10	not scored	
3b. Flood Frequency	50	not scored	
3c. Potential to Release by Flood (lines 3a x 3b)	500	not scored	
4. Potential to Release (lines 2d+3c)	500	not scored	
5. Likelihood of Release	550	550	
Waste Characteristics			
6. Toxicity/Mobility	*	10,000	p. 28
7. Hazardous Waste Quantity	*	100	p. 29
8. Waste Characteristics	100	32	p. 29
Targets			
9. Nearest Intake	50	0	p. 31
10. Population			
10a. Level I Concentrations	**	0	p. 32
10b. Level II Concentrations	**	0	p. 33
10c. Potential Contamination	**	0	p. 34
10d. Population (lines 10a+10b+10c)	**	0	
11. Resources	5	5	p. 35
12. Targets (lines 9+10d+11)	**	5	
13. DRINKING WATER THREAT SCORE ([lines 5 x 8 x 12]/82,500)	100	1.06	

* Maximum value applies to waste characteristics category.

** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG – SOURCE 1 (LAURENCE HARBOR SEAWALL)

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	MAXIMUM VALUE	VALUE ASSIGNED	HRS DOCUMENTATION RECORD PAGE
Likelihood of Release			
14. Likelihood of Release (same as line 5)	550	550	pp. 21-24, 26-27
Waste Characteristics			
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+07	p. 36
16. Hazardous Waste Quantity	*	100	p. 37
17. Waste Characteristics	1,000	180	p. 37
Targets			
18. Food Chain Individual	50	45	p. 41
19. Population			
19a. Level I Concentrations	**	0	p. 42
19b. Level II Concentrations	**	0.03	p. 42
19c. Potential Human Food Chain Contamination	**	0	p. 43
19d. Population (lines 19a+19b+19c)	**	0.03	
20. Targets (lines 18+19d)	**	45.03	
21. HUMAN FOOD CHAIN THREAT SCORE ([lines 14 x 17 x 20]/82,500)	100	54	

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG – SOURCE 1 (LAURENCE HARBOR SEAWALL)

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	MAXIMUM VALUE	VALUE ASSIGNED	HRS DOCUMENTATION RECORD PAGE
Likelihood of Release			
22. Likelihood of Release (same as line 5)	550	550	pp. 21-24, 26-27
Waste Characteristics			
23. Ecosystem Toxicity/Persistence/Bioaccumulation 24. Hazardous Waste Quantity 25. Waste Characteristics	* * 1,000	5.00E+07 100 180	p. 44 p. 45 p. 45
Targets			
26. Sensitive Environments 26a. Level I Concentrations 26b. Level II Concentrations 26c. Potential Contamination 26d. Sensitive Environments 27. Targets (line 26d)	 ** ** ** ** **	 0 105 not scored 105 105	 p. 47 p. 47 p. 48
28. ENVIRONMENTAL THREAT SCORE ([lines 22 x 25 x 27]/82,500)	60	60	
29. WATERSHED SCORE (lines 13 + 21 + 28)	100	100	
30. SW: OVERLAND/FLOOD COMPONENT SCORE (S_{of})	100	100	
SURFACE WATER MIGRATION PATHWAY SCORE (S_{sw})	100	100	

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG – SOURCE 2 (WESTERN JETTY – CHEESEQUAKE CREEK INLET)

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	MAXIMUM VALUE	VALUE ASSIGNED	HRS DOCUMENTATION RECORD PAGE
Likelihood of Release			
1. Observed Release	550	550	pp. 21, 25-27
2. Potential to Release by Overland Flow			
2a. Containment	10	not scored	
2b. Runoff	25	not scored	
2c. Distance to Surface Water	25	not scored	
2d. Potential to Release by Overland Flow [lines 2a (2b+2c)]	500	not scored	
3. Potential to Release by Flood			
3a. Containment (Flood)	10	not scored	
3b. Flood Frequency	50	not scored	
3c. Potential to Release by Flood (lines 3a x 3b)	500	not scored	
4. Potential to Release (lines 2d+3c)	500	not scored	
5. Likelihood of Release	550	550	
Waste Characteristics			
6. Toxicity/Mobility	*	10,000	p. 28
7. Hazardous Waste Quantity	*	100	p. 29
8. Waste Characteristics	100	32	p. 29
Targets			
9. Nearest Intake	50	0	p. 31
10. Population			
10a. Level I Concentrations	**	0	p. 32
10b. Level II Concentrations	**	0	p. 33
10c. Potential Contamination	**	0	p. 34
10d. Population (lines 10a+10b+10c)	**	0	
11. Resources	5	5	p. 35
12. Targets (lines 9+10d+11)	**	5	
13. DRINKING WATER THREAT SCORE ([lines 5 x 8 x 12]/82,500)	100	1.06	

* Maximum value applies to waste characteristics category.

** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG – SOURCE 2 (WESTERN JETTY – CHEESEQUAKE CREEK INLET)

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	MAXIMUM VALUE	VALUE ASSIGNED	HRS DOCUMENTATION RECORD PAGE
Likelihood of Release			
14. Likelihood of Release (same as line 5)	550	550	pp. 21, 25-27
Waste Characteristics			
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+07	p. 37
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19. Population			
19a. Level I Concentrations	**	0	p. 42
19b. Level II Concentrations	**	0.03	p. 42
19c. Potential Human Food Chain Contamination	**	0	p. 43
19d. Population (lines 19a+19b+19c)	**	0.03	
20. Targets (lines 18+19d)	**	45.03	
21. HUMAN FOOD CHAIN THREAT SCORE ([lines 14 x 17 x 20]/82,500)	100	54	

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
RARITAN BAY SLAG – SOURCE 2 (WESTERN JETTY – CHEESEQUAKE CREEK INLET)

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	MAXIMUM VALUE	VALUE ASSIGNED	HRS DOCUMENTATION RECORD PAGE
Likelihood of Release			
22. Likelihood of Release (same as line 5)	550	550	pp. 21, 25-27
Waste Characteristics			
23. Ecosystem Toxicity/Persistence/Bioaccumulation 24. Hazardous Waste Quantity 25. Waste Characteristics	* * 1,000	5.00E+07 100 180	p. 44 p. 45 p. 45
Targets			
26. Sensitive Environments 26a. Level I Concentrations 26b. Level II Concentrations 26c. Potential Contamination 26d. Sensitive Environments 27. Targets (line 26d)	 ** ** ** ** **	 0 105 not scored 105 105	 p. 47 p. 47 p. 48
28. ENVIRONMENTAL THREAT SCORE ([lines 22 x 25 x 27]/82,500)	60	60	
29. WATERSHED SCORE (lines 13 + 21 + 28)	100	100	
30. SW: OVERLAND/FLOOD COMPONENT SCORE (S_{of})	100	100	
SURFACE WATER MIGRATION PATHWAY SCORE (S_{sw})	100	100	

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

REFERENCE 1

REFERENCE 1

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 300

[FRL-3730-8]

RIN 2050 AB73

Hazard Ranking System

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is adopting revisions to the Hazard Ranking System (HRS), the principal mechanism for placing sites on the National Priorities List (NPL). The revisions change the way EPA evaluates potential threats to human health and the environment from hazardous waste sites and make the HRS more accurate in assessing relative potential risk. These revisions comply with other statutory requirements in the Superfund Amendments and Reauthorization Act of 1986 (SARA).

DATES: Effective date March 14, 1991. As discussed in Section III H of this preamble, comments are invited on the addition of specific benchmarks in the air and soil exposure pathways until January 14, 1991.

ADDRESSES: Documents related to this rulemaking are available at and comments on the specific benchmarks in the air and soil exposure pathways may be mailed to the CERCLA Docket Office, OS-245, U.S. Environmental Protection Agency, Waterside Mall, 401 M Street, SW, Washington, DC 20460, phone 202-382-3046. Please send four copies of comments. The docket is available for viewing by appointment only from 9:00 am to 4:00 pm, Monday through Friday, excluding Federal holidays. The docket number is 105NCP-HRS.

FOR FURTHER INFORMATION CONTACT: Steve Caldwell or Agnes Ortiz, Hazardous Site Evaluation Division, Office of Emergency and Remedial Response, OS-230, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or the Superfund Hotline at 800-424-9346 (in the Washington, DC area, 202-382-3000).

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I. Background

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601 *et seq.*), commonly called the Superfund, in response to the dangers posed by uncontrolled releases of hazardous substances, contaminants, and pollutants. To implement section 105(8)(A) of CERCLA and Executive Order 12316 (46 FR 42237, August 20, 1981), the U.S. Environmental Protection Agency (EPA) revised the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR part 300, on July 16, 1982 (47 FR 31180), with later revisions on September 16, 1985 (50 FR 37624), November 20, 1985 (50 FR 47912), and March 8, 1990 (55 FR 8666). The NCP sets forth guidelines and procedures for responding to releases or potential release of hazardous substances, pollutants, or contaminants.

Section 105(8)(A) of CERCLA (now section 105(a)(8)(A)) requires EPA to establish:

> Criteria for determining priorities among releases or threatened releases [of hazardous substances] throughout the United States for the purpose of taking remedial action and, to the extent practicable taking into account the potential urgency of such action, for the purpose of taking removal action. Criteria and priorities * * * shall be based upon the relative risk or danger to public health or welfare or the environment * * * taking into account to the extent possible the population at risk, the hazard potential of the hazardous substances at such facilities, the potential for contamination of drinking water supplies, the potential for direct human contact, [and] the potential for destruction of sensitive ecosystems * * *.

To meet this requirement and help set priorities, EPA adopted the Hazard Ranking System (HRS) as appendix A to the NCP (47 FR 31180, July 16, 1982). The HRS is a scoring system used to assess the relative threat associated with actual or potential releases of hazardous substances at sites. The HRS is the primary way of determining whether a site is to be included on the National Priorities List (NPL), the Agency's list of sites that are priorities for long-term evaluation and remedial response, and is a crucial part of the Agency's program to address the identification of actual and potential releases. (Each State can nominate one site to the NPL as a State top priority regardless of its HRS score; sites may also be added in response to a health advisory from the Agency for Toxic Substances and Disease Registry (see NCP, 40 CFR 300.425(c)(3)).) Under the original HRS, a score was determined for a site by evaluating three migration pathways—ground water, surface water, and air. Direct contact and fire and explosion threats were also evaluated to determine the need for emergency actions, but did not enter into the decision on whether to place a site on the NPL.

In 1986, Congress enacted the Superfund Amendments and Reauthorization Act of 1986 (SARA) (Pub. L. 99-499), which added section 105(c)(1) to CERCLA, requiring EPA to amend the HRS to assure "to the maximum extent feasible, that the hazard ranking system accurately assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review." Congress, in its Conference Report on SARA, stated the substantive standard against which HRS revisions could be assessed:

> This standard is to be applied within the context of the purpose for the National Priorities List; i.e., identifying for the States and the public those facilities and sites which appear to warrant remedial actions. * * * This standard does not, however, require the Hazard Ranking System to be equivalent to detailed risk assessments, quantitative or qualitative, such as might be performed as part of remedial actions. The standard requires the Hazard Ranking System to rank sites as accurately as the Agency believes is feasible using information from preliminary assessments and site inspections * * * Meeting this standard does not require long-term monitoring or an accurate determination of the full nature and extent of contamination at sites or the projected levels of exposure such as might be done during remedial investigations and feasibility studies. This provision is intended to ensure that the Hazard Ranking System performs with a degree of accuracy appropriate to its role in expeditiously identifying candidates for response actions. [H.R. Rep. No. 962, 99th Cong., 2nd Sess. at 199-200 [1986]]

Section 105(c)(2) further specifies that the HRS appropriately assess the human health risks associated with actual or potential contamination of surface waters used for recreation or drinking

water and that this assessment should take into account the potential migration of any hazardous substance through surface water to downstream sources of drinking water.

SARA added two criteria for evaluating sites under section 105(a)(8)(A): Actual or potential contamination of the ambient air and threats through the human food chain. In addition, CERCLA section 118, added by SARA, requires EPA to give a high priority to facilities where the release of hazardous substances has resulted in the closing of drinking water wells or has contaminated a principal drinking water supply. Finally, CERCLA section 125, added by SARA, requires revisions to the HRS to address facilities that contain substantial volumes of wastes specified in section 3001(b)(3)(A)(i) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act (RCRA). These wastes include fly ash wastes, bottom ash wastes, slag wastes, and flue gas emission control wastes generated primarily from the combustion of coal or other fossil fuels. Specifically, section 125 requires EPA to revise the HRS to assure the appropriate consideration of each of the following site-specific characteristics of such facilities:

- The quantity, toxicity, and concentrations of hazardous constituents that are present in such waste and a comparison with other wastes;
- The extent of, and potential for, release of such hazardous constituents into the environment; and
- The degree of risk to human health and the environment posed by such constituents.

EPA published an advance notice of proposed rulemaking (ANPRM) on April 9, 1987 (52 FR 11513), announcing its intention to revise the HRS and requesting comments on a number of issues. After a comprehensive review of the original HRS, including consideration of alternative models and Science Advisory Board review, EPA published a notice of proposed rulemaking (NPRM) for HRS revisions on December 23, 1988 (53 FR 51962). The NPRM contains a detailed preamble, which should be consulted for a more extensive discussion of CERCLA, SARA, the HRS, and the proposed changes to the HRS.

Today, EPA is publishing the revised HRS, which will supersede the HRS previously in effect as appendix A to the NCP. CERCLA section 105(c)(1) states that the revised HRS shall be applied to any site newly listed on the NPL after its effective date; as specified in section 105(c)(3), sites scored with the original HRS prior to that effective date need not be reevaluated.

The HRS is a scoring system based on factors grouped into three factor categories. The factor categories are multiplied and then normalized to 100 points to obtain a pathway score (e.g., the ground water migration pathway score). The final HRS score is obtained by combining the pathway scores using a root-mean-square method. The proposed HRS revised every factor to some extent. A few factors were replaced, and several new factors were added. The major proposed changes included:

(1) Consideration of potential as well as actual releases to air;
(2) Addition of mobility factors;
(3) Addition of dilution and distance weightings for the water migration pathways and modification of distance weighting in the air migration pathway;
(4) Revisions to the toxicity factor;
(5) Additions to the list of covered sensitive environments;
(6) Addition of human food chain and recreation threats to the surface water migration pathway;
(7) Revision of the hazardous waste quantity factor to allow a tiered approach;
(8) Addition of health-based benchmarks for evaluating population factors and ecological-based benchmarks for evaluating sensitive environments;
(9) Addition of factors for evaluating the maximally exposed individual; and
(10) Inclusion of a new onsite exposure pathway.

EPA conducted a field test of the proposed HRS to assess the feasibility of implementing the proposed HRS factors, to determine resources required for specific tasks, to assess the availability of information needed for evaluation of sites, and to identify difficulties with the use of the proposed revisions. To meet the objectives, site inspections were performed at 29 sites nationwide. The sites were selected either because work was already planned at the site or because the sites had specific features EPA wanted to test using the proposed revisions to the HRS. The major results of the field test were summarized on September 14, 1989 (54 FR 37949), when the field test report was made available for public review and comment.

II. Overview of the Final Rule

The rule being promulgated today incorporates substantial changes to revisions proposed in December 1988. EPA has changed the rule for three reasons: (1) To respond to the general comment submitted by many commenters that the factor categories and pathways need to be consistent with each other; (2) to respond to specific recommendations made by commenters; and (3) to respond to problems identified during the field test and discussed in the field test report. Major changes affecting multiple pathways include:

- Multiplication of hazardous waste quantity factor, toxicity, and other waste characteristics factors;
- Uncapping of population factors (i.e., no limit is placed on maximum value);
- Revised criteria for establishing an observed release;
- Capping of potential to release at a value less than observed release;
- Revision of the toxicity evaluation to select carcinogenic and non-cancer chronic values in preference to acute toxicity values;
- Elimination of Level III concentrations and extension of weighting based on levels of exposure to nearest individual (well/intake; formerly maximally exposed individual) factors;
- Modification of the weights assigned to Level I and Level II concentrations;
- Revisions to the benchmarks used and methods for determining exceedance of benchmarks;
- Use of ranges to assign values for potentially exposed populations;
- Inclusion of factors assessing exposures of the nearest individual in all pathways;
- Revisions to distance and dilution weights in all pathways except ground water migration;
- Replacement of the use factors with less heavily weighted resources factors;
- Evaluation of wetlands based on size or surface water frontage; and
- Specific instructions for the evaluation of radionuclides at radioactive waste sites and sites with radioactive and other hazardous substances wastes.

The major changes in the ground water migration pathway include:

- Replacement of depth to aquifer/hydraulic conductivity and sorptive capacity factors with travel time and depth to aquifer factors; and
- Revision of the mobility factor, including consideration of distribution coefficients.

In the surface water migration pathways, the major changes include:

- Elimination of the separate recreational use threat;
- Addition of a ground water to surface water component;

- Incorporation of bioaccumulation into the waste characteristics factor category rather than the targets factor category for the human food chain threat;
- Revision to allow use of additional tissue samples in establishing Level I concentrations for the human food chain threat; and
- Addition of ecosystem bioaccumulation potential factor for sensitive environments.

The major changes in the soil exposure pathway (formerly the onsite exposure pathway) include:

- Elimination of separate consideration of the high risk population;
- Inclusion of hazardous waste quantity in the waste characteristics factor category;
- Consideration of workers in the resident threat's targets factor category; and
- Revisions to scoring of terrestrial sensitive environments.

The major changes in the air migration pathway include:

- Separate evaluation of gas and particulate potential to release; and
- Consideration of actual contamination in evaluating sensitive environments.

Figures 1 to 4 show the differences between the pathways in the original HRS and in the final rule.

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Figure 1

Ground Water Migration Pathway

ORIGINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Persistence		Ground Water Use
or		Hazardous Waste Quantity		Distance to Nearest Well/
Route Characteristics				Population Served
Depth to Aquifer of Concern				
Net Precipitation				
Permeability of Unsaturated Zone				
Physical State				
Containment				

FINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Mobility		Nearest Well
or		Hazardous Waste Quantity		Population
Potential to Release				Resources
Containment				Wellhead Protection Area
Net Precipitation				
Depth to Aquifer				
Travel Time				

Figure 2

Surface Water Migration Pathway

ORIGINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Persistence		Surface Water Use
or		Hazardous Waste Quantity		Distance to Sensitive Environment
Route Characteristics				Population Served/Distance to Nearest Intake Downstream
Facility Slope/Intervening Terrain				
1-Year, 24-Hour Rainfall				
Distance to Nearest Surface Water				
Physical State				
Containment				

Figure 2

Surface Water Migration Pathway (continued)

FINAL HRS

Likelihood of Release:
Overland Flow/Flood Component

Observed Release
or
Potential to Release

By Overland Flow
- Containment
- Runoff
- Distance to Surface Water

By Flood
- Containment
- Flood Frequency

or

Likelihood of Release:
***Ground Water to Surface* Water Component**

Observed Release
or
Potential to Release
- Containment
- Net Precipitation
- Depth to Aquifer
- Travel Time

X

Drinking Water Threat

Waste Characteristics	x	**Targets**
Toxicity/Mobility[1]/Persistence		Nearest Intake Population
Hazardous Waste Quantity		Resources

+

Human Food Chain Threat

Waste Characteristics	x	**Targets**
Toxicity/Mobility[1]/ Persistence/Bioaccumulation		Food Chain Individual Population
Hazardous Waste Quantity		

+

Environmental Threat

Waste Characteristics	x	**Targets**
Ecosystem Toxicity/Mobility[1]/ Persistence/Bioaccumulation		Sensitive Environments
Hazardous Waste Quantity		

[1] Mobility is only applicable to the Ground Water to Surface Water Component.

Figure 3

Soil Exposure Pathway [1]

FINAL HRS

Resident Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Observed Contamination		Toxicity Hazardous Waste Quantity		Resident Individual Resident Population Workers Resources Terrestrial Sensitive Environments

+

Nearby Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Attractiveness/Accessibility Area of Contamination		Toxicity Hazardous Waste Quantity		Population Within 1 Mile Nearby Individual

[1] New pathway.

Figure 4

Air Migration Pathway

ORIGINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Reactivity and Incompatibility Toxicity Hazardous Waste Quantity		Population Within 4-Mile Radius Distance to Sensitive Environment Land Use

FINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release or Potential to Release Gas Gas Containment Gas Source Type Gas Migration Potential Particulate Particulate Containment Particulate Source Type Particulate Migration Potential		Toxicity/Mobility Hazardous Waste Quantity		Nearest Individual Population Resources Sensitive Environments

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Section III of this preamble summarizes and responds to major issues raised by commenters. These issues are organized so that issues that affect multiple pathways are covered first, followed by discussions of individual pathway issues. Section IV provides a section-by-section discussion of the final rule. All substantive changes not discussed in section III are identified in section IV. Because the rule has been substantially rewritten to clarify the requirements, editorial changes are not generally noted.

III. Discussion of Comments

About 100 groups and individuals submitted comments on the ANPRM and NPRM. Nineteen of these also submitted comments on the field test report; two other groups submitted comments only on the field test report. The commenters included more than 20 State agencies, several Federal agencies, companies, trade associations, Indian tribes, environmental groups, technical consultants, and individuals. This section summarizes and responds to the major issues raised by commenters. A description of the comments and EPA's response to each issue raised in the comments are available in *Responses to Comments on Revisions to the Hazard Ranking System (HRS)* in the EPA CERCLA docket (see **ADDRESSES** section above).

A. Simplification

In response to SARA, EPA proposed revisions to the HRS so that, to the maximum extent feasible, it accurately assesses the relative risks posed by hazardous waste sites to human health and the environment. Consequently, the proposed rule required more data than did the original HRS.

A number of commenters stated that the data collection requirements of the proposed rule were excessive given its purpose as a screening tool. These commenters expressed concern that the data requirements were too extensive for a screening process; specifically, that the data requirements would lengthen the time needed to score sites with the HRS, increase the cost of listing sites, and, therefore, limit the money available for remedial actions. Most commenters—even those who considered that the revisions increased the accuracy of the model—stated that the resources required to evaluate sites under the proposed HRS were excessive.

One commenter suggested the proposed HRS would be so expensive to implement that EPA would need to develop a new screening tool to determine whether a site should undergo an HRS evaluation. Another commenter suggested that because of the complexity of the proposed revisions, preliminary scoring of a site during the site assessment process would be impractical because sites would advance too far in the site assessment process before they were determined not to be NPL candidates. Several commenters stated that, with the additional requirements, the proposed HRS is more of a quantitative risk-assessment tool than the screening tool it is supposed to be. Another suggested that the increased accuracy of the proposed rule over the original HRS is of marginal value relative to the amount of time and money involved, and that the HRS is no longer a quick and inexpensive method of assessing relative risks associated with sites.

Several commenters expressed concern that the increased data requirements of the proposed HRS would affect the schedule of the entire site assessment process. They suggested that these requirements would create a backlog of sites to be evaluated, slow the process of listing sites, and delay cleanup. Some noted that this would be contrary to the goal of identifying and evaluating sites expeditiously.

In response, the Agency believes the requirements of the final rule are within the scope of the site assessment process and that a new screening tool to determine whether a site should undergo an HRS evaluation will not be needed. To assist in screening sites, the site assessment process is divided into two stages:

- A preliminary assessment (PA), which focuses on a visual inspection, collection of available local, State, and Federal permitting data, site-specific information (e.g., topography, population), and historical industrial activity; and
- A site inspection (SI), where PA data are augmented by additional data collection, including sampling of appropriate environmental media and wastes, to determine the likelihood of a site receiving a high enough HRS score to be considered for the NPL.

The field test identified a best estimate of the average and range of costs incurred to support the data requirements of the proposed HRS. These cost estimates represented the entire site assessment process from PA to SI, and comprehensive evaluations for all pathways at most sites. As such, the Agency believes these cost estimates overstate the costs associated with site assessments occurring on the greater universe of CERCLA sites. The amount of data collected during an SI varies from site to site depending on the complexity of the site and the number of environmental media believed to be contaminated. Some SIs may be limited in scope if data are easy to obtain, while others require more substantial resource commitments. The most important factors in determining costliness of an SI are (1) the presence or absence of ground water monitoring wells in situations where ground water is affected, and (2) the number of affected media, which determines the number of samples taken and analyzed. The Agency believes the greater universe of CERCLA sites will not require the more substantial resource commitments.

Finally, EPA does not agree that the requirements of the final rule will delay the listing of sites. The site assessment process screens sites at each stage, thereby limiting the number of sites that require evaluation for scoring. The Agency believes that it will be possible to score sites expeditiously with the revised HRS.

The Agency believes the additional data requirements of the final rule will make it more accurately reflect the relative risks posed by sites, but also that the HRS should be as simple as possible to make it easier to implement and to retain its usefulness as a screening device. This approach responds to the majority of commenters who recommended that EPA simplify the proposed HRS to make it easier and less expensive to implement. In response to these comments, the rule adopted today includes a number of changes from the proposed rule that simplify the HRS. These simplifying changes were based largely on EPA's field test of the proposed rule, sensitivity studies, and issue analyses undertaken by EPA in response to comments.

- In the surface water migration pathway, the proposed recreation threat has been eliminated as a separate threat. Instead of requiring a separate set of detailed calculations and data, the final rule accounts for recreational use exposures through resources factors, where points may be added for recreation use.
- In the ground water migration pathway, the proposed potential to release has been simplified by dropping "sorptive capacity," by revising "depth to aquifer" and making it a separate factor, and by eliminating the requirement to consider all geological layers between the hazardous substance and the aquifer in evaluating travel time to the aquifer. The "travel time" factor (the depth to aquifer/hydraulic conductivity factor in the proposed rule)

is now based on the layer(s) with the lowest hydraulic conductivity.

• In the three migration pathways (i.e., ground water, surface water, and air), the use factors in the proposed rule—"land use" in the air migration pathway, "drinking water use" and "other water use" in the ground water migration pathway, and "drinking water use" and "other water use" in the surface water migration pathway—have been replaced by "resources" factors. The "fishery use" factor has been dropped from the surface water migration pathway. A resources factor has been added to the soil exposure pathway.

• In the soil exposure pathway, the requirement that children under seven be counted as a separate population has been dropped. The "accessibility/frequency of use" factor has been replaced by a simpler "attractiveness/accessibility" factor.

• In the surface water migration pathway, the "runoff curve number," which required determining the predominant land use within the drainage area, has been replaced by a simpler factor, "soil group," which only requires classifying the predominant soil group in the drainage area into one of four categories.

• In the air migration pathway, the maps used to assign values of particulate migration potential (formerly particulate mobility under potential to release) have been simplified.

• In all pathways, potentially exposed populations are assigned values based on ranges rather than exact counts, reducing documentation requirements.

• In the surface water and ground water migration pathways, Level III benchmarks have been dropped.

• In all pathways, hazardous waste quantity values are based on ranges, which will reduce documentation requirements. The methodology and explanation for evaluating the hazardous waste quantity factor have been simplified.

• Containment tables have been simplified in the air, ground water, and surface water migration pathways.

A number of the simplifications, such as the changes to the travel time and hazardous waste quantity factors, better reflect the uncertainty of the underlying site data and, therefore, do not generally affect the accuracy of the HRS. In addition, EPA notes that some revisions that may appear to make the HRS more complex actually make it more flexible. For example, the hierarchy for determining hazardous waste quantity allows using data on the quantity of hazardous constituents if they are available or can be determined; additionally, data on the quantity of hazardous wastestreams, source volume, and source area can be used, depending on the completeness of data within the hierarchy. The hierarchy allows a site to be scored at the most precise level for which data are reasonably available, but does not require extensive data collection where available data are less precise.

In response to comments on the complexity of the rule language, the presentation of the HRS has been reorganized and clarified. Factors that are evaluated in more than one pathway are explained in a separate section of the final rule (§ 2) to eliminate the repetition of instructions. The proposed HRS included descriptive background material that, while useful, made the HRS difficult to read. Much of this descriptive material has been removed from the rule.

B. HRS Structure Issues

Although the proposed rule retained the basic structure of the original HRS, a number of commenters felt that the HRS should provide results consistent with the results of a quantitative risk assessment. Several commenters identified this issue explicitly, while others identified specific aspects of the proposed rule that they believed to be inconsistent with basic risk assessment principles. The commenters maintained that if the HRS is to reflect relative risks to the extent feasible, as required by the statute, its structure should be modified to better reflect the methods employed in quantitative risk assessments. Commenters stressed the need for EPA to follow the advice of the EPA Science Advisory Board (SAB) as expressed in the SAB review of the HRS:

> Revisions to the HRS should begin with the development of a chain of logic, without regard for the ease or difficulty of collecting data, that would lead to a risk assessment for each site. This framework, but not the underlying logic, would be simplified to account for the very real difficulties of data collection.
>
> This chain of logic * * * should lead to a situation in which an increased score reflects an increased risk presented by a site.

In response to the structural issues raised by commenters and to the statutory mandate to reflect relative risk to the extent feasible, EPA made a number of changes to the final rule. These structural changes affect how various factors are scored and how scores are combined, but do not involve changes in the types or amount of data required to score a site with the HRS. The Agency stresses that the limited data generated at the SI stage are designed to support site screening, and are not intended to provide support for a quantitative risk assessment.

General structural changes. While the final rule retains the basic structure of the proposed rule in that three factor categories (likelihood of release, waste characteristics, and targets) continue to be multiplied together to obtain pathway scores, the structure has been changed in certain respects to make the underlying logic of the HRS more consistent with risk assessment principles.

The key structural changes to the waste characteristics factor category were to make use of consistent scales and to multiply the hazardous waste quantity and toxicity (or, depending on the pathway and threat, toxicity/mobility, toxicity/persistence, or toxicity/persistence/bioaccumulation) factors. Within the waste characteristics factor category, factors have been modified so they are on linear scales. These modifications make the functional relationships between the HRS factors more consistent with the toxicity and exposure parameters evaluated in risk assessments.

Where possible, the final rule assigns similar maximum point values to factor categories across pathways. The likelihood of release (likelihood of exposure) factor category is assigned a maximum value of 550; the waste characteristics factor category is assigned a maximum value of 100 (except for the human food chain and environmental threats of the surface water migration pathway); the targets factor category is not assigned a maximum. EPA determined that in general targets should be a key determinant of site threat because the data on which the targets factors are based are relatively more reliable than most other data available at the SI stage.

Likelihood of release. Except in the air migration pathway, the proposed rule assigned the same maximum value to observed release and potential to release. In the final rule, an observed release is assigned a value of 550 points and potential to release has a maximum value of 500 in all pathways. This relative weighting of values reflects the greater confidence (the association of risks with targets) when reporting an observed release as opposed to a potential release. As a result of this change in point values at the factor category level, as well as the new maximums for most pathways, the values assigned to individual potential to release factors have been adjusted.

Waste characteristics. The proposed rule assigned a maximum point value to

hazardous substance quantities of 1,000 pounds. Because some sites have hazardous substance quantities far in excess of that amount and because it is reasonable to assume that these sites present some additional risk, all else being equal, the final rule elevates the maximum value to quantities in excess of 1,000,000 pounds. Even when hazardous waste quantity is documented with precision, EPA concluded that there are diminishing returns in considering quantities above this amount.

Although the HRS does not employ the same type and quality of information that would be used to support a risk assessment (e.g., pounds of waste and mobility are combined in the ground water pathway as a surrogate for long-term magnitude of releases), as waste characteristics values rise, contamination resulting from conditions at the sites in general should be worse. As a result of using linear scales and incorporation of a multiplicative relationship between hazardous waste quantity, toxicity, and other waste characteristics factors, the influence of the waste characteristics factor category could be disproportionately large relative to the likelihood of release and targets factor categories in determining overall pathway scores. Therefore, EPA is limiting—through use of a scale transformation—the values assigned to the waste characteristics factor category, shown in Table 2-7 of the final HRS, to limit the effect of waste characteristics on the pathway scores.

While the waste characteristics factor values are limited to values of 0 to 100 in most cases, the waste characteristics factor category may reach values of up to 1,000 for both the human food chain and environmental threats in the surface water migration pathway. These exceptions have been made to accommodate the bioaccumulation factor (or ecosystem bioaccumulation factor), applied in these threats but not in other pathways or threats, which can add up to four orders of magnitude to the waste characteristics factor values *before reduction to the scale values of 0* to 1,000.

Targets. The final rule includes two major structural changes to the targets factor category. Population factor values are not capped as they were in the proposed rule. This change allows a site with a large population but a low waste characteristics value to receive scores similar to a site with a smaller population but larger waste characteristics value (as would be done in a risk assessment). A second change in the targets factors involves the nearest individual (or intake or well) factors (i.e., the maximally exposed individual factors in the proposed rule). These factors are now assigned values based on exposure to Level I and Level II contamination (50 and 45 points, respectively). Potentially exposed nearest individuals are assigned a maximum of 20 points in all pathways. EPA changed the assigned values for these factors to give more relative weight to individuals that are exposed to documented contamination.

C. Hazardous Waste Quantity

In the NPRM, EPA proposed to change the hazardous waste quantity factor to allow the use of four levels of data depending on what data are available and how complete they are. Hazardous waste quantity for a source could be based on (a) hazardous constituent quantity, (b) the total quantity of hazardous wastes in the source, (c) the volume of the source, or (d) the area of the source. Each source at the site would be evaluated separately, based on data available for the source.

EPA received numerous comments relating to changes in the hazardous waste quantity factor. Several commenters agreed that allowing use of waste constituent data, when available, was an improvement over the original HRS. Several also supported the tiered approach to scoring hazardous waste quantity when constituent data were incomplete or unavailable.

Two commenters stated that the emphasis on hazardous constituent data will require more extensive and expensive site investigations. These commenters have misunderstood the revisions. The rule does not require the scorer to determine hazardous constituent quantities in all instances, but simply encourages use of those data when they are available. This approach allows a scorer the flexibility to use different types of available data for scoring hazardous waste quantity. At a minimum, the scorer need only determine the area of a source (or the area of observed contamination), which is routinely done in site inspections. Where better data are available, they may be used in scoring the factor. This approach is in keeping with the intent of Congress that the HRS should act as a screening tool for identifying sites warranting further investigation.

Several commenters stated that the methodology for determining hazardous waste quantity was too complex and time consuming, and that its administrative costs outweighed its benefits. Others found the proposed rule instructions and tables confusing and hard to follow.

EPA strongly disagrees with the claim that the costs of the revised approach to scoring waste quantity outweigh its benefits. The amount of hazardous substances present at a site is an important indicator of the potential threat the site poses. At the same time, EPA recognizes that cost is an important consideration. In revising the hazardous waste quantity factor, however, the Agency believes it has established an appropriate balance between time and cost required for scoring this factor and the degree of accuracy needed to evaluate the relative risk of the site properly.

In response to comments, EPA has modified the hazardous waste quantity scoring methodology to make it easier to understand and to use. The changes include elimination of proposed rule Table 2-13, Hazardous Waste Quantity Factor Evaluation Methodology and Worksheet. In addition, the scale for the hazardous waste quantity factor has been divided into ranges that span two orders of magnitude (100x) to reflect the uncertainty inherent in estimates of hazardous waste quantities at typical sites. The practical effect of this scale change is to reduce the data collection and documentation requirements. See §§ 2.4.2–2.4.2.2. The final rule also clarifies the treatment of wastes classified as hazardous under RCRA. Under CERCLA, any RCRA hazardous waste stream is considered a hazardous substance. If this definition were strictly applied in evaluating hazardous waste quantity of RCRA hazardous wastestreams, hazardous constituent quantity and hazardous wastestream quantity would be the same because the entire wastestream would be considered a hazardous substance. The final rule makes clear that only the constituents in a RCRA wastestream that are CERCLA hazardous substances should be evaluated for determining hazardous constituent quantity; for the other three tiers, however, the entire RCRA wastestream is considered as is any other wastestream.

As discussed in section III Q, EPA will consider removal actions when calculating waste quantities. EPA believes consideration of removal actions is likely to increase incentives for rapid actions. If there has been a removal at a site, and the hazardous constituent quantity for all sources and associated releases is adequately determined, the hazardous waste quantity factor value will be based only on the amount remaining after the removal. This will result in lowering some hazardous waste quantity factor values.

Where an adequate determination of the hazardous constituent quantity remaining after the removal cannot be made, EPA has established minimum hazardous waste quantity factor values in order to ensure that the HRS score reflects any continuing risks at the sites. In this case, the assigned hazardous waste quantity factor value will be the current hazardous waste quantity factor value (as derived in Table 2-6), or the minimum value, whichever is greater.

The proposed rule assigned a minimum hazardous waste quantity factor value of 10 when data on hazardous constituent quantity was not complete. In the final rule, for migration pathways (i.e., not the soil exposure pathway), if the hazardous constituent quantity is not adequately determined, and if any target is subject to Level I or II contamination, the minimum hazardous waste quantity factor value will be 100.

If the hazardous constituent quantity for all sources is not adequately determined, and none of the targets are subject to Level I or II contamination, the minimum factor value assigned for hazardous waste quantity depends on whether there has been a removal action, and what the hazardous waste quantity factor value would have been without consideration of the removal action. If there has not been a removal action, the minimum hazardous waste quantity factor value will be 10. If there has been a removal action and if a factor value of 100 or greater would have been assigned without consideration of the removal action, a minimum hazardous waste quantity factor value of 100 will be assigned. If the hazardous waste quantity factor value was less than 100 prior to consideration of the removal action, a minimum hazardous waste quantity factor value of 10 will be assigned. This will ensure that the Agency provides an incentive for removal actions and that in no case will consideration of removal actions result in an increased hazardous waste quantity factor value score.

D. Toxicity

The proposed HRS substantially changed the basis for evaluating toxicity. The major change was that hazardous substance toxicity would be based on carcinogenicity, chronic non-cancer toxicity, and acute toxicity. For each migration pathway and each surface water threat except human food chain and recreation, toxicity was combined with mobility or persistence factors to select the hazardous substance with the highest combined value for toxicity and the applicable mobility or persistence factor. For the human food chain threat, only substances with the highest bioaccumulation values were evaluated for toxicity/persistence. For the recreation threat, only substances with the highest dose adjusting factor values were evaluated for toxicity/persistence. In addition, ecosystem toxicity rather than human toxicity was evaluated for the environmental threat of the surface water migration pathway.

Several commenters expressed concern about or opposition to using the single most hazardous substance at a site to score toxicity, stating that the approach seems overly conservative and unlikely to distinguish sites on the basis of hazard. Some commenters suggested that EPA allow flexibility in weighting the toxicity values of multiple substances either by concentration, waste quantity, or proportion information, whenever such information is available. One commenter suggested basing toxicity on a fixed percentage of the hazardous substances known to be present at a site.

The Agency agrees that, for purposes of accurately assessing the risk to human health and the environment posed by a site, it would be preferable to evaluate the overall toxicity by considering all hazardous substances present, based on some type of dose- (or concentration-) weighted toxicity approach. EPA believes, however, that this approach is not feasible because the data requirements would be excessive. Such an approach would be feasible only when relative exposure levels of multiple substances are known or can reasonably be estimated; however, these data can be obtained only by conducting a comprehensive risk assessment. Extensive concentration data would be required to be confident that comparable concentrations are being used for the various substances, and that the multi-substance toxicity of the contaminants is not, in fact, being underestimated. Use of inadequate data could result in underestimating or overestimating the toxicity of substances in a pathway.

EPA considered a number of alternatives to the use of a single hazardous substance to score toxicity (mobility/persistence) and tested some of these on several real and hypothetical sites. The analyses included comparisons between the single most toxic substance and the average toxicity value for all substances, the average toxicity value for the 10 most toxic substances, and the concentration-weighted average value of all substances. These alternatives were also tested using toxicity/mobility values. The results of these analyses showed that using a single substance approach usually resulted in an assigned value (either toxicity or toxicity/mobility) that was within one interval in the scale of values of the alternatives tested; for example, the single substance approach would assign a value of 1,000 for toxicity whereas averaging the toxicities would assign a value of 1,000 or 100, the next lower scale value. (The final rule uses linear scales to assign values for toxicity, mobility, and persistence. The scales for toxicity now range from 0 to 10,000 rather than 0 to 5; consequently, the default value for toxicity is now 100 rather than 3.) The Agency recognizes the uncertainty in the use of the single substance approach, but concludes that it is a reasonable approach for a screening model, especially given the general unavailability of information to support alternatives. In making this judgment, the Agency notes that the single substance approach to evaluating the toxicity factor was not identified in SARA as a portion of the HRS requiring further examination, even though it had been used in the original HRS and EPA had received criticism similar to the above comments prior to the enactment of SARA.

Several commenters suggested that additive, synergistic, or antagonistic effects among substances be considered in scoring toxicity when several substances are found at a site. In particular, one commenter suggested increasing the scores for sites with a large number of hazardous substances to account for additive or synergistic effects.

As noted in EPA's 1988 *Technical Support Document for the Proposed Revisions to the Hazard Ranking System*, quantitative consideration of synergistic/antagonistic effects between hazardous substances is generally not possible even in RI/FS risk assessments because appropriate data are lacking for most combinations of substances. Interactive effects have been documented for only a few substance mixtures, and the Agency's risk assessment guidelines for mixtures (51 FR 34014, September 24, 1986) emphasize that although additivity is a theoretically sound concept, it is best applied for assessing mixtures of similar acting components that do not interact. Thus, the Agency believes that consideration of interactive effects in evaluating toxicity in the HRS is not feasible, nor is it necessary to allow use of the HRS as a screening model. The Agency rejects the suggestion that scores should simply be raised for sites

with numerous substances because this approach ignores the technical complexities related to interactions (i.e., the possibility of antagonistic effects.)

One commenter suggested that a waste's toxicity should be assessed in terms of its "degree of risk," and that this could be measured by comparing constituent concentrations at the point of exposure to appropriate toxicity reference levels. Two commenters stated that toxicity should be measured at a likely point of human exposure rather than at the waste site.

The toxicity of a substance, as used in the HRS, is an inherent property, often expressed quantitatively as a dose or exposure concentration associated with a specific response (i.e., a dose-response relationship). These toxicity values, in general, are independent of expected environmental exposure levels; many are based on laboratory tests on animals. Risk, on the other hand, is a function of toxicity, the concentration of a substance in environmental media to which humans may be exposed, and the likelihood of exposure to that medium (and the population likely to be exposed). The toxicity factor in the waste characteristics factor category of the HRS is intended to reflect only the inherent toxicity (i.e., the basic dose-response relationship) of substances found at the site. The HRS as a whole is intended to evaluate, to the extent feasible, relative risks posed by sites by including factors for likelihood of release, waste quantity, toxicity, and the proximity of potentially exposed populations. If actual contamination (for example, of drinking water) has been detected at a site, the measured environmental concentration of each substance is compared with its appropriate health-based or ecological-based concentration limit (i.e., its benchmark). If these environmental concentrations equal or exceed a benchmark, certain target factors are assigned higher values than if environmental concentrations are less than benchmarks.

Two commenters suggested using Cancer Potency Factors to score toxicity only for Class A and B1 carcinogens, and using reference doses (RfDs) for scoring Class B2 and C carcinogens (i.e., substances for which there is inadequate or no direct human evidence of carcinogenicity).

In response, EPA believes that because the HRS is a screening tool, it should maintain a conservative (i.e., protective) approach to evaluation of potential cancer risks. EPA's 1986 *Guidelines for Carcinogen Risk Assessment* (51 FR 34014, September 24, 1986) provide for substances in Class A and Class B (both B1 and B2) to be regarded as suitable for quantitative human risk assessment. In general, according to EPA's 1989 *Risk Assessment Guidance for Superfund: Human Health Evaluation Manual*, Class C substances are evaluated for cancer risks within the Superfund risk assessment process. Thus, the use of cancer risk information for Class B2 and C substances in the HRS is consistent with the objective of maintaining a conservative approach and with other Agency and Superfund program risk assessment guidelines.

In response to comments that the best available data should be used to score sites, that accepted Agency practices be relied on, and that consistency across pathways be encouraged, the Agency has modified slightly the way the toxicity value for a substance is selected. The final rule requires the use of carcinogenicity and chronic toxicity data, when available, over acute toxicity data. If both slope factors and RfDs are available, the higher of the values assigned for these types of toxicity parameters is used. If neither is available, but acute toxicity data are available, the acute toxicity data are used to assign toxicity factor values. EPA decided to give preference to slope factors and RfD values because these undergo more extensive Agency review and are based on long-term exposure studies.

E. Radionuclides

The proposed HRS assigned radionuclides a maximum toxicity value, but included no other procedures specific to radionuclides.

One commenter, the U.S. Department of Energy (DOE), asserted that the proposed HRS "* * * contains an inequitable bias regarding radionuclides * * *" DOE specifically criticized assigning maximum toxicity factor values to radionuclides, "* * * where, in fact, the health impact associated with radionuclides is associated with the type of decay, the level of decay energy, the half-life, the mobility, the concentration of the radionuclide, internal biological factors, and external pathway factors." DOE proposed using concepts for evaluating radionuclides that were included in its Modified Hazard Ranking System (mHRS). In its subsequent comments on the HRS field test report, DOE stated that it considered the "* * * method of handling radionuclides in the proposed revised HRS to be a serious flaw in the evaluation system."

In the final rule, EPA has clarified and significantly changed how radionuclides are evaluated. Instead of using or adapting the mHRS directly, however, EPA modified the proposed HRS to account more fully for radionuclides based on EPA's own methods for evaluating them, which are similar to and generally consistent with the radiation analysis concepts underlying the mHRS.

The final rule evaluates radionuclides within the same basic structure as other hazardous substances, and the evaluation of many individual HRS factors is the same whether radionuclides are present or not. Table 7-1 of the final rule lists HRS factors and indicates which are evaluated differently for radionuclides. Essentially, radionuclides are simply treated as additional hazardous substances with certain special characteristics that are accounted for by separate scoring rules for some HRS factors. For sites containing only radionuclides, the scoring process is very similar to the process at other hazardous substance sites, except that different scoring rules are applied to a number of substance-specific factors and a few other factors. For sites containing both radionuclides and other hazardous substances, both types of substances are scored for all HRS factors that are substance-specific, with overall factor values based either on combined values or the higher of the values, as appropriate.

EPA notes that, although some radioactive substances are statutorily excluded from the definition of "hazardous waste" in both CERCLA and RCRA (specifically, source, special nuclear, and byproduct material as defined in the Atomic Energy Act of 1954), such substances may be, and generally are, "hazardous substances" as defined in section 101(14) of CERCLA and therefore may be addressed under CERCLA. Radioactive substances should be included in HRS scoring and section 7 of the final rule is intended to facilitate that analysis. It also should be noted that two narrow categories of releases (either from "nuclear incidents" or from sites designated under the Uranium Mill Tailings Radiation Control Act of 1978) are excluded from CERCLA's definition of the term "release" (CERCLA section 101(22)), and such releases should not be scored using the HRS.

The major changes to the HRS in the evaluation of radionuclides apply to establishing observed releases, to factors in the waste characteristics category, and to determining the level of actual contamination in the targets factor category. The HRS components that have been modified are briefly described below.

The criteria for establishing an observed release through analysis of samples for radionuclides differ considerably from the criteria used for other hazardous substances. These criteria are divided into three groups: radionuclides that occur naturally or are ubiquitous in the environment; manmade radionuclides that are not ubiquitous in the environment; and gamma radiation (soil exposure pathway only). (See § 7.1.1.)

The hazardous waste quantity factor for sources (and areas of observed contamination) containing radionuclides has been modified to reflect the different units used to measure the amount of radiation (curies, a measure of activity) versus the units used for other hazardous substances (pounds, a measure of mass). EPA believes it is preferable to use activity units rather than mass units because activity is the standard measure of radiation quantity and is a better indicator of energy released and potential to cause human health damage than is mass. In addition, the hierarchy for evaluating the waste quantity factor for sources (and areas of observed contamination) containing radionuclides is limited to Tiers A and B. Tiers C and D, based on source volume and source area, respectively, are not used because adequate data to derive their quantitative relationship to Tier A were unavailable. Thus, the waste quantity factor is based either on radionuclide constituent quantity (Tier A) or radionuclide wastestream quantity (Tier B).

For sites containing only radionuclides, hazardous waste quantity is calculated based on the activi'y content of the radionuclides or radionuclide wastestreams associated with each source. For sites with both radionuclides and other hazardous substances, hazardous waste quantity is evaluated separately for the two types of hazardous substance for each source, and the values are then summed in determining the hazardous waste quantity value. The scale for scoring radionuclide waste quantity was derived based on concepts of risk equivalence between radionuclides and other hazardous substances.

In the proposed rule, all radionuclides were automatically assigned a maximum default value for the toxicity factor. The final rule evaluates radionuclides individually on the basis of human toxicity, across a range of factor values based on the potential to cause cancer (i.e., cancer slope factors). Non-cancer effects are not considered for radionuclides because cancer is generally the most significant toxic effect. Incorporated in the development of cancer slope factors are the type of radioactive decay; energy emitted during decay; biological uptake, distribution, and retention; and radiation dose-response relationship. Thus, across the set of scoring ranges used, radionuclides that are more potent carcinogens per unit activity now receive higher toxicity factor values than those that are less potent. The new toxicity scoring scale for radionuclides was derived in a manner consistent with the derivation of the existing carcinogenicity scale for other hazardous substances. Taken together, the new toxicity and hazardous waste quantity scales for radionuclides result in a risk equivalence between radionuclides and other hazardous substances.

Mobility of radionuclides in both the air and ground water migration pathways is evaluated in the same way as mobility for other hazardous substances; that is, on the basis of the chemical and physical characteristics of the radionuclide. Similarly, the bioaccumulation (and ecosystem bioaccumulation) potential factor is evaluated in the same way for radionuclides as for other hazardous substances. The final rule clarifies that radionuclides should be scored for these factors in all relevant pathways.

The persistence factor in the surface water migration pathway has been modified so that radionuclides are evaluated solely on the basis of half-life, which for HRS purposes is based on both radioactive half-life and volatilization half-life. Sorption to sediments is not considered, nor are hydrolysis, photolysis, or biodegradation. Other than this change in the processes considered to estimate surface water half-life, the scoring of the persistence factor is the same for radionuclides as for other hazardous substances.

The final rule extends to radionuclides the benchmark concept used throughout the HRS for weighting certain targets factor values. Measured levels of specific radionuclides at potential exposure points are compared to benchmark levels, and additional weight is given to targets subject to actual contamination (Levels I and II). This approach for weighting target factors using benchmarks is similar for radionuclides and for other hazardous substances, although both the specific benchmark values used for radionuclides and the methods for deriving the values are different. Benchmarks for evaluating radionuclide contamination parallel those used for other hazardous substances in that available Federal standards and screening concentrations are used when applicable. At sites with both radionuclides and other hazardous substances, each radionuclide and other substance is evaluated separately. If no individual substance equals or exceeds its benchmark, the ratios of the measured concentrations to the screening concentrations for cancer for radionuclides and other hazardous substances are added. Radionuclides are not evaluated using screening concentrations for non-cancer effects.

Specific benchmark values for radionuclides are in activity units instead of mass units, however, to reflect the appropriate measurement units for the level of radionuclide contamination. Radionuclide benchmarks include drinking water maximum contaminant levels (MCLs) for both the ground water and the surface water/drinking water threat pathways; Uranium Mill Tailings Radiation Control Act (UMTRCA) standards for the soil exposure pathway; and screening levels corresponding to 10^{-6} individual cancer risk for inhalation or oral exposures, as derived from cancer slope factors, for all pathways and threats incorporating human health benchmarks. The radionuclide benchmarks are consistent with EPA's radionuclide risk assessment methods in that they incorporate standard data or assumptions about contact/consumption rates for various environmental media and radiation dose-response, as well as the specific radionuclide's type of decay, decay energy, biological absorption, and biological half-life. Furthermore, radionuclide benchmarks for the soil exposure pathway account for external exposure (i.e., exposure to radiation originating outside the human body) from gamma-emitting radioactive materials in surficial material as well as from ingestion, which is the sole basis for non-radioactive hazardous substance benchmarks for the soil exposure pathway, because external exposure from gamma-emitting radionuclides can be an extremely important exposure route.

F. Mobility/Persistence

The proposed rule added mobility factors to both the ground water and air migration pathways and modified the persistence factor in the surface water migration pathway to consider a greater number of potential degradation mechanisms.

The Agency received a large number of comments critical of several aspects

of the ground water mobility factor. The most common issues included:

- Concern about the use of coefficients of aqueous migration to establish mobility values for inorganic cations and anions;
- Suggestions that solubility values, distribution coefficients, and other measures be used to establish mobility values for anions and cations; and
- Requests that the same measures of mobility be used for organics and inorganics.

Criticism of the use of the coefficients of aqueous migration focused on its obscurity; except for geochemists, few scientists are familiar with the measure. In response to these comments and because coefficients of aqueous migration are not available for all hazardous substances and radionuclides, the Agency decided to replace coefficients of aqueous migration.

The majority of commenters stated a preference for using parameters related either to hazardous substance release (solubility) or to transport (distribution coefficients) as measures of mobility. The ground water mobility factor is intended to reflect the fraction of a hazardous substance expected to be released from sources, migrate through porous media, and contaminate aquifers and the drinking water wells that draw from them. Because mobility is concerned with both release and transport, the Agency concluded that mobility for all hazardous substances in ground water will be evaluated using both solubility and distribution coefficient values. A default value is assigned when none of the hazardous substances eligible to be evaluated can be assigned a mobility factor value based on available data.

A number of commenters raised questions about the persistence factor in the surface water migration pathway. In general, the commenters were divided between those who wanted more degradation mechanisms considered and those who believed the equation in the proposed rule for calculating half-lives was too complex. Several commenters suggested including sorption of substances by sediments.

In response to these comments, EPA has made several changes to the persistence factor. The free-radical oxidation half-life has been dropped from the equation used to calculate half-life because the data on which its half-life values are based are typically derived from ideal, laboratory conditions that differ greatly from conditions found in nature; few field validation studies have been conducted to provide a basis for extrapolating these laboratory values to natural environments. Thus, EPA concluded that including free-radical oxidation in the persistence equation resulted in an overemphasis of the influence of free-radical oxidation as a degradation mechanism. For hazardous substances that sorb readily to particulates found in natural water bodies, the persistence equation as proposed overemphasized the importance of degradation mechanisms that occur in the liquid phase. Log K_{ow}, the logarithm of the n-octanol-water partition coefficient, has been added to account for sorption to sediments.

The Agency received several comments concerning the mobility factors in the air migration pathway. The most significant of the issues raised by commenters were:

- Whether consideration of mobility in both the likelihood of release factor category and the waste characteristics factor category counts mobility twice;
- Whether the approach used in the proposed rule properly reflected the dynamics of releases of gases from sources into the atmosphere; and
- Whether the Thornthwaite P-E Index was sufficient as the sole measure of particulate mobility and whether particle size should be included.

In response to these and other related structural and air migration pathway comments, the Agency thoroughly re-assessed the adequacy of the mobility factors in the likelihood of release and waste characteristics factor categories. Based on this review, EPA has made several changes to the mobility factors in the final rule. In response to the "double counting" issue, the Agency believes there are differences between mobility in the context of likelihood of release and mobility in the context of waste characteristics. The potential to release mobility factor is a measure of the likelihood that a source at a site will release a substance to the air; the waste characteristics mobility factor, together with the hazardous waste quantity factor, is a measure of the magnitude of release. To highlight these differences, the names of the likelihood of release mobility factors have been changed to gas (or particulate) migration potential.

In response to comments on air migration pathway mobility and structure, EPA reviewed gas and particulate release rate models to develop revised mobility factors that improve evaluations of release magnitude and duration. The gas and particulate mobility factors in the final rule are a result of that review. The gas mobility factor is based on a simplified release model and is determined by the vapor pressure of the most toxic/mobile hazardous substance available for migration to the atmosphere at the site. The particulate mobility factor is based on a simplified fine-particle wind-erosion model and reflects the combined effects of differing wind speeds and soil moisture. Analyses indicated that soil moisture was dominant over both wind speed and particle size, which are essentially equal in effect. Because of the comparative difficulty of determining particle sizes in an SI, a single particle size was assumed to apply to all sites. This constant particle size value was factored into the simplified model yielding the factor in the final rule.

G. Observed Release

The proposed HRS described how to determine whether an observed release was significantly above background levels based on multiples of detection limits and background concentrations.

Some commenters stated that the proposed revisions treated observed release in an overly complex manner. A number of commenters, primarily from the mining industries, were concerned about the consideration of background concentration in determining an observed release. (See Section III P below for a summary of their concerns and EPA's response.)

As in the proposed rule, observed releases may be established based on either direct observation or chemical analysis of samples. In the case of direct observation, material (e.g., particulate matter) containing hazardous substances must be seen entering the medium directly or must have been deposited in the medium.

EPA has replaced the proposed rule criteria for establishing an observed release by chemical analysis with simpler criteria. In the final HRS, an observed release is established when a sample measurement equals or exceeds the sample quantitation limit (SQL) and is at least three times above the background level, and available information attributes some portion of the release of the hazardous substance to the site. (The SQL is the quantity of a hazardous substance that can be reasonably quantified, given the limits of detection for the methods of analysis and sample characteristics that may affect quantitation (e.g., dilution, concentration).) When a background concentration is not detected (i.e., below detection limits), an observed release is established when the sample measurement equals or exceeds the SQL. Any time the sample measurement is less than the SQL, no observed release is established. Table 2-3 of the

final rule provides the criteria for determining when analytic sampling information is sufficient for establishing an observed release (or observed contamination in the soil exposure pathway). The final rule also provides procedures to be followed when the SQL is unavailable and defines various types of detection and quantitation limits in the context of the HRS. (See § 2.3 of the final rule.)

H. Benchmarks

SARA requires that EPA give high priority to sites that have led to closing of drinking water wells or contamination of principal drinking water supplies. To respond to this mandate, the proposed rule added health-based benchmarks to the ground water and surface water migration pathways; in addition, ecological-based benchmarks were added to evaluate sensitive environments targets in surface water. In the proposed rule, population factors were evaluated at Level I if a health-based benchmark had been exceeded. If actual contamination was present, but the benchmark was not exceeded, populations were evaluated based on two levels of contamination (i.e., Level II and Level III). Sensitive environments in the surface water migration pathway were evaluated based on two levels of actual contamination (exceeding benchmark or not exceeding benchmark). Where several hazardous substances were present below benchmarks, the percentages of their concentrations relative to their benchmarks were added to determine which level was used to assign values.

Of the commenters on this issue, most supported EPA's proposal to give extra weighting to sites where measured exposure-point concentrations exceed benchmarks. One commenter who dissented suggested giving extra weighting to sites where actual contamination is documented; documentation of an observed release (or observed contamination) would be the only criterion for assigning higher values to target factors, and the relationship of the concentration of hazardous substances to benchmarks would not be used. The other dissenting commenter suggested that EPA re-evaluate the role of health-based benchmarks in the HRS because common sense, and other laws, will discourage people from drinking water contaminated above benchmark levels, and because evaluating this factor will entail large resource expenditures for marginal gains in discrimination.

The final rule weights most targets based on actual and potential exposure to contamination across all pathways and threats, including those for which benchmarks were not originally proposed, because EPA believes that this approach both improves the ability of the HRS to identify sites that pose the greatest threat to human health and the environment and increases the internal consistency of the HRS. (See §§ 2.5, 2.5.1, 2.5.2, 3.3.1, 3.3.2, 4.1.2.3.1, 4.1.2.3.2, 4.1.3.3.1, 4.1.3.3.2, 4.1.4.3.1, 4.2.2.3.1, 4.2.2.3.2, 4.2.3.3.1, 4.2.3.3.2, 4.2.4.3.1, 5.1.3.1, 5.1.3.2, 6.3.1, 6.3.2, 6.3.4, 7.3.1, 7.3.2.) In the final rule, both the population factors and the factors reflecting the hazard to the nearest individual (or well or intake) are evaluated in relation to health-based benchmarks in all pathways. The sensitive environment factor in the surface water environmental threat is weighted in relation to ecological-based benchmarks; however, in the soil exposure and air migration pathways, the sensitive environment factor is weighted simply on the basis of exposure to actual contamination, and no benchmarks are used.

The Agency chose to use benchmarks in all pathways in response to comments that specifically suggested such a change; it is also responding to comments that the HRS should better reflect relative risks and that the approaches in all pathways should be consistent. The Agency has concluded that the concerns expressed by commenters outweigh the concerns about uncertainties in the evaluation of samples collected in air and soil and about the lack of regulatory standards and criteria on which to base soil or air benchmarks that led the Agency not to include benchmarks for those pathways in the proposed rule. In short, EPA carefully considered this point and concluded that the consistent application of benchmarks across all pathways provides for the most reasonable use of data given the purpose of the HRS as a screening tool.

EPA generally selected specific criteria based on applicable or relevant and appropriate requirements (ARARs), excluding State standards, that have been selected for the protection of public health and the environment as outlined in the NCP (55 FR 8666, March 8, 1990). In the HRS NPRM, EPA proposed to use MCLs, maximum contaminant level goals (MCLGs), and screening concentrations (SCs) based on cancer slope factors as drinking water benchmarks, and Food and Drug Administration (FDA) Action Levels as benchmarks for the human food chain threat. EPA also proposed to use Ambient Water Quality Criteria (AWQC) as ecological-based benchmarks for the environmental threat. EPA received 21 comments from 12 commenters on which benchmarks the HRS should use and whether additional information should be considered in establishing benchmarks. Opinion was divided on the use of specific types of benchmarks: three commenters supported the use of MCLs; three did not. Two commenters supported the use of MCLGs, two opposed such use, and one suggested that EPA consider the economic impact of using the value of 0 (i.e., the MCLG for a carcinogen) as a health-based benchmark. Two commenters suggested including relevant State drinking water standards, and one suggested including concentrations based on RfDs. One commenter expressed concern that the current lack of water quality standards for many substances might make the benchmark system ineffective in identifying sites that pose a significant threat to human health. Two commenters suggested that carcinogen weight of evidence should be used in establishing SCs (e.g., the individual risk level should be lower for a Class A carcinogen than for a Class B2 carcinogen). Two commenters suggested considering other important routes of exposure (e.g., inhalation of hazardous substances volatilized from water, or dermal contact with contaminated water) in establishing drinking water benchmarks.

EPA conducted a number of analyses on specific benchmarks and on the modification of factors to consider in establishing HRS benchmarks. As a result of public comments and these analyses, EPA has concluded that the HRS is improved by including concentrations based on nationally uniform standards, criteria, or toxicity values as health-based or ecological-based benchmarks in all pathways and threats. EPA's conclusion is based on several considerations. First, the addition of benchmarks across all pathways and the use of ARARs for those benchmarks improves linkages with the RI/FS process. That is, the HRS benchmarks will be those used most frequently during RI/FSs, and the additional points provided by equalling or exceeding a benchmark will aid in identifying areas requiring follow-up in the RI/FS. Second, the internal consistency of the HRS is improved by using benchmarks because concentrations measured at or above benchmark levels are treated in a parallel manner across all pathways, allowing more consistent and fuller use of the relatively costly sampling data

collected during the SI. Third, the number of hazardous substances for which at least one health-based or ecological-based benchmark is available is increased, allowing for more uniform assessment of sites nationwide.

The benchmark criteria that the Agency has concluded are most appropriate for each pathway and threat are listed below. As discussed above, EPA agrees with comments suggesting that benchmarks also be used in the soil exposure and air migration pathways and has selected criteria for these pathways based upon the kinds of factors discussed above. While EPA believes the criteria for the soil exposure and air migration pathways in the final rule are appropriate, it is open to any comments that members of the public may wish to submit regarding these criteria and specifically solicits such comments at this time. EPA asks that any such comments be submitted on or before (30 days after the date of publication in the **Federal Register**).

For the final rule; EPA has selected the following types of benchmarks in each pathway and threat, subject to any revisions in the criteria for air and soil exposure that may be made in response to comments. (Benchmarks for radionuclides are discussed in Section III E of this preamble.)

- Benchmarks in the ground water migration pathway and the surface water drinking water threat include MCLs, non-zero MCLGs, screening concentrations (SCs) for non-cancer effects based on RfDs for oral exposures, and SCs for cancer based on slope factors for oral exposures and 10^{-6} individual cancer risk (see Table 3–10). Because SCs based on RfDs and slope factors are used as drinking water benchmarks, MCLGs with a value of 0 have been dropped as HRS benchmarks.
- Benchmarks in the surface water human food chain threat include FDA Action Levels for fish or shellfish, SCs for non-cancer effects based on RfDs for oral exposures, and SCs for cancer based on slope factors for oral exposures and 10^{-6} individual cancer risk (see Table 4–17).
- Benchmarks in the surface water environmental threat include AWQC and Ambient Aquatic Life Advisory Concentrations (AALACs); AALACs will be considered as they become available (see Table 4–22).
- Benchmarks in the soil exposure pathway include SCs for non-cancer effects based on RfDs for oral exposures, and SCs for cancer based on slope factors for oral exposures and 10^{-6} individual cancer risk (see Table 5–3).
- Benchmarks in the air migration pathway include National Ambient Air Quality Standards, National Emission Standards for Hazardous Air Pollutants (NESHAPs) that are expressed in ambient concentration units, SCs for non-cancer effects based on RfDs for inhalation exposures, and SCs for cancer based on slope factors for inhalation exposures and 10^{-6} individual cancer risk (see Table 6–14).

Several commenters suggested technical refinements for deriving health-based benchmarks. Although qualifying information is useful and important and is, in fact, used extensively in the RI/FS process, the benefits of including such information in the HRS must be balanced against its limited scope and purpose as well as the limited data available to determine concentration at the point of exposure. Consequently, in the final rule:

- All health-based benchmarks are set in reference to the major exposure concern for each pathway or threat (e.g., benchmarks in the air migration pathway are set in reference to inhalation only; benchmarks in drinking water, the human food chain threat, and the soil exposure pathway are set in reference to ingestion), except for radionuclides for which external exposure is also considered in the soil exposure pathway;
- All benchmarks are set in reference to uniform exposure assumptions that are consistent with RI/FS procedures (e.g., water consumption is assumed to be two liters per day; body weight is assumed to be 70 kg);
- State water quality standards and other State or local regulations are not included as benchmarks because they would introduce regional variation in the HRS;
- A hierarchy has been developed to provide a single benchmark concentration for each hazardous substance by pathway and threat; and
- Qualitative weight-of-evidence is not used in deriving SCs for carcinogens.

In the NPRM, EPA requested comments on how many tiers (levels) of actual contamination to consider when weighting populations relative to benchmarks (i.e., which of three alternative methods presented should be adopted). EPA received two comments on this issue and three related comments regarding the weighting factors for each level. One commenter supported Alternative 2 (i.e., use of two levels of observed contamination and one level of potential contamination). Another commenter suggested that Level II and Level III concentrations be combined to include the range of contaminant levels above background, but below health-based benchmarks. A third commenter suggested that the weighting factors for each level be reconsidered. A fourth commenter suggested that $\frac{1}{1000}$ of a benchmark factor is inappropriate because it is excessively conservative and difficult to detect. The fifth commenter suggested that because Level III represents concentrations with cancer risks below 10^{-7}, populations exposed to Level III concentrations should not be considered in the population category of drinking water threats.

EPA conducted a number of analyses on the subject of benchmark tiers and has dropped Level III contamination. In the final rule, Level I contamination is defined as concentration levels for targets which meet the criteria for actual contamination (see § 2.5 of the final rule) and are at or above media-specific benchmark levels; Level II contamination is defined as concentration levels for targets which either meet the criteria for actual contamination but are less than media-specific benchmarks, or meet the criteria for actual contamination based on direct observation; and potential contamination is defined as targets that are potentially subject to releases (i.e., targets that are not associated with actual contamination for that pathway or threat). These three tiers are used to assign values to both the nearest individual (or well or intake) and the population factors. As a result of EPA's analyses of benchmark issues, the weighting assigned to Level I and Level II contamination has been changed and made consistent across pathways. For example, Level I populations are now multiplied by a factor of 10 in all pathways. As in the proposed rule, potentially contaminated populations and nearest individuals (or wells or intakes) are distance or dilution weighted.

The proposed rule summed the ratios of all hazardous substances to their individual benchmarks as a means of defining the level of actual contamination, and EPA requested comments on the appropriateness of this approach to scoring multiple substances detected in drinking water. Of the 10 comments in response to this proposal, nine strongly opposed the proposed approach, particularly when applied to drinking water standards (i.e., MCLs), MCLGs, and noncarcinogens. One commenter supported the proposed approach.

EPA has decided to retain the summing of ratios of hazardous substances to their individual benchmarks, but in a modified form. The final rule sums measures of carcinogenic and noncarcinogenic effects separately;

concentrations specified in regulatory limits (e.g., NAAQS, MCLs, or FDA Action Levels) are not included in the summing algorithm. EPA recognizes that a more precise estimate of relative risk would be obtained by summing the ratios of hazardous substances to their individual RfD-based concentrations by segregating substances according to major effect, target organ, and mechanism of action. In fact, such a segregation is recommended during the RI/FS. However, health-based benchmarks are used in the HRS to provide a higher weight to populations exposed to hazardous substances at levels that might result in adverse health effects. As a consequence, EPA believes that use of the summed ratios of hazardous substances within pathways and threats to their individual RfD-based benchmark levels is appropriate for the screening purpose of the HRS.

EPA proposed and solicited comments on a range of 10^{-4} to 10^{-7} for individual cancer risk levels of concern in establishing levels of actual contamination with respect to health-based benchmarks. EPA received eight comments concerning this risk range. Four commenters suggested restricting the range to 10^{-4} to 10^{-6}, primarily because this range would be consistent with risk levels identified in the NCP and used by other EPA regulatory programs. Three commenters said the SCs for carcinogens should be the 10^{-6} individual cancer risk level. One commenter stated that 10^{-4} to 10^{-7} generally is the risk range considered for Superfund response. The final rule defines only two levels of actual contamination: significantly above background and equal to or above benchmark, and significantly above background but less than benchmark. When an applicable or relevant and appropriate requirement does not exist for a carcinogen, EPA selects remedies resulting in cumulative risks that fall within a range of 10^{-4} to 10^{-6} incremental individual lifetime cancer risk based on the use of reliable cancer potency information. EPA has selected the 10^{-6} screening risk level in defining the HRS benchmark level for cancer risk because it is the lower end of the cancer risk range (i.e., 10^{-4} to 10^{-6}) identified in the NCP and used by other EPA regulatory programs.

Two commenters objected to assigning releases of substances with no benchmarks to Level II as a default value. One suggested assigning unknowns to Level III because substances that are frequently released or are known or suspected to cause health problems are studied before those that are not. The other objected because "the absence of data is not data."

Because EPA has decided to adopt a benchmark system incorporating only two levels of actual contamination, the default level is Level II. If none of the hazardous substances eligible to be evaluated at a sampling location has an applicable benchmark, but actual contamination has been established, the actual contamination at the location is assigned to Level II.

I. Use Factors

The proposed HRS included factors to assign values to uses of potentially affected resources in the three migration pathways: ground water use (drinking water and other) in the ground water migration pathway, drinking water and other use and fishery use in the surface water migration pathway, and land use in the air migration pathway.

EPA received a number of comments on each of these factors. The commenters raised specific objections to distinctions drawn among various potential uses and to the weights assigned to those uses. For example, for the ground water use factor, some commenters asserted that the HRS should not delineate between private and public water supply contamination. For the surface water use factors, a commenter recommended a range of assigned values for irrigation of commercial food or forage crops because of variations in rates of uptake of hazardous substances. For the land use factor, two commenters urged giving greater consideration to institutional land use because of the sensitive populations that would be exposed.

Partly in response to these comments, and in an effort to simplify the HRS, EPA has substantially revised the method of incorporating resource use information in targets factor categories. The field test indicated that collecting data on each of the use factors involved considerable effort at many sites. In addition, because of weighting factors applied to potentially contaminated populations, at sites with no actual contamination, use factors were contributing more to the targets value than were large populations. As some commenters pointed out, the use factors mixed concerns about human health with concerns about the value of the resource and, therefore, were partially redundant with population factors. To avoid redundancy with human health concerns as evaluated through the population factor, EPA has made major changes in how resource uses are evaluated and scored in the final rule.

In each migration pathway, the use factors have been replaced by a resources factor that assigns values to resources appropriate for the pathway. In addition, a resources factor has been added to the soil exposure pathway. The resources factor for a pathway is assigned a maximum of five points if any of the resource uses for that pathway exists within the target distance limit in the ground water or surface water migration pathway, within one-half mile of a source in the air migration pathway, or within an area of observed contamination in the soil exposure pathway. If none of the uses exists, the factor is assigned a value of 0.

The resources factor in the ground water migration pathway assigns a value of 5 for wells supplying water for irrigation of commercial food or commercial forage crops (five-acre minimum), watering of commercial livestock, as an ingredient in commercial food preparation, or as a supply for commercial aquaculture or for a major or designated water recreation area (excluding drinking water use)—for example, water parks (see § 3.3.3). A value of 5 is also assigned if the water in the aquifer is usable for drinking water, but not used.

The resources factor in the drinking water threat of the surface water migration pathway assigns a value of 5 if the surface water is designated by a State for drinking water use but not used, or is usable but not used for drinking water. In addition, points may be assigned for intakes supplying water for irrigation of commercial food or commercial forage crops (five-acre minimum), watering of commercial livestock, as an ingredient in commercial food preparation, or if the water body is used as a major or designated water recreation area (see § 4.1.2.3.3). The fishery use factor has been deleted to avoid double-counting of fisheries.

In the air migration pathway, the resources factor is assigned a value of 5 if there is commercial agriculture or commercial silviculture, or a major or designated recreation area within a half mile of a source (see § 6.3.3). The distance of one-half mile for the agricultural, silvicultural, and recreational areas was determined by the distance weighting factors for the air migration pathway, which reflect the rapid diminishing of air contaminant concentrations beyond one-half mile from a source. Therefore, resources beyond this distance are not considered in this pathway.

A resources factor has also been added to the resident population threat of the soil exposure pathway. The factor is assigned a value of 5 if there is commercial agriculture, commercial silviculture, or commercial livestock production or grazing on an area of observed contamination at the site.

J. Sensitive Environments

The proposed rule expanded the list of sensitive environments considerably and, for the surface water and air pathways, counted all sensitive environments within the target distance limit, rather than just the one with the highest assigned value; for the soil exposure pathway, only the sensitive environment assigned the highest value was counted. Potentially contaminated sensitive environments were distance/dilution weighted; in the surface water environmental threat, actual contamination of sensitive environments was evaluated on the basis of ecological-based benchmarks.

EPA received relatively few comments on issues related to sensitive environments. However, participants in the field test requested clarification of three categories of sensitive environments involving spawning areas, migratory pathways, and feeding areas critical for the maintenance of a fish species within a river system, coastal embayment, or estuary. In particular, critical migratory pathways and feeding areas were difficult to identify and seemed to provide little discrimination among surface waters in some areas of the country.

EPA has redefined critical spawning areas to include shellfish beds, and has limited the areas to those used for intense or concentrated spawning by a given species. Critical migratory pathways and feeding areas have been combined into a single category and limited to anadromous fish (i.e., fish that ascend from the ocean to spawn), which face special problems in migrating substantial distances between the ocean and their spawning areas. These feeding areas are further restricted to only those areas in which the fish spend extended periods of time. Examples include areas where juveniles of anadromous species feed for prolonged periods (e.g., weeks) as they prepare to migrate from fresh water to the ocean, and holding areas along the adult migratory pathways.

Terrestrial areas used for breeding by large or dense aggregations of vertebrates (e.g., heron rookery, sea lion breeding beach) have been added to the list of sensitive environments to parallel the spawning areas listed for fish species. Water segments designated by a State as not attaining toxic water quality standards have been removed because these environments are already degraded and thus are not analogous to the other sensitive environments listed. Also, the assigned value for State designated areas for protection or maintenance of aquatic life has been changed from 50 points to 5 points (see Table 4–23 in final rule) to be consistent with the points assigned under the resources factor for State designated areas for drinking water use.

In response to public comment, National Monuments have been added to the 100-point category on the list of terrestrial sensitive environments considered under the soil exposure pathway. "State designated natural areas" and "particular areas, relatively small in size, important to the maintenance of unique biotic communities" were also added to the list of terrestrial sensitive environments in response to public comment. These latter two categories were already considered in the air and surface water pathway evaluation of sensitive environments. (See Table 5–5.)

The method for evaluating wetlands has been revised, partially because participants in the field test had difficulty identifying discrete wetlands. Some wetlands were patchy and could be classified as one large or many small wetlands. Other wetlands were divided by rivers or roads, or changed from one type of wetland to another, making it unclear whether more than one wetland should be counted. To eliminate these difficulties, wetlands are now evaluated on the basis of size and level of contamination. In the air migration pathway, wetlands are evaluated based on acreage and level of contamination (see § 6.3.4); in the surface water migration pathway, wetlands are evaluated by linear frontage along the surface water hazardous substance migration path and level of contamination (see § 4.1.4.3.1). Distinguishing among wetlands on the basis of size and level of contamination should improve the discriminating ability of the sensitive environments factor. In the drier portions of the country, where even small wetlands (e.g., prairie potholes) are very important, small wetlands may also qualify as "particular areas, relatively small in size, important to the maintenance of unique biotic communities."

Sensitive environments other than wetlands are not evaluated on the basis of size for several reasons. Most other HRS sensitive environments tend to be less common and less widely distributed nationally than wetlands (e.g., see EPA's 1989 *Field Test of the Proposed Revised HRS*) and, therefore, their numbers and boundaries tend to be easier to identify. In addition, the value of many sensitive environments is independent of size; for example, the size of a critical habitat of an endangered species may vary solely due to the type of species present. Furthermore, potential or actual contamination of even a small portion of many sensitive environments—for example, a wildlife refuge—tends to be viewed as unacceptable.

An ecosystem bioaccumulation potential factor has been added to the waste characteristics factor category of the surface water environmental threat in response to comments that hazardous substances that demonstrate an ability to bind to sediments and/or to bioaccumulate (e.g., PCBs, mercury) tend to pose the greatest long-term threats to aquatic organisms. The accumulation of hazardous substances in the aquatic food chain can result in adverse effects in aquatic species and in other animals that ingest aquatic species (e.g., waterfowl). The ecosystem bioaccumulation potential factor differs slightly from the bioaccumulation potential factor in the human food chain threat, primarily in that all BCF data are considered in deriving it and not just BCF data for human food chain organisms.

The EPA ambient aquatic life advisory concentrations (AALACs) have been added to the data hierarchy used to assign the ecosystem toxicity value (see § 4.1.4.2.1.1). The Natural Heritage Program alternative sensitive environment rating factors have been removed from the rule because of problems that arose during the field tests; field test participants found that the availability of information varied substantially among States. However, a Natural Heritage Program Data Center can assist in identifying many of the sensitive environment types listed in Tables 4–23 and 5–5.

K. Use of Available Data

A number of commenters stated that all available data should be used when scoring a site. Several cited the tiered approach to hazardous waste quantity as a model that could be applied to other factors. Under this method, where data are available, they would be used; where data are not available, defaults or more generalized approaches would be applied. Several commenters specifically suggested using this approach for ground water flow direction and for scoring mining sites. These commenters argued that it would be less expensive and time-consuming to use available data when scoring a site

than to wait until the remedial investigation to consider the additional information.

EPA considered modifying the HRS to allow the use of additional data, but determined that further expanding the HRS to account for varying levels of data availability is inconsistent with the HRS's role as an initial screening tool. Adding tiers to various factors to accommodate the use of all available data would make the HRS considerably more difficult to apply and could lead to substantial inconsistencies in how sites are investigated and evaluated. EPA Regions and States would have to determine, for each set of data presented, whether the data quality was good enough for the data to be considered. Debates over decisions on data quality could delay scoring and, ultimately, delay cleanup at sites. Therefore, the Agency believes that the limited use of tiers in the final HRS represents a reasonable tradeoff between the need to limit the complexity of the system and the desire to accommodate risk-related information that is generally outside the scope of a site inspection.

L. Ground Water Migration Pathway

The proposed rule included a number of significant changes in the ground water migration pathway: new hydrogeologic factors were added; populations were distance weighted unless exposed to actual contamination; a maximally exposed individual (MEI) factor was added; the target distance limit was extended; a mobility factor was added and combined with toxicity; and a wellhead protection area factor was added. Figure 5 shows the proposed ground water migration pathway and the final rule pathway.

Ground water flow direction. Neither the original HRS nor the proposed HRS directly considered ground water flow direction in evaluating targets. The proposed HRS indirectly considered ground water flow direction by weighting populations based on actual and potential contamination of drinking water wells.

EPA received 50 letters from 40 commenters on this issue; 27 letters responded to the ANPRM, 21 to the NPRM, and two to the field test report. Commenters included eight States, three Federal agencies, the mining, petroleum, chemical, and cement industries, utilities, and professional engineers. The commenters supported the consideration of ground water flow direction data, at least in some circumstances. Numerous commenters urged the use of ground water flow direction data when they are either available or easily obtained. They suggested several methods to incorporate flow direction, including:

- Considering use of a radial impact area when directional release routes can be determined. Only a half circle with a three-mile radius for the downgradient portion (and a half-mile radius for the rest of the circle) should be considered when scoring;
- Differentiating between upgradient and downgradient areas using topographic maps, evaluating water levels at wells, and noting the presence of major surface water bodies;
- Expending the effort to obtain accurate data and considering selected upgradient locations as a precaution against unanticipated anomalies;
- Excluding drinking water wells where analytical data prove no contamination is present;
- Having a "professional" review available information and conduct a site visit;
- Using available flow direction data and developing regionally based defaults when no data are available;
- Installing piezometers to determine flow direction in the PA/SI phase and when no ground water flow data are available;
- Incorporating ground water flow direction into the "depth to aquifer" and "distance to nearest well/population served" scores; and
- Affording responsible parties the opportunity to determine flow direction.

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Figure 5

Ground Water Migration Pathway

PROPOSED HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release or Potential to Release Containment Net Precipitation Depth to Aquifer/ Hydraulic Conductivity Sorptive Capacity		Toxicity/Mobility Hazardous Waste Quantity		Maximally Exposed Individual Population Ground Water Use Wellhead Protection Area

FINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release or Potential to Release Containment Net Precipitation Depth to Aquifer Travel Time		Toxicity/Mobility Hazardous Waste Quantity		Nearest Well Population Resources Wellhead Protection Area

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Commenters suggested that data on ground water flow are either readily available or can be easily obtained at reasonable cost and are no more imprecise than other aspects of the HRS. Some commenters stated that the level of effort required to estimate the direction of ground water flow is no greater than that required to determine other hydrogeologic parameters in the HRS.

EPA reviewed a range of options for considering ground water flow direction in evaluating targets. For the reasons discussed above under "Use of Available Data," the Agency decided that it was not feasible to adopt a tiered approach in the targets factors for evaluating ground water flow direction. EPA does not agree that increased accuracy warrants the increased complexity of accounting for ground water flow direction, because this level of accuracy is not required for a screening tool that is intended to assess relative risk. This level of accuracy, however, is needed to determine the extent of remedial action and, therefore, is appropriate at the time of the RI.

EPA disagrees with the argument that determining ground water flow direction is no more difficult than determining other ground water factors. Aquifer interconnections and discontinuities as well as hydraulic conductivity and depth to aquifer, which are evaluated in the final rule, are geologic features that are unlikely to change over the short-term. In contrast, ground water flow direction can be influenced by factors such as seasonal flows and pumping from well fields. In addition, the ground water flow direction may be different in each aquifer at the site, and the direction of hazardous substance migration is not always the same as the direction of ground water flow. Therefore, data on ground water flow direction would need to be considerably more extensive than would the data required to document the other hydrogeologic factors. EPA notes that in the final rule, many of the other hydrogeologic factors considered have been simplified and the sorptive capacity factor has been dropped. EPA also notes that ground water flow direction was not identified in SARA as a portion of the HRS requiring further examination, even though ground water flow direction was not considered in the original HRS and the Agency had received criticism similar to the above comments prior to enactment of SARA.

Although the final rule does not consider ground water flow direction directly in evaluating targets, it does consider flow direction indirectly in the method used to evaluate target populations. If wells have not been contaminated by the site, as the commenters assume upgradient wells would not be, the population drawing from those wells is distance weighted and, thus, populations drawing from the wells would have to be substantial before a large number of points could be assigned. Moreover, in addition to providing a measure of the population at risk from the site, the target factors afford a measure of the value of the ground water resources in the area of the site and of the potential need for expanded uses of the ground water.

Aquifer interconnections. Aquifer interconnections facilitate the transfer of ground water or hazardous substances between aquifers. The final rule specifies that if aquifer interconnections occur within two miles of the sources at the site (or within areas of observed ground water contamination attributed to sources at the site that extend beyond two miles from the sources), the interconnected aquifers are treated as a single aquifer for the purposes of scoring the site. Thus, for example, when an observed release to a shallow aquifer has been identified, targets using deeper aquifers interconnected to the shallow aquifer are included in the evaluation of the combined aquifer. This approach is common to the original as well as the revised HRS.

In practice, EPA has found that studies in the field to determine whether aquifers are interconnected in the vicinity of a site will generally require resources more consistent with remedial investigations than SIs, especially where installation of deep wells is necessary to conduct aquifer testing. Thus, EPA has in the past relied largely on existing information to make such determinations and the Agency finds it necessary to continue that approach. Examples of the types of information useful in identifying aquifer interconnections were given in the proposed rule. This information includes literature or well logs indicating that no lower relative hydraulic conductivity layer or confining layer separates the aquifers being assessed (e.g., presence of a layer with a hydraulic conductivity lower by two or more orders of magnitude); literature or well logs indicating that a lower relative hydraulic conductivity layer or confining layer separating the aquifers is not continuous through the two-mile radius (i.e., hydrogeologic interconnections between the aquifers are identified); evidence that withdrawals of water from one aquifer (e.g., pumping tests, aquifer tests, well tests) affect water levels in another aquifer; and observed migration of any constituents from one aquifer to another within two miles. For this last type of information, the mechanism of vertical migration does not have to be defined, and the constituents do not have to be attributable to the site being evaluated. Other mechanisms that can cause interconnection (e.g., boreholes, mining activities, faults, etc.) will also be considered. While the descriptive text has been removed from the rule, the approaches mentioned in the proposed rule will be used in making aquifer interconnection determinations. In general, EPA will base such determinations on the best information available; in the absence of definitive studies and where costs of field studies are prohibitive, the Agency will rely on expert opinion (e.g., U.S. Geological Survey staff or State geologists). In the absence of such information, EPA assumes that aquifers are not interconnected.

Ground water potential to release factors. EPA proposed replacing the depth to the aquifer of concern and permeability factors of the original HRS with depth to aquifer/hydraulic conductivity and sorptive capacity factors. EPA received more than 75 comments on these factors, in addition to general comments on evaluating ground water potential to release in response to the ANPRM.

Several commenters supported consideration of depth to aquifer in evaluating the ground water migration pathway. One commenter stated that use of a depth to aquifer/hydraulic conductivity matrix, which was intended to reflect travel time to ground water, was an improvement over considering these two parameters individually and additively. Concerns were raised, however, about how to determine depth to aquifer. In addition, commenters stated that the two-mile radius for evaluating hydrogeologic factors should be extended to four miles, while others commented that the distance should be measured from vertical points as near to the source as possible.

Commenters generally supported the proposal to include hydraulic conductivity, although many believed that the proposed method was too complicated; several commenters suggested that the single least conductive layer(s) should be used. Another concern was the lack of data for determining hydraulic conductivity. One commenter stated that unless data can confirm that the geologic strata

extend throughout the entire area of a site, assigning a hydraulic conductivity value is highly questionable.

Some commenters offered alternative approaches to evaluating hydraulic conductivity. These included replacing the proposed method with:

- Assigned "confidence levels" tied to professional estimates based on regional data and judgment;
- Consideration of actual travel time in the unsaturated zone; or
- An assumption of maximum hydraulic conductivity among the various geological layers below the site.

More than 20 comments were received on the sorptive capacity factor, but there was little consensus among the commenters. A number of commenters agreed that the factor should be added, but stated that the approach was not detailed enough and that more waste- and site-specific information should be required. Other commenters agreed that the factor was an improvement, but said that sorptive capacity should be dropped because the waste- and site-specific information needed for an accurate evaluation cannot be collected during a screening process. Others said that it was too complex as proposed and should be dropped.

Based on these comments and the field test results, EPA examined the depth to aquifer/hydraulic conductivity and sorptive capacity factors. The examination showed that the lowest hydraulic conductivity layer(s) accounted for almost all of the travel time to the aquifer if a one-foot or three-foot minimum layer thickness was used. Accordingly, in the final rule, the depth to aquifer/hydraulic conductivity factor has been replaced with a simpler factor, travel time, which is determined using a matrix of the hydraulic conductivity and thickness of the lowest hydraulic conductivity layer(s) with at least a three-foot thickness. (See § 3.1.2.4 and Table 3–7 of the final rule.)

To conform with the change limiting the travel time factor to the least conductive layer(s), and to meet the goal of simplification, a change to the sorptive capacity factor was necessary. The proposed rule evaluated this factor using all layers between the source and the aquifer. In reexamining this factor, EPA concluded that depth to aquifer is one of the major parameters affecting total sorbent content, at least within the HRS ranges for the factor. Depth to aquifer also indirectly reflects geochemical retardation mechanisms because, all else being equal, the effect of these retardation mechanisms increases as the depth to aquifer increases. At the field test sites, using only the layer(s) of lowest hydraulic conductivity decreased the calculated sorbent content between 10 and 99 percent. For these reasons, EPA has decided to replace the sorptive capacity factor with a depth to aquifer factor. (See § 3.1.2.3 and Table 3–5 of the final rule).

M. Surface Water Migration Pathway

The proposed rule made major changes to the evaluation of releases or threatened releases to surface water. The pathway was divided into four threats: drinking water, human food chain, recreational use, and environmental. Other changes included consideration of flood potential; revision of potential overland flow; addition of dilution weights for potentially contaminated populations; extension of the target distance limit to 15 miles; revision of the persistence factor to consider more degradation mechanisms; addition of a bioaccumulation factor for evaluation of human food chain toxicity/persistence and populations; addition of ecosystem toxicity to evaluate the environmental threat; and addition of a maximally exposed individual factor (MEI) factor to the drinking water threat. Figure 6 shows the proposed rule and the overland flow/flood migration component of the surface water migration pathway in the final rule.

Recreational use threat. SARA stated that the HRS should consider threats to surface water used for recreation and drinking water, and the proposed HRS included a recreational use threat in the surface water migration pathway. A number of States, several companies and trade associations, and two Federal agencies identified problems with the proposed recreational use threat. Some commenters objected to weighting it as heavily as the drinking water threat, while others suggested that evaluating the threat was too complicated for use in a screening tool. Many commenters said that proposed methods for assigning values to recreation areas were too broadly drawn and that a limited number of recreation areas should be considered. Two commenters suggested using actual attendance data, and one commenter suggested that recreational uses be considered in other pathways as well.

EPA's field test indicated that the recreational use threat evaluation was too complex for HRS purposes and, at the same time, was not very accurate. Several field test participants commented that the recreation target population was difficult to evaluate and that the approach for determining population was inaccurate and time-consuming. In addition, the population factor did not provide meaningful discrimination among sites. The proposed rule used the physical characteristics (e.g., capital improvements) of a recreational site as the basis for determining the distance limit used to evaluate population, but because major and minor sites may have the same types of capital improvements (e.g., boat ramps, picnic facilities), the same distance limit could be associated with a minor recreation area and a major recreation area. The alternative approach would be to require actual use data to evaluate targets; however, site-specific population data are not available for many recreation areas, making it difficult to obtain accurate estimates of the population at risk. The target distance limits, which ranged from 10 to 125 miles, also contributed to the problems with evaluating targets. The Agency invited comments on refining these calculations; no alternative approaches were suggested, and EPA did not identify viable alternatives.

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Figure 6

Surface Water Migration Pathway

PROPOSED HRS

Likelihood of Release X **Drinking Water Threat**

Observed Release		
or		
Potential to Release		
By Overland Flow		
Containment		
Runoff		
Distance to Surface Water		
By Flood		
Containment		
Flood Frequency		

Waste Characteristics	X	**Targets**
Toxicity/Persistence		Maximally Exposed Individual
Hazardous Waste Quantity		Population
		Surface Water Use

+

Human Food Chain Threat

Waste Characteristics	X	**Targets**
Toxicity/Persistence/ Bioaccumulation		Population
Hazardous Waste Quantity		Fishery Use

+

Recreational Use Threat

Waste Characteristics	X	**Targets**
Toxicity/Persistence/Dose Adjusting Factor		Population
Hazardous Waste Quantity		

+

Environmental Threat

Waste Characterisitics	X	**Targets**
Ecosystem Toxicity/ Persistence		Sensitive Environments
Hazardous Waste Quantity		

Figure 6

Surface Water Migration Pathway - Overland Flow/Flood Component

FINAL HRS

Likelihood of Release X **Drinking Water Threat**

Observed Release		
or		
Potential to Release		
By Overland Flow		
Containment		
Runoff		
Distance to Surface Water		
By Flood		
Containment		
Flood Frequency		

Waste Characteristics	X	**Targets**
Toxicity/Persistence		Nearest Intake
Hazardous Waste Quantity		Population
		Resources

+

Human Food Chain Threat

Waste Characteristics	X	**Targets**
Toxicity/Persistence/ Bioaccumulation		Food Chain Individual
Hazardous Waste Quantity		Population

+

Environmental Threat

Waste Characteristics	X	**Targets**
Ecosystem Toxicity/ Persistence/Bioaccumulation		Sensitive Environments
Hazardous Waste Quantity		

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EPA is also concerned that many qualities of recreation areas (e.g., uniqueness, attractiveness, value) cannot be readily quantified or measured, which poses significant problems for a screening tool. Therefore, the recreational use threat has been removed from the final rule. Instead, factors related to recreational use are being included in the assessment of resource factors in the air, surface water, and ground water migration pathways. (See the discussion of resources factors above and §§ 3.3.3, 4.1.2.3.3, 4.2.2.3.3, and 6.3.3 of the rule.) Recreational use is also a major component of the evaluation of the attractiveness/accessibility factor in the soil exposure pathway (see § 5.2.1.1 of the rule).

Human food chain. SARA requires that EPA consider "the damage to natural resources which may affect the human food chain * * *" Accordingly, the surface water migration pathway of the proposed rule included evaluation of threats to human health via the aquatic food chain.

A number of commenters suggested that terrestrial food chain threats should also be evaluated because most of the food eaten in the United States originates on land, and the terrestrial human food chain is, therefore, more important than the aquatic human food chain. Commenters specifically stated that the HRS should account for human food chain threats involving irrigated crops, livestock, and game animals. One commenter stated that the SARA mandate would not be fulfilled if only aquatic human food chain threats were evaluated.

After conducting an investigation into possible methods, EPA determined that it would not be practical to include a separate evaluation of terrestrial human food chain threats in the HRS. The terrestrial food chain is more complex and site-specific and is less understood than the aquatic food chain, and its assessment requires considerably more data. These factors render evaluation of the relative risks associated with the terrestrial human food chain well beyond the capability of a screening system such as the HRS. The final rule, therefore, does not separately evaluate terrestrial human food chain threats. These threats are, however, considered indirectly under the resources target components in the air migration pathway, ground water migration pathway, soil exposure pathway, and drinking water threat portion of the surface water migration pathway.

The proposed rule required the estimation of bioaccumulation potentials for hazardous substances posing threats via the human food chain. One commenter stated that the estimation of bioaccumulation potentials requires excessive time and resources, and that this step should be dropped from the HRS.

EPA disagrees and considers the bioaccumulation potentials of hazardous substances to be among the most important factors determining the degree of human health threat posed by substances via the human food chain. Substances that do not bioaccumulate pose less of a threat via the human food chain than substances that bioaccumulate, all else being equal. Conversely, substances with high bioaccumulation potentials can pose very significant threats via the human food chain even if they are only moderately toxic, or are present in modest quantities. EPA believes that compiling bioaccumulation potential tables will reduce the effort and resources required to score this factor.

EPA received several comments stating that bioaccumulation potential was not given sufficient weight in the evaluation of human food chain threats. EPA evaluated the use of bioaccumulation potential during the field test and determined that there was considerable uncertainty related to this factor, in part because of major differences in uptake associated with different species in different environments. In addition, bioconcentration values have been computed for only a few species for most substances. In light of this uncertainty, EPA decided that bioaccumulation potential should not be given additional weight in the HRS. In addition, as part of the structural changes discussed in Section III B, the bioaccumulation potential factor was moved from the targets factor category to the waste characteristics factor category so that it is evaluated consistently with the other waste characteristics factors that reflect exposure. As part of these changes, the use of the bioaccumulation potential factor in selecting the substance posing the greatest hazard also has been modified.

The final rule broadens the definition of actual contamination of the human food chain by modifying one criterion and adding a new criterion defining actual contamination. The proposed rule defined a fishery as actually contaminated if (1) the fishery was closed as a result of contamination and a substance for which the fishery was closed had been documented in an observed release from the site, or (2) a tissue sample from a human food chain organism from the fishery was found to contain a hazardous substance at a concentration level exceeding the FDAAL for that substance in fish tissue and the substance had been documented in an observed release from the site. In both cases, at least a portion of the fishery must be within the boundaries of the observed release.

Under the final rule, the former criterion (closed fishery) remains essentially unchanged. The latter criterion (tissue contamination) has been modified: A fishery is considered actually contaminated if the concentration of a hazardous substance in tissue of an essentially sessile benthic human food chain organism from the watershed is at a level that meets the criteria for an observed release from the site and at least a portion of the fishery is within the boundaries of the observed release. A new criterion has also been added: A fishery is considered actually contaminated if a hazardous substance having a bioaccumulation potential factor value of 500 or greater either is present in an observed release established by direct observation or is present in a surface water or sediment sample at a level that meets the criteria for an observed release from the site and at least a portion of the fishery is within the boundaries of the observed release. Only the portion of a fishery within the boundaries of an observed release is considered actually contaminated.

EPA broadened the definition of actually contaminated fisheries on the basis of field test results. With the more narrow definition in the proposed rule, few actually contaminated fisheries were identified because:

(1) Closed fisheries did not exist at most sites;

(2) Hazardous substance concentration data from tissues of applicable organisms were available for only a small portion of fisheries; and

(3) FDAALs exist for only a relatively small number of hazardous substances.

The final rule also introduces two levels of actually contaminated fisheries or portions of fisheries:

- Level I: Applicable when concentrations of site-related hazardous substances meeting the criteria for actual contamination of the fishery equal or exceed the benchmark concentration levels established in the final rule based on FDAALs, screening concentrations corresponding to elevated cancer risks, and screening concentrations corresponding to elevated chronic, non-cancer toxicity risks via oral exposures. The final rule allows Level I contamination to be established based on hazardous

substance concentrations in tissue samples from "organisms other than essentially sessile benthic organisms" (e.g., fish, lobsters, crabs), even though these organisms cannot be used to establish observed releases or actual contamination.

• Level II: Applicable to all actually contaminated fisheries (or portions of actually contaminated fisheries) not meeting Level I criteria.

The final rule assigns human food chain populations associated with Level I concentrations tenfold greater weight than those associated with Level II concentrations. The final rule also describes the procedures for determining, where applicable, the part of a fishery subject to Level I concentrations, the part subject to Level II concentrations, and/or the part subject to potential contamination.

EPA received several comments suggesting that, to be consistent with the other threats, a maximally exposed individual factor should be incorporated into the human food chain threat. The Agency agrees, and to provide this consistency the final rule incorporates a maximally exposed individual factor (the food chain individual) into the human food chain targets factor category. As with similar factors in other pathways and threats, the food chain individual is assigned points according to the level of contamination. Where actual contamination of a fishery is documented, the food chain individual factor is assigned 50 points for Level I and 45 points for Level II concentrations. Where no actual contamination of a fishery is documented, but there is documentation of an observed release of a hazardous substance having a bioaccumulation potential factor value of 500 or greater to a watershed containing a fishery within the target distance limit, the food chain individual is assigned a value of 20 points. Where there are no observed releases to surface water or no observed release of a hazardous substance with a bioaccumulation potential factor value of 500 or greater, but a fishery is present (i.e., there is a potentially contaminated fishery) within the target distance limit, the food chain individual is assigned points ranging from 0 to 20, depending on the dilution weight assigned to the associated surface water body.

The proposed rule estimated human food chain production of actually contaminated or potentially contaminated fisheries based on harvest data or stocking data for those fisheries, if available. Where such data were not available, production estimates were based on productivity of the surface water body or the estimated standing crop of aquatic biota in the fisheries. The proposed rule included a table of standing crop default values for estimating human food chain production of the fishery.

EPA received numerous comments to the effect that the standing crop default table was difficult to use, provided several different values for some water bodies and none for others, and provided unreliable data. Several commenters stated that standing crop values are not an appropriate basis for estimating aquatic human food chain production. One commenter pointed out that standing crop estimates do not correlate well with harvest for various water body types. Another commenter stated that estimates of harvest from fish and game officials are preferable to standing crop default values because standing crop is a measure of biomass (weight of all edible living organisms in the water body) rather than productivity.

EPA agrees with the commenters. In the final rule, estimates of fishery human food chain production are based on fish harvest data (including stocking data) as opposed to standing crop data. When site-specific data are not available, harvest rates are to be estimated based on the average harvest per unit area for the particular water body type under assessment and the geographic area in which the water body is located.

Ground water discharge to surface water. A number of commenters and field test participants suggested that the HRS should consider the potential impact of ground water discharges to surface water because contaminated ground water can be a significant source of surface water contamination. Field test participants noted that some sites have no overland flow route, but surface water can be contaminated through ground water discharges.

EPA agrees and has added a ground water to surface water migration component to the surface water migration pathway. Figure 7 shows the structure of this component. The surface water migration pathway, therefore, now includes two components: The overland flow/flood migration component, which retains the structure of the surface water migration pathway as proposed (except for the changes discussed in this preamble), and the new ground water to surface water migration component. Either or both components may be scored; if both are scored, the surface water migration pathway score is the higher of the two scores. EPA selected the higher of the two scores rather than combining them because, if scores were combined, the amount of hazardous substances at the site available to migrate via each component would have to be apportioned between the two components. The site-specific data needed to determine the appropriate apportionment are rarely available.

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Figure 7

Surface Water Migration Pathway - Ground Water to Surface Water Component[1]

FINAL HRS

Likelihood of Release X **Drinking Water Threat**

Observed Release or Potential to Release Containment Net Precipitation Depth to Aquifer Travel Time		**Waste Characteristics** X **Targets** Toxicity/Mobility/Persistence — Nearest Intake Hazardous Waste Quantity — Population Resources

+

Human Food Chain Threat

		Waste Characteristics X **Targets** Toxicity/Mobility/Persistence/ Bioaccumulation — Food Chain Individual Hazardous Waste Quantity — Population

+

Environmental Threat

		Waste Characteristics X **Targets** Ecosystem Toxicity/Mobility/ Persistence/Bioaccumulation — Sensitive Environments Hazardous Waste Quantity

New component.

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The ground water to surface water migration component evaluates three threats: drinking water, human food chain, and environmental. The component is scored only if: (1) A portion of the surface water is within one mile of any source at the site that could release to ground water; (2) there is no discontinuity in the uppermost aquifer between the source and the portion of the surface water within one mile of the source; and (3) the bottom of the surface water is at or below the top of the aquifer. The target distance limit for the component is determined the same way as for the overland flow/flood component. For each threat, likelihood of release is based on either observed release or potential to release. An observed release is established if, and only if, there is an observed release to the uppermost aquifer, while potential to release is based on ground water potential to release factors, except that only the uppermost aquifer is considered. (See § 4.2.2.1.2.)

The hazardous waste quantity factor is scored in the same way it is scored for the overland flow/flood migration component, except that only sources that could release to ground water are considered (see § 4.2.2.2.2). Toxicity, ground water mobility, and surface water persistence are considered in selecting the substance potentially posing the greatest hazard in drinking water (see § 4.2.2.2.1). By considering ground water mobility, the final rule reflects the fraction of a hazardous substance expected to be released from the sources and to migrate through ground water to the surface water body. For human food chain and environmental threats, bioaccumulation (or ecosystem bioaccumulation) potential is also considered in selecting the substance potentially posing the greatest hazard (see § 4.2.3.2.1).

The targets factors in this component are evaluated in the same way as targets factors in the overland flow/flood migration component, except that a dilution-weight adjustment is combined with the surface water dilution weights for populations potentially exposed to contamination. The dilution-weight adjustment was added because the HRS assumes that hazardous substances migrate via ground water in all directions from a site. Under this assumption, except in those instances where the surface water body completely surrounds the site, only a portion of the hazardous substances can be assumed to reach the surface water through the ground water. The dilution-weight adjustment accounts for the portion of the hazardous substances assumed to be available to migrate to surface water through ground water. The probable point of entry is defined as the shortest straight-line distance, within the aquifer boundaries, from the sources at the site to the surface water body. Therefore, the actual targets considered may differ somewhat from targets evaluated in the overland flow/flood migration component because the two probable points of entry may differ. This approach might allow evaluation of intakes, fisheries, and sensitive environments that may be exposed to contamination from a site but are upstream from the point of overland flow entry.

N. Soil Exposure Pathway

The onsite exposure pathway, which was added to the HRS in the proposed rule, has been renamed the soil exposure pathway in the final rule. The pathway was primarily designed to assess the potential threats posed by direct exposure to wastes and contaminated surficial materials at a site. It evaluated two threats—the resident population and the nearby population. In the proposed rule, the resident population threat included three types of targets: High risk population on a property with observed contamination, all other residents and people attending school or day care on a property with observed contamination, and terrestrial sensitive environments in which there is observed contamination. The nearby population was based on people who live or attend school within a one-mile travel distance and who did not meet the criteria for resident population. Figure 8 summarizes the proposed and final rules.

A number of commenters supported the inclusion of the pathway, but raised issues related to its evaluation. For example, commenters objected to evaluating the waste characteristics factor category solely on toxicity. Three commenters objected to limiting the high risk population to children under seven. Other commenters stated that collecting data on the high risk population would be difficult. A number of commenters questioned how the onsite area and area of contamination would be defined and how accessibility of the site was evaluated.

In response to these comments and to the field test results, EPA has made a number of changes to the soil exposure pathway. The name of the pathway has been changed to be more consistent with terminology used in the Superfund human health evaluation process.

As suggested by commenters, the final rule limits the area within which human targets are evaluated for the resident population threat to locations within property boundaries and within a distance limit of 200 feet from an area of observed contamination. The 200-foot limit accounts for those situations where the property boundary is very large, and exposure to contaminated surficial materials is unlikely or infrequent because of the distance of residences, schools, or work places from an area of observed contamination on the same property.

To make the pathway consistent with the other pathways and in response to comments, the final rule includes hazardous waste quantity in the waste characteristics factor category and multiplies it by the factor value for toxicity. New factors, resident individual and nearby individual, have been added to make the pathway consistent with the other pathways, all of which assign values for the maximally exposed individual (e.g., nearest individual or intake). Population is evaluated using two levels of actual contamination based on health-based benchmarks. Separate consideration of the high risk population (children under seven) has been eliminated because the field test indicated that this factor could greatly add to the time and expense of scoring a site yet resulted in little discrimination among sites. This change also makes the soil exposure pathway more consistent with the other pathways.

In the nearby population threat, the hazardous waste quantity factor in the likelihood of exposure factor category has been renamed "area of contamination" to reflect both the intent of the factor and how it is evaluated. The accessibility/frequency of use factor has been revised and renamed the "attractiveness/accessibility" factor. The revised factor emphasizes recreational uses of areas of observed contamination because they are most likely to result in exposures to contaminated surficial materials. In addition, the weighting of the nearby population relative to the resident population has been reduced to better reflect the relative levels of exposure for those threats.

A number of commenters questioned whether workers should be counted when evaluating target populations in the soil exposure pathway. One commenter suggested that soil exposure scoring should "not include activities at facilities that presently are regulated under the Occupational Safety and Health Administration (OSHA)." Other commenters, however, stated that workers should be counted in the target population. One commenter argued that

not counting a facility's work force is inconsistent with other population counting techniques. Another commenter said that workers should be included in the resident population because the proposed method of calculating soil exposure pathway scores can result in inappropriately low scores when onsite workers are exposed to wastes or contaminated soil.

In response to these comments, the Agency investigated statutory, regulatory, and policy conditions that might restrict the inclusion of workers in the target population for the soil exposure pathway. This analysis found no broad statutory or regulatory authority for excluding workers covered by OSHA regulations from consideration as targets in the HRS. Although the definition of a release under CERCLA section 101(22) excludes "any release which results in exposure to persons solely within a workplace * * *" it only does so for purposes of claims by workers who are already covered by State worker compensation laws. The legislative history of section 101(22) specifically anticipated that authority under CERCLA might, in appropriate cases, be used to respond to releases within a workplace. Thus, the Agency concludes that there are no broad statutory or regulatory restrictions against consideration of activities at OSHA-regulated facilities.

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Figure 8

Soil Exposure Pathway

PROPOSED HRS

Resident Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Observed Contamination		Toxicity		High Risk Population Total Resident Population Terrestrial Sensitive Environments

+

Nearby Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Waste Quantity Accessibility/Frequency of Use		Toxicity		Population Within 1 Mile

FINAL HRS

Resident Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Observed Contamination		Toxicity Hazardous Waste Quantity		Resident Individual Resident Population Workers Resources Terrestrial Sensitive Environments

+

Nearby Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Attractiveness/Accessibility Area of Contamination		Toxicity Hazardous Waste Quantity		Population Within 1 Mile Nearby Individual

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The soil exposure pathway is designed to account for exposures and health risks resulting from ingestion of contaminated surficial materials. Because ingestion exposures are comparable for some types of workers and residents, the Agency has decided to include workers in the resident population threat. However, substantial variability in the kinds of workers and work activities at sites (e.g., indoor and outdoor) leads to considerable variability in exposure potential. The Agency believes that determining specific categories or types of workers is beyond the scope of HRS data collection. Thus, workers are assigned target points on a prorated basis: 5 points are assigned for sites with up to 100 workers; 10 points for sites with 101 to 1,000 workers, and 15 points for greater than 1,000 workers. Prorating workers will reduce the data collection effort. Evaluation of workers is not affected by health-based benchmarks. (See § 5.1.3.3.) Nearby workers are not counted in the nearby population because the Agency considers it unlikely that workers from nearby workplaces would regularly visit contaminated areas outside the property boundary of their workplace during the workday, and because there is no way to estimate accurately the number of workers who might.

O. Air Migration Pathway

The proposed rule made several significant changes to the air migration pathway in the original HRS. In response to the SARA mandate to consider potential as well as actual releases to air, the proposed rule included an evaluation of the potential to release. The proposed rule also added a mobility factor to the waste characteristics factor category and an MEI factor to the targets category. Finally, the proposed rule added explicit distance weighting factors for evaluating all factors in the targets category. Figure 9 shows the proposed air migration pathway and the final rule pathway.

The public provided numerous comments on these changes and raised new issues as well. The most significant new issue concerned the structural inconsistency in the treatment of gases and particulates in the proposed air migration pathway. For example, commenters observed that in the potential to release evaluation, it was possible to assign a high containment value to a source with good gas containment and poor particulate containment while assigning high source type and mobility values based on the presence of gaseous hazardous substances. This combination would yield an inappropriately high potential to release value. This concern was also noted in discussions with field test personnel.

The Agency agrees with these commenters and investigated methods to better reflect the differences between gases and particulates. As a result of these analyses, EPA has made several changes to the final rule in both the likelihood of release and waste characteristics factor categories.

In the likelihood of release factor category, the final rule evaluates source potential to release separately for gases and particulates. Only those sources containing gaseous hazardous substances are evaluated for gas potential to release, and only those sources containing hazardous substances that can be released as particulates are evaluated for particulate potential to release. This change in potential to release structure necessitated other changes in the scoring of potential to release including development of separate gas and particulate source type factors and migration potential factors. The names of these latter factors were also changed to highlight the differences between potential to release "mobility" and waste characteristics "mobility." (See §§ 6.1.2.1.3, 6.1.2.2.3.)

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Figure 9

Air Migration Pathway

PROPOSED HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Mobility		Maximally Exposed Individual
or		Hazardous Waste Quantity		Population
Potential to Release				Land Use
Source Containment				Sensitive Environments
Source Type				
Source Mobility				

FINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Mobility		Nearest Individual
or		Hazardous Waste Quantity		Population
Potential to Release				Resources
				Sensitive Environments
Gas				
Gas Containment				
Gas Source Type				
Gas Migration Potential				
Particulate				
Particulate Containment				
Particulate Source Type				
Particulate Migration Potential				

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In addition to these changes in the basic structure of the potential to release factors, the final rule includes several additional changes in the source type list, migration potential factors, and containment factors. Based on the experience gained in the field test, EPA added several source types to the source type list. Some of these additions (e.g., surface impoundment (not buried/backfilled); dry) simply clarify classifications that were implied in the proposed source type list. Other additions, such as source types involving biogas release, were considered early in the development of the proposed HRS but were not included originally in the interest of simplicity. Field test experience, however, indicated that their inclusion in the final rule was necessary. Finally, new distinctions within some source types (e.g., the various types of piles) were added partly in response to comments and partly as a result of field test experience. As applicable, source type values were also revised. (See §§ 6.1.2.1.2, 6.1.2.2.2 and Table 6-4.)

The revised gas and particulate migration potential factors are very similar to the proposed likelihood of release gas and particulate mobility factors. Several commenters questioned the need for including dry relative soil volatility in the final gas migration factor. A simplification analysis indicated that dry relative soil volatility was redundant, as it was almost completely determined by vapor pressure. Hence, the final gas migration potential factor includes only vapor pressure and Henry's law constant. The particulate migration potential factor in the final rule is simply the particulate component of the proposed potential to release mobility factor.

The containment factors were also changed as a result of the field test, a review of recent information on covering systems, the examination of air release rate models, and the public comments on the need for simplicity in the final rule. The final list of containment descriptions eliminated many redundant descriptions and changed others, retaining only those distinctions that are necessary based on type of source. (See §§ 6.1.2.1.1, 6.1.2.2.1 and Tables 6-3, 6-9.) As discussed in Section III F above, two new mobility factors were developed for the waste characteristics factor category.

Commenters generally supported the concept of distance weighting target factors. However, several disagreed with the approach used to develop the proposed factor values. Some commenters suggested basing the factor values on long-term meteorology and the size of the site, while others suggested that additional atmospheric phenomena (e.g., particulate deposition) be reflected in the final values. As a result of these comments, EPA has revised the distance weighting factors used in the final rule to reflect long-term atmospheric phenomena. Analyses indicated that particulate deposition and other similar phenomena as well as site size were not sufficiently significant within four miles of a site to warrant their inclusion in the final factor values. EPA also notes that the distance weighting factor values are now incorporated in the population factor value table. (See § 6.3.2.4 and Table 6-17.)

P. Large Volume Wastes

Mining waste sites. A number of commenters representing mining companies, trade associations, and State and Federal agencies commented on how the proposed HRS would score mining waste sites; commenters representing waste management facilities raised similar issues in regard to their sites. This section summarizes and addresses the major issues addressed by these commenters.

Commenters raised several concerns regarding the appropriate consideration of background levels of metals in documenting direct or indirect releases from mining waste sites. One commenter recommended that in determining direct releases from a mining waste site, EPA should consider the natural characteristics of the site prior to mining and the changes in migration rates resulting from mining. The commenter explained that the concentration of metals in a mining waste pile may be similar to or less than natural concentrations in soil or rocks below and adjacent to the pile. To document indirect releases, the commenter suggested that EPA require collection of detailed information on site geology and hydrological gradients to ensure proper consideration of background levels. Finally, the commenter asserted that although it is appropriate to weight observed releases more heavily than potential releases at sites with synthetic organic hazardous substances, the criteria used to define observed release are not valid at sites with natural sources of metals. Another commenter agreed and suggested that because of background levels of inorganic elements, the proposed HRS could identify as an observed release concentrations unrelated to mining activities.

EPA recognizes that natural background concentrations of metals in soil or rocks can affect the measured concentration necessary to establish an observed release at a mining waste site. This consideration is reflected in the requirement that concentrations significantly above background be shown to establish an observed release. Moreover, EPA has clarified the observed release criteria in the final rule to explain that they specify minimum differences necessary to establish an observed release by chemical analysis.

Several commenters questioned the treatment of metals in the ground water mobility factor. One commenter stated that the proposed HRS is biased against mining waste sites because it gives greater consideration to the accurate assessment of the mobility of organic substances than to that of naturally occurring metals. The commenter noted that the proposed persistence factor for the surface water migration pathway accounts for the degradation of hazardous substances in the environment through four processes. None of these processes, according to the commenter, applies to metallic elements, which received a default value of 3 (the highest possible score for persistence). Another commenter stated that decreased mobility was considered only for organic compounds, even though inorganic compounds are immobile in some situations.

One commenter stated that adding a metals mobility factor, as EPA's Science Advisory Board (SAB) recommended, would allow the HRS to reflect more accurately the potential for metallic elements to migrate in the aqueous phase. Two commenters were concerned that metals would be assigned a "worst-case" default value for mobility. On the other hand, another commenter stated that consideration of the mobility of metals in the revised HRS would at least partially rectify the bias in the current HRS against high-volume, low-concentration mining wastes.

A number of these commenters appear to have misunderstood the proposed rule. Metals were not automatically assigned the maximum value as a default in the ground water mobility factor, but rather were assigned values based on their coefficient of aqueous migration. The final rule automatically assigns the maximum value for mobility only to metals establishing an observed release by chemical analysis, which is the same way organics and nonmetallic inorganics are evaluated. For metals and metal compounds not establishing an observed release by chemical analysis, mobility is based on water solubility and distribution coefficient (K_d), the same as for organics and nonmetalli

inorganics. If none of the hazardous substances (including metals, organics, and nonmetallic inorganics) eligible to be evaluated for the site can be assigned a mobility factor value based on available data, § 3.2.1.2 of the final rule assigns a mobility factor value of 0.002 for all of the hazardous substances. This value was selected based on a review of the range of mobility factor values assigned to those hazardous substances (including metals) for which data were available for assigning mobility factor values. The value of 0.002 is clearly not a worst-case default (which would be 1.0).

EPA believes that the persistence factor is not biased against metals. Elemental metals do not degrade and, therefore, should receive higher scores for persistence than other substances subject to degradation processes.

One commenter claimed that the soil exposure pathway is likely to bias the HRS scores of mining waste sites toward higher values because such sites contain large volumes of waste covering large surface areas, and because of geographic factors, these large areas are seldom secured against direct public access. In addition, according to the commenter, the public may be attracted to mining waste sites. The commenter suggested that the soil exposure pathway incorrectly assumes there is an exposure because there is access to mining waste sites.

EPA does not agree that the soil exposure pathway is biased against mining waste sites. The pathway evaluates exposures of people via contact with surficial hazardous substances. The Agency believes that, all else being equal, large contaminated surface areas with public access, including those associated with mining waste sites, should receive higher scores for the soil exposure pathway than smaller sites with more restricted access. Even sites with large contaminated surface areas are unlikely to be assigned high scores except when they are near residential areas or include a listed sensitive environment. As some commenters representing mining-related activities have noted in the past, most mines are located some distance from inhabited areas.

Three commenters stated that the original HRS was biased against sites such as mining waste sites that are characterized by high volumes of waste with relatively low concentrations of toxic constituents. Two of these commenters suggested that mining wastes would be appropriate for hazardous constituent quantity determination because such wastes are relatively homogeneous (compared to other wastes) and, therefore, have fairly consistent concentrations. One of these two commenters also stated that the hazardous waste quantity factor equations in Table 2-14 of the proposed rule should be revised to be less conservative. The remaining commenter suggested that the proposed HRS was still biased against mining waste sites because they are still scored based on the quantity of waste rather than on the concentration of the waste at the point of exposure.

EPA does not agree that the HRS is biased against high-volume, low-concentration waste sites. The final rule incorporates concentration data in three factors: (1) Likelihood of release (concentration data can be used for establishing an observed release); (2) hazardous waste quantity (concentration data, if available and adequate, can be used for calculating hazardous constituent quantity); and (3) targets (concentrations of hazardous substances present in drinking water wells or at other exposure points can be used to determine weightings for nearest individuals (or wells or intakes), populations, and sensitive environments factors). EPA has not explicitly required concentration data for all sites because of the substantial costs for obtaining these data and the very high degree of uncertainty associated with data collected during SIs.

EPA requested that the SAB review issues related to large-volume waste sites before the NPRM was published. The SAB final report is available in the CERCLA docket. Two commenters stated that the Agency did not adequately consider the SAB's recommendations for revising the HRS, specifically those concerning the use of mobility data.

The SAB, in its review of the original HRS, examined whether large-volume waste sites (e.g., mining waste sites) had been treated differently than other waste sites and concluded that insufficient data were presented to demonstrate that the original HRS was biased against mining waste sites. However, the SAB noted that the original HRS had the potential for such a bias, particularly when scoring potential to release, because the original HRS did not consider mobility, concentration of hazardous constituents, and transport. The SAB suggested several possible modifications to improve the application of the HRS to mining waste sites.

Based in part on the SAB suggestions, EPA proposed several changes to the overall scoring process to make the HRS more accurately reflect risks associated with mining waste sites, notably, addition of a mobility factor to the air and ground water migration pathways, changes in the persistence factor, incorporation of a tiered hazardous waste quantity factor that can account for waste concentration data, and addition of health-based benchmarks for evaluating population. As explained in the NPRM, determining speciation of metals and pH, as the SAB had suggested, is not feasible given the temporal and spatial variations at hazardous waste sites and the limitations on SI data collection. Moreover, determining speciation is not feasible for most substances given EPA's current analytical procedures; requiring speciation analyses would add substantially to the cost of data collection.

Two commenters stated that the proposed HRS can significantly overestimate risks associated with mining waste sites that consist of high-volume, low-concentration wastes. One of these commenters recommended a "preliminary evaluation system" to more accurately reflect the actual risks associated with such sites and remove any bias in the HRS relative to other types of sites. This commenter also suggested that in proposing the HRS revisions, EPA had ignored the results of its own studies under RCRA sections 3001 and 8002, which the commenter believed to be more focused efforts to quantify risks from mining waste sites than the HRS revisions.

EPA does not believe that a separate "preliminary evaluation system" for scoring mining waste sites would be appropriate. A single HRS can be applied uniformly to all sites, allowing the Agency to evaluate sites relative to each other with respect to actual and potential hazards. The Agency examined the RCRA studies cited by the commenter before proposing HRS revisions. Those studies, which focus on the management of wastes at active facilities, concluded that many special study waste sites (e.g., mining) do not present very high risks, while others may present substantial risks. EPA believes that the conclusions of these studies and the Agency's subsequent regulatory determinations (i.e., not to regulate most mining wastes under RCRA Subtitle C) are not inconsistent with a determination that some mining waste releases can require Superfund response actions. Furthermore, the HRS is designed so that it can be applied to closed and abandoned sites as well as active sites.

Other large volume waste sites. Several commenters suggested that the proposed HRS did not meet CERCLA section 125 requirements for sites

involving fossil fuel combustion wastes. These commenters generally agreed that section 125 requires EPA to consider the quantity and concentration of hazardous constituents in fossil fuel combustion wastes and that the proposed HRS had not adequately addressed this requirement.

One commenter supported the Agency's proposal to allow consideration of concentration data when such data are available. Three commenters stated that the proposed HRS would often assign fossil fuel combustion waste sites high scores in part because of the worst-case assumptions or "default values" for certain factors (i.e., hazardous waste quantity, toxicity, target populations). The commenters claimed that fossil fuel combustion waste sites receive high scores merely because of the large quantity of waste, although this waste presents no significant adverse environmental effects, and that these high scores are inconsistent with EPA's findings in the RCRA section 8002 study. One of the three commenters suggested that the proposed HRS retained certain deficiencies of the original HRS, such as assuming that all hazardous substances in the waste consist of the single most toxic constituent in the waste.

EPA does not believe that the approach taken in the final rule creates a bias against fossil fuel combustion wastes. Partly because concentration data are considered in the final rule, fossil fuel combustion waste sites are not expected to score disproportionately high when compared with other types of sites. The HRS assumes that it is not possible to determine in a consistent manner the relative contribution to risk of all hazardous substances found at sites. Given this assumption, EPA has determined that basing the toxicity of the combination of substances at a site on the toxicity of the substance posing the greatest hazard is a reasonable and appropriately conservative approach. In many cases, the substance posing the greatest hazard is not several orders of magnitude more toxic than other hazardous substances at the site. Therefore, the effect of this approach on the toxicity factor value—which is evaluated in one order of magnitude scoring categories—is not as great as some commenters have suggested (see also section III D). In addition, as noted above, worst-case defaults are not assigned for mobility; population factors have no default values.

Two commenters suggested that because CERCLA section 125 contains no statutory deadlines, EPA should take as much time as necessary to adequately respond. These commenters recommended that EPA extend the tiered approach of the hazardous waste quantity factor to other factors to take advantage of the extensive data on fossil fuel combustion wastes generated by the electric utility industry.

The Agency does not agree that the tiered approach used in the hazardous waste quantity factor should be extended to other factors for fossil fuel combustion waste sites (see also section III K). EPA believes that creating a separate HRS to score certain types of sites would not allow the Agency to provide a uniform measure of relative risk at a wide variety of sites, as Congress intended.

One commenter recommended that EPA consider using fate and transport models currently under development to incorporate quantitative representations of specific processes and mechanisms into the HRS. EPA carefully examined this possibility and concluded that although the use of fate and transport models could conceivably increase the accuracy of the HRS for some pathways, collection of the required site-specific data would be far too complex and costly. Fate and transport models are appropriate for a comprehensive risk assessment, but not for a screening tool such as the HRS. In addition, EPA's review suggested that it would be more difficult to achieve consistent results among users of such models than with the HRS. EPA points out that it used fate and transport models to develop the distance weighting factors used in the HRS target calculations, and also that the HRS incorporates several hazardous substance parameters (e.g., mobility) and site parameters (e.g., travel time) that are components of fate and transport models.

Two commenters expressed concern that the proposed HRS fails to account for the leachability of hazardous constituents as required by CERCLA section 125. According to the commenters, some hazardous constituents pose no risk via ground water because they will never be released to that medium. Thus, even if hazardous waste quantity and concentration are considered adequately, hazardous waste quantity scores for fossil fuel combustion sites will be erroneously high unless leachability is considered as well.

EPA examined the availability of leachate data and the feasibility of using such data for calculating hazardous substance quantity for all types of sources and wastes. The Agency decided against using leachate concentrations because:

- Leachate data are not available for all sources and wastes, and available leachate data on high-volume wastes and some landfills have limited applicability for estimating the quantity of leachable hazardous substances;
- Leachate data derived from lab studies are limited and do not realistically represent the universe of field conditions such as heterogeneity of wastes, chemistry of leachate, and density and pore volume of disposed wastes; and
- Any method for using leachate data could not be consistently or uniformly applied to all sites.

EPA also examined the feasibility of developing site-specific leachate data for estimating leachable hazardous substance quantity for the ground water migration pathway. EPA decided against this option because reliable estimation of leachable hazardous substance quantity requires comprehensive sampling of site-specific heterogeneous waste, which would be prohibitively expensive and not feasible. In some cases, such sampling would be technically unfeasible and unsafe.

EPA evaluated alternatives for developing a surrogate for estimating leachable hazardous substance quantity. The Agency found that adding the mobility factor to the ground water migration pathway, based both on solubilities and distribution coefficients (K_ds) of hazardous substances, and multiplying it by the hazardous waste quantity factor would be a feasible alternative for approximating the fraction of hazardous substance quantity expected to be released to ground water.

Q. Consideration of Removal Actions (Current Versus Initial Conditions)

The original HRS based the evaluation of factors on initial conditions. In the preamble to the proposed rule, EPA specifically requested comments on whether sites should be scored on the basis of initial or current conditions. The principal question is whether the effect of response actions, such as the removal of some quantity of the waste, should be considered when sites are scored. Initial conditions are defined by the timing of the response action; that is, initial conditions are the conditions that existed prior to any response action. For sites where no response action has occurred, initial and current conditions are the same for evaluating sites.

Of the 25 commenters responding to this issue, 15—including all industry commenters—supported scoring on current conditions. In the preamble of

the proposed rule, EPA presented two approaches for considering response actions in HRS scores: (1) Consider these actions only for those pathways and factors for which they are most appropriate; and (2) consider these actions in all pathways, but make exceptions at sites where initial conditions more accurately reflect risks.

Those who stated a preference favored the second, specifying that the exceptions should be clearly defined in the final rule. These commenters stated that scoring all pathways on current conditions would encourage responsible parties to clean up sites quickly. They reasoned that if cleanups are delayed, the threat of migration of the hazardous substances increases; therefore, scoring on current conditions is consistent with the intent of CERCLA because it encourages rapid remedial action. One commenter said that scoring on initial conditions made little sense when, as a result of the cleanup, the level of residual contamination was below the level required by CERCLA.

Several proponents of scoring on current conditions stated that EPA's concern that responsible parties would clean up sites just enough to avoid being listed on the NPL was unfounded. They argued that the proposed scoring system is too complicated to manipulate, and that predicting the effect of partial cleanups on the final score would be difficult. Others suggested that where contamination remains, sampling during an SI will discover it.

Ten commenters did not fully support scoring on current conditions. Only one opposed any consideration of current conditions. Several commenters supported scoring the soil exposure and air migration pathways on current conditions. Others stated that response actions should be considered only when the actions are conducted under Federal or State direction, or when the action constitutes a complete cleanup. Several added that State actions should not be considered because it would penalize States with active remedial programs. One commenter suggested scoring sites on both current and initial conditions; if the response action had addressed all hazards, then the current conditions score should be used.

Based on public comment, EPA has decided to change its policy on consideration of removal actions. The Agency agrees that consideration of such actions in HRS scores is likely to increase incentives for rapid actions by responsible parties, reducing risks to the public and allowing for more cost effective expenditure of the Fund. In making this decision, EPA tried to balance the benefits of considering removal actions in HRS scores (e.g., increased incentives for rapid actions) while also ensuring that the HRS score reflects any continuing risks at sites where contamination occurred prior to any response action.

Therefore, EPA will calculate waste quantities based on current conditions. However, EPA believes the accuracy of this approach depends on being able to determine with reasonable confidence the quantity of hazardous constituents remaining in sources at the site and the quantity released into the environment. As a consequence, where the Agency does not have sufficient information to estimate the quantity of hazardous constituents remaining in the sources at the site and in the associated releases, a minimum factor value may be assigned to the hazardous waste quantity factor value. Thus, removal actions may not reduce waste quantity factor values unless the quantity of hazardous constituents remaining in sources and in releases can be estimated with reasonable confidence.

In addition to providing incentives for early response, this approach also provides incentives for potentially responsible parties to ascertain the extent of the remaining contamination at sites. Potentially responsible parties undertaking removal actions will have the primary responsibility for collecting any data needed to support a determination of the quantity of hazardous constituents remaining. EPA expects responsible parties may need to conduct sampling and analyses to determine the extent of hazardous substance migration in soils and other media in order to estimate with reasonable confidence the quantity of hazardous constituents remaining.

EPA decided not to limit the consideration of response actions to certain pathways (e.g., the soil exposure pathway) because this would overstate the risk at sites where removal of wastes has eliminated threats in all pathways. Moreover, a more limited approach to consideration of response actions would provide less incentive for rapid response action.

EPA will evaluate a site based on current conditions provided that response actions actually have removed wastes from the site for proper disposal or destruction in a facility permitted under the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), or by the Nuclear Regulatory Commission. HRS scoring will not consider the effects of responses that do not reduce waste quantities such as providing alternate drinking water supplies to populations with drinking water supplies contaminated by the site. In such cases, EPA believes that the initial targets factor should be used to reflect the adverse impacts caused by contamination of drinking water supplies; otherwise, a contaminated aquifer could be artificially shielded from further remediation. This decision is consistent with SARA section 118(a), which requires that EPA give high priority to sites where contamination from the site results in closed drinking water wells. Similarly, if residents are relocated or if a school is closed because of contamination due to the site, EPA will consider the initial targets in scoring the site.

As noted in the proposed rule preamble, EPA would only consider removals conducted prior to an SI. EPA believes that the SI is the appropriate time to evaluate conditions, because it is the source of most of the data used to score a site. Because response action at sites may be an ongoing process, it would be burdensome to recalculate scores continually to reflect such actions.

In response to commenters, EPA also considered whether response actions should be considered in HRS scores only if they are performed under a State or EPA order. EPA decided not to choose this approach for two reasons. First, it would diminish the incentive for an expeditious response at the site if a signed order were required. Second, because a response action must be conducted before the SI to be considered in the HRS score, there would be little information on site conditions upon which this order could be based.

EPA has also decided not to differentiate between response actions initiated by States and those conducted by other parties. The Agency believes this approach will help ensure consistent application of the HRS by avoiding situations where two similar sites are scored using different sets of rules. Moreover, although the Agency is sympathetic to concerns about disincentives to States for initiating actions, it believes that such cases will be rare. Many State (and Federal) removal actions are interim measures designed to stabilize conditions at the site. Given the more limited definition of response action noted above (e.g., removal of waste from the site for disposal or destruction in a RCRA-permitted facility), many actions conducted by States would not be considered in HRS scoring. In addition, in many cases, State and Federal removal actions are undertaken after an SI has been conducted. As noted above,

EPA will only consider removals conducted before the SI in the HRS score.

R. Cutoff Score

In the NPRM preamble, EPA proposed that the cutoff score for the revised HRS be functionally equivalent to the current cutoff score of 28.5. The Agency also requested comment on three proposed options for determining functional equivalence:

- Option 1: Score sites using both the original and final rule, then use statistical analysis to determine what revised HRS score best corresponds to 28.5;
- Option 2: Choose a score that would result in an NPL of the same size as the NPL that would be created by using the original HRS; and
- Option 3: Identify the risk level that would correspond to 28.5 in the original HRS and then determine what revised HRS score corresponds to that risk level.

Some commenters stated that there cannot be a functional equivalence if the revisions have any meaning. They argued that if the revisions meet the statutory mandate to make the HRS more accurate, the scores should be different and, therefore, cannot be related. Several commenters supported the use of a functional equivalent, but were divided about which option should be used. One commenter stated that the 28.5 score should be evaluated to determine whether it reflected minimum risk levels. If it did, the commenter suggested that a functional equivalent would be appropriate and should be determined using equivalent risk levels (option 3), but also with an eye toward keeping the NPL to a manageable size (option 2).

Commenters not supporting the use of a functional equivalent suggested a variety of alternative approaches, including:

- Establish the cutoff score based on risk, without regard to the current cutoff level or a functional equivalent;
- Leave the score at 28.5;
- Propose a new cutoff score and a description of methodology in a public notice with a 60-day public comment period;
- Lower the cutoff score to provide an incentive to responsible parties to undertake remedial efforts and make it possible for sites where a removal action has taken place to make the NPL, thus reducing the controversy over whether to score sites based on current conditions;
- Raise the cutoff score by at least 20 points;
- Eliminate the present cutoff score by creating categories of sites instead of individual ranks as a means of prioritizing NPL sites;
- Amend the NPL annually to include only those sites that deserve priority attention (e.g., orphaned sites) and are likely to receive Superfund financing; or
- Rank all sites showing any degree of public health and/or environmental risk on a relative scale and perform remedial activities based on available funding.

In addition, four commenters felt that the cutoff score for the final rule should not be fixed until the technical merits and potential scores of representative sites are tested and compared using both the current and proposed HRS. Further, one commenter noted that the field test did not indicate the relationship between the revised HRS score for a given site and the current score; another added that until this equivalency issue is clarified, meaningful comment on any proposed revisions cannot be made.

Based on an analysis of 110 test sites, EPA has decided not to change the cutoff score at this time. This conclusion was reached after applying all three approaches to setting a cutoff score that would be functionally equivalent to 28.5. In its analysis, the Agency scored field test sites with both the original and revised HRS. The data from these test sites show that few sites score in the range of 25 to 30 with the revised HRS model. The Agency believes that this range may represent a breakpoint in the distribution of site scores and that the sites scoring above the range of 25–30 are clearly the types of sites that the Agency should capture with a screening model. Because the analysis did not point to a single number as the appropriate cutoff, the Agency has decided to continue to employ 28.5 as a management tool for identifying sites that are candidates for the National Priorities List.

EPA believes that the cutoff score has been, and should continue to be, a mechanism that allows it to make objective decisions on national priorities. Because the HRS is intended to be a screening system, the Agency has never attached significance to the cutoff score as an indicator of a specific level of risk from a site, nor has the Agency intended the cutoff to reflect a point below which no risk was present. The score of 28.5 is not meant to imply that risky and non-risky sites can be precisely distinguished. Nevertheless, the cutoff score has been a useful screening tool that has allowed the Agency to set priorities and to move forward with studying and, where appropriate, cleaning up hazardous waste sites. The vast majority of sites scoring above 28.5 in the past have been shown to present risks. EPA believes that a cutoff score of 28.5 will continue to serve this crucial function.

IV. Section-by-Section Analysis of Rule Changes

Besides the changes discussed above, EPA has made substantial editorial revisions in the rule being adopted today. Source characterization is discussed in section 2 of the final rule, along with factors that are evaluated in each pathway. These factors include hazardous waste quantity, toxicity, and evaluation of targets based on benchmarks. The order of presentation of the pathways has been changed to ground water, surface water, soil exposure, and air. Following the four sections describing the pathways, a section has been added explaining how to evaluate sites that have radionuclides either as the only hazardous substances at the site or in combination with other hazardous substances.

In general, descriptive text that provided background information has been removed as have references and data sources; the sections have been rewritten to make the rule easier to read and to apply. The figures presenting overviews of the pathways and the scoring sheets have been revised throughout to reflect changes in the rule and assigned values.

This section describes, for each section of the rule and each table, the specific substantive changes; editorial changes that do not affect the content of the rule are not generally noted.

Section 1 Introduction

The text explaining the background of the HRS and describing the rule has been removed. Definitions of a number of additional terms used in the rule have been added for clarity. The definition of "hazardous substance" has been revised for clarification. The definition of "site" has been clarified and now indicates that the area between sources may also be considered part of the site. The definition of "source" has been revised to explain that those volumes of air, ground water, surface water, or surface water sediments that become contaminated by migration of hazardous substances are not considered a source, except contaminated ground water plumes or contaminated surface water sediments may be considered a source if they cannot be attributed to an identified source. In addition, the definition of source now includes soils contaminated by migration of hazardous substances.

Under the original HRS, the Agency took the approach that all feasible efforts should be made to identify sources before listing a site on the NPL. If, after an appropriate effort has failed to identify a source, the Agency believed that the contamination was likely to have originated at the type of source that would be addressed under Superfund, such sites were listed. Subsequent investigations after listing have generally identified a specific source. In some cases, EPA has not listed contaminated media without clearly identified sources because it appeared the source of pollution would not be addressed by Superfund programs; an example of such a source would be extensive, low-level contamination of surface water sediments caused by pesticide applications. EPA has found this approach to be generally workable and will continue to evaluate, on a case-by-case basis, whether sites with no identified sources should be listed.

Where contaminated media with no identified sources exist, the final rule generally assigns a hazardous waste quantity factor value to such contamination, with the value depending on whether there are any targets subject to Level I or Level II concentrations. For contaminated sediments in the surface water migration pathway, if there is a clearly defined direction of flow, target distances are measured from the point of observed sediment contamination that is farthest upstream. For ground water plumes and for contaminated sediments where there is no clear direction of flow, the center of the observed ground water or sediment contamination is used for the purpose of measuring target distance limits.

Section 2 Evaluations Common to Multiple Pathways

This section covers factors and evaluations common to multiple pathways. The major changes to these factors include: observed release criteria have been revised; the toxicity factor has been changed to a linear rather than a log scale; scales for hazardous waste quantity have been made linear and expanded, and the hazardous waste quantity minimum value has been changed; the waste characteristics factor category score is now obtained by multiplying the factor values and using a table to assign the final score; use of benchmarks has been extended to all pathways and to the nearest individual (well/intake) factor; and the methods for comparisons to benchmarks have been changed as have the benchmarks used. The purpose of this part is to make the rule less repetitious by presenting full explanations of the evaluation of certain factors only once rather than in each pathway in which they occur. Exceptions related to radionuclides are noted throughout the rule and referenced to Section 7.

Section 2.1 Overview. Introduces the pathways and threats included in HRS scoring.

Section 2.1.1 Calculation of HRS site score. Provides the equation used to calculate the final HRS score.

Section 2.1.2 Calculation of pathway score. Indicates, in general, how pathway scores are calculated and includes a sample pathway score sheet (Table 2–1).

Section 2.1.3 Common evaluations. Lists evaluations common to all pathways.

Section 2.2 Characterize sources. Introduces source characterization and references Table 2–2, the new sample source characterization worksheet.

Section 2.2.1 Identify sources. Explains that for the three migration pathways, sources are identified, and for the soil exposure pathway, areas of observed contamination are identified.

Section 2.2.2 Identify hazardous substances associated with a source. Covers information previously provided in the introduction to the waste characteristics factor category.

Section 2.2.3 Identify hazardous substances available to a pathway. Explains which hazardous substances may be considered available to each pathway. For the three migration pathways, the primary limitation on availability of a hazardous substance to a pathway is that the substance must be in a source with a containment factor value, for that pathway, greater than 0; that is, the hazardous substance must be available to migrate from its source to the medium evaluated. For the soil exposure pathway, the primary limitation is that the substance must meet the criteria for observed contamination and, for the nearby threat, it must also be accessible.

Section 2.3 Likelihood of release. Specifies the criteria for establishing an observed release (discussed in section III G of this preamble) and explains that potential to release factors are evaluated only when an observed release cannot be documented. Table 2–3, which replaces Table 2–2 in the proposed rule, provides the revised observed release criteria for chemical analyses for the migration pathways. Table 2–3 is also used in establishing observed contamination for the soil exposure pathway.

Section 2.4 Waste characteristics. Defines the waste characteristics factor category.

Section 2.4.1 Selection of substance potentially posing greatest hazard. Explains how to select the substance potentially posing the greatest hazard.

Section 2.4.1.1 Toxicity factor. Explains how to assign toxicity values. Changes in the approach to scoring toxicity are discussed in section III D of this preamble. Table 2–4 (proposed rule Table 2–11) has been revised to make the assigned factor values linear rather than logarithmic values; however, the relationship among the values has not changed. A provision to always assign lead (and its compounds) an HRS toxicity factor value of 10,000 was added as a result of changes since the time of the proposed rule in the way EPA develops chronic toxicity values for lead (i.e., reference doses, in units of intake (mg/kg-day), are no longer developed for lead).

Section 2.4.1.2 Hazardous substance selection. Lists which factors are combined, in each pathway or threat, to select the hazardous substance potentially posing the greatest hazard. For each migration pathway, each substance eligible for consideration is evaluated based on the combination of toxicity (human or ecosystem) and/or mobility, persistence, and bioaccumulation (or ecosystem bioaccumulation) potential. The substances selected for each pathway or threat are those with the highest combined values. For the soil exposure pathway, the substance with the highest toxicity value is selected from among substances that meet the criteria for observed contamination for the threat being evaluated. The use of bioaccumulation in the selection of substances in the human food chain threat has changed as a result of the structural changes discussed above. In the proposed rule, only substances with the highest bioaccumulation values were evaluated for toxicity/persistence; in the final rule, the substance with the highest combined toxicity/persistence/bioaccumulation value is selected in the human food chain threat of the overland flow/flood migration component. For the ground water to surface water migration component, mobility is also considered. This revised method better reflects the overall threat.

Section 2.4.2 Hazardous waste quantity. Describes how to calculate the hazardous waste quantity factor value, as explained in section III D of this preamble. The explanation has been simplified from that presented in the proposed rule, and a discussion of unallocated sources has been added. A discussion clarifying the method for evaluating hazardous waste quantity in the soil exposure pathway was also added, and clarifying language on this

point was inserted throughout the subsections of § 2.4.2. Table 2–13 from the proposed rule has been eliminated.

Section 2.4.2.1 Source hazardous waste quantity. Details the measures that may be considered in evaluating hazardous waste quantity for a source or area of observed contamination.

Section 2.4.2.1.1 Hazardous constituent quantity. Explains how to assign a value to the hazardous constituent quantity factor. An explanation of the treatment of RCRA hazardous wastes has been added to clarify the scoring of these wastes. Table 2–5, Hazardous Waste Quantity Evaluation Equations (proposed rule Table 2–14), has been revised in several ways. The constant divisor of 10 has been moved from these equations and is now incorporated into the factor values assigned using Table 2–6. Two types of surface impoundments are now listed to ensure that buried surface impoundments are treated appropriately. The term "tanks" has been added to containers other than drums to clarify how tanks should be evaluated. Also, equations for calculating hazardous waste quantity based on area have been revised based on a study of waste sites. The study indicated that new depth assumptions should be used for some sources; the land treatment equation was revised based on data from the same study about typical loading rates in land treatment operations.

Section 2.4.2.1.2 Hazardous wastestream quantity. Explains how to assign a value for hazardous wastestream quantity based on the mass of the wastestream. An explanation of the treatment of RCRA hazardous wastes has been added to clarify the scoring of these wastes.

Section 2.4.2.1.3 Volume. Explains how to assign a value for source volume.

Section 2.4.2.1.4 Area. Explains how to assign a value for source area.

Section 2.4.2.1.5 Calculation of source hazardous waste quantity value. Explains how to assign a value to source hazardous waste quantity.

Section 2.4.2.2 Calculation of hazardous waste quantity factor value. Explains how to assign a factor value to hazardous waste quantity using Table 2–6. The values in Table 2–6 include several changes. The cap applied to the factor value (i.e., the lowest hazardous waste quantity value required to assign the maximum factor value) has been increased to reflect more accurately the range of hazardous substance quantities found at waste sites. The cap is set based on the maximum quantity found at current NPL sites. Rather than being assigned a maximum of 100, as in the proposed rule, the assigned factor values range to 1,000,000. Each factor value less than the cap is assigned for quantities that range across two orders of magnitude. The two-order-of-magnitude ranges reflect the uncertainty in estimates of both quantity and concentration of the hazardous substances in sources and associated releases as well as uncertainty in identifying all sources and associated releases. Using the ranges also simplifies documentation requirements. Non-zero values below 1 are rounded to 1 to ensure that sites with small amounts of hazardous substances will receive a non-zero score for waste characteristics. When hazardous constituent quantity data are incomplete, the minimum hazardous waste quantity factor value is 10, except for: (1) Migration pathways that have any target subject to Level I or II concentrations; and (2) migration pathways where there has been a removal action and the hazardous waste quantity factor value would be 100 or greater without consideration of the removal action. In these cases, the minimum hazardous waste quantity factor value has been changed to 100 (see sections III C and III Q above for further discussion of the new minimum values).

Section 2.4.3 Waste characteristics factor category value. Explains how to assign a value to the waste characteristics factor category. As discussed above, the final waste characteristics factor value is capped at 100 (1,000 with bioaccumulation potential). Values are assigned by placing the product of the waste characteristics factors into ranges of one order of magnitude, to a cap of 10^8 (10^{12} if bioaccumulation potential is considered).

Section 2.4.3.1 Factor category value. Explains how to use Table 2–7 to assign a value to waste characteristics when bioaccumulation (or ecosystem bioaccumulation) potential is not considered.

Section 2.4.3.2 Factor category value, considering bioaccumulation potential. Explains how to use Table 2–7 to assign a value to waste characteristics when bioaccumulation (or ecosystem bioaccumulation) potential is considered.

Section 2.5 Targets. Explains how targets factors are evaluated. This approach generally involves three levels of evaluation (Level I, Level II, and Potential) and the use of media-specific concentration benchmarks, as discussed in section III H of this preamble. Level III has been dropped; use of benchmarks has been extended to all pathways and to factors that assign values to the nearest individual (well/intake). Also discusses assigning level based on direct observation and describes when tissue samples that do not establish actual contamination may be used in comparisons to benchmarks.

Section 2.5.1 Determination of level of actual contamination at a sampling location. Explains the approach used for evaluating the level of actual contamination at a sampling location; changes have been made to allow the level of actual contamination in the human food chain threat to be based on tissue samples from aquatic food chain organisms that cannot be used to establish an observed release.

Section 2.5.2 Comparison to benchmarks. Lists benchmarks and explains how to determine whether benchmarks have been equalled or exceeded (see section III H of this preamble); changes have been made to allow the level of actual contamination in the human food chain threat to be based on tissue samples from aquatic food chain organisms that cannot be used to establish an observed release.

Section 3 Ground Water Migration Pathway

The ground water migration pathway evaluates threats resulting from releases or potential releases of hazardous substances to aquifers. The major changes specific only to this pathway include replacement of the depth to aquifer/hydraulic conductivity and sorptive capacity factors with travel time and depth to aquifer factors; a revised approach for assigning mobility values; removal of the ground water use factors and their replacement by a resources factor; evaluation of the nearest well factor based on benchmarks; and revisions to scoring of sites having both karst and non-karst aquifers present.

Section 3.0 Ground Water Migration Pathway. Descriptive text has been removed. Figure 3–1 has been revised to reflect revisions to the factors evaluated, and Table 3–1 has been revised to reflect the new factor category values throughout.

Section 3.0.1 General considerations. The title has been changed.

Section 3.0.1.1 Ground water target distance limit. An explanation of the treatment of contaminated ground water plumes with no identified source has been added. For these plumes, measurement of the target distance limit begins at the center of the area of observed ground water contamination;

the center is determined based on available data.

Section 3.0.1.2 Aquifer boundaries. Descriptive text has been removed.

Section 3.0.1.2.1 Aquifer interconnections. Descriptive text has been removed as have examples of information useful for identifying aquifer interconnections.

Section 3.0.1.2.2 Aquifer discontinuities. Descriptive text has been removed.

Section 3.0.1.3 Karst aquifer. Descriptive text has been removed, and references to factors have been revised to reflect changes in factors. Text was added to clarify that karst aquifers underlying any portion of the sources at a site are given special consideration.

Section 3.1 Likelihood of release. Descriptive text has been removed.

Section 3.1.1 Observed release. Description of the criteria for establishing an observed release has been revised as discussed in Section III G of this preamble.

Section 3.1.2 Potential to release. Text has been revised to reflect changes in the factors evaluated and to clarify that karst aquifers underlying any portion of the sources at a site are given special consideration in evaluating depth to aquifer and travel time.

Section 3.1.2.1 Containment. Explanatory text has been removed and the ground water containment table is referenced. Only sources that meet the minimum size requirement (i.e., that have a source hazardous waste quantity value of 0.5 or higher) are used in assigning containment factor values. This requirement has been added to ensure that very small, uncontained sources do not unduly influence the score. For example, a site might have a large, but highly contained source and a very small, uncontained source; without a minimum size requirement, potential to release could be assigned the maximum value based on the very small source, which could overestimate the potential hazard posed by the site. If no source meets the minimum size requirement, the highest ground water containment factor value assigned to the sources at the site is used as the factor value. Table 3–2—Containment Factor Values for Ground Water Migration Pathway, has been simplified by combining repetitious items and has been moved from an attachment to the proposed rule into the body of the rule.

Section 3.1.2.2 Net precipitation. A new map has been added as Figure 3–2 to assign net precipitation factor values. The equation for calculating monthly potential evapotranspiration was clarified. Descriptive text has been removed.

Section 3.1.2.3 Depth to aquifer. As described in section III L of this preamble, the depth to aquifer factor has replaced the sorptive capacity factor and is no longer combined in a matrix with hydraulic conductivity for scoring. Table 3–5 is new and provides the factor values. The depth to aquifer factor reflects the geochemical retardation capacity of the subsurface materials, which generally increases as the depth increases. Depth to aquifer factor values are assigned to three depth ranges. Clarifying language was added related to karst aquifers.

Section 3.1.2.4 Travel time. As discussed in section III L of this preamble, this factor replaces the depth to aquifer/hydraulic conductivity factor and is based on the least conductive layer(s) rather than on the conductivities of all layers between the hazardous substances and the aquifer. Table 3–7 has been revised to reflect these changes. Table 3–5 from the proposed rule has been renumbered as Table 3–6. Text on how to obtain information to score this factor has been removed. Clarifying language was added related to karst aquifers.

Section 3.1.2.5 Calculation of potential to release factor value. Text has been revised to reflect new factor names.

Section 3.1.3 Calculation of likelihood of release factor category value. New maximum value of 550 based on observed release has been added.

Section 3.2 Waste characteristics. Descriptive text has been removed.

Section 3.2.1 Toxicity/mobility. Descriptive text has been removed.

Section 3.2.1.1 Toxicity. References § 2.4.1.1.

Section 3.2.1.2 Mobility. As discussed in sections III F and III P of this preamble, the method for assigning mobility values to hazardous substances has been revised. Table 3–8 has been revised. Mobility values are now linear rather than categorical place holders and are assigned in a matrix combining water solubility and distribution coefficients. Mobility values may now vary by aquifer for a specific hazardous substance. The maximum mobility value is no longer assigned based on observed release by direct observation. A factor value of 0 is no longer assigned for mobility, as had been the case under the proposed rule, where categorical placeholder values were used; because mobility is now multiplied by toxicity and hazardous waste quantity, assigning a 0 value would result in a pathway score of 0. This result could understate the risk posed by a site with a large volume of highly toxic hazardous substances with low mobility. Furthermore, given the uncertainties about estimates of mobility in ground water and their applicability in site-specific situations, EPA determined that a 0 value should not be assigned to the mobility factor under any conditions.

Section 3.2.1.3 Calculation of toxicity/mobility factor value. Text has been simplified. Table 3–9 (proposed rule Table 3–10), the matrix for assigning factor values, has been revised to reflect the linear nature of the assigned values. Values for a specific hazardous substance may now vary by aquifer.

Section 3.2.2 Hazardous waste quantity. References § 2.4.2.

Section 3.2.3 Calculation of waste characteristics factor category value. Text has been revised to indicate the multiplication of the factors, the new maximum value, and the table used to assign the factor category value.

Section 3.3 Targets. Text has been revised to reflect the new names for factors. Descriptive text has been removed. Table 3–10 (Table 3–12 in the proposed rule) has been modified to list the revised benchmarks in this pathway.

Section 3.3.1 Nearest well. Title has been changed from maximally exposed individual. Text has been added to explain how to evaluate nearest wells with documented contamination (at Level I and II) and those potentially contaminated. Text was added to assign Level II contamination to any drinking water well where an observed release was established by direct observation. This section also explains how to evaluate wells drawing from karst aquifers. Table 3–11 has been renamed and the factor values have been changed. See section III B of this preamble for a discussion of the changes to assigned values for this factor.

Section 3.3.2 Population. As discussed in section III H, population is evaluated using health-based benchmarks for drinking water. For populations potentially exposed, population ranges are used to evaluate the factor. This section explains whom to count for population. Populations served by wells whose water is blended with that from other drinking water sources are to be apportioned based on the well's relative contribution to the total blended system. The rule includes instructions on the type of data to use when determining relative contributions of wells and intakes. This change is intended to reflect more accurately the exposure to populations through blended systems. The rule also includes instructions on how to apportion population for systems with standby wells or standby surface water intakes.

Section 3.3.2.1 Level of contamination. Explains how to evaluate population based on concentrations of hazardous substances in samples. Text was added to assign Level II contamination to any drinking water wells where there is an observed release by direct observation.

Section 3.3.2.2 Level I concentrations. Explains how to evaluate populations exposed to Level I concentrations. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 10.

Section 3.3.2.3 Level II concentrations. Explains how to evaluate populations exposed to Level II concentrations. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 1.

Section 3.3.2.4 Potential contamination. Explains how to assign values to populations potentially exposed to contamination from the site. The formula for calculating population values has been modified to reflect both the revised method for evaluating karst aquifers (see below) and the use of distance-weighted population values from Table 3–12, which has been added to assign distance-weighted values for populations in each distance category. The values are determined for each distance category and are then added across distance categories, and the sum is divided by 10 to derive the factor value for potentially contaminated population. The assigned values in Table 3–12 were determined by statistical simulation to yield the same population value, on average, as the use of the formulas in the proposed rule. The use of range values has been adopted as part of the simplification discussed in section III A. The rounding rules have also changed. The method for evaluating karst aquifers has been simplified and is explained in this section. Table 3–14 in the proposed rule, which included dilution weighting factors for the general case and for two special cases, has been removed, and the two special karst cases are no longer evaluated. (The generally applicable dilution factors for karst have not changed and are all incorporated into the distance-weighted population values in Table 3–12.) The scoring cap was eliminated, and the multiplier (i.e., weight) is now 0.1.

Section 3.3.2.5 Calculation of population factor value. Has been revised to reflect the changes in the evaluation of actually contaminated wells. The rounding rule has also been changed, and the scoring cap was eliminated.

Section 3.3.3 Resources. Describes how points are assigned to resource uses of ground water. Points may be assigned if there are no drinking water wells within the target distance limit, but the water is usable for drinking water. This scoring allows for consideration of potential future uses of the aquifers. (See section III I of this preamble for a discussion of the relative weighting of these factors.)

Section 3.3.4 Wellhead protection area. Explains how to assign values to this factor. The maximum value is assigned when a source or an observed release lies partially or fully within a wellhead protection area applicable to the aquifer being evaluated, and this value has been changed from 50 to 20 to adjust for scale changes. A new criterion for scoring this factor has been added. If a wellhead protection area applicable to the aquifer being evaluated is within the target distance limit and neither of the other conditions is met, a value of five is assigned. This change allows the HRS to place a value on the resource.

Section 3.3.5 Calculation of targets factor category value. Has been revised to reflect changes in the factor names. The rounding rule has been changed, and the scoring cap was eliminated.

Section 3.4 Ground water migration score for an aquifer. Text has been revised to reflect the new divisor for normalizing pathway scores.

Section 3.5 Calculation of ground water migration pathway score. Text has been simplified.

In addition to the above noted changes, the sorptive capacity factor has been elimtnated and replaced by the depth to aquifer factor, as have the tables used to assign values to this factor (Tables 3–6 and 3–7 in the proposed rule). The ground water use factors have also been eliminated as have the tables used to assign their values (Tables 3–15 and 3–16 in the proposed rule). Figures 3–2, 3–3, and 3–4 and Tables 3–4, 3–8, 3–9, 3–13 of the proposed rule have been removed .

Section 4 Surface Water Migration Pathway

The surface water migration pathway evaluates threats resulting from releases or potential releases of hazardous substances to surface water bodies. One major change to this pathway is the addition of a new component for scoring ground water discharge to surface water: either this component or the overland flow/flood migration component or both may be scored. For each component, three threats are evaluated: drinking water threat, human food chain threat, and environmental threat. Other major changes specific to this pathway include elimination of the recreational use threat; simplification of overland flow potential to release factors; modifications to the human food chain threat including addition of a food chain individual; modifications to the treatment of bioaccumulation potential and addition of a similar factor, ecosystem bioaccumulation potential, to the evaluation of the environmental threat; modifications to the persistence factor; revisions to the dilution weights; additions of benchmarks, extension of benchmarks to evaluation of the nearest intake, and addition of levels of contamination to the human food chain targets; modifications to criteria for establishing actual food chain contamination; elimination of the surface water use factor; addition of a resources factor to the targets evaluation in the drinking water threat; and revisions to sensitive environments.

Section 4.0 Surface Water Migration Pathway. New structure of the pathway is explained. Descriptive text has been removed. Figure 4–1 has been revised to reflect revisions to the factors evaluated, and Table 4–1 has been revised to reflect the new factor category values throughout.

Section 4.0.1 Migration components. Explains how to score the two migration components.

Section 4.0.2 Surface water categories. A definition of coastal tidal waters has been added. Some surface water bodies that belong in this new category were listed in other categories in the proposed rule (e.g., bays and wetlands contiguous with oceans). Isolated perennial wetlands have been added to the definition of lakes; salt water harbors largely protected by seawalls have been removed from the definition of lakes. Ocean has been defined more precisely as areas seaward from the baseline of the Territorial Sea. Contiguous bays have been removed from, and wetlands contiguous to the Great Lakes have been added to ocean and ocean-like bodies. These definitional changes/clarifications more accurately reflect the different characteristics of the water bodies.

Section 4.1 Overland flow/flood migration component. As discussed in section III M of this preamble, the surface water migration pathway has been divided into two components. The overland flow/flood component is essentially the surface water migration pathway as proposed except that the recreational use threat has been eliminated.

Section 4.1.1 General considerations. Consists of several subsections.

Section 4.1.1.1 Definition of the hazardous substance migration path for overland flow/flood migration component. Text has been simplified.

Section 4.1.1.2 Target distance limit. Explains target distance limits for sites in general and adds an explanation of how to calculate the target distance limit for contaminated sediments with no identified source. For these latter sources only, when there is a clearly defined direction of flow, the target distance limit is measured beginning at the observed sediment contamination farthest upstream; when there is no clearly defined direction of flow, the target distance limit is measured from the center of the area of observed sediment contamination. Discusses the determination of whether surface water targets are subject to actual or potential contamination. Also, text was added to assign Level II to targets subject to actual contamination based on direct observation.

Section 4.1.1.3 Evaluation of the overland flow/flood migration component. Explains that for multiple watersheds, highest score assigned to a watershed is used instead of summing watershed scores as proposed.

Section 4.1.2 Drinking water threat. Descriptive text has been removed.

Section 4.1.2.1 Drinking water threat—likelihood of release. Text has been simplified to clarify when potential to release factors need to be evaluated.

Section 4.1.2.1.1 Observed release. Text has been revised to reflect the changed maximum value.

Section 4.1.2.1.2 Potential to release. Text has been revised to reflect the changed maximum value and has been simplified.

Section 4.1.2.1.2.1 Potential to release by overland flow. Explains when overland flow potential to release is not evaluated.

Section 4.1.2.1.2.1.1 Containment. Text has been revised to reflect changes in the numbering of the containment table. Only sources that meet the minimum size requirement (i.e., that have a source hazardous waste quantity value of 0.5 or higher) are used in assigning containment values. This requirement has been added to ensure that very small, uncontained sources do not unduly influence the score. For example, a site might have a large, but highly contained source and a very small, uncontained source; without a minimum size requirement, the potential to release could be assigned the maximum value based on the very small source, which could overestimate the potential hazard posed by the site. If no source meets the minimum size requirement, the source with the highest surface water containment factor value is used. Descriptive text has been removed. Table 4–2, Containment Factor Values for Surface Water Migration Pathway, has been simplified by combining repetitious items and has been moved from an attachment to the proposed rule into this section of the final rule.

Section 4.1.2.1.2.1.2 Runoff. Text on evaluating rainfall has been simplified by removing explanatory references. The runoff curve number has been simplified by substituting a soil group designation in its place. Table 4–4 (proposed rule Table 4–2) has been revised to list only the soil group designations. Based on analyses of runoff and actual drainage area sizes, Table 4–3 (proposed rule Table 4–3) has been revised by changing the divisions of drainage area size. Table 4–5 (proposed rule Table 4–4) has been revised to reflect the changes related to the use of soil group designations. Table 4–6 (proposed rule Table 4–5) has been revised so that the heading in the table reads Rainfall/Runoff Value; the values assigned have been adjusted on the basis of both the higher maximum value assigned to the factor category and the analyses described above. Explanatory text has been removed.

Section 4.1.2.1.2.1.3 Distance to surface water. Values assigned to distance to surface water factor values in Table 4–7 (proposed rule Table 4–6) have been revised to adjust for the higher maximum assigned to the factor category.

Section 4.1.2.1.2.1.4 Calculation of the factor value for potential to release by overland flow. Has not been changed except for assigned value.

Section 4.1.2.1.2.2 Potential to release by flood. Descriptive text has been removed.

Section 4.1.2.1.2.2.1 Containment (flood). Text in Table 4–8 (proposed rule Table 4–7) has been revised to incorporate new language on required documentation on containment. The requirement for certification by an engineer has been dropped. The new documentation requirements have been added to make the rule consistent with RCRA requirements.

Section 4.1.2.1.2.2.2 Flood frequency. Values assigned to this factor by Table 4–9 (proposed rule Table 4–8) have been revised to better reflect probabilities and to adjust for the higher maximum assigned to the factor category. Descriptive text has been removed.

Section 4.1.2.1.2.2.3 Calculation of the factor value for potential to release by flood. Has been revised to reflect a minimum size requirement for sources.

Section 4.1.2.1.2.3 Calculation of potential to release factor value. Text has been simplified, and the assigned value has been changed.

Section 4.1.2.1.3 Calculation of drinking water threat—likelihood of release factor category value. Text has been simplified. The maximum value has been changed, and the maximum for potential to release is no longer equal to the maximum for observed release.

Section 4.1.2.2 Drinking water threat—waste characteristics. Descriptive text has been removed.

Section 4.1.2.2.1 Toxicity/persistence. Editorial changes have been made.

Section 4.1.2.2.1.1 Toxicity. References § 2.4.1.1.

Section 4.1.2.2.1.2 Persistence. As discussed in section III F of this preamble, several changes have been made to this factor, including the deletion of free-radical oxidation as a decay process and the inclusion of consideration of K_{ow} to account for sorption to sediments. Table 4–10 (proposed rule Table 4–9) has been revised to change the values assigned from categorical numbers to linear scales. The divisions among the half-lives for rivers, oceans, coastal tidal waters, and Great Lakes have changed based on a study of travel time, and the text has been modified to clarify the procedure for determining whether to base the persistence factor on lakes or on rivers, oceans, coastal tidal waters, and Great Lakes. A factor value of 0 is no longer assigned for persistence, as had been the case under the proposed rule, where categorical place-holder values were used; because persistence is now multiplied by toxicity and hazardous waste quantity, assigning a 0 value would result in a pathway score of 0. This result could understate the risk posed by a site with a large volume of highly toxic hazardous substances with low persistence. Furthermore, given the uncertainties about half-life estimates and their applicability in site-specific situations, EPA determined that a 0 value should not be assigned to the persistence factor under any conditions. The text has been modified to clarify selection of an appropriate default value. Table 4–11—Persistence Values—Log K_{ow}, has been added. Descriptive text has been removed.

Section 4.1.2.2.1.3 Calculation of toxicity/persistence factor value. Table reference has been changed to reflect the change in numbering. Table 4–12 (proposed rule Table 4–10) has been changed to reflect the multiplicative relationship.

Section 4.1.2.2.2 Hazardous waste quantity. References § 2.4.2.

Section 4.1.2.2.3 Calculation of drinking water threat—waste characteristics factor category value. Text has been revised to indicate the multiplication of the factors, the new maximum value, and the table used to assign the factor category value.

Section 4.1.2.3 Drinking water threat—targets. Descriptive text has been removed. Text was added to assign Level II to actual contamination based on direct observation.

Section 4.1.2.3.1 Nearest intake. Title and the factor name have been changed. As discussed in Section III B of this preamble, this factor is now assigned values based on health-based benchmarks. Instructions for how to assign dilution weights to closed lakes and lakes with no surface flow entering have been added. Table 4–13, Surface Water Dilution Weights (proposed rule Table 4–11), has been revised to add more types of surface water bodies and to change the dilution weights. These changes have been made to reflect more accurately the flow ranges of water bodies and are based on analysis of data on flow rates and dilution.

Section 4.1.2.3.2 Population. As explained above, population is evaluated based on two levels of actual contamination. Targets potentially contaminated are dilution weighted and are assigned values based on ranges. Populations served by intakes which are blended with water from other drinking water sources are to be apportioned based on the intake's relative contribution to the total blended system. The rule includes instructions on the type of data to use when determining relative contributions of intakes and wells. This change is intended to reflect more accurately the exposure of populations through blended systems. The rule also includes instructions on how to apportion population for systems with standby wells or standby surface water intakes.

Section 4.1.2.3.2.1 Level of contamination. Explains how to evaluate population based on the level of contamination to which they are exposed.

Section 4.1.2.3.2.2 Level I concentrations. Descriptive text has been removed. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 10.

Section 4.1.2.3.2.3 Level II concentrations. Text has been simplified and revised to reflect the changes discussed above. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 1.

Section 4.1.2.3.2.4 Potential contamination. Equation used to calculate this factor has been revised as discussed above. A new table, Table 4–14, Dilution-Weighted Population Values for Potential Contamination Factor for Surface Water Migration Pathway, has been added to assign values, which are then added across different surface water body types and divided by 10 to derive the value for potentially contaminated population. The assigned values in Table 4–14 for each population range category were determined by statistical simulation to yield the same population value, on average, as the use of the formulas in the proposed rule. The use of range values has been added as part of the simplification discussed in section III A. The rounding rule has also been changed, the scoring cap was eliminated, and the multiplier (i.e., weight) is now 0.1.

Section 4.1.2.3.2.5 Calculation of population factor value. Explains how to combine values assigned to the three population groups. The rounding rule has also been changed, and the scoring cap was eliminated.

Section 4.1.2.3.3 Resources. As discussed in section III J of this preamble, this factor has been added to account for the potential impact of surface water contamination on resource uses.

Section 4.1.2.3.4 Calculation of drinking water threat—targets factor category value. Has been revised to reflect the changes in this factor category. The rounding rule has also been changed, and the scoring cap was eliminated.

Section 4.1.2.4 Calculation of drinking water threat score for a watershed. Text has been simplified. The divisor has changed.

Section 4.1.3 Human food chain threat. Descriptive text has been removed.

Section 4.1.3.1 Human food chain threat—likelihood of release. Section references have been changed.

Section 4.1.3.2 Human food chain threat—waste characteristics. Text has been simplified.

Section 4.1.3.2.1 Toxicity/persistence/bioaccumulation. Text has been simplified and modified because of the change in the use of bioaccumulation potential in selecting the substance potentially posing the greatest hazard.

Section 4.1.3.2.1.1 Toxicity. Has been changed to reference § 2.4.1.1. Also changed so that evaluation of toxicity is not limited to substances with the highest bioaccumulation potential.

Section 4.1.3.2.1.2 Persistence. Clarifies how to evaluate persistence for contaminated sediment sources, and adds coastal tidal waters as a category of surface water. Also changed so that evaluation of persistence is not limited to substances with the highest bioaccumulation potential.

Section 4.1.3.2.1.3 Bioaccumulation potential. As described in section III M of this preamble, the method of accounting for bioaccumulation potential in the selection of the substance potentially posing the greatest hazard has been changed. In the final rule, bioaccumulation potential is considered together with toxicity and persistence rather than as a primary selection criterion. This change was made because all three factors are now scored on linear scales. In addition, where data exist, separate bioconcentration factor values are assigned for salt water and fresh water; the text now clarifies that the higher of these values is used for fisheries in brackish water and for sites with fisheries present in both salt water and fresh water. The adjustment for biomagnification has been dropped because it tended to double count bioaccumulation. Both Table 4–15 (Table 4–14 in the proposed rule) and the text have been modified to clarify the data hierarchy for assigning bioaccumulation potential factor values. Also, Table 4–15 now makes it clear that the assigned values for bioaccumulation potential are on a linear scale.

Section 4.1.3.2.1.4 Calculation of toxicity/persistence/bioaccumulation factor value. Explains how to calculate a toxicity/persistence/bioaccumulation value. Table 4–16, Toxicity/Persistence/Bioaccumulation, has been added to assign the factor value.

Section 4.1.3.2.2 Hazardous waste quantity. References § 4.1.2.2.2.

Section 4.1.3.2.3 Calculation of human food chain threat—waste characteristics factor category value. Text has been revised to indicate the multiplication of the toxicity/persistence and hazardous waste quantity factor values, subject to a maximum, and the further multiplication of that product by the bioaccumulation potential factor value, subject to a maximum for this second product, and to reference the table for assigning the factor category value.

Section 4.1.3.3 Human food chain threat—targets. Has been revised to reflect addition of the new food chain individual and the deletion of the fishery use factor. As discussed in section III M of this preamble, criteria for establishing a fishery subject to actual contamination have been revised. Text was added to describe the additional

tissue samples that can be used to establish Level I contamination.

Section 4.1.3.3.1 Food chain individual. As discussed in section III M of this preamble, this factor is new. This section explains how to assign a value to the factor.

Section 4.1.3.3.2 Population. Has been changed as discussed in section III M of this preamble.

Section 4.1.3.3.2.1 Level I concentrations. The approach to calculating this factor value has been revised as discussed in section III M of this preamble. The rounding rule has been changed, the scoring cap was eliminated, and the multiplier (i.e., weight) is now 10.

Section 4.1.3.3.2.2 Level II concentrations. Explains how to assign values as discussed in section III M of this preamble. The rounding rule has been changed, the scoring cap was eliminated, and the multiplier (i.e., weight) is now 1.

Section 4.1.3.3.2.3 Potential human food chain contamination. The approach to calculating this factor value has been revised as discussed in section III M of this preamble. The rounding rule has been changed, the scoring cap was eliminated, and the multiplier (i.e., weight) is now 0.1.

Section 4.1.3.3.2.4 Calculation of the population factor value. Text has been revised to omit the maximum. The rounding rule has been changed, and the scoring cap was eliminated.

Section 4.1.3.3.3 Calculation of human food chain threat—targets factor category value. Explains how to calculate the targets value. The rounding rule has been changed, and the scoring cap was eliminated.

Section 4.1.3.4 Calculation of human food chain threat score for a watershed. Text has been simplified. The divisor has changed.

Section 4.1.4 Environmental threat. Descriptive text has been removed.

Section 4.1.4.1 Environmental threat—likelihood of release. Section references have been changed.

Section 4.1.4.2 Environmental threat—waste characteris[illegible]. Descriptive text has been removed.

Section 4.1.4.2.1 Ecosystem toxicity/persistence/bioaccumulation. Text has been revised to include the addition of ecosystem bioaccumulation potential as a multiplicative factor.

Section 4.1.4.2.1.1 Ecosystem toxicity. The approach for evaluating ecosystem toxicity has been revised. Additions have been made to the data hierarchy (see section III J of this preamble), and a default value of 100 was added to cover the situation where appropriate aquatic toxicity data were unavailable for all of the substances being evaluated. Table 4–19 (proposed rule Table 4–23) has been revised to make the factor linear and to eliminate the rating category of 0 (except when data are unavailable for a given substance); these changes make the ecosystem toxicity factor more consistent with the toxicity factor in the other pathways and threats. Text was added to clarify the evaluation of ecosystem toxicity for brackish water.

Section 4.1.4.2.1.2 Persistence. Section references have been changed. Clarifies how to evaluate persistence for contaminated sediment sources, and adds coastal tidal waters as a category of surface water.

Section 4.1.4.2.1.3 Ecosystem bioaccumulation potential. As explained in section III J of this preamble, this factor is new for this threat and is evaluated similarly to (but with several key differences from) the bioaccumulation potential factor in the human food chain threat.

Section 4.1.4.2.1.4 Calculation of ecosystem toxicity/persistence/bioaccumulation factor value. Section references have been changed. Table 4–20 (proposed rule Table 4–24) has been changed to reflect the changes in the values for the factors. Table 4–21, Ecosystem Toxicity/Persistence/Bioaccumulation Values, is new and assigns values for the combined toxicity/persistence/bioaccumulation factor.

Section 4.1.4.2.2 Hazardous waste quantity. Section references have been changed.

Section 4.1.4.2.3 Calculation of environmental threat—waste characteristics factor category value. Text has been revised to indicate the multiplication of the ecosystem toxicity/persistence and hazardous waste quantity factor values, subject to a maximum, and the further multiplication of that product by the ecosystem bioaccumulation potential factor value, subject to a maximum for this second product, and to reference the table for assigning the factor category value.

Section 4.1.4.3 Environmental threat—targets. Descriptive text has been removed.

Section 4.1.4.3.1 Sensitive environments. Explains how to evaluate sensitive environments. Table 4–22, Ecological-Based Benchmarks for Hazardous Substances in Surface Water, has been revised as described in section III H of this preamble. The rounding rule has also been changed.

Section 4.1.4.3.1.1 Level I concentrations. Explains the new method of evaluating wetlands based on wetland frontage, or, in some situations, wetland perimeter. Table 4–23, Sensitive Environments Rating Values, has been revised as discussed in section III J of this preamble. Table 4–24, Wetlands Rating Values for Surface Water Migration Pathway, has been added to assign values to wetlands based on the total length of wetlands. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 10.

Section 4.1.4.3.1.2 Level II concentrations. Has been revised to reflect the method of evaluating wetlands. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 1.

Section 4.1.4.3.1.3 Potential contamination. Has been revised to reflect the method of evaluating wetlands. The rounding rule has also been changed, the scoring cap was eliminated, and the multiplier (i.e., weight) is now 0.1.

Section 4.1.4.3.1.4 Calculation of environmental threat—targets factor category value. Has been revised to remove the maximum from the targets factor category. The rounding rule has also been changed.

Section 4.1.4.4 Calculation of environmental threat score for a watershed. Divisor for the threat has changed. A cap of 60 was explicitly placed on the environmental threat score, which results in the same maximum possible threat score as in the proposed rule. (In the proposed rule, environmental threat targets were capped at 120, which resulted in an environmental threat score maximum of 60.) However, in the final rule the targets category is uncapped and can score higher than 120 to compensate for low scores in other factor categories.

Section 4.1.5 Calculation of overland flow/flood migration component score for a watershed. Explains how to calculate the score for the watershed.

Section 4.1.6 Calculation of overland flow/flood migration component score. Explains how to calculate the score for the component based on the highest watershed score (in the proposed rule watershed scores were summed).

Section 4.2 Ground water to surface water migration component. As discussed in section III M of this preamble, this component has been added to the rule to account for contamination of surface water bodies through ground water migration of hazardous substances. Thus, all sections referring to this component are new.

Section 4.2.1 General considerations.

Section 4.2.1.1 Eligible surface waters. Explains the conditions that must apply before this component is

scored. In general, this component is scored only when there is a surface water within one mile of a source, the top of the uppermost aquifer is at or above the bottom of the surface water, and no aquifer discontinuity is established between the source and the portion of surface water within one mile of the source. Exceptions are also explained.

Section 4.2.1.2 Definition of the hazardous substance migration path for ground water to surface water migration component. Explains that the migration path is defined as shortest straight-line distance, within the aquifer boundary, from a source to surface water.

Section 4.2.1.3 Observed release of a specific hazardous substance to surface water in-water segment. Explains that before an observed release of an individual hazardous substance can be established to the surface water in-water segment, the substance must meet the criteria for an observed release both to ground water and to surface water (this requirement does not affect the actual scoring of observed release). Also clarifies the use of samples from the surface water in-water segment.

Section 4.2.1.4 Target distance limit. Explains the criteria for determining the target distance limit and for establishing whether targets are subject to actual or potential contamination.

Section 4.2.1.5 Evaluation of the ground water to surface water migration component. Explains the general approach for evaluating this component. Figure 4–2, Overview of Ground Water to Surface Water Migration Component, is new. Table 4–25, which is new, provides the scoring sheets for this component.

Section 4.2.2 Drinking water threat. Explains the general approach for evaluating this threat.

Section 4.2.2.1 Drinking water threat—likelihood of release. Explains the general approach for evaluating this factor category.

Section 4.2.2.1.1 Observed release. Explains that scoring an observed release is based on releases to ground water.

Section 4.2.2.1.2 Potential to release. Explains that scoring is based on the scoring of potential release to uppermost aquifer.

Section 4.2.2.1.3 Calculation of drinking water threat—likelihood of release factor category value. Explains how to assign the factor category value.

Section 4.2.2.2 Drinking water threat—waste characteristics. Explains the general approach for evaluating this factor category.

Section 4.2.2.2.1 Toxicity/mobility/persistence. Explains the approach for evaluating these factors.

Section 4.2.2.2.1.1 Toxicity. Explains that toxicity values are assigned to all hazardous substances available to migrate to ground water.

Section 4.2.2.2.1.2 Mobility. Explains that the mobility value is assigned to all hazardous substances available to migrate to ground water.

Section 4.2.2.2.1.3 Persistence. Explains that this factor value is assigned as in the drinking water threat for the overland flow/flood migration component for all hazardous substances available to migrate to ground water.

Section 4.2.2.2.1.4 Calculation of toxicity/mobility/persistence factor value. Explains that the factor value is the highest value assigned to any hazardous substance evaluated using Table 4–26, which is new.

Section 4.2.2.2.2 Hazardous waste quantity. Explains that hazardous waste quantity is calculated for hazardous substances available to migrate to ground water.

Section 4.2.2.2.3 Calculation of drinking water threat—waste characteristics factor category value. Explains how to calculate the factor category value.

Section 4.2.2.3 Drinking water threat—targets. Explains the general approach for evaluating this factor category.

Section 4.2.2.3.1 Nearest intake. Explains how to determine the dilution weight adjustment using Table 4–27, which was added, and how to assign factor values. Figure 4–3 was added to illustrate determination of the ground water to surface water angle. (See section III O of this preamble for a discussion of this adjustment.)

Section 4.2.2.3.2 Population. This section parallels other population factor sections.

Section 4.2.2.3.2.1 Level I concentrations. Parallels the population factor sections in the overland flow/flood migration component.

Section 4.2.2.3.2.2 Level II concentrations. Parallels the population factor sections in the overland flow/flood migration component.

Section 4.2.2.3.2.3 Potential contamination. Parallels the population factor sections in the overland flow/flood migration component, except for addition of the dilution weight adjustment.

Section 4.2.2.3.2.4 Calculation of population factor value. Parallels other population factor sections.

Section 4.2.2.3.3 Resources. Parallels other resources factor sections.

Section 4.2.2.3.4 Calculation of the drinking water threat—targets factor category value. Explains how to calculate the factor category value.

Section 4.2.2.4 Calculation of drinking water threat score for a watershed. Explains how to calculate the score for a watershed.

Section 4.2.3 Human food chain threat. Lists the factors evaluated.

Section 4.2.3.1 Human food chain threat—likelihood of release. Explains how to assign the factor category value.

Section 4.2.3.2 Human food chain threat—waste characteristics. Lists the factors evaluated.

Section 4.2.3.2.1 Toxicity/mobility/persistence/bioaccumulation. Explains how to calculate these factor values using Table 4–28, which is new.

Section 4.2.3.2.1.1 Toxicity. Explains how to calculate this factor value.

Section 4.2.3.2.1.2 Mobility. Explains how to calculate this factor value.

Section 4.2.3.2.1.3 Persistence. Explains how to calculate this factor value.

Section 4.2.3.2.1.4 Bioaccumulation potential. Explains how to calculate this factor value.

Section 4.2.3.2.1.5 Calculation of toxicity/mobility/persistence/bioaccumulation factor value. Explains how to calculate this value using Tables 3–9, 4–26, and 4–28.

Section 4.2.3.2.2 Hazardous waste quantity. Explains how to assign the factor value.

Section 4.2.3.2.3 Calculation of human food chain threat—waste characteristics factor category value. Explains how to calculate this factor category value.

Section 4.2.3.3 Human food chain threat—targets. Explains the factors to be evaluated.

Section 4.2.3.3.1 Food chain individual. Explains how to assign the factor value.

Section 4.2.3.3.2 Population. Explains how to calculate this factor value.

Section 4.2.3.3.2.1 Level I concentrations. Parallels the population factor in the human food chain threat for the overland flow/flood migration component.

Section 4.2.3.3.2.2 Level II concentrations. Parallels the population factor in the human food chain threat for the overland flow/flood migration component.

Section 4.2.3.3.2.3 Potential human food chain contamination. Parallels the population factor in the human food chain threat for the overland flow/flood component, except for addition of the dilution weight adjustment.

Section 4.2.3.3.2.4 Calculation of the population factor value. Explains how to calculate this factor value.

Section 4.2.3.3.3 Calculation of human food chain threat—targets factor category value. Explains how to calculate this factor category value.

Section 4.2.3.4 Calculation of human food chain threat score for a watershed. Explains how to calculate the score for a watershed.

Section 4.2.4 Environmental threat. Lists the factors evaluated.

Section 4.2.4.1 Environmental threat—likelihood of release. Explains how to calculate this factor category value.

Section 4.2.4.2 Environmental threat—waste characteristics. Explains how to calculate this factor category value.

Section 4.2.4.2.1 Ecosystem toxicity/mobility/persistence/bioaccumulation. Explains how to calculate these factor values.

Section 4.2.4.2.1.1 Ecosystem toxicity. Explains how to calculate this factor value.

Section 4.2.4.2.1.2 Mobility. Explains how to calculate this factor value.

Section 4.2.4.2.1.3 Persistence. Explains how to calculate this factor value.

Section 4.2.4.2.1.4 Ecosystem bioaccumulation potential. Parallels the ecosystem bioaccumulation evaluation in the overland flow/flood component, except expands the species considered as discussed in section III J.

Section 4.2.4.2.1.5 Calculation of ecosystem toxicity/mobility/persistence/bioaccumulation factor value. Explains how to calculate this factor value using Tables 3–9, 4–29, and 4–30, which were added.

Section 4.2.4.2.2 Hazardous waste quantity. Explains how to calculate this factor value.

Section 4.2.4.2.3 Calculation of environmental threat—waste characteristics factor category value. Explains how to calculate this factor category value.

Section 4.2.4.3 Environmental threat—targets. Explains how to calculate this factor category value.

Section 4.2.4.3.1 Sensitive environments. Explains how to calculate this factor value.

Section 4.2.4.3.1.1 Level I concentrations. Parallels factor sections in the overland flow/flood migration component.

Section 4.2.4.3.1.2 Level II concentrations. Parallels factor sections in the overland flow/flood migration component.

Section 4.2.4.3.1.3 Potential contamination. Parallels factor sections in the overland flow/flood migration component, except for addition of the dilution weight adjustment.

Section 4.2.4.3.1.4 Calculation of environmental threat—targets factor category value. Explains how to calculate the value for the factor category.

Section 4.2.4.4 Calculation of environmental threat score for a watershed. Explains how to calculate this threat score for a watershed.

Section 4.2.5 Calculation of ground water to surface water migration component score for a watershed. Explains how to calculate a watershed score for this component.

Section 4.2.6 Calculation of ground water to surface water migration component score. Explains how to calculate this score based on the scores for watersheds evaluated for this component.

Section 4.3 Calculation of surface water migration pathway score. Explains how to assign the pathway score.

In addition to the above noted changes, the recreational use threat has been eliminated. The drinking water use and other use factors have also been eliminated as have the tables (4–12 and 4–13 in the proposed rule) that related to scoring these factors. Figures 4–1, 4–2, and 4–3 as well as Tables 4–15, and 4–17 through 4–22 from the proposed rule have been eliminated.

Section 5 Soil Exposure Pathway

The soil exposure pathway evaluates threats resulting from contamination of surface material. The major changes specific to this pathway include revision of the name of the pathway; elimination of children under seven as a population that must be counted and evaluated separately; addition of hazardous waste quantity to the waste characteristics factor category; inclusion of workers in the evaluation of resident population targets; weighting of resident population based on benchmarks; inclusion of the nearest individual factor in both the resident and nearby targets factor category; inclusion of a resources factor in the resident population evaluation; and revisions to the sensitive environments factor.

Section 5.0 Soil Exposure Pathway. The name of the pathway has been changed from onsite exposure to soil exposure. Descriptive text has been removed. Figure 5–1 has been revised to reflect revisions to the factors evaluated. Table 5–1 has been revised to reflect the new factor category values throughout, which were made more consistent with the other pathways.

Section 5.0.1 General considerations. Has been revised to reflect the redefinition of source, discussed in section III N of this preamble. The methods for establishing areas of observed contamination and for determining the hazardous substances associated with an area of observed contamination have been clarified. The instructions have been revised to make clear that any part of a site that is covered by a permanent or otherwise maintained impermeable material such as asphalt is not considered in evaluating the pathway.

Section 5.1 Resident population threat. Has been revised to specify when the resident population threat should be evaluated. The requirements state that this threat is scored when there is an area of observed contamination within the property boundary and within 200 feet of a residence, school, day care center, or workplace, or within the boundaries of terrestrial sensitive environments and specified resources.

Section 5.1.1 Likelihood of exposure. Text has been simplified.

Section 5.1.2 Waste characteristics. Evaluation of waste characteristics has been changed to include hazardous waste quantity as well as toxicity. Hazardous waste quantity was added to the factor category in response to comments that the pathway did not consider the dose relationship; the combination of hazardous waste quantity and toxicity is a surrogate for that relationship and makes the pathway more consistent with the rest of the rule. The text has been revised to reflect the change.

Section 5.1.2.1 Toxicity. References the section explaining how to assign toxicity factor values.

Section 5.1.2.2 Hazardous waste quantity. This section is new and explains how to assign a value to this factor. Table 5–2, Hazardous Waste Quantity Evaluation Equations for Soil Exposure Pathway, is a revision of Table 2–14 from the proposed rule. This table differs from Table 2–5 of the final rule because generally only the top two feet of an area of observed contamination are considered in evaluating the pathway. Landfills, contaminated soils, waste piles, land treatment areas, dry surface impoundments, and buried/backfilled surface impoundments, which can be evaluated based on their volume in Table 2–5, are evaluated for this pathway using the area measure because the area measure now has a two-foot depth built into the equation. Surface impoundments containing

hazardous substances present as liquids, tanks, and containers may be evaluated based on volume because it is possible that a person could wade, swim, reach, or fall to a depth greater than two feet.

Section 5.1.2.3 Calculation of waste characteristics factor category value. Explains how to combine the toxicity and hazardous waste quantity factor values, subject to the new maximum.

Section 5.1.3 Targets. This factor category has been revised substantially. As discussed in section III N above, the high-risk target population has been eliminated, and workers have been added as targets. Table 5–3, Health-Based Benchmarks for Hazardous Substances in Soils, has been added to list benchmarks appropriate for this pathway.

Section 5.1.3.1 Resident individual. The resident individual factor has been added for consistency with other pathways.

Section 5.1.3.2 Resident population. Explains how to evaluate the resident population using health-based benchmarks, described in section III H above, and how to estimate this population.

Section 5.1.3.2.1 Level I concentrations. Explains how to assign a value for this new factor.

Section 5.1.3.2.2 Level II concentrations. Explains how to assign a value for this new factor.

Section 5.1.3.2.3 Calculation of resident population factor value. Explains how to calculate this factor value.

Section 5.1.3.3 Workers. Explains how to evaluate workers.

Section 5.1.3.4 Resources. Explains how to assign values if the area of observed contamination includes land used for commercial agriculture, commercial silviculture, or commercial livestock grazing or production.

Section 5.1.3.5 Terrestrial sensitive environments. The value assigned for this factor has been revised so that the value is based on the sum of the values assigned to terrestrial sensitive environments in areas of observed contamination, rather than on the highest scoring terrestrial sensitive environment. The maximum value that can be assigned to this factor is limited, but is higher than under the proposed rule. The limit is determined by scoring the pathway with only sensitive environments in the targets factor category; the pathway score under these conditions may not exceed 60 points. The sensitive environments listed in Table 5–5 have been modified. The text has been simplified and references changed to correspond to changes in the rule. The rounding rule has been changed.

Section 5.1.3.6 Calculation of resident population targets factor category value. Explains how to calculate the factor category value from the revised factors. The rounding rule has been changed.

Section 5.1.4 Calculation of resident population threat score. Has only minor editorial changes.

Section 5.2 Nearby population threat. Introductory text has been clarified.

Section 5.2.1 Likelihood of exposure. Lists the factors evaluated.

Section 5.2.1.1 Attractiveness/accessibility. As explained in section III N of this preamble, the name of this factor has changed as have the criteria used to assign values. This factor now emphasizes the use of the area by the general public. Descriptive text has been removed. Table 5–6 (proposed rule Table 5–4) has been changed by redefining the criteria and the assigned values, and by adding a value of 0 for sites that are physically inaccessible to the public.

Section 5.2.1.2 Area of contamination. The title of this section has been changed. This factor is now based solely on area of contamination, which relates to the likelihood of exposure, unlike hazardous waste quantity, which serves as part of the surrogate for dose. Values are assigned using Table 5–7, which is new.

Section 5.2.1.3 Likelihood of exposure factor category value. Text has been revised to reflect the new names of the factors. Table 5–8 (proposed rule Table 5–5) has been revised in response to the changes noted above for the attractiveness/accessibility and area of contamination factors.

Section 5.2.2 Waste characteristics. Text has been revised to reflect changes in the factor category.

Section 5.2.2.1 Toxicity. Explains how to evaluate the toxicity factor for the nearby population threat.

Section 5.2.2.2 Hazardous waste quantity. This section is new, as is consideration of this factor in this threat. As discussed above, this factor has been added in response to comments and to make the pathway more consistent with the other pathways. The section explains how to assign the factor value.

Section 5.2.2.3 Calculation of waste characteristics factor category value. Explains how to combine the toxicity and hazardous waste quantity factor values, subject to the new maximum.

Section 5.2.3 Targets. Descriptive text has been removed.

Section 5.2.3.1 Nearby individual. This section is new and explains how to assign a value to the nearby individual (i.e., resident or student with shortest travel distance) if there is no resident individual. The factor has been added to make the nearby threat consistent with other pathways. Table 5–9, Nearby Individual Factor Values, is new.

Section 5.2.3.2 Population within one mile. This section is new and includes the text that previously appeared under the Targets section. The section explains how to assign a value using Table 5–10. The text has been revised for clarity. Table 5–10, Distance-Weighted Population Values for Nearby Population Threat, is new. The table assigns distance-weighted values for population in each travel distance category. The values in the table were determined by statistical simulation to yield the same population, on average, as the use of the formulas in the proposed rule. The distance weights have been modified as follows: for travel distance of >0 to ¼ mile, the assigned distance weight is 0.025; for > ¼ to ½ mile, 0.0125, and for > ½ to 1 mile, 0.00625. The use of population ranges has been adopted as part of the simplification discussed in section III A.

Section 5.2.3.3 Calculation of nearby population targets factor category value. Text has been revised to reflect the changes in the targets factor category and in the rounding rule.

Section 5.2.4 Calculation of nearby population threat score. Minor editorial changes only.

Section 5.3 Calculation of the soil exposure pathway score. Has been changed to reflect the change in the value used as a divisor.

In addition to the above noted changes, Figures 5–2 and 5–3 and Tables 5–4 and 5–6 from the proposed rule have been removed.

Section 6 Air Migration Pathway

The air migration pathway evaluates the relative threat resulting from releases or potential releases of hazardous substances, either as gases or particulates, to the air. The major changes specific to this pathway include separate evaluation of gas and particulates in the likelihood to release factor category; inclusion of benchmarks to evaluate population and the nearest individual; weighting of sensitive environments based on actual or potential contamination; revision of the distance weights; deletion of the land use factor and inclusion of a resources factor in the evaluation of population; and revisions to the mobility factor.

Section 6.0 Air Migration Pathway. Descriptive text has been removed. Figure 6–1 has been revised to reflect revisions to the factors evaluated, and Table 6–1 has been revised to reflect the new factor category values throughout.

Section 6.1 Likelihood of release. Has been revised to eliminate explanatory text and to add instructions about which factors to evaluate for this factor category.

Section 6.1.1 Observed release. As discussed in section III G of this preamble, the specific criteria have been revised.

Section 6.1.2 Potential to release. As explained in section III O of this preamble, the method for evaluating this factor has been revised. Gas potential to release and particulate potential to release are evaluated separately. The explanatory text has been removed.

Section 6.1.2.1 Gas potential to release. Explains how this factor is evaluated. Table 6–2 (proposed rule Table 2–3) has been revised to apply only to the gas potential to release factors.

Section 6.1.2.1.1 Gas containment. Descriptive text has been removed. Table 6–3 (proposed rule Table 2–5) has been simplified. The depth requirements and other containment requirements have been revised based on public comment, the field test, and a review of recent information on covering systems. Consideration of biogas releases has been added. Assigned values have been revised and also reflect the revised maximum value for the factor.

Section 6.1.2.1.2 Gas source type. New source types have been added to Table 6–4 (proposed rule Table 2–6), and the assigned values have been revised. As explained in section III O of this preamble, new source types and subgroups for specific types have been added, in response to comments and the field test, to make this factor easier to evaluate. Treatment of sources when no source meets the minimum size has been clarified.

Section 6.1.2.1.3 Gas migration potential. As explained in section III O of this preamble, this section has been renamed and the approach for assigning values changed slightly. This section explains how to assign values to each substance and subsequently to the source using Tables 6–5, 6–6, and 6–7. Dry soil relative volatility has been removed as a measure of gas migration potential. The footnotes have been removed from Table 6–5 (proposed rule Table 2–7) and the name has been changed to "Values for Vapor Pressure and Henry's Constant." The titles of Tables 6–6 and 6–7 have been changed. The values assigned have also been changed to reflect the revised maximum value for the factor category. Descriptive text has been removed.

Section 6.1.2.1.4 Calculation of gas potential to release value. Explains how to calculate this value.

Section 6.1.2.2 Particulate potential to release. Explains how this factor is evaluated. Table 6–8 (proposed rule Table 2–3) has been revised to apply only to the particulate potential to release factors.

Section 6.1.2.2.1 Particulate containment. References Table 6–9 (Table 2–5 from the proposed rule). The criteria and values assigned using this table have been changed, as discussed in section III O of this preamble. Considerations of depth have been added for particulates.

Section 6.1.2.2.2 Particulate source type. In response to comments, new kinds of source types and subgroups of source types have been added to make this factor easier to score. The values assigned have been revised to reflect the changed factor category maximum. Treatment of sources when no source meets the minimum size has been clarified.

Section 6.1.2.2.3 Particulate migration potential. Has been renamed. Descriptive text has been removed. Proposed rule Figure 2–3 has been simplified, expanded, and renumbered as Figure 6–2. Proposed rule Table 2–9 has been renumbered as Table 6–10.

Section 6.1.2.2.4 Calculation of particulate potential to release value. Describes how to calculate this value.

Section 6.1.2.3 Calculation of potential to release factor value for the site. Text has been simplified and modified to account for gas and particulate potential to release.

Section 6.1.3 Calculation of likelihood of release factor category value. Describes calculation procedure.

Section 6.2 Waste characteristics. Descriptive text has been removed.

Section 6.2.1 Toxicity/mobility. Text has been simplified.

Section 6.2.1.1 Toxicity. Descriptive text has been removed and § 2.4.1.1 is referenced.

Section 6.2.1.2 Mobility. As explained in section III F of this preamble, the scoring of this factor has changed. Gas mobility is now based only on vapor pressure. The maximum value assigned for particulate mobility is no longer the same as the maximum assigned for gas mobility. The particulate mobility values are assigned based on Figure 6–3 or the equation in the text along with Table 6–12. The values assigned have been put on linear scales to be consistent with the new structure of the waste characteristics factor category. The text has been simplified.

Section 6.2.1.3 Calculation of toxicity/mobility factor value. Table 6–13, proposed rule Table 2–12, the matrix for assigning toxicity/mobility factor values has been revised to reflect the changes in values assigned to both factors.

Section 6.2.2 Hazardous waste quantity. Descriptive text has been removed and § 2.4.2 is referenced.

Section 6.2.3 Calculation of waste characteristics factor category value. The text has been revised to indicate the multiplication of the component factors, the new maximum value, and the table used to assign the factor category value.

Section 6.3 Targets. The target distance limit has been modified to include targets beyond four miles when an observed release extends beyond that distance. Text has been added to explain how to evaluate populations and sensitive environments exposed to actual contamination. Text was added to clarify that actual contamination based on an observed release established by direct observation should be considered Level II. Table 6–14, Health-Based Benchmarks for Hazardous Substances in Air, has been added to list the benchmarks used for this pathway. Table 6–15, Air Migration Pathway Distance Weights (proposed rule Table 2–16), has been revised to reflect changes in the distance weights discussed in section III O of this preamble.

Section 6.3.1 Nearest individual. The title has been changed from maximally exposed individual. As discussed above, this factor is now evaluated based on actual contamination and potential contamination. The name of Table 6–16 (proposed rule Table 2–15) has been changed and the values have been revised based on changes to the distance weights. Descriptive text has been removed.

Section 6.3.2 Population. Evaluation of population based on health-based benchmarks has been added as discussed in section III H of this preamble.

Section 6.3.2.1 Level of contamination. Explains how to evaluate population based on concentrations of hazardous substances in samples.

Section 6.3.2.2 Level I concentrations. Explains how to evaluate populations exposed to Level I concentrations. The scoring cap was eliminated, and the multiplier (i.e., weight) is now 10.

Section 6.3.2.3 Level II concentrations. Explains how to

evaluate populations exposed to Level II concentrations.

Section 6.3.2.4 Potential contamination. Explains how to assign values to populations potentially exposed to contamination from the site. The formula for calculating population values has been revised. Table 6–17, which assigns distance-weighted values for populations in each distance category, has been added. The values in the table were determined by statistical simulation to yield the same population, on average, as the use of the formulas in the proposed rule. The use of population ranges has been adopted as part of the simplification discussed in section III A. The rounding rule has been changed, the scoring cap was eliminated, and the multiplier (i.e., weight) is now 0.1.

Section 6.3.2.5 Calculation of the population factor value. Explains how to calculate the factor value. The scoring cap was eliminated.

Section 6.3.3 Resources. Explains how to assign points to resources, which in this pathway is based on the presence of commercial agriculture, commercial silviculture, and major or designated recreation areas.

Section 6.3.4 Sensitive environments. Explains how sensitive environments are evaluated based on actual and potential contamination. The maximum value that can be assigned to this factor is limited, but is greater than in the proposed rule. The limit is determined by scoring the pathway with only sensitive environments in the targets factor category; the pathway score under these conditions may not exceed 60 points.

Section 6.3.4.1 Actual contamination. Explains how to assign factor values for sensitive environments subject to actual contamination and how to assign values to wetlands based on total acreage. A new Table 6–18, Wetlands Rating Values for the Air Migration Pathway, has been added to assign values to wetlands based on acreage.

Section 6.3.4.2 Potential contamination. Explains how to calculate the factor value for potentially contaminated sensitive environments and how to assign values to wetlands based on total acreage within each distance category. The rounding rule has been changed.

Section 6.3.4.3 Calculation of sensitive environments factor value. Explains how to calculate the factor value. The rounding rule has been changed.

Section 6.3.5 Calculation of targets factor category value. Text has been revised to reflect the new names for factors.

Section 6.4 Calculation of air migration pathway score. Text has been revised to reflect the new divisor.

In addition to the above noted changes, the land use factor, Figure 2–2, and Tables 2–2, 2–3, 2–13, 2–17, and 2–19 in the proposed rule have been removed.

Section 7 Sites Containing Radioactive Substances

This entire part of the rule is new. As discussed in section III E of the preamble, this section has been added to provide direction on evaluating sites containing radioactive substances. Table 7–1 lists factors evaluated differently for such sites.

Section 7.1 Likelihood of release/likelihood of exposure. Explains the approach to evaluating the factor category.

Section 7.1.1 Observed release/observed contamination. Explains how to evaluate observed release (observed contamination) for radionuclides. The evaluation differs for radionuclides that occur naturally or are ubiquitous in the environment, for man-made radionuclides without ubiquitous background concentrations in the environment, and for gamma-emitting radionuclides in the soil exposure pathway. This section also explains the appropriate procedures for sites with mixed radioactive and other hazardous substances.

Section 7.1.2 Potential to release. Explains that potential to release factors are evaluated on the physical and chemical properties of radionuclides, not their radioactivity.

Section 7.2 Waste characteristics. Lists the factors evaluated.

Section 7.2.1 Human toxicity. Explains how to assign toxicity values to radioactive substances and describes appropriate procedures for sites containing mixed radionuclides and other hazardous substances.

Section 7.2.2 Ecosystem toxicity. Explains that ecosystem toxicity for radionuclides is assigned a value in the same way as is human toxicity except that the default value is 100 rather than 1,000.

Section 7.2.3 Persistence. Explains that radioactive substances are assigned persistence values based solely on half-life—radioactive half-life and volatilization half-life. Explains how to evaluate persistence for mixed radioactive and other hazardous substances.

Section 7.2.4 Selection of the substance potentially posing greatest hazard. The section explains how to select the substance potentially posing the greatest hazard.

Section 7.2.5 Hazardous waste quantity. Explains how to evaluate the hazardous waste quantity factor for sites containing radioactive substances.

Section 7.2.5.1 Source hazardous waste quantity for radionuclides. Describes differences between the migration pathways and the soil exposure pathway.

Section 7.2.5.1.1 Radionuclide constituent quantity (Tier A). Explains how to evaluate radionuclide constituent quantity for radionuclides.

Section 7.2.5.1.2 Radionuclide wastestream quantity (Tier B). Explains how to evaluate radionuclide wastestream quantity for radionuclides.

Section 7.2.5.1.3 Calculation of source hazardous waste quantity value for radionuclides. Explains how to assign a source value.

Section 7.2.5.2 Calculation of hazardous waste quantity factor value for radionuclides. Explains how to calculate the hazardous waste quantity factor value for radionuclides and describes use of the minimum value, which is either 10 or 100 (as described in section 2.4.2.2 above).

Section 7.2.5.3 Calculation of hazardous waste quantity factor volue for sites containing mixed radioactive and other hazardous substances. Explains how to calculate the factor value for these sites.

Section 7.3 Targets. Explains how to evaluate targets at sites containing radioactive substances and sites containing radioactive and other hazardous substances.

Section 7.3.1 Level of contamination at a sampling location. Explains how to determine the appropriate level of contamination.

Section 7.3.2 Selection of benchmarks and comparisons with observed release/observed contamination. This section lists the benchmarks and explains how they are used in determining the level of contamination.

V. Required Analyses

A. Executive Order No. 12291

Under Executive Order No. 12291, the Agency must judge whether a regulation is "major" and thus subject to the requirement of a Regulatory Impact Analysis. The rule published today is not major because the rule will not result in an effect on the economy of $100 million or more, will not result in increased costs or prices, will not have significant adverse effects on competition, employment, investment, productivity, and innovation, and will

not significantly disrupt domestic and export markets.

To estimate the costs associated with the final rule, a final economic analysis entitled "Economic Impact Analysis of the Revised Hazard Ranking System" was prepared as an addendum to the December 1987 economic impact analysis (EIA) to incorporate new data. As in the January 1988 EIA, the total annual cost of implementing the final rule is estimated as a function of the number of Screening SIs (SSI) and Listing SIs (LSI) that will be conducted annually and the unit cost of each. In the January 1988 EIA, estimates of total costs were developed assuming 1,130 SSIs and 100 LSIs would be conducted annually. The Agency now estimates that 1,100 SIs will be conducted annually (EPA is no longer using the terms SSI and LSI). The total annual cost is estimated to be $78.8 million, the sum of the cost of conducting 1,000 SIs at a unit cost of $55,000, 70 SIs for NPL sites (without monitoring wells) at a unit cost of $100,000, and 30 SIs for NPL sites (with monitoring wells) at a unit cost of $160,000.

To estimate the incremental cost of implementing the final revised version of the HRS, the unit cost of conducting all preremedial listing activities using the current HRS from the January 1988 EIA is updated. That cost was estimated to be $58,200 in the January 1988 EIA, and was developed assuming the PA had already been conducted. The 1988 estimate is a function of 480 hours of Field Investigation Team (FIT) technical time valued at $40 per hour and 30 samples being evaluated at a unit cost of $1,300 per sample. To compare the costs of the current HRS to those developed above for the final revised version of the HRS, the FIT technical time is valued at $50 per hour and each sample evaluation is estimated to cost $1,000. The revised total cost of conducting all listing activities beyond the PA for the current HRS, therefore, is estimated to be $54,000. In addition, the average level of effort for a PA under the current HRS is estimated to be 60 hours, and the unit cost of the PA, assuming a $50 FIT hourly rate, is estimated to be $3,000.

Based on these revisions, the annual cost of using the current HRS is estimated to be $65.4 million, the sum of the cost of conducting 2,000 PAs at a unit cost of $3,000 ($6 million) and the cost of conducting 1,100 SIs at a unit cost of $54,000 ($59.4 million). Compared to the current HRS, the annual incremental cost of using the final revised version of the HRS is estimated to be $13.4 million. On the basis of this evaluation, implementing the final revised version of the HRS would not constitute a major rule, because the annual incremental cost of the final rule is less than $100 million. No negative economic effects are anticipated from this rule.

B. Regulatory Flexibility Determination

Appendix A of the December 1987 EIA includes an assessment of the ability of responsible parties to pay the costs of HRS scoring under the current HRS and the three alternative scoring mechanisms considered at that time. That analysis evaluated the impact of HRS costs under each ranking methodology on the financial viability of 15 sample companies. Under that analysis, only the smallest sample firm (one with an average net income of $53,700) was expected to have difficulty in paying the costs of conducting a complete SI under each of the alternative ranking scenarios. The new unit cost of a complete SI developed during the Phase I field test and used in this economic analysis falls within the range of costs already evaluated in appendix A of the December 1987 EIA. Given the previous analysis, EPA concludes that most sample firms are healthy enough financially to be able to afford the expenditures associated with HRS site inspections. Responsible Parties (RPs) that are financially similar to the smallest firm (Firm 15 in appendix A of the December 1987 RIA), however, do not have the assets or the income to enable them to assume payments similar to the estimates derived for the SI done under the current HRS or the final revised version of the HRS.

The Regulatory Flexibility Act of 1980 requires that Federal agencies explicitly consider the effects of proposed and existing regulations on small entities and examine alternative regulations that would reduce significant adverse impacts on small entities. The small entities that could be affected by the revisions to the HRS are small businesses and small municipalities that are responsible for hazardous wastes at a site. Based on the updated analysis presented here, EPA concludes that using the final rule is unlikely to result in a significant impact on a substantial number of small entities. As discussed in the December 1987 EIA, this conclusion is drawn because small firms are no more or less likely to be responsible parties than are large firms. In addition, when they are RPs, small firms usually are one of several companies responsible for a site and probably would not bear the full burden of liability for HRS expenditures and other cleanup costs.

C. Paperwork Reduction Act

The information collection requirements contained in this rule have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, and has assigned OMB control number 2050–0095.

Public reporting burden for this collection of information is estimated to be 620 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM—U.S. Environmental Protection Agency, 401 M St., SW., Washington, DC 20460; and the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer for EPA."

D. Federalism Implications

E.O. 12612 requires agencies to assess whether a regulation will have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPA has determined that this regulation does not have federalism implications and that, therefore, a Federalism Assessment is not required.

List of Subjects in 40 CFR Part 300

Air pollution controls, Chemicals, Hazardous materials, Intergovernmental relations, Natural resources, Oil pollution, Reporting and recordkeeping, Superfund, Waste treatment and disposal, Water pollution control, Water supply.

Dated: November 9, 1990.

William K. Reilly,

Administrator.

40 CFR part 300 is amended as follows:

PART 300—[AMENDED]

1. The authority citation for part 300 continues to read as follows:

Authority: 42 U.S.C. 9605; 33 U.S.C. 1321(c)(2); E.O. No. 11735, 38 FR 21243; E.O No. 12580, 52 FR 2923.

2. Part 300, appendix A is revised to read as follows:

Appendix A to Part 300—The Hazard Ranking System

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1.0 Introduction

The Hazard Ranking System (HRS) is the principal mechanism the U.S. Environmental Protection Agency (EPA) uses to place sites on the National Priorities List (NPL). The HRS serves as a screening device to evaluate the potential for releases of uncontrolled hazardous substances to cause human health or environmental damage. The HRS provides a measure of relative rather than absolute risk. It is designed so that it can be consistently applied to a wide variety of sites.

1.1 Definitions

Acute toxicity: Measure of toxicological responses that result from a single exposure to a substance or from multiple exposures within a short period of time (typically several days or less). Specific measures of acute toxicity used within the HRS include lethal dose$_{50}$ (LD_{50}) and lethal concentration$_{50}$ (LC_{50}), typically measured within a 24-hour to 96-hour period.

Ambient Aquatic Life Advisory Concentrations (AALACs): EPA's advisory concentration limit for acute or chronic toxicity to aquatic organisms as established under section 304(a)(1) of the Clean Water Act, as amended.

Ambient Water Quality Criteria (AWQC): EPA's maximum acute or chronic toxicity concentrations for protection of aquatic life and its uses as established under section 304(a)(1) of the Clean Water Act, as amended.

Bioconcentration factor (BCF): Measure of the tendency for a substance to accumulate in the tissue of an aquatic organism. BCF is determined by the extent of partitioning of a substance, at equilibrium, between the tissue of an aquatic organism and water. As the ratio of concentration of a substance in the organism divided by the concentration in water, higher BCF values reflect a tendency for substances to accumulate in the tissue of aquatic organisms. [unitless].

Biodegradation: Chemical reaction of a substance induced by enzymatic activity of microorganisms.

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (Pub. L. 96–510, as amended).

Chronic toxicity: Measure of toxicological responses that result from repeated exposure to a substance over an extended period of time (typically 3 months or longer). Such responses may persist beyond the exposure or may not appear until much later in time than the exposure. HRS measures of chronic toxicity include Reference Dose (RfD) values.

Contract Laboratory Program (CLP): Analytical program developed for CERCLA waste site samples to fill the need for legally defensible analytical results supported by a high level of quality assurance and documentation.

Contract-Required Detection Limit (CRDL): Term equivalent to contract-required quantitation limit, but used primarily for inorganic substances.

Contract-Required Quantitation Limit (CRQL): Substance-specific level that a CLP laboratory must be able to routinely and reliably detect in specific sample matrices. It is not the lowest detectable level achievable, but rather the level that a CLP laboratory should reasonably quantify. The CRQL may or may not be equal to the quantitation limit of a given substance in a given sample. For HRS purposes, the term CRQL refers to both the contract-required quantitation limit and the contract-required detection limit.

Curie (Ci): Measure used to quantify the amount of radioactivity. One curie equals 37 billion nuclear transformations per second, and one picocurie (pCi) equals 10^{-12} Ci.

Decay product: Isotope formed by the radioactive decay of some other isotope. This newly formed isotope possesses physical and chemical properties that are different from

those of its parent isotope, and may also be radioactive.

Detection Limit (DL): Lowest amount that can be distinguished from the normal random "noise" of an analytical instrument or method. For HRS purposes, the detection limit used is the method detection limit (MDL) or, for real-time field instruments, the detection limit of the instrument as used in the field.

Dilution weight: Parameter in the HRS surface water migration pathway that reduces the point value assigned to targets as the flow or depth of the relevant surface water body increases. [unitless].

Distance weight: Parameter in the HRS air migration, ground water migration, and soil exposure pathways that reduces the point value assigned to targets as their distance increases from the site. [unitless].

Distribution coefficient (K_d): Measure of the extent of partitioning of a substance between geologic materials (for example, soil, sediment, rock) and water (also called partition coefficient). The distribution coefficient is used in the HRS in evaluating the mobility of a substance for the ground water migration pathway. [ml/g].

ED_{10} (10 percent effective dose): Estimated dose associated with a 10 percent increase in response over control groups. For HRS purposes, the response considered is cancer. [milligrams toxicant per kilogram body weight per day (mg/kg-day)].

Food and Drug Administration Action Level (FDAAL): Under section 406 of the Federal Food, Drug and Cosmetic Act, as amended, concentration of a poisonous or deleterious substance in human food or animal feed at or above which FDA will take legal action to remove adulterated products from the market. Only FDAALs established for fish and shellfish apply in the HRS.

Half-life: Length of time required for an initial concentration of a substance to be halved as a result of loss through decay. The HRS considers five decay processes: biodegradation, hydrolysis, photolysis, radioactive decay, and volatilization.

Hazardous substance: CERCLA hazardous substances, pollutants, and contaminants as defined in CERCLA sections 101(14) and 101(33), except where otherwise specifically noted in the HRS.

Hazardous wastestream: Material containing CERCLA hazardous substances (as defined in CERCLA section 101[14]) that was deposited, stored, disposed, or placed in, or that otherwise migrated to, a source.

HRS *"factor"*: Primary rating elements internal to the HRS.

HRS *"factor category"*: Set of HRS factors (that is, likelihood of release [or exposure], waste characteristics, targets).

HRS *"migration pathways"*: HRS ground water, surface water, and air migration pathways.

HRS *"pathway"*: Set of HRS factor categories combined to produce a score to measure relative risks posed by a site in one of four environmental pathways (that is, ground water, surface water, soil, and air).

HRS *"site score"*: Composite of the four HRS pathway scores.

Henry's law constant: Measure of the volatility of a substance in a dilute solution of water at equilibrium. It is the ratio of the vapor pressure exerted by a substance in the gas phase over a dilute aqueous solution of that substance to its concentration in the solution at a given temperature. For HRS purposes, use the value reported at or near 25° C. [atmosphere-cubic meters per mole (atm-m^3/mol)].

Hydrolysis: Chemical reaction of a substance with water.

Karst: Terrain with characteristics of relief and drainage arising from a high degree of rock solubility in natural waters. The majority of karst occurs in limestones, but karst may also form in dolomite, gypsum, and salt deposits. Features associated with karst terrains typically include irregular topography, sinkholes, vertical shafts, abrupt ridges, caverns, abundant springs, and/or disappearing streams. Karst aquifers are associated with karst terrain.

LC_{50} (lethal concentration, 50 percent): Concentration of a substance in air [typically micrograms per cubic meter ($\mu g/m^3$)] or water [typically micrograms per liter ($\mu g/l$)] that kills 50 percent of a group of exposed organisms. The LC_{50} is used in the HRS in assessing acute toxicity.

LD_{50} (lethal dose, 50 percent): Dose of a substance that kills 50 percent of a group of exposed organisms. The LD_{50} is used in the HRS in assessing acute toxicity [milligrams toxicant per kilogram body weight (mg/kg)].

Maximum Contaminant Level (MCL): Under section 1412 of the Safe Drinking Water Act, as amended, the maximum permissible concentration of a substance in water that is delivered to any user of a public water supply.

Maximum Contaminant Level Goal (MCLG): Under section 1412 of the Safe Drinking Water Act, as amended, a nonenforceable concentration for a substance in drinking water that is protective of adverse human health effects and allows an adequate margin of safety.

Method Detection Limit (MDL): Lowest concentration of analyte that a method can detect reliably in either a sample or blank.

Mixed radioactive and other hazardous substances: Material containing both radioactive hazardous substances and nonradioactive hazardous substances, regardless of whether these types of substances are physically separated, combined chemically, or simply mixed together.

National Ambient Air Quality Standards (NAAQS): Primary standards for air quality established under sections 108 and 109 of the Clean Air Act, as amended.

National Emission Standards for Hazardous Air Pollutants (NESHAPs): Standards established for substances listed under section 112 of the Clean Air Act, as amended. Only those NESHAPs promulgated in ambient concentration units apply in the HRS.

Octanol-water partition coefficient (K_{ow} [or P]): Measure of the extent of partitioning of a substance between water and octanol at equilibrium. The K_{ow} is determined by the ratio between the concentration in octanol divided by the concentration in water at equilibrium. [unitless].

Organic carbon partition coefficient (K_{oc}): Measure of the extent of partitioning of a substance, at equilibrium, between organic carbon in geologic materials and water. The higher the K_{oc}, the more likely a substance is to bind to geologic materials than to remain in water. [ml/g].

Photolysis: Chemical reaction of a substance caused by direct absorption of solar energy (direct photolysis) or caused by other substances that absorb solar energy (indirect photolysis).

Radiation: Particles (alpha, beta, neutrons) or photons (x- and gamma-rays) emitted by radionuclides.

Radioactive decay: Process of spontaneous nuclear transformation, whereby an isotope of one element is transformed into an isotope of another element, releasing excess energy in the form of radiation.

Radioactive half-life: Time required for one-half the atoms in a given quantity of a specific radionuclide to undergo radioactive decay.

Radioactive substance: Solid, liquid, or gas containing atoms of a single radionuclide or multiple radionuclides.

Radioactivity: Property of those isotopes of elements that exhibit radioactive decay and emit radiation.

Radionuclide/radioisotope: Isotope of an element exhibiting radioactivity. For HRS purposes, "radionuclide" and "radioisotope" are used synonymously.

Reference dose (RfD): Estimate of a daily exposure level of a substance to a human population below which adverse noncancer health effects are not anticipated. [milligrams toxicant per kilogram body weight per day (mg/kg-day)].

Removal action: Action that removes hazardous substances from the site for proper disposal or destruction in a facility permitted under the Resource Conservation and Recovery Act or the Toxic Substances Control Act or by the Nuclear Regulatory Commission.

Roentgen (R): Measure of external exposures to ionizing radiation. One roentgen equals that amount of x-ray or gamma radiation required to produce ions carrying a charge of 1 electrostatic unit (esu) in 1 cubic centimeter of dry air under standard conditions. One microroentgen (μR) equals 10^{-6} R.

Sample quantitation limit (SQL): Quantity of a substance that can be reasonably quantified given the limits of detection for the methods of analysis and sample characteristics that may affect quantitation (for example, dilution, concentration).

Screening concentration: Media-specific benchmark concentration for a hazardous substance that is used in the HRS for comparison with the concentration of that hazardous substance in a sample from that media. The screening concentration for a specific hazardous substance corresponds to its reference dose for inhalation exposures or for oral exposures, as appropriate, and, if the substance is a human carcinogen with a weight-of-evidence classification of A, B, or C, to that concentration that corresponds to its 10^{-6} individual lifetime excess cancer risk for inhalation exposures or for oral exposures, as appropriate.

Site: Area(s) where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located. Such areas may include multiple sources and may include the area between sources.

Slope factor (also referred to as cancer potency factor): Estimate of the probability of response (for example, cancer) per unit intake of a substance over a lifetime. The slope factor is typically used to estimate upper-bound probability of an individual developing cancer as a result of exposure to a particular level of a human carcinogen with a weight-of-evidence classification of A, B, or C. [(mg/kg-day)$^{-1}$ for non-radioactive substances and (pC$_i$)$^{-1}$ for radioactive substances].

Source: Any area where a hazardous substance has been deposited, stored, disposed, or placed, plus those soils that have become contaminated from migration of a hazardous substance. Sources do not include those volumes of air, ground water, surface water, or surface water sediments that have become contaminated by migration, except: in the case of either a ground water plume with no identified source or contaminated surface water sediments with no identified source, the plume or contaminated sediments may be considered a source.

Target distance limit: Maximum distance over which targets for the site are evaluated. The target distance limit varies by HRS pathway.

Uranium Mill Tailings Radiation Control Act (UMTRCA) Standards: Standards for radionuclides established under sections 102, 104, and 108 of the Uranium Mill Tailings Radiation Control Act, as amended.

Vapor pressure: Pressure exerted by the vapor of a substance when it is in equilibrium with its solid or liquid form at a given temperature. For HRS purposes, use the value reported at or near 25° C. [atmosphere or torr].

Volatilization: Physical transfer process through which a substance undergoes a change of state from a solid or liquid to a gas.

Water solubility: Maximum concentration of a substance in pure water at a given temperature. For HRS purposes, use the value reported at or near 25° C. [milligrams per liter (mg/l)].

Weight-of-evidence: EPA classification system for characterizing the evidence supporting the designation of a substance as a human carcinogen. EPA weight-of-evidence groupings include:

Group A: Human carcinogen--sufficient evidence of carcinogenicity in humans.
Group B1: Probable human carcinogen--limited evidence of carcinogenicity in humans.
Group B2: Probable human carcinogen--sufficient evidence of carcinogenicity in animals.
Group C: Possible human carcinogen--limited evidence of carcinogenicity in animals.
Group D: Not classifiable as to human carcinogenicity--applicable when there is no animal evidence, or when human or animal evidence is inadequate.
Group E: Evidence of noncarcinogenicity for humans.

2.0 Evaluations Common to Multiple Pathways

2.1 *Overview.* The HRS site score (S) is the result of an evaluation of four pathways:

- Ground Water Migration (S_{gw}).
- Surface Water Migration (S_{sw}).
- Soil Exposure (S_s).
- Air Migration (S_a).

The ground water and air migration pathways use single threat evaluations, while the surface water migration and soil exposure pathways use multiple threat evaluations. Three threats are evaluated for the surface water migration pathway: drinking water, human food chain, and environmental. These threats are evaluated for two separate migration components--overland/flood migration and ground water to surface water migration. Two threats are evaluated for the soil exposure pathway: resident population and nearby population.

The HRS is structured to provide a parallel evaluation for each of these pathways and threats. This section focuses on these parallel evaluations, starting with the calculation of the HRS site score and the individual pathway scores.

2.1.1 *Calculation of HRS site score.* Scores are first calculated for the individual pathways as specified in sections 2 through 7 and then are combined for the site using the following root-mean-square equation to determine the overall HRS site score, which ranges from 0 to 100:

$$S = \sqrt{\frac{S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2}{4}}$$

2.1.2 *Calculation of pathway score.* Table 2-1, which is based on the air migration pathway, illustrates the basic parameters used to calculate a pathway score. As Table 2-1 shows, each pathway (or threat) score is the product of three "factor categories": likelihood of release, waste characteristics, and targets. (The soil exposure pathway uses likelihood of exposure rather than likelihood of release.) Each of the three factor categories contains a set of factors that are assigned numerical values and combined as specified in sections 2 through 7. The factor values are rounded to the nearest integer, except where otherwise noted.

2.1.3 *Common evaluations.* Evaluations common to all four HRS pathways include:

- Characterizing sources.
  - –Identifying sources [and, for the soil exposure pathway, areas of observed contamination [see section 5.0.1]].
  - –Identifying hazardous substances associated with each source (or area of observed contamination).
  - –Identifying hazardous substances available to a pathway.

TABLE 2-1.—SAMPLE PATHWAY SCORESHEET

Factor category	Maximum value	Value assigned
Likelihood of Release		
1. Observed Release	550	
2. Potential to Release	500	
3. Likelihood of Release (higher of lines 1 and 2)	550	
Waste Characteristics		
4. Toxicity/Mobility	(a)	
5. Hazardous Waste Quantity	(a)	
6. Waste Characteristics	100	
Targets		
7. Nearest Individual		
7a. Level I	50	
7b. Level II	45	
7c. Potential Contamination	20	
7d. Nearest Individual (higher of lines 7a, 7b, or 7c)	50	
8. Population		
8a. Level I	(b)	
8b. Level II	(b)	
8c. Potential Contamination	(b)	
8d. Total Population (lines 8a+8b+8c)	(b)	
9. Resources	5	
10. Sensitive Environments	(b)	
10a. Actual Contamination	(b)	
10b. Potential Contamination	(b)	
10c. Sensitive Environments (lines 10a+10b)	(b)	
11. Targets (lines 7d+8d+9+10c)	(b)	
12. Pathway Score is the product of Likelihood of Release, Waste Characteristics, and Targets, divided by 82,500. Pathway scores are limited to a maximum of 100 points.		

[a] Maximum value applies to waste characteristics category. The product of lines 4 and 5 is used in Table 2-7 to derive the value for the waste characteristics factor category.

[b] There is no limit to the human population or sensitive environments factor values. However, the pathway score based solely on sensitive environments is limited to a maximum of 60 points.

- Scoring likelihood of release (or likelihood of exposure) factor category.
  - –Scoring observed release (or observed contamination).
  - –Scoring potential to release when there is no observed release.
- Scoring waste characteristics factor category.
  - –Evaluating toxicity.
  - –Combining toxicity with mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential, as appropriate to the pathway (or threat).
  - –Evaluating hazardous waste quantity.
  - –Combining hazardous waste quantity with the other waste characteristics factors.
  - –Determining waste characteristics factor category value.
- Scoring targets factor category.
  - –Determining level of contamination for targets.

These evaluations are essentially identical for the three migration pathways (ground water, surface water, and air). However, the

evaluations differ in certain respects for the soil exposure pathway.

Section 7 specifies modifications that apply to each pathway when evaluating sites containing radioactive substances.

Section 2 focuses on evaluations common at the pathway and threat levels. Note that for the ground water and surface water migration pathways, separate scores are calculated for each aquifer (see section 3.0) and each watershed (see sections 4.1.1.3 and 4.2.1.5) when determining the pathway scores for a site. Although the evaluations in section 2 do not vary when different aquifers or watersheds are scored at a site, the specific factor values (for example, observed release, hazardous waste quantity, toxicity/mobility) that result from these evaluations can vary by aquifer and by watershed at the site. This can occur through differences both in the specific sources and targets eligible to be evaluated for each aquifer and watershed and in whether observed releases can be established for each aquifer and watershed. Such differences in scoring at the aquifer and watershed level are addressed in sections 3 and 4, not section 2.

2.2 *Characterize sources.* Source characterization includes identification of the following:

- Sources (and areas of observed contamination) at the site.
- Hazardous substances associated with these sources (or areas of observed contamination).
- Pathways potentially threatened by these hazardous substances.

Table 2-2 presents a sample worksheet for source characterization.

2.2.1 *Identify sources.* For the three migration pathways, identify the sources at the site that contain hazardous substances. Identify the migration pathway(s) to which each source applies. For the soil exposure pathway, identify areas of observed contamination at the site (see section 5.0.1).

TABLE 2-2.—SAMPLE SOURCE CHARACTERIZATION WORKSHEET

Source: _____

A. Source dimensions and hazardous waste quantity.

Hazardous constituent quantity: _____

Hazardous wastestream quantity: _____

Volume: _____

Area: _____

Area of observed contamination: _____

B. Hazardous substances associated with the source.

Hazardous substance	Available to pathway						
	Air		Ground water (GW)	Surface water (SW)		Soil	
	Gas	Particulate		Overland/ flood	GW to SW	Resident	Nearby

2.2.2 *Identify hazardous substances associated with a source.* For each of the three migration pathways, consider those hazardous substances documented in a source (for example, by sampling, labels, manifests, oral or written statements) to be associated with that source when evaluating each pathway. In some instances, a hazardous substance can be documented as being present at a site (for example, by labels, manifests, oral or written statements), but the specific source(s) containing that hazardous substance cannot be documented. For the three migration pathways, in those instances when the specific source(s) cannot be documented for a bazardous substance, consider the hazardous substance to be present in each source at the site, except sources for which definitive information indicates that the hazardous substance was not or could not be present.

For an area of observed contamination in the soil exposure pathway, consider only those hazardous substances that meet the criteria for observed contamination for that area (see section 5.0.1) to be associated with that area when evaluating the pathway.

2.2.3 *Identify hazardous substances available to a pathway.* In evaluating each migration pathway, consider the following hazardous substances available to migrate from the sources at the site to the pathway:

- Ground water migration.
  - –Hazardous substances that meet the criteria for an observed release (see section 2.3) to ground water.
  - –All hazardous substances associated with a source with a ground water containment factor value greater than 0 (see section 3.1.2.1).
- Surface water migration—overland/flood component.
  - –Hazardous substances that meet the criteria for an observed release to surface water in the watershed being evaluated.
  - –All hazardous substances associated with a source with a surface water containment factor value greater than 0 for the watershed (see sections 4.1.2.1.2.1.1 and 4.1.2.1.2.2.1).
- Surface water migration—ground water to surface water component.
  - –Hazardous substances that meet the criteria for an observed release to ground water.
  - –All hazardous substances associated with a source with a ground water containment factor value greater than 0 (see sections 4.2.2.1.2 and 3.1.2.1).
- Air migration.
  - –Hazardous substances that meet the criteria for an observed release to the atmosphere.
  - –All gaseous hazardous substances associated with a source with a gas containment factor value greater than 0 (see section 6.1.2.1.1).
  - –All particulate hazardous substances associated with a source with a particulate containment factor value greater than 0 (see section 6.1.2.2.1).
- For each migration pathway, in those instances when the specific source(s) containing the hazardous substance cannot be documented, consider that hazardous substance to be available to migrate to the pathway when it can be associated (see section 2.2.2) with at least one source having a containment factor value greater than 0 for that pathway.

In evaluating the soil exposure pathway, consider the following hazardous substances available to the pathway:

• Soil exposure—resident population threat.

–All hazardous substances that meet the criteria for observed contamination at the site (see section 5.0.1).

• Soil exposure—nearby population threat.

–All hazardous substances that meet the criteria for observed contamination at areas with an attractiveness/accessibility factor value greater than 0 (see section 5.2.1.1).

2.3 *Likelihood of release.* Likelihood of release is a measure of the likelihood that a waste has been or will be released to the environment. The likelihood of release factor category is assigned the maximum value of 550 for a migration pathway whenever the criteria for an observed release are met for that pathway. If the criteria for an observed release are met, do not evaluate potential to release for that pathway. When the criteria for an observed release are not met, evaluate potential to release for that pathway, with a maximum value of 500. The evaluation of potential to release varies by migration pathway (see sections 3, 4 and 6).

Establish an observed release either by direct observation of the release of a hazardous substance into the media being evaluated (for example, surface water) or by chemical analysis of samples appropriate to the pathway being evaluated (see sections 3, 4, and 6). The minimum standard to establish an observed release by chemical analysis is analytical evidence of a hazardous substance in the media significantly above the background level. Further, some portion of the release must be attributable to the site. Use the criteria in Table 2–3 as the standard for determining analytical significance. (The criteria in Table 2–3 are also used in establishing observed contamination for the soil exposure pathway, see section 5.0.1.) Separate criteria apply to radionuclides (see section 7.1.1).

TABLE 2–3.—OBSERVED RELEASE CRITERIA FOR CHEMICAL ANALYSIS

Sample Measurement < Sample Quantitation Limit [a]
No observed release is established.
Sample Measurement ≥ SAMPLE QUANTITATION LIMIT [a]
An observed release is established as follows: • If the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the sample quantitation limit.[a] • If the background concentration equals or exceeds the detection limit, an observed release is established when the sample measurement is 3 times or more above the background concentration.

[a] If the sample quantitation limit (SQL) cannot be established, determined if there is an observed release as follows:

—If the sample analysis was performed under the EPA Contract Laboratory Program, use the EPA contract-required quantitation limit (CRQL) in place of the SQL.

—If the sample analysis is not performed under the EPA Contract Laboratory Program, use the detection limit (DL) in place of the SQL.

2.4 *Waste characteristics.* The waste characteristics factor category includes the following factors: hazardous waste quantity, toxicity, and as appropriate to the pathway or threat being evaluated, mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential.

2.4.1 *Selection of substance potentially posing greatest hazard.* For all pathways (and threats), select the hazardous substance potentially posing the greatest hazard for the pathway (or threat) and use that substance in evaluating the waste characteristics category of the pathway (or threat). For the three migration pathways (and threats), base the selection of this hazardous substance on the toxicity factor value for the substance, combined with its mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential factor values, as applicable to the migration pathway (or threat). For the soil exposure pathway, base the selection on the toxicity factor alone.

Evaluation of the toxicity factor is specified in section 2.4.1.1. Use and evaluation of the mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential factors vary by pathway (or threat) and are specified under the appropriate pathway (or threat) section. Section 2.4.1.2 identifies the specific factors that are combined with toxicity in evaluating each pathway (or threat).

2.4.1.1 *Toxicity factor.* Evaluate toxicity for those hazardous substances at the site that are available to the pathway being scored. For all pathways and threats, except the surface water environmental threat, evaluate human toxicity as specified below. For the surface water environmental threat, evaluate ecosystem toxicity as specified in section 4.1.4.2.1.1.

Establish human toxicity factor values based on quantitative dose-response parameters for the following three types of toxicity:

• Cancer—Use slope factors (also referred to as cancer potency factors) combined with weight-of-evidence ratings for carcinogenicity. If a slope factor is not available for a substance, use its ED_{10} value to estimate a slope factor as follows:

$$\text{Slope factor} = \frac{1}{6\ (ED_{10})}$$

• Noncancer toxicological responses of chronic exposure—use reference dose (RfD) values.

• Noncancer toxicological responses of acute exposure—use acute toxicity parameters, such as the LD_{50}.

Assign human toxicity factor values to a hazardous substance using Table 2–4, as follows:

• If RfD and slope factor values are both available for the hazardous substance, assign the substance a value from Table 2–4 for each. Select the higher of the two values assigned and use it as the overall toxicity factor value for the hazardous substance.

• If either an RfD or slope factor value is available, but not both, assign the hazardous substance an overall toxicity factor value from Table 2–4 based solely on the available value (RfD or slope factor).

• If neither an RfD nor slope factor value is available, assign the hazardous substance an overall toxicity factor value from Table 2–4 based solely on acute toxicity. That is, consider acute toxicity in Table 2–4 only when both RfD and slope factor values are not available.

• If neither an RfD, nor slope factor, nor acute toxicity value is available, assign the hazardous substance an overall toxicity factor value of 0 and use other hazardous substances for which information is available in evaluating the pathway.

TABLE 2–4.—TOXICITY FACTOR EVALUATION

Chronic Toxicity (Human)

Reference dose (RfD) (mg/kg-day)	Assigned value
RfD < 0.0005	10,000
0.0005 ≤ RfD < 0.005	1,000
0.005 ≤ RfD < 0.05	100
0.05 ≤ RfD < 0.5	10
0.5 ≤ RfD	1
RfD not available	0

Carcinogenicity (Human)

Weight-of-evidence[a]/slope factor (mg/kg-day)$^{-1}$			Assigned value
A	B	C	
0.5 ≤ SF[b]	5 ≤ SF	50 ≤ SF	10,000
0.05 ≤ SF < 0.5	0.5 ≤ SF < 5	5 ≤ SF < 50	1,000
SF < 0.05	0.05 ≤ SF < 0.5	0.5 ≤ SF < 5	100
— — —	SF < 0.05	SF < 0.5	10
Slope factor not available.	Slope factor not available.	Slope factor not available.	0

[a] A, B, and C refer to weight-of-evidence categories. Assign substances with a weight-of-evidence category of D (inadequate evidence of carcinogenicity) or E (evidence of lack of carcinogenicity) a value of 0 for carcinogenicity.

[b] SF = Slope factor.

TABLE 2-4.—TOXICITY FACTOR EVALUATION—CONCLUDED

Acute Toxicity (Human)

Oral LD_{50} (mg/kg)	Dermal LD_{50} (mg/kg)	Dust or mist LC_{50} (mg/l)	Gas or vapor LC_{50} (ppm)	Assigned value
— — —	— — —	— — —	— — —	— — —
$LD_{50} < 5$	$LD_{50} < 2$	$LC_{50} < 0.2$	$LC_{50} < 20$	1,000
$5 \leq LD_{50} < 50$	$2 \leq LD_{50} < 20$	$0.2 \leq LC_{50} < 2$	$20 \leq LC_{50} < 200$	100
$50 \leq LD_{50} < 500$	$20 \leq LD_{50} < 200$	$2 \leq LC_{50} < 20$	$200 \leq LC_{50} < 2,000$	10
$500 \leq LD_{50}$	$200 \leq LD_{50}$	$20 \leq LC_{50}$	$2,000 \leq LC_{50}$	1
LD_{50} not available	LD_{50} not available	LC_{50} not available	LC_{50} not available	0

If a toxicity factor value of 0 is assigned to all hazardous substances available to a particular pathway (that is, insufficient toxicity data are available for evaluating all the substances), use a default value of 100 as the overall human toxicity factor value for all hazardous substances available to the pathway. For hazardous substances having usable toxicity data for multiple exposure routes (for example, inhalation and ingestion), consider all exposure routes and use the highest assigned value, regardless of exposure route, as the toxicity factor value.

For HRS purposes, assign both asbestos and lead (and its compounds) a human toxicity factor value of 10,000.

Separate criteria apply for assigning factor values for human toxicity and ecosystem toxicity for radionuclides (see sections 7.2.1 and 7.2.2).

2.4.1.2 *Hazardous substance selection.* For each hazardous substance evaluated for a migration pathway (or threat), combine the human toxicity factor value (or ecosystem toxicity factor value) for the hazardous substance with a mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential factor value as follows:

- Ground water migration.
  - –Determine a combined human toxicity/mobility factor value for the hazardous substance (see section 3.2.1).
- Surface water migration-overland/flood migration component.
  - –Determine a combined human toxicity/persistence factor value for the hazardous substance for the drinking water threat (see section 4.1.2.2.1).
  - –Determine a combined human toxicity/persistence/bioaccumulation factor value for the hazardous substance for the human food chain threat (see section 4.1.3.2.1).
  - –Determine a combined ecosystem toxicity/persistence/bioaccumulation factor value for the hazardous substance for the environmental threat (see section 4.1.4.2.1).
- Surface water migration-ground water to surface water migration component.
  - –Determine a combined human toxicity/mobility/persistence factor value for the hazardous substance for the drinking water threat (see section 4.2.2.2.1).
  - –Determine a combined human toxicity/mobility/persistence/bioaccumulation factor value for the hazardous substance for the human food chain threat (see section 4.2.3.2.1).
  - –Determine a combined ecosystem toxicity/mobility/persistence/bioaccumulation factor value for the hazardous substance for the environmental threat (see section 4.2.4.2.1).
- Air migration.
  - –Determine a combined human toxicity/mobility factor value for the hazardous substance (see section 6.2.1).

Determine each combined factor value for a hazardous substance by multiplying the individual factor values appropriate to the pathway (or threat). For each migration pathway (or threat) being evaluated, select the hazardous substance with the highest combined factor value and use that substance in evaluating the waste characteristics factor category of the pathway (or threat).

For the soil exposure pathway, select the hazardous substance with the highest human toxicity factor value from among the substances that meet the criteria for observed contamination for the threat evaluated and use that substance in evaluating the waste characteristics factor category.

2.4.2 *Hazardous waste quantity.* Evaluate the hazardous waste quantity factor by first assigning each source (or area of observed contamination) a source hazardous waste quantity value as specified below. Sum these values to obtain the hazardous waste quantity factor value for the pathway being evaluated.

In evaluating the hazardous waste quantity factor for the three migration pathways, allocate hazardous substances and hazardous wastestreams to specific sources in the manner specified in section 2.2.2, except: consider hazardous substances and hazardous wastestreams that cannot be allocated to any specific source to constitute a separate "unallocated source" for purposes of evaluating only this factor for the three migration pathways. Do not, however, include a hazardous substance or hazardous wastestream in the unallocated source for a migration pathway if there is definitive information indicating that the substance or wastestream could only have been placed in sources with a containment factor value of 0 for that migration pathway.

In evaluating the hazardous waste quantity factor for the soil exposure pathway, allocate to each area of observed contamination only those hazardous substances that meet the criteria for observed contamination for that area of observed contamination and only those hazardous wastestreams that contain hazardous substances that meet the criteria for observed contamination for that area of observed contamination. Do not consider other hazardous substances or hazardous wastestreams at the site in evaluating this factor for the soil exposure pathway.

2.4.2.1 *Source hazardous waste quantity.* For each of the three migration pathways, assign a source hazardous waste quantity value to each source (including the unallocated source) having a containment factor value greater than 0 for the pathway being evaluated. Consider the unallocated source to have a containment factor value greater than 0 for each migration pathway.

For the soil exposure pathway, assign a source hazardous waste quantity value to each area of observed contamination, as applicable to the threat being evaluated.

For all pathways, evaluate source hazardous waste quantity using the following four measures in the following hierarchy:

- Hazardous constituent quantity.
- Hazardous wastestream quantity.
- Volume.
- Area.

For the unallocated source, use only the first two measures.

Separate criteria apply for assigning a source hazardous waste quantity value for radionuclides (see section 7.2.5).

2.4.2.1.1 *Hazardous constituent quantity.* Evaluate hazardous constituent quantity for the source (or area of observed contamination) based solely on the mass of CERCLA hazardous substances (as defined in CERCLA section 101(14), as amended) allocated to the source (or area of observed contamination), except:

- For a hazardous waste listed pursuant to section 3001 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA), 42 U.S.C. 6901 et seq., determine its mass for the evaluation of this measure as follows:
  - –If the hazardous waste is listed solely for Hazard Code T (toxic waste), include only the mass of constituents in the hazardous waste that are CERCLA hazardous substances and not the mass of the entire hazardous waste.
  - –If the hazardous waste is listed for any other Hazard Code (including T plus any other Hazard Code), include the mass of the entire hazardous waste.
- For a RCRA hazardous waste that exhibits the characteristics identified under section 3001 of RCRA, as amended, determine its mass for the evaluation of this measure as follows:

-If the hazardous waste exhibits only the characteristic of toxicity (or only the characteristic of EP toxicity), include only the mass of constituents in the hazardous waste that are CERCLA hazardous substances and not the mass of the entire hazardous waste.
-If the hazardous waste exhibits any other characteristic identified under section 3001 (including any other characteristic plus the characteristic of toxicity [or the characteristic of EP toxicity]), include the mass of the entire hazardous waste.

Based on this mass, designated as C, assign a value for hazardous constituent quantity as follows:

• For the migration pathways, assign the source a value for hazardous constituent quantity using the Tier A equation of Table 2-5.

• For the soil exposure pathway, assign the area of observed contamination a value using the Tier A equation of Table 5-2 (section 5.1.2.2).

If the hazardous constituent quantity for the source (or area of observed contamination) is adequately determined (that is, the total mass of all CERCLA hazardous substances in the source and releases from the source [or in the area of observed contamination] is known or is estimated with reasonable confidence), do not evaluate the other three measures discussed below. Instead assign these other three measures a value of 0 for the source (or area of observed contamination) and proceed to section 2.4.2.1.5.

If the hazardous constituent quantity is not adequately determined, assign the source (or area of observed contamination) a value for hazardous constituent quantity based on the available data and proceed to section 2.4.2.1.2.

TABLE 2-5.—HAZARDOUS WASTE QUANTITY EVALUATION EQUATIONS

Tier	Measure	Units	Equation for assigning value [a]
A	**Hazardous constituent quantity (C)**	lb	C
B [b]	**Hazardous wastestream quantity (W)**	lb	W/5,000
C [b]	**/olume (V)**		
	Landfill	yd^3	V/2,500
	Surface impoundment	yd^3	V/2.5
	Surface impoundment (buried/backfilled)	yd^3	V/2.5
	Drums [c]	gallon	V/500
	Tanks and containers other than drums	yd^3	V/2.5
	Contaminated soil	yd^3	V/2,500
	Pile	yd^3	V/2.5
	Other	yd^3	V/2.5
D [b]	**Area (A)**		
	Landfill	ft^2	A/3,400
	Surface impoundment	ft^2	A/13

TABLE 2-5.—HAZARDOUS WASTE QUANTITY EVALUATION EQUATIONS—Concluded

Tier	Measure	Units	Equation for assigning value [a]
	Surface impoundment (buried/backfilled)	ft^2	A/13
	Land treatment	ft^2	A/270
	Pile [d]	ft^2	A/13
	Contaminated soil	ft^2	A/34,000

[a] Do not round to nearest integer.
[b] Convert volume to mass when necessary: 1 ton = 2,000 pounds = 1 cubic yard = 4 drums = 200 gallons.
[c] If actual volume of drums is unavailable, assume 1 drum = 50 gallons.
[d] Use land surface area under pile, not surface area of pile.

2.4.2.1.2 *Hazardous wastestream quantity.* Evaluate hazardous wastestream quantity for the source (or area of observed contamination) based on the mass of hazardous wastestreams plus the mass of any additional CERCLA pollutants and contaminants (as defined in CERCLA section 101[33], as amended) that are allocated to the source (or area of observed contamination). For a wastestream that consists solely of a hazardous waste listed pursuant to section 3001 of RCRA, as amended or that consists solely of a RCRA hazardous waste that exhibits the characteristics identified under section 3001 of RCRA, as amended, include the mass of that entire hazardous waste in the evaluation of this measure.

Based on this mass, designated as W, assign a value for hazardous wastestream quantity as follows:

• For the migration pathways, assign the source a value for hazardous wastestream quantity using the Tier B equation of Table 2-5.

• For the soil exposure pathway, assign the area of observed contamination a value using the Tier B equation of Table 5-2 (section 5.1.2.2).

Do not evaluate the volume and area measures described below if the source is the unallocated source or if the following condition applies:

• The hazardous wastestream quantity for the source (or area of observed contamination) is adequately determined—that is, total mass of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source (or for the area of observed contamination) is known or is estimated with reasonable confidence.

If the source is the unallocated source or if this condition applies, assign the volume and area measures a value of 0 for the source (or area of observed contamination) and proceed to section 2.4.2.1.5. Otherwise, assign the source (or area of observed contamination) a value for hazardous wastestream quantity based on the available data and proceed to section 2.4.2.1.3.

2.4.2.1.3 *Volume.* Evaluate the volume measure using the volume of the source (or the volume of the area of observed contamination). For the soil exposure pathway, restrict the use of the volume measure to those areas of observed contamination specified in section 5.1.2.2.

Based on the volume, designated as V, assign a value to the volume measure as follows:

• For the migration pathways, assign the source a value for volume using the appropriate Tier C equation of Table 2-5.

• For the soil exposure pathway, assign the area of observed contamination a value for volume using the appropriate Tier C equation of Table 5-2 (section 5.1.2.2).

If the volume of the source (or volume of the area of observed contamination, if applicable) can be determined, do not evaluate the area measure. Instead, assign the area measure a value of 0 and proceed to section 2.4.2.1.5. If the volume cannot be determined (or is not applicable for the soil exposure pathway), assign the source (or area of observed contamination) a value of 0 for the volume measure and proceed to section 2.4.2.1.4.

2.4.2.1.4 *Area.* Evaluate the area measure using the area of the source (or the area of the area of observed contamination). Based on this area, designated as A, assign a value to the area measure as follows:

• For the migration pathways, assign the source a value for area using the appropriate Tier D equation of Table 2-5.

• For the soil exposure pathway, assign the area of observed contamination a value for area using the appropriate Tier D equation of Table 5-2 (section 5.1.2.2).

2.4.2.1.5 *Calculation of source hazardous waste quantity value.* Select the highest of the values assigned to the source (or area of observed contamination) for the hazardous constituent quantity, hazardous wastestream quantity, volume, and area measures. Assign this value as the source hazardous waste quantity value. Do not round to the nearest integer.

2.4.2.2 *Calculation of hazardous waste quantity factor value.* Sum the source hazardous waste quantity values assigned to all sources (including the unallocated source) or areas of observed contamination for the pathway being evaluated and round this sum to the nearest integer, except: if the sum is greater than 0, but less than 1, round it to 1. Based on this value, select a hazardous waste quantity factor value for the pathway from Table 2-6.

TABLE 2-6.—HAZARDOUS WASTE QUANTITY FACTOR VALUES

Hazardous waste quantity value	Assigned value
0	0
1 [a] to 100	1 [b]
Greater than 100 to 10,000	100
Greater than 10,000 to 1,000,000	10,000
Greater than 1,000,000	1,000,000

[a] If the hazardous waste quantity value is greater than 0, but less than 1, round it to 1 as specified in text.
[b] For the pathway, if hazardous constituent quantity is not adequately determined, assign a value as specified in the text; do not assign the value of 1.

For a migration pathway, if the hazardous constituent quantity is adequately determined (see section 2.4.2.1.1) for all sources (or all portions of sources and releases remaining after a removal action), assign the value from Table 2-6 as the hazardous waste quantity factor value for the pathway. If the hazardous constituent quantity is not adequately determined for one or more sources (or one or more portions of sources or releases remaining after a removal action) assign a factor value as follows:

- If any target for that migration pathway is subject to Level I or Level II concentrations (see section 2.5), assign either the value from Table 2-6 or a value of 100, whichever is greater, as the hazardous waste quantity factor value for that pathway.
- If none of the targets for that pathway is subject to Level I or Level II concentrations, assign a factor value as follows:
  - -If there has been no removal action, assign either the value from Table 2-6 or a value of 10, whichever is greater, as the hazardous waste quantity factor value for that pathway.
  - -If there has been a removal action:
    - --Determine values from Table 2-6 with and without consideration of the removal action.
    - --If the value that would be assigned from Table 2-6 without consideration of the removal action would be 100 or greater, assign either the value from Table 2-6 with consideration of the removal action or a value of 100, whichever is greater, as the hazardous waste quantity factor value for the pathway.
    - --If the value that would be assigned from Table 2-6 without consideration of the removal action would be less than 100, assign a value of 10 as the hazardous waste quantity factor value for the pathway.

For the soil exposure pathway, if the hazardous constituent quantity is adequately determined for all areas of observed contamination, assign the value from Table 2-6 as the hazardous waste quantity factor value. If the hazardous constituent quantity is not adequately determined for one or more areas of observed contamination, assign either the value from Table 2-6 or a value of 10, whichever is greater, as the hazardous waste quantity factor value.

2.4.3 *Waste characteristics factor category value.* Determine the waste characteristics factor category value as specified in section 2.4.3.1 for all pathways and threats, except the surface water-human food chain threat and the surface water-environmental threat. Determine the waste characteristics factor category value for these latter two threats as specified in section 2.4.3.2.

2.4.3.1 *Factor category value.* For the pathway (or threat) being evaluated, multiply the toxicity or combined factor value, as appropriate, from section 2.4.1.2 and the hazardous waste quantity factor value from section 2.4.2.2, subject to a maximum product of 1×10^8. Based on this waste characteristics product assign a waste characteristics factor category value to the pathway (or threat) from Table 2-7.

TABLE 2-7.—WASTE CHARACTERISTICS FACTOR CATEGORY VALUES

Waste characteristics product	Assigned value
0	0
Greater than 0 to less than 10	1
10 to less than 1×10^2	2
1×10^2 to less than 1×10^3	3
1×10^3 to less than 1×10^4	6
1×10^4 to less than 1×10^5	10
1×10^5 to less than 1×10^6	18
1×10^6 to less than 1×10^7	32
1×10^7 to less than 1×10^8	56
1×10^8 to less than 1×10^9	100
1×10^9 to less than 1×10^{10}	180
1×10^{10} to less than 1×10^{11}	320
1×10^{11} to less than 1×10^{12}	560
1×10^{12}	1,000

2.4.3.2 *Factor category value, considering bioaccumulation potential.* For the surface water-human food chain threat and the surface water-environmental threat, multiply the toxicity or combined factor value, as appropriate, from section 2.4.1.2 and the hazardous waste quantity factor value from section 2.4.2.2, subject to:

- A maximum product of 1×10^{12}; *and*
- A maximum product exclusive of the bioaccumulation (or ecosystem bioaccumulation) potential factor of 1×10^8.

Based on the total waste characteristics product, assign a waste characteristics factor category value to these threats from Table 2-7.

2.5 *Targets.*

The types of targets evaluated include the following:

- Individual (factor name varies by pathway and threat).
- Human population.
- Resources (these vary by pathway and threat).
- Sensitive environments (included for all pathways except ground water migration).

The factor values that may be assigned to each type of target have the same range for each pathway for which that type of target is evaluated. The factor value for most types of targets depends on whether the target is subject to actual or potential contamination for the pathway and whether the actual contamination is Level I or Level II:

- Actual contamination: Target is associated either with a sampling location that meets the criteria for an observed release (or observed contamination) for the pathway or with an observed release based on direct observation for the pathway (additional criteria apply for establishing actual contamination for the human food chain threat in the surface water migration pathway, see sections 4.1.3.3 and 4.2.3.3). sections 3 through 6 specify how to determine the targets associated with a sampling location or with an observed release based on direct observation. Determine whether the actual contamination is Level I or Level II as follows:
  - -Level I:
    - --Media-specific concentrations for the target meet the criteria for an observed release (or observed contamination) for the pathway and are at or above media-specific benchmark values. These benchmark values (see section 2.5.2) include both screening concentrations and concentrations specified in regulatory limits (such as Maximum Contaminant Level (MCL) values), or
    - --For the human food chain threat in the surface water migration pathway, concentrations in tissue samples from aquatic human food chain organisms are at or above benchmark values. Such tissue samples may be used in addition to media-specific concentrations only as specified in sections 4.1.3.3 and 4.2.3.3.
  - -Level II:
    - --Media-specific concentrations for the target meet the criteria for an observed release (or observed contamination) for the pathway, but are less than media-specific benchmarks. If none of the hazardous substances eligible to be evaluated for the sampling location has an applicable benchmark, assign Level II to the actual contamination at the sampling location, or
    - --For observed releases based on direct observation, assign Level II to targets as specified in sections 3, 4, and 6, or
    - --For the human food chain threat in the surface water migration pathway, concentrations in tissue samples from aquatic human food chain organisms, when applicable, are below benchmark values.
  - -If a target is subject to both Level I and Level II concentrations for a pathway (or threat), evaluate the target using Level I concentrations for that pathway (or threat).
- Potential contamination: Target is subject to a potential release (that is, target is not associated with actual contamination for that pathway or threat).

Assign a factor value for individual risk as follows (select the highest value that applies to the pathway or threat):

- 50 points if any individual is exposed to Level I concentrations.
- 45 points if any individual is exposed to Level II concentrations.
- Maximum of 20 points if any individual is subject to potential contamination. The value assigned is 20 multiplied by the distance or dilution weight appropriate to the pathway.

Assign factor values for population and sensitive environments as follows:

- Sum Level I targets and multiply by 10. (Level I is not used for sensitive environments in the soil exposure and air migration pathways.)
- Sum Level II targets.
- Multiply potential targets by distance or dilution weights appropriate to the pathway, sum, and divide by 10. Distance or dilution weighting accounts for diminishing exposure

with increasing distance or dilution within the different pathways.

• Sum the values for the three levels.

In addition, resource value points are assigned within all pathways for welfare-related impacts (for example, impacts to agricultural land), but do not depend on whether there is actual or potential contamination.

2.5.1 *Determination of level of actual contamination at a sampling location.* Determine whether Level I concentrations or Level II concentrations apply at a sampling location (and thus to the associated targets) as follows:

• Select the benchmarks applicable to the pathway (or threat) being evaluated.

• Compare the concentrations of hazardous substances in the sample (or comparable samples) to their benchmark concentrations for the pathway (or threat), as specified in section 2.5.2.

• Determine which level applies based on this comparison.

• If none of the hazardous substances eligible to be evaluated for the sampling location has an applicable benchmark, assign Level II to the actual contamination at that sampling location for the pathway (or threat).

In making the comparison, consider only those samples, and only those hazardous substances in the sample, that meet the criteria for an observed release (or observed contamination) for the pathway, except: tissue samples from aquatic human food chain organisms may also be used as specified in sections 4.1.3.3 and 4.2.3.3 of the surface water-human food chain threat. If any hazardous substance is present in more than one comparable sample for the sampling location, use the highest concentration of that hazardous substance from any of the comparable samples in making the comparisons.

Treat sets of samples that are not comparable separately and make a separate comparison for each such set.

2.5.2 *Comparison to benchmarks.* Use the following media-specific benchmarks for making the comparisons for the indicated pathway (or threat):

• Maximum Contaminant Level Goals (MCLGs)—ground water migration pathway and drinking water threat in surface water migration pathway. Use only MCLG values greater than 0.

• Maximum Contaminant Levels (MCLs)—ground water migration pathway and drinking water threat in surface water migration pathway.

• Food and Drug Administration Action Level (FDAAL) for fish or shellfish—human food chain threat in surface water migration pathway.

• EPA Ambient Water Quality Criteria (AWQC) for protection of aquatic life—environmental threat in surface water migration pathway.

• EPA Ambient Aquatic Life Advisory Concentrations (AALAC)—environmental threat in surface water migration pathway.

• National Ambient Air Quality Standards (NAAQS)—air migration pathway.

• National Emission Standards for Hazardous Air Pollutants (NESHAPs)—air migration pathway. Use only those NESHAPs promulgated in ambient concentration units.

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• Screening concentration for cancer corresponding to that concentration that corresponds to the 10^{-6} individual cancer risk for inhalation exposures (air migration pathway) or for oral exposures (ground water migration pathway; drinking water and human food chain threats in surface water migration pathway; and soil exposure pathway).

• Screening concentration for noncancer toxicological responses corresponding to the RfD for inhalation exposures (air migration pathway) or for oral exposures (ground water migration pathway; drinking water and human food chain threats in surface water migration pathway; and soil exposure pathway).

Select the benchmark(s) applicable to the pathway (or threat) being evaluated as specified in sections 3 through 6. Compare the concentration of each hazardous substance from the sampling location to its benchmark concentration(s) for that pathway (or threat). Use only those samples and only those hazardous substances in the sample that meet the criteria for an observed release (or observed contamination) for the pathway, except: tissue samples from aquatic human food chain organisms may be used as specified in sections 4.1.3.3 and 4.2.3.3. If the concentration of any applicable hazardous substance from any sample equals or exceeds its benchmark concentration, consider the sampling location to be subject to Level I concentrations for that pathway (or threat). If more than one benchmark applies to the hazardous substance, assign Level I if the concentration of the hazardous substance equals or exceeds the lowest applicable benchmark concentration.

If no hazardous substance individually equals or exceeds its benchmark concentration, but more than one hazardous substance either meets the criteria for an observed release (or observed contamination) for the sample (or comparable samples) or is eligible to be evaluated for a tissue sample (see sections 4.1.3.3 and 4.2.3.3), calculate the indices I and J specified below based on these hazardous substances.

For those hazardous substances that are carcinogens (that is, those having a carcinogen weight-of-evidence classification of A, B, or C), calculate an index I for the sample location as follows:

$$I = \sum_{i=1}^{n} \frac{C_i}{SC_i}$$

where:

C_i = Concentration of hazardous substance i in sample (or highest concentration of hazardous substance i from among comparable samples).

SC_i = Screening concentration for cancer corresponding to that concentration that corresponds to its 10^{-6} individual cancer risk for applicable exposure (inhalation or oral) for hazardous substance i.

n = Number of applicable hazardous substances in sample (or comparable samples) that are carcinogens and for which an SC_i is available.

For those hazardous substances for which an RfD is available, calculate an index J for the sample location as follows:

$$J = \sum_{j=1}^{m} \frac{C_j}{CR_j}$$

where:

C_j = Concentration of hazardous substance j in sample (or highest concentration of hazardous substance j from among comparable samples).

CR_j = Screening concentration for noncancer toxicological responses corresponding to RfD for applicable exposure (inhalation or oral) for hazardous substance j.

m = Number of applicable hazardous substances in sample (or comparable samples) for which a CR_j is available.

If either I or J equals or exceeds 1, consider the sampling location to be subject to Level I concentrations for that pathway (or threat). If both I and J are less than 1, consider the sampling location to be subject to Level II concentrations for that pathway (or threat). If, for the sampling location, there are sets of samples that are not comparable, calculate I and J separately for each such set, and use the highest calculated values of I and J to assign Level I and Level II.

See sections 7.3.1 and 7.3.2 for criteria for determining the level of contamination for radioactive substances.

3.0 Ground Water Migration Pathway

Evaluate the ground water migration pathway based on three factor categories: likelihood of release, waste characteristics, and targets. Figure 3-1 indicates the factors included within each factor category.

Determine the ground water migration pathway score (S_{gw}) in terms of the factor category values as follows:

$$S_{gw} = \frac{(LR)\,(WC)\,(T)}{SF}$$

where:

LR = Likelihood of release factor category value.

WC = Waste characteristics factor category value.

T = Targets factor category value.

SF = Scaling factor.

Table 3-1 outlines the specific calculation procedure.

Calculate a separate ground water migration pathway score for each aquifer, using the factor category values for that aquifer for likelihood of release, waste characteristics, and targets. In doing so, include both the targets using water from that aquifer and the targets using water from all overlying aquifers through which the hazardous substances would migrate to reach the aquifer being evaluated. Assign the highest ground water migration pathway score that results for any aquifer as the ground water migration pathway score for the site.

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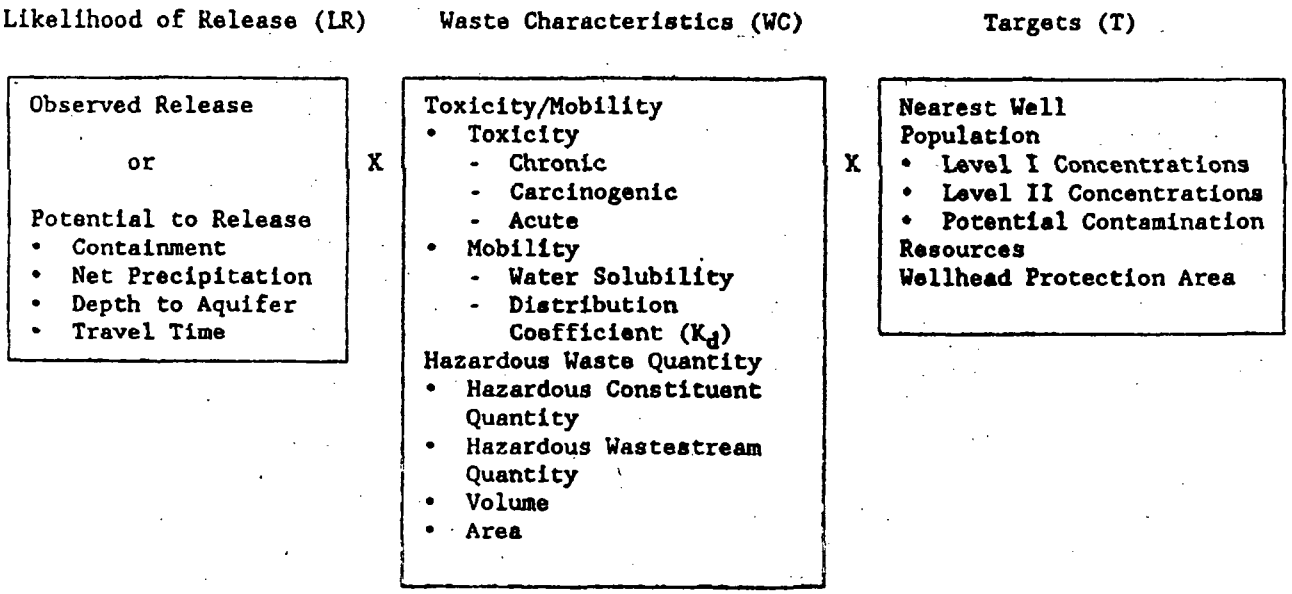

FIGURE 3-1
OVERVIEW OF GROUND WATER MIGRATION PATHWAY

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TABLE 3-1.—GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor categories and factors	Maximum value	Value assigned
Likelihood of Release to an Aquifer:		
1. Observed Release	550	
2. Potential to Release:		
2a. Containment	10	
2b. Net Precipitation	10	
2c. Depth to Aquifer	5	
2d. Travel Time	35	
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	
3. Likelihood of Release (higher of lines 1 and 2e)	550	
Waste Characteristics:		
4. Toxicity/Mobility	(a)	
5. Hazardous Waste Quantity	(a)	
6. Waste Characteristics	100	
Targets:		
7. Nearest Well	50	
8. Population:		
8a. Level I Concentrations	(b)	
8b. Level II Concentrations	(b)	
8c. Potential Contamination	(b)	
8d. Population (lines 8a+8b+8c)	(b)	
9. Resources	5	
10. Wellhead Protection Area	20	
11. Targets (lines 7+8d+9+10)	(b)	
Ground Water Migration Score for an Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11)/82,500] [c]	100	
Ground Water Migration Pathway Score:		
13. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c]	100	

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

3.0.1 *General considerations*

3.0.1.1 *Ground water target distance limit.* The target distance limit defines the maximum distance from the sources at the site over which targets are evaluated. Use a target distance limit of 4 miles for the ground water migration pathway, except when aquifer discontinuities apply (see section 3.0.1.2.2). Furthermore, consider any well with an observed release from a source at the site (see section 3.1.1) to lie within the target distance limit of the site, regardless of the well's distance from the sources at the site.

For sites that consist solely of a contaminated ground water plume with no identified source, begin measuring the 4-mile target distance limit at the center of the area of observed ground water contamination. Determine the area of observed ground water contamination based on available samples that meet the criteria for an observed release.

3.0.1.2 *Aquifer boundaries.* Combine multiple aquifers into a single hydrologic unit for scoring purposes if aquifer interconnections can be established for these aquifers. In contrast, restrict aquifer boundaries if aquifer discontinuities can be established.

3.0.1.2.1 *Aquifer interconnections.* Evaluate whether aquifer interconnections occur within 2 miles of the sources at the site. If they occur within this 2-mile distance, combine the aquifers having interconnections in scoring the site. In addition, if observed ground water contamination attributable to the sources at the site extends beyond 2 miles from the sources, use any locations within the limits of this observed ground water contamination in evaluating aquifer interconnections. If data are not adequate to establish aquifer interconnections, evaluate the aquifers as separate aquifers.

3.0.1.2.2 *Aquifer discontinuities.* Evaluate whether aquifer discontinuities occur within the 4-mile target distance limit. An aquifer discontinuity occurs for scoring purposes only when a geologic, topographic, or other structure or feature entirely transects an aquifer within the 4-mile target distance limit, thereby creating a continuous boundary to ground water flow within this limit. If two or more aquifers can be combined into a single hydrologic unit for scoring purposes, an aquifer discontinuity occurs only when the structure or feature entirely transects the boundaries of this single hydrologic unit.

When an aquifer discontinuity is established within the 4-mile target distance limit, exclude that portion of the aquifer beyond the discontinuity in evaluating the ground water migration pathway. However, if hazardous substances have migrated across an apparent discontinuity within the 4-mile target distance limit, do not consider this to be a discontinuity in scoring the site.

3.0.1.3 *Karst aquifer.* Give a karst aquifer that underlies any portion of the sources at the site special consideration in the evaluation of two potential to release factors (depth to aquifer in section 3.1.2.3 and travel time in section 3.1.2.4), one waste characteristics factor (mobility in section 3.2.1.2), and two targets factors (nearest well in section 3.3.1 and potential contamination in section 3.3.2.4).

3.1 *Likelihood of release.* For an aquifer, evaluate the likelihood of release factor category in terms of an observed release factor or a potential to release factor.

3.1.1 *Observed release.* Establish an observed release to an aquifer by demonstrating that the site has released a hazardous substance to the aquifer. Base this demonstration on either:

- Direct observation—a material that contains one or more hazardous substances has been deposited into or has been observed entering the aquifer.
- Chemical analysis—an analysis of ground water samples from the aquifer indicates that the concentration of hazardous substance(s) has increased significantly above the background concentration for the site (see section 2.3). Some portion of the significant increase must be attributable to the site to establish the observed release, except: when the source itself consists of a ground water plume with no identified source, no separate attribution is required.

If an observed release can be established for the aquifer, assign the aquifer an observed release factor value of 550, enter this value in Table 3-1, and proceed to section 3.1.3. If an observed release cannot be established for the aquifer, assign an observed release factor value of 0, enter this value in Table 3-1, and proceed to section 3.1.2.

3.1.2 *Potential to release.* Evaluate potential to release only if an observed release cannot be established for the aquifer. Evaluate potential to release based on four factors: containment, net precipitation, depth to aquifer, and travel time. For sources overlying karst terrain, give any karst aquifer that underlies any portion of the sources at the site special consideration in evaluating depth to aquifer and travel time, as specified in sections 3.1.2.3 and 3.1.2.4.

3.1.2.1 *Containment.* Assign a containment factor value from Table 3-2 to each source at the site. Select the highest containment factor value assigned to those sources with a source hazardous waste quantity value of 0.5 or more (see section

2.4.2.1.5). (Do not include this minimum size requirement in evaluating any other factor of this pathway.) Assign this highest value as the containment factor value for the aquifer being evaluated. Enter this value in Table 3-1.

If no source at the site meets the minimum size requirement, then select the highest value assigned to the sources at the site and assign it as the containment factor value for the aquifer being evaluated. Enter this value in Table 3-1.

3.1.2.2 *Net precipitation.* Assign a net precipitation factor value to the site. Figure 3-2 provides computed net precipitation factor values, based on site location. Where necessary, determine the net precipitation factor value as follows:

- Determine monthly precipitation and monthly evapotranspiration:
  - –Use local measured monthly averages.
  - –When local data are not available, use monthly averages from the nearest National Oceanographic and Atmospheric Administration weather station that is in a similar geographic setting.

TABLE 3-2.—CONTAINMENT FACTOR VALUES FOR GROUND WATER MIGRATION PATHWAY

Source	Assigned value
All Sources (Except Surface Impoundments, Land Treatment, Containers, and Tanks)	
Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10
No liner	10
No evidence of hazardous substance migration from source area, a liner, *and*:	
(a) None of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) functioning leachate collection and removal system immediately above liner.	10
(b) Any one of the three items in (a) present	9
(c) Any two of the items in (a) present	7
(d) All three items in (a) present plus a functioning ground water monitoring system	5
(e) All items in (d) present, plus no bulk or non-containerized liquids nor materials containing free liquids deposited in source area.	3
No evidence of hazardous substance migration from source area, double liner with functioning leachate collection and removal system above and between liners, functioning ground water monitoring system, *and*:	
(f) Only one of the following deficiencies present in containment: (1) bulk or noncontainerized liquids or materials containing free liquids deposited in source area, or (2) no or nonfunctioning or nonmaintained run-on control system and runoff management system, or (3) no or nonmaintained engineered cover.	3
(g) None of the deficiencies in (f) present	0
Source area inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate is generated, liquids or materials containing free liquids not deposited in source area, and functioning and maintained run-on control present.	0
Surface Impoundment	
Evidence of hazardous substance migration from surface impoundment	10
No liner	10
Free liquids present with either no diking, unsound diking, or diking that is not regularly inspected and maintained	10
No evidence of hazardous substance migration from surface impoundment, free liquids present, sound diking that is regularly inspected and maintained, adequate freeboard, *and*:	
(a) Liner	9
(b) Liner with functioning leachate collection and removal system below liner, and functioning ground water monitoring system.	5
(c) Double liner with functioning leachate collection and removal system between liners, and functioning ground water monitoring system.	3
No evidence of hazardous substance migration from surface impoundment and all free liquids eliminated at closure (either by removal of liquids or solidification of remaining wastes and waste residues).	Evaluate using **All sources** criteria (with no bulk or free liquid deposited).
Land Treatment	
Evidence of hazardous substance migration from land treatment zone	10
No functioning, maintained, run-on control and runoff management system	10
No evidence of hazardous substance migration from land treatment zone *and*:	
(a) Functioning and maintained run-on control and runoff management system	7
(b) Functioning and maintained run-on control and runoff management system, and vegetative cover established over entire land treatment area.	5
(c) Land treatment area maintained in compliance with 40 CFR 264.280	0

TABLE 3-2.—CONTAINMENT FACTOR VALUES FOR GROUND WATER MIGRATION PATHWAY—Continued

Source	Assigned value
Containers	
All containers buried	Evaluate using All sources criteria.
Evidence of hazardous substance migration from container area (i.e., container area includes containers and any associated containment structures).	10
No liner (or no essentially impervious base) under container area	10
No diking (or no similar structure) surrounding container area	10
Diking surrounding container area unsound or not regularly inspected and maintained	10
No evidence of hazardous substance migration from container area, container area surrounded by sound diking that is regularly inspected and maintained, *and*:	
(a) Liner (or essentially impervious base) under container area	9
(b) Essentially impervious base under container area with liquids collection and removal system	7
(c) Containment system includes essentially impervious base, liquids collection system, sufficient capacity to contain 10 percent of volume of all containers, and functioning and maintained run-on control; plus functioning ground water monitoring system, and spilled or leaked hazardous substances and accumulated precipitation removed in timely manner to prevent overflow of collection system, at least weekly inspection of containers, hazardous substances in leaking or deteriorating containers transferred to containers in good condition, and containers sealed except when waste is added or removed.	5
(d) Free liquids present, containment system has sufficient capacity to hold total volume of all containers and to provide adequate freeboard, single liner under container area with functioning leachate collection and removal system below liner, and functioning ground water monitoring system.	5
(e) Same as (d) except: double liner under container area with functioning leachate collection and removal system between liners.	3
Containers inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any unsealed or ruptured containers, liquids or materials containing free liquids not deposited in any container, and functioning and maintained run-off control present.	0
No evidence of hazardous substance migration from container area, containers leaking, and all free liquids eliminated at closure (either by removal of liquid or solidification of remaining wastes and waste residues).	Evaluate using All sources criteria (with no bulk or free liquid deposited).
Tank	
Below-ground tank	Evaluate using All sources criteria.
Evidence of hazardous substance migration from tank area (i.e., tank area includes tank, ancillary equipment such as piping, and any associated containment structures).	10
Tank and ancillary equipment not provided with secondary containment (e.g., liner under tank area, vault system, double wall).	10
No diking (or no similar structure) surrounding tank and ancillary equipment	10
Diking surrounding tank and ancillary equipment unsound or not regularly inspected and maintained	10
No evidence of hazardous substance migration from tank area, tank and ancillary equipment surrounded by sound diking that is regularly inspected and maintained, *and*:	
(a) Tank and ancillary equipment provided with secondary containment	9
(b) Tank and ancillary equipment provided with secondary containment with leak detection and collection system.	7
(c) Tank and ancillary equipment provided with secondary containment system that detects and collects spilled or leaked hazardous substances and accumulated precipitation and has sufficient capacity to contain 110 percent of volume of largest tank within containment area, spilled or leaked hazardous substances and accumulated precipitation removed in timely manner, at least weekly inspection of tank and secondary containment system, all leaking or unfit-for-use tank systems promptly responded to, and functioning ground water monitoring system.	5
(d) Containment system has sufficient capacity to hold volume of all tanks within tank containment area and to provide adequate freeboard, single liner under that containment area with functioning leachate collection and removal system below liner, and functioning ground water monitoring system.	5
(e) Same as (d) except: double liner under tank containment area with functioning leachate collection and removal system between liners.	3
Tank is above ground, and inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any material released from tank, liquids or materials containing free liquids not deposited in any tank, and functioning and maintained run-on control present.	0

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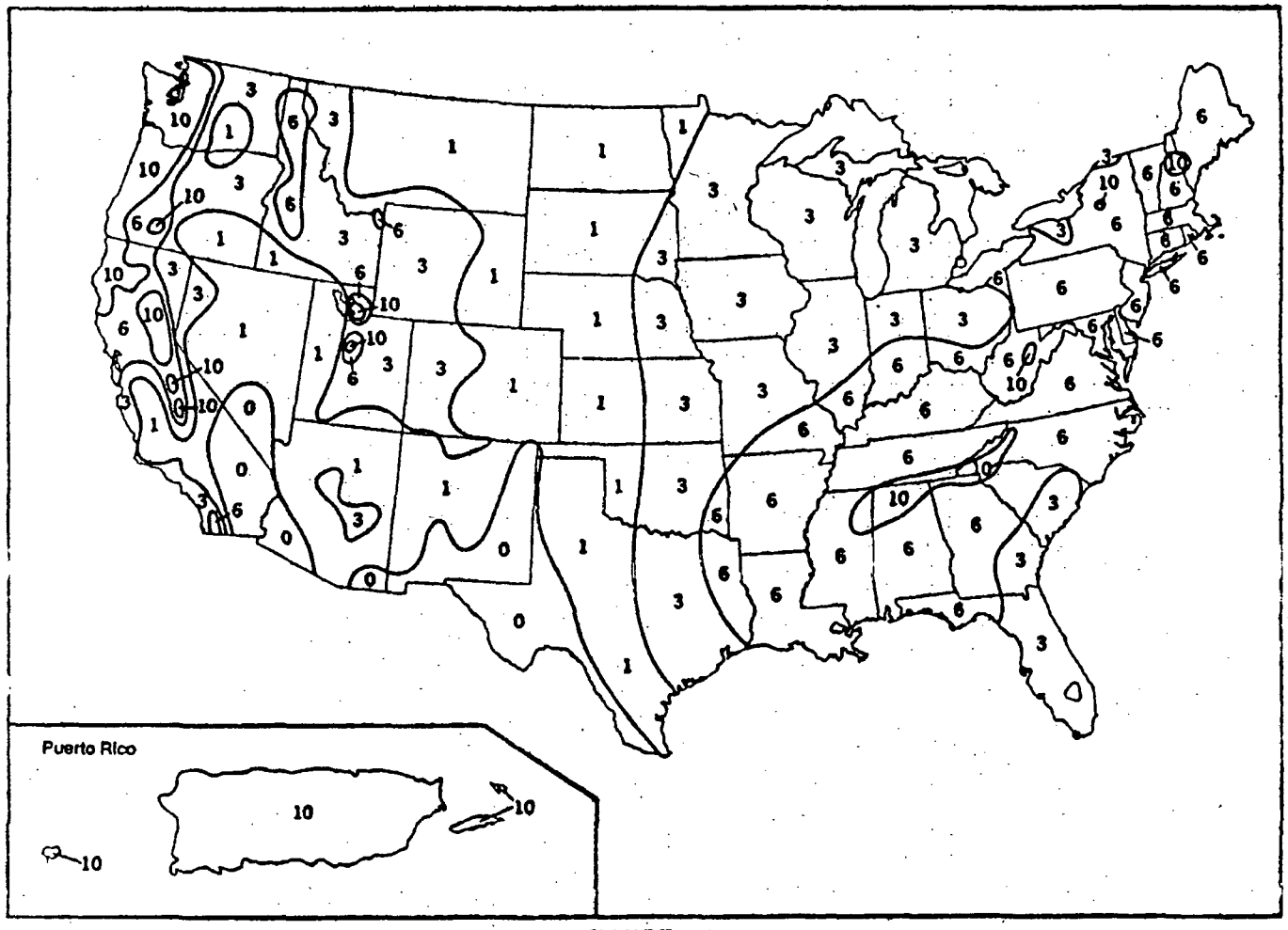

FIGURE 3-2
NET PRECIPITATION FACTOR VALUES

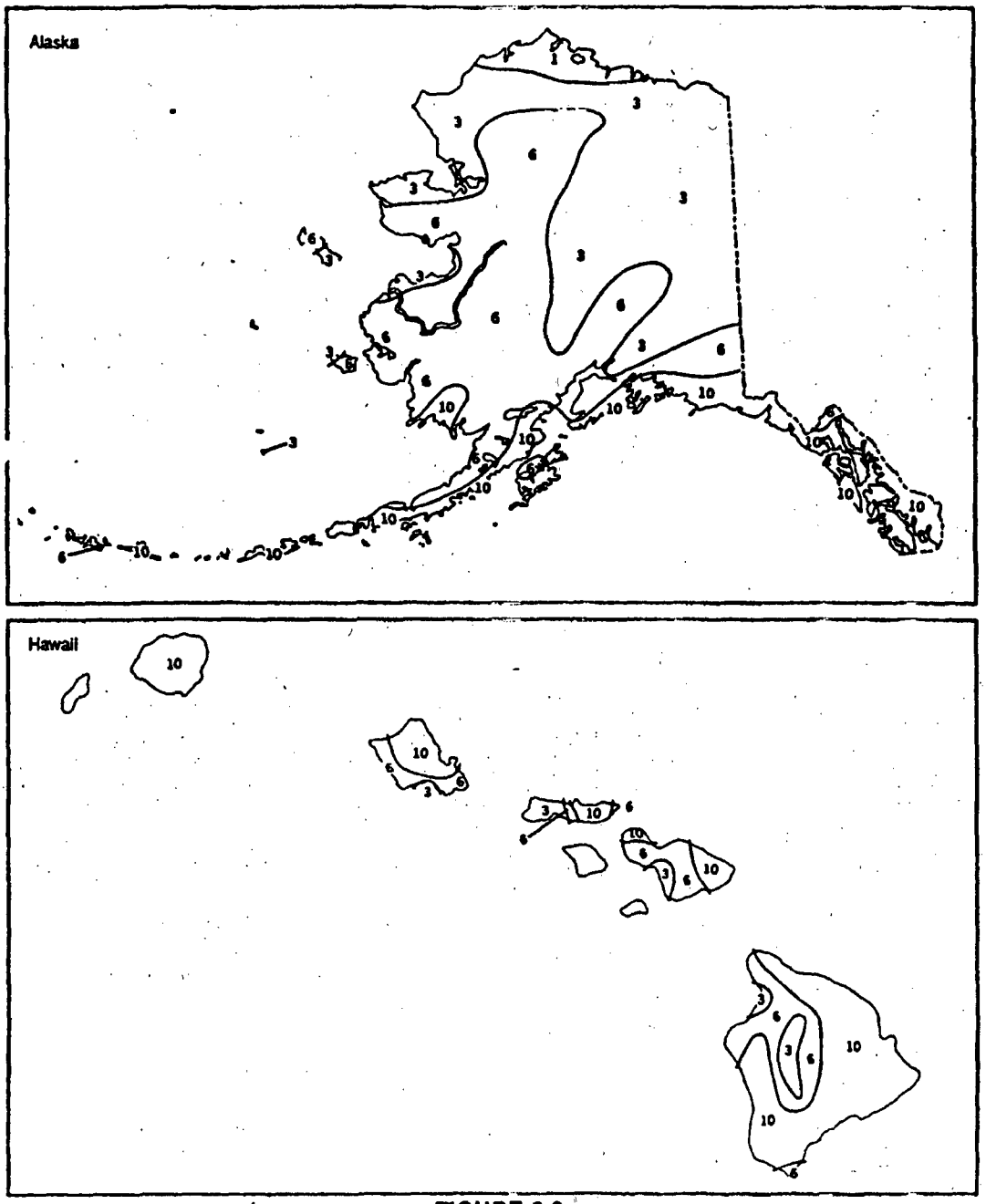

FIGURE 3-2
NET PRECIPITATION FACTOR VALUES
(CONCLUDED)

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–When measured monthly evapotranspiration is not available, calculate monthly potential evapotranspiration (E_i) as follows:

$E_i = 0.6\, F_i\, (10\, T_i/I)^a$

where:

E_i = Monthly potential evapotranspiration (inches) for month i.

F_i = Monthly latitude adjusting value for month i.

T_i = Mean monthly temperature (°C) for month i.

$$I = \sum_{i=1}^{12} (T_i/5)^{1.514}$$

$$a = 6.75 \times 10^{-7} I^3 - 7.71 \times 10^{-5} I^2 + 1.79 \times 10^{-3} I + 0.49239$$

Select the latitude adjusting value for each month from Table 3–3. For latitudes lower than 50° North or 20° South, determine the monthly latitude adjusting value by interpolation.

• Calculate monthly net precipitation by subtracting monthly evapotranspiration (or monthly potential evapotranspiration) from monthly precipitation. If evapotranspiration (or potential evapotranspiration) exceeds precipitation for a month, assign that month a net precipitation value of 0.

• Calculate the annual net precipitation by summing the monthly net precipitation values.

• Based on the annual net precipitation, assign a net precipitation factor value from Table 3–4.

Enter the value assigned from Figure 3–2 or from Table 3–4, as appropriate, in Table 3–1.

TABLE 3–3.—MONTHLY LATITUDE ADJUSTING VALUES[a]

Latitude[b] (degrees)	Month											
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
≥50 N	0.74	0.78	1.02	1.15	1.33	1.36	1.37	1.25	1.06	0.92	0.76	0.70
45 N	0.80	0.81	1.02	1.13	1.28	1.29	1.31	1.21	1.04	0.94	0.79	0.75
40 N	0.84	0.83	1.03	1.11	1.24	1.25	1.27	1.18	1.04	0.96	0.83	0.81
35 N	0.87	0.85	1.03	1.09	1.21	1.21	1.23	1.16	1.03	0.97	0.89	0.85
30 N	0.90	0.87	1.03	1.08	1.16	1.17	1.20	1.14	1.03	0.98	0.89	0.88
20 N	0.95	0.90	1.03	1.05	1.13	1.11	1.14	1.11	1.02	1.00	0.93	0.94
10 N	1.00	0.91	1.03	1.03	1.08	1.06	1.06	1.07	1.02	1.02	0.98	0.99
0	1.04	0.94	1.04	1.01	1.04	1.01	1.04	1.04	1.01	1.04	1.01	1.04
10 S	1.06	0.97	1.05	0.99	1.00	0.96	1.00	1.02	1.00	1.06	1.05	1.09
20 S	1.14	0.99	1.05	0.97	0.96	0.91	0.95	0.99	1.00	1.08	1.09	1.15

[a] Do not round to nearest integer.
[b] For unlisted latitudes lower than 50° North or 20° South, determine the latitude adjusting value by interpolation.

TABLE 3–4.—NET PRECIPITATION FACTOR VALUES

Net precipitation (inches)	Assigned value
0	0
Greater than 0 to 5	1
Greater than 5 to 15	3
Greater than 15 to 30	6
Greater than 30	10

3.1.2.3 *Depth to aquifer.* Evaluate depth to aquifer by determining the depth from the lowest known point of hazardous substances at a site to the top of the aquifer being evaluated, considering all layers in that interval. Measure the depth to an aquifer as the distance from the surface to the top of the aquifer minus the distance from the surface to the lowest known point of hazardous substances eligible to be evaluated for that aquifer. In evaluating depth to aquifer in karst terrain, assign a thickness of 0 feet to a karst aquifer that underlies any portion of the sources at the site. Based on the calculated depth, assign a value from Table 3–5 to the depth to aquifer factor.

Determine the depth to aquifer only at locations within 2 miles of the sources at the site, except: if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the depth to aquifer factor for any aquifer that does not have an observed release. If the necessary geologic information is available at multiple locations, calculate the depth to aquifer at each location. Use the location having the smallest depth to assign the factor value. Enter this value in Table 3–1.

TABLE 3–5.—DEPTH TO AQUIFER FACTOR VALUES

Depth to aquifer[a] (feet)	Assigned value
Less than or equal to 25	5
Greater than 25 to 250	3
Greater than 250	1

[a] Use depth of all layers between the hazardous substances and aquifer. Assign a thickness of 0 feet to any karst aquifer that underlies any portion of the sources at the site.

3.1.2.4 *Travel time.* Evaluate the travel time factor based on the geologic materials in the interval between the lowest known point of hazardous substances at the site and the top of the aquifer being evaluated. Assign a value to the travel time factor as follows:

• If the depth to aquifer (see section 3.1.2.3) is 10 feet or less, assign a value of 35.

• If, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

• Otherwise:

–Select the lowest hydraulic conductivity layer(s) from within the above interval. Consider only layers at least 3 feet thick. However, do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

–Determine hydraulic conductivities for individual layers from Table 3–6 or from in-situ or laboratory tests. Use representative, measured, hydraulic conductivity values whenever available.

–If more than one layer has the same lowest hydraulic conductivity, include all such layers and sum their thicknesses. Assign a thickness of 0 feet to a karst layer that underlies any portion of the sources at the site.

–Assign a value from Table 3–7 to the travel time factor, based on the thickness and hydraulic conductivity of the lowest hydraulic conductivity layer(s).

TABLE 3–6.—HYDRAULIC CONDUCTIVITY OF GEOLOGIC MATERIALS

Type of material	Assigned hydraulic conductivity [a] (cm/sec)
Clay; low permeability till (compact unfractured till); shale; unfractured metamorphic and igneous rocks	10^{-6}
Silt; loesses; silty clays; sediments that are predominantly silts; moderately permeable till (fine-grained, unconsolidated till, or compact till with some fractures); low permeability limestones and dolomites (no karst); low permeability sandstone; low permeability fractured igneous and metamorphic rocks	10^{-4}
Sands; sandy silts; sediments that are predominantly sand; highly permeable till (coarse-grained, unconsolidated or compact and highly fractured); peat; moderately permeable limestones and dolomites (no karst); moderately permeable sandstone; moderately permeable fractured igneous and metamorphic rocks	10^{-2}
Gravel; clean sand; highly permeable fractured igneous and metamorphic rocks; permeable basalt; karst limestones and dolomites	10^{-2}

[a] Do not round to nearest integer.

TABLE 3–7.—TRAVEL TIME FACTOR VALUES [a]

Hydraulic conductivity (cm/sec)	Thickness of lowest hydraulic conductivity layer(s) [b] (feet)			
	Greater than 3 to 5	Greater than 5 to 100	Greater than 100 to 500	Greater than 500
Greater than or equal to 10^{-3}	35	35	35	25
Less than 10^{-3} to 10^{-5}	35	25	15	15
Less than 10^{-5} to 10^{-7}	15	15	5	5
Less than 10^{-7}	5	5	1	1

[a] If depth to aquifer is 10 feet or less or if, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

[b] Consider only layers at least 3 feet thick. Do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

Determine travel time only at locations within 2 miles of the sources at the site, except if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the travel time factor for any aquifer that does not have an observed release. If the necessary subsurface geologic information is available at multiple locations, evaluate the travel time factor at each location. Use the location having the highest travel time factor value to assign the factor value for the aquifer. Enter this value in Table 3–1.

3.1.2.5 *Calculation of potential to release factor value.* Sum the factor values for net precipitation, depth to aquifer, and travel time, and multiply this sum by the factor value for containment. Assign this product as the potential to release factor value for the aquifer. Enter this value in Table 3–1.

3.1.3 *Calculation of likelihood of release factor category value.* If an observed release is established for an aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for that aquifer. Otherwise, assign the potential to release factor value for that aquifer as the likelihood of release value. Enter the value assigned in Table 3–1.

3.2 *Waste characteristics.* Evaluate the waste characteristics factor category for an aquifer based on two factors: toxicity/mobility and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to ground water. Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to ground water.
- All hazardous substances associated with a source that has a ground water containment factor value greater than 0 (see sections 2.2.2, 2.2.3, and 3.1.2.1).

3.2.1 *Toxicity/mobility.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, and a combined toxicity/mobility factor value as specified in the following sections. Select the toxicity/mobility factor value for the aquifer being evaluated as specified in section 3.2.1.3.

3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in Section 2.4.1.1.

3.2.1.2 *Mobility.* Assign a mobility factor value to each hazardous substance for the aquifer being evaluated as follows:

- For any hazardous substance that meets the criteria for an observed release by chemical analysis to one or more aquifers underlying the sources at the site, regardless of the aquifer being evaluated, assign a mobility factor value of 1.
- For any hazardous substance that does not meet the criteria for an observed release by chemical analysis to at least one of the aquifers, assign that hazardous substance a mobility factor value from Table 3–8 for the aquifer being evaluated, based on its water solubility and distribution coefficient (K_d).
- If the hazardous substance cannot be assigned a mobility factor value because data on its water solubility or distribution coefficient are not available, use other hazardous substances for which information is available in evaluating the pathway.

TABLE 3–8.—GROUND WATER MOBILITY FACTOR VALUES [a]

Water solubility (mg/l)	Distribution coefficient (K_d) (ml/g)			
	Karst [c]	≤10	>10 to 1,000	>1,000
Present as liquid [b]	1	1	0.01	0.0001
Greater than 100	1	1	0.01	0.0001
Greater than 1 to 100	0.2	0.2	0.002	2×10^{-5}
Greater than 0.01 to 1	0.002	0.002	2×10^{-5}	2×10^{-7}
Less than or equal to 0.01	2×10^{-5}	2×10^{-5}	2×10^{-7}	2×10^{-9}

[a] Do not round to nearest integer.
[b] Use if the hazardous substance is present or deposited as a liquid.
[c] Use if the entire interval from the source to the aquifer being evaluated is karst.

• If none of the hazardous substances eligible to be evaluated can be assigned a mobility factor value, use a default value of 0.002 as the mobility factor value for all these hazardous substances.

Determine the water solubility to be used in Table 3–6 for the hazardous substance as follows (use this same water solubility for all aquifers):

• For any hazardous substance that does not meet the criteria for an observed release by chemical analysis, if the hazardous substance is present or deposited as a liquid, use the water solubility category "Present as Liquid" in Table 3–6 to assign the mobility factor value to that hazardous substance.

• Otherwise:

–For any hazardous substance that is a metal (or metalloid) and that does not meet the criteria for an observed release by chemical analysis, establish a water solubility for the hazardous substance as follows:

– –Determine the overall range of water solubilities for compounds of this hazardous substance (consider all compounds for which adequate water solubility information is available, not just compounds identified as present at the site).

– –Calculate the geometric mean of the highest and the lowest water solubility in this range.

– –Use this geometric mean as the water solubility in assigning the hazardous substance a mobility factor value from Table 3–6.

–For any other hazardous substance (either organic or inorganic) that does not meet the criteria for an observed release by chemical analysis, use the water solubility of that hazardous substance to assign a mobility factor value from Table 3–6 to the hazardous substance.

For the aquifer being evaluated, determine the distribution coefficient to be used in Table 3–6 for the hazardous substance as follows:

• For any hazardous substance that does not meet the criteria for an observed release by chemical analysis, if the entire interval from a source at the site to the aquifer being evaluated is karst, use the distribution coefficient category "Karst" in Table 3–6 in assigning the mobility factor value for that hazardous substance for that aquifer.

• Otherwise:

–For any hazardous substance that is a metal (or metalloid) and that does not meet the criteria for an observed release by chemical analysis, use the distribution coefficient for the metal or (metalloid) to assign a mobility factor value from Table 3–6 for that hazardous substance.

–For any other inorganic hazardous substance that does not meet the criteria for an observed release by chemical analysis, use the distribution coefficient for that inorganic hazardous substance, if available, to assign a mobility factor value from Table 3–6. If the distribution coefficient is not available, use a default value of "less than 10" as the distribution coefficient, except: for asbestos use a default value of "greater than 1,000" as the distribution coefficient.

–For any hazardous substance that is organic and that does not meet the criteria for an observed release by chemical analysis, establish a distribution coefficient for that hazardous substance as follows:

– –Estimate the K_d range for the hazardous substance using the following equation:

$$K_d = (K_{oc})(f_s)$$

where:

K_{oc} = Soil-water partition coefficient for organic carbon for the hazardous substance.

f_s = Sorbent content (fraction of clays plus organic carbon) in the subsurface.

– –Use f_s values of 0.03 and 0.77 in the above equation to establish the upper and lower values of the K_d range for the hazardous substance.

– –Calculate the geometric mean of the upper and lower K_d range values. Use this geometric mean as the distribution coefficient in assigning the hazardous substance a mobility factor value from Table 3–6.

3.2.1.3 *Calculation of toxicity/mobility factor value.* Assign each hazardous substance a toxicity/mobility factor value from Table 3–9, based on the values assigned to the hazardous substance for the toxicity and mobility factors. Use the hazardous substance with the highest toxicity/mobility factor value for the aquifer being evaluated to assign the value to the toxicity/mobility factor for that aquifer. Enter this value in Table 3–1.

TABLE 3–9.—TOXICITY/MOBILITY FACTOR VALUES [a]

Mobility factor value	Toxicity factor value					
	10,000	1,000	100	10	1	0
1.0	10,000	1,000	100	10	1	0
0.2	2,000	200	20	2	0.2	0
0.01	100	10	1	0.1	0.01	0
0.002	20	2	0.2	0.02	0.002	0
0.0001	1	0.1	0.01	0.001	1×10^{-4}	0
2×10^{-5}	0.2	0.02	0.002	2×10^{-4}	2×10^{-5}	0
2×10^{-7}	0.002	2×10^{-4}	2×10^{-5}	2×10^{-6}	2×10^{-7}	0
2×10^{-9}	2×10^{-5}	2×10^{-6}	2×10^{-7}	2×10^{-8}	2×10^{-9}	0

[a] Do not round to nearest integer.

3.2.2 *Hazardous waste quantity.* Assign a hazardous waste quantity factor value for the ground water pathway (or aquifer) as specified in section 2.4.2. Enter this value in Table 3–1.

3.2.3 *Calculation of waste characteristics factor category value.* Multiply the toxicity/mobility and hazardous waste quantity factor values, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2–7 (section 2.4.3.1) to the waste characteristics factor category. Enter this value in Table 3–1.

3.3 *Targets.* Evaluate the targets factor category for an aquifer based on four factors: nearest well, population, resources, and Wellhead Protection Area. Evaluate these four factors based on targets within the target distance limit specified in section 3.0.1.1 and the aquifer boundaries specified in section 3.0.1.2. Determine the targets to be included in evaluating these factors for an aquifer as specified in section 3.0.

3.3.1 *Nearest well.* In evaluating the nearest well factor, include both the drinking water wells drawing from the aquifer being evaluated and those drawing from overlying aquifers as specified in section 3.0. Include standby wells in evaluating this factor only if they are used for drinking water supply at least once every year.

If there is an observed release by direct observation for a drinking water well within the target distance limit, assign Level II concentrations to that well. However, if one or more samples meet the criteria for an observed release for that well, determine if that well is subject to Level I or Level II concentrations as specified in sections 2.5.1 and 2.5.2. Use the health-based benchmarks from Table 3–10 in determining the level of contamination.

Assign a value for the nearest well factor as follows:

• If one or more drinking water wells is subject to Level I concentrations, assign a value of 50.

• If not, but if one or more drinking water wells is subject to Level II concentrations, assign a value of 45.

• If none of the drinking water wells is subject to Level I or Level II concentrations, assign a value as follows:

–If one of the target aquifers is a karst aquifer that underlies any portion of the sources at the site and any well draws drinking water from this karst aquifer within the target distance limit, assign a value of 20.

–If not, determine the shortest distance to any drinking water well, as measured from any source at the site with a ground water containment factor value greater than 0. Select a value from Table 3–11 based on this distance. Assign it as the value for the nearest well factor.

Enter the value assigned to the nearest well factor in Table 3–1.

TABLE 3–10.—HEALTH-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN DRINKING WATER

- Concentration corresponding to Maximum Contaminant Level (MCL).
- Concentration corresponding to a nonzero Maximum Contaminant Level Goal (MCLG).
- Screening concentration for cancer corresponding to that concentration that corresponds to the 10^{-6} individual cancer risk for oral exposures.
- Screening concentration for noncancer toxicological responses corresponding to the Reference Dose (RfD) for oral exposures.

TABLE 3–11.—NEAREST WELL FACTOR VALUES

Distance from source (miles)	Assigned value
Level I concentrations*	50
Level II concentrations*	45
0 to ¼	20
Greater than ¼ to ½	18
Greater than ½ to 1	9
Greater than 1 to 2	5
Greater than 2 to 3	3
Greater than 3 to 4	2
Greater than 4	0

* Distance does not apply.

3.3.2 *Population.* In evaluating the population factor, include those persons served by drinking water wells within the target distance limit specified in section 3.0.1.1. For the aquifer being evaluated, count those persons served by wells in that aquifer and those persons served by wells in overlying aquifers as specified in section 3.0. Include residents, students, and workers who regularly use the water. Exclude transient populations such as customers and travelers passing through the area. Evaluate the population based on the location of the water supply wells, not on the location of residences, work places, etc. When a standby well is maintained on a regular basis so that water can be withdrawn, include it in evaluating the population factor.

In estimating residential population, when the estimate is based on the number of residences, multiply each residence by the average number of persons per residence for the county in which the residence is located.

In determining the population served by a well, if the water from the well is blended with other water (for example, water from other ground water wells or surface water intakes), apportion the total population regularly served by the blended system to the well based on the well's relative contribution to the total blended system. In estimating the well's relative contribution, assume each well and intake contributes equally and apportion the population accordingly, except: if the relative contribution of any one well or intake exceeds 40 percent based on average annual pumpage or capacity, estimate the relative contribution of the wells and intakes considering the following data, if available:

• Average annual pumpage from the ground water wells and surface water intakes in the blended system.

• Capacities of the wells and intakes in the blended system.

For systems with standby ground water wells or standby surface water intakes, apportion the total population regularly served by the blended system as described above, except:

• Exclude standby surface water intakes in apportioning the population.

• When using pumpage data for a standby ground water well, use average pumpage for the period during which the standby well is used rather than average annual pumpage.

• For that portion of the total population that could be apportioned to a standby ground water well, assign that portion of the population either to that standby well or to the other ground water well(s) and surface water intake(s) that serve that population; do not assign that portion of the population both to the standby well and to the other well(s) and intake(s) in the blended system. Use the apportioning that results in the highest population factor value. (Either include all standby well(s) or exclude some or all of the standby well(s) as appropriate to obtain this highest value.) Note that the specific standby well(s) included or excluded and, thus, the specific apportioning may vary in evaluating different aquifers and in evaluating the surface water pathway.

3.3.2.1 *Level of contamination.* Evaluate the population served by water from a point of withdrawal based on the level of contamination for that point of withdrawal. Use the applicable factor: Level I concentrations, Level II concentrations, or potential contamination.

If no samples meet the criteria for an observed release for a point of withdrawal and there is no observed release by direct observation for that point of withdrawal, evaluate that point of withdrawal using the potential contamination factor in section 3.3.2.4. If there is an observed release by direct observation, use Level II concentrations for that point of withdrawal. However, if one or more samples meet the criteria for an observed release for the point of withdrawal, determine which factor (Level I or Level II concentrations) applies to that point of withdrawal as specified in sections 2.5.1 and 2.5.2. Use the health-based benchmarks from Table 3–10 in determining the level of contamination. Evaluate the point of withdrawal using the Level I concentrations factor in section 3.3.2.2 or the Level II concentrations factor in section 3.3.2.3, as appropriate.

For the potential contamination factor, use population ranges in evaluating the factor as specified in section 3.3.2.4. For the Level I and Level II concentrations factors, use the population estimate, not population ranges, in evaluating both factors.

3.3.2.2 *Level I concentrations.* Sum the number of people served by drinking water from points of withdrawal subject to Level I concentrations. Multiply this sum by 10. Assign this product as the value for this factor. Enter this value in Table 3–1.

3.3.2.3 *Level II concentrations.* Sum the number of people served by drinking water from points of withdrawal subject to Level II concentrations. Do not include those people already counted under the Level I concentrations factor. Assign this sum as the value for this factor. Enter this value in Table 3–1.

3.3.2.4 *Potential contamination.* Determine the number of people served by drinking water from points of withdrawal subject to potential contamination. Do not include those people already counted under the Level I and Level II concentrations factors.

Assign distance-weighted population values from Table 3–12 to this population as follows:

• Use the "Karst" portion of Table 3–12 to assign values only for that portion of the population served by points of withdrawal that draw drinking water from a karst aquifer that underlies any portion of the sources at the site.

–For this portion of the population, determine the number of people included within each "Karst" distance category in Table 3–12.

TABLE 3–12.—DISTANCE-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FACTOR FOR GROUND WATER MIGRATION PATHWAY [a]

Distance category (miles)	Number of people within the distance category												
	0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000
Other Than Karst [b]:													
0 to ¼	0	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
Greater than ¼ to ½	0	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,249	1,012,122
Greater than ½ to 1	0	1	5	17	52	167	523	1,669	5,224	16,684	52,239	166,835	522,385
Greater than 1 to 2	0	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842
Greater than 2 to 3	0	0.5	2	7	21	68	212	678	2,122	6,778	21,222	67,777	212,219
Greater than 3 to 4	0	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596
Karst [c]:													
0 to ¼	0	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
Greater than ¼ to ½	0	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,249	1,012,122
Greater than ½ to 1	0	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,689	816,227
Greater than 1 to 2	0	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,689	816,227
Greater than 2 to 3	0	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,689	816,227
Greater than 3 to 4	0	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,689	816,227

[a] Round the number of people present within a distance category to nearest integer. Do not round the assigned distance-weighted population value to nearest integer.
[b] Use for all aquifers, except karst aquifers underlying any portion of the sources at the site.
[c] Use only for karst aquifers underlying any portion of the sources at the site.

–Assign a distance-weighted population value for each distance category based on the number of people included within the distance category.

• Use the "Other Than Karst" portion of Table 3–12 for the remainder of the population served by points of withdrawal, subject to potential contamination.

–For this portion of the population, determine the number of people included within each "Other Than Karst" distance category in Table 3–12.
–Assign a distance-weighted population value for each distance category based on the number of people included within the distance category.

Calculate the value for the potential contamination factor (PC) as follows:

$$PC = \frac{1}{10} \sum_{i=1}^{n} (W_i + K_i)$$

where:
W_i = Distance-weighted population from "Other Than Karst" portion of Table 3–12 for distance category i.
K_i = Distance-weighted population from "Karst" portion of Table 3–12 for distance category i.
n = Number of distance categories.

If PC is less than 1, do not round it to the nearest integer; if PC is 1 or more, round to the nearest integer. Enter this value in Table 3–1.

3.3.2.5 *Calculation of population factor value.* Sum the factor values for Level I concentrations, Level II concentrations, and potential contamination. Do not round this sum to the nearest integer. Assign this sum as the population factor value for the aquifer. Enter this value in Table 3–1.

3.3.3 *Resources.* To evaluate the resources factor, select the highest value specified below that applies for the aquifer being evaluated. Assign this value as the resources factor value for the aquifer. Enter this value in Table 3–1.

Assign a resources value of 5 if water drawn from any target well for the aquifer being evaluated or overlying aquifers (as specified in section 3.0) is used for one or more of the following purposes:

• Irrigation (5-acre minimum) of commercial food crops or commercial forage crops.
• Watering of commercial livestock.
• Ingredient in commercial food preparation.
• Supply for commercial aquaculture.
• Supply for a major or designated water recreation area, excluding drinking water use.

Assign a resources value of 5 if no drinking water wells are within the target distance limit, but the water in the aquifer being evaluated or any overlying aquifers (as specified in section 3.0) is usable for drinking water purposes.

Assign a resources value of 0 if none of the above applies.

3.3.4 *Wellhead Protection Area.* Evaluate the Wellhead Protection Area factor based on Wellhead Protection Areas designated according to section 1428 of the Safe Drinking Water Act, as amended. Consider only those Wellhead Protection Areas applicable to the aquifer being evaluated or overlying aquifers (as specified in section 3.0). Select the highest value below that applies. Assign it as the value for the Wellhead Protection Area factor for the aquifer being evaluated. Enter this value in Table 3–1.

Assign a value of 20 if either of the following criteria applies for the aquifer being evaluated or overlying aquifers:

• A source with a ground water containment factor value greater than 0 lies, either partially or fully, within or above the designated Wellhead Protection Area.
• Observed ground water contamination attributable to the sources at the site lies, either partially or fully, within the designated Wellhead Protection Area.

If neither criterion applies, assign a value of 5, if, within the target distance limit, there is a designated Wellhead Protection Area applicable to the aquifer being evaluated or overlying aquifers.

Assign a value of 0 if none of the above applies.

3.3.5 *Calculation of targets factor category value.* Sum the factor values for nearest well, population, resources, and Wellhead Protection Area. Do not round this sum to the nearest integer. Use this sum as the targets factor category value for the aquifer. Enter this value in Table 3–1.

3.4 *Ground water migration score for an aquifer.* For the aquifer being evaluated, multiply the factor category values for likelihood of release, waste characteristics, and targets, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum value of 100, as the ground water migration pathway score for the aquifer. Enter this score in Table 3–1.

3.5 *Calculation of ground water migration pathway score.* Calculate a ground water migration score for each aquifer underlying the sources at the site, as appropriate. Assign the highest ground water migration score for an aquifer as the ground water migration pathway score (S_{gw}) for the site. Enter this score in Table 3–1.

4.0 *Surface Water Migration Pathway.*

4.0.1 *Migration components.* Evaluate the surface water migration pathway based on two migration components:

• Overland/flood migration to surface water (see section 4.1).
• Ground water to surface water migration (see section 4.2).

Evaluate each component based on the same three threats: drinking water threat, human food chain threat, and environmental threat.

Score one or both components, considering their relative importance. If only one component is scored, assign its score as the surface water migration pathway score. If

both components are scored, select the higher of the two scores and assign it as the surface water migration pathway score.

4.0.2 *Surface water categories.* For HRS purposes, classify surface water into four categories: rivers, lakes, oceans, and coastal tidal waters.

Rivers include:

- Perennially flowing waters from point of origin to the ocean or to coastal tidal waters, whichever comes first, and wetlands contiguous to these flowing waters.
- Aboveground portions of disappearing rivers.
- Man-made ditches only insofar as they perennially flow into other surface water.
- Intermittently flowing waters and contiguous intermittently flowing ditches only in arid or semiarid areas with less than 20 inches of mean annual precipitation.

Lakes include:

- Natural and man-made lakes (including impoundments) that lie along rivers, but excluding the Great Lakes.
- Isolated, but perennial, lakes, ponds, and wetlands.
- Static water channels or oxbow lakes contiguous to rivers.
- Small rivers, without diking, that merge into surrounding perennially inundated wetlands.
- Wetlands contiguous to water bodies defined here as lakes.

Ocean and ocean-like water bodies include:

- Ocean areas seaward from the baseline of the Territorial Sea. (This baseline represents the generalized coastline of the United States. It is parallel to the seaward limit of the Territorial Sea and other maritime limits such as the inner boundary of Federal fisheries jurisdiction and the limit of States jurisdiction under the Submerged Lands Act, as amended.)
- The Great Lakes.
- Wetlands contiguous to the Great Lakes.

Coastal tidal waters include:

- Embayments, harbors, sounds, estuaries, back bays, lagoons, wetlands, etc. seaward from mouths of rivers and landward from the baseline of the Territorial Sea.

4.1 *Overland/flood migration component.* Use the overland/flood migration component to evaluate surface water threats that result from overland migration of hazardous substances from a source at the site to surface water. Evaluate three types of threats for this component: drinking water threat, human food chain threat, and environmental threat.

4.1.1 *General considerations.*

4.1.1.1 *Definition of hazardous substance migration path for overland/flood migration component.* The hazardous substance migration path includes both the overland segment and the in-water segment that hazardous substances would take as they migrate away from sources at the site:

- Begin the overland segment at a source and proceed downgradient to the probable point of entry to surface water.
- Begin the in-water segment at this probable point of entry.
  - –For rivers, continue the in-water segment in the direction of flow (including any tidal flows) for the distance established by the target distance limit (see section 4.1.1.2).
  - –For lakes, oceans, coastal tidal waters, or Great Lakes, do not consider flow direction. Instead apply the target distance limit as an arc.
  - –If the in-water segment includes both rivers and lakes (or oceans, coastal tidal waters, or Great Lakes), apply the target distance limit to their combined in-water segments.

For sites that consist of contaminated sediments with no identified source, the hazardous substance migration path consists solely of the in-water segment specified in section 4.1.1.2.

Consider a site to be in two or more watersheds for this component if two or more hazardous substance migration paths from the sources at the site do not reach a common point within the target distance limit. If the site is in more than one watershed, define a separate hazardous substance migration path for each watershed. Evaluate the overland/flood migration component for each watershed separately as specified in section 4.1.1.3.

4.1.1.2 *Target distance limit.* The target distance limit defines the maximum distance over which targets are considered in evaluating the site. Determine a separate target distance limit for each watershed as follows:

- If there is no observed release to surface water in the watershed or if there is an observed release only by direct observation (see section 4.1.2.1.1), begin measuring the target distance limit for the watershed at the probable point of entry to surface water and extend it for 15 miles along the surface water from that point.
- If there is an observed release from the site to the surface water in the watershed that is based on sampling, begin measuring the target distance limit for the watershed at the probable point of entry; extend the target distance limit either for 15 miles along the surface water or to the most distant sample point that meets the criteria for an observed release to that watershed, whichever is greater.

In evaluating the site, include only surface water targets (for example, intakes, fisheries, sensitive environments) that are within or contiguous to the hazardous substance migration path and located, partially or wholly, at or between the probable point of entry and the target distance limit applicable to the watershed:

- If flow within the hazardous substance migration path is reversed by tides, evaluate upstream targets only if there is documentation that the tidal run could carry substances from the site as far as those upstream targets.
- Determine whether targets within or contiguous to the hazardous substance migration path are subject to actual or potential contamination as follows:
  - –If a target is located, partially or wholly, either at or between the probable point of entry and any sampling point that meets the criteria for an observed release to the watershed or at a point that meets the criteria for an observed release by direct observation, evaluate that target as subject to actual contamination, except as otherwise specified for fisheries in section 4.1.3.3 and for wetlands in section 4.1.4.3.1.1. If the actual contamination is based on direct observation, assign Level II to the actual contamination. However, if the actual contamination is based on samples, determine whether the actual contamination is at Level I or Level II concentrations as specified in sections 4.1.2.3, 4.1.3.3, and 4.1.4.3.1.
  - –If a target is located, partially or wholly, within the target distance limit for the watershed, but not at or between the probable point of entry and any sampling point that meets the criteria for an observed release to the watershed, nor at a point that meets the criteria for an observed release by direct observation, evaluate it as subject to potential contamination.

For sites consisting solely of contaminated sediments with no identified source, determine the target distance limit as follows:

- If there is a clearly defined direction of flow for the surface water body (or bodies) containing the contaminated sediments, begin measuring the target distance limit at the point of observed sediment contamination that is farthest upstream (that is, at the location of the farthest available upstream sediment sample that meets the criteria for an observed release); extend the target distance limit either for 15 miles along the surface water or to the most distant downstream sample point that meets the criteria for an observed release to that watershed, whichever is greater.
- If there is no clearly defined direction of flow, begin measuring the target distance limit at the center of the area of observed sediment contamination. Extend the target distance limit as an arc either for 15 miles along the surface water or to the most distant sample point that meets the criteria for an observed release to that watershed, whichever is greater. Determine the area of observed sediment contamination based on available samples that meet the criteria for an observed release.

Note that the hazardous substance migration path for these contaminated sediment sites consists solely of the in-water segment defined by the target distance limit; there is no overland segment.

For these contaminated sediment sites, include only those targets (for example, intakes, fisheries, sensitive environments) that are within or contiguous to the hazardous substance migration path and located, wholly or partially, within the target distance limit for the site. Determine whether these targets are subject to actual or potential contamination as follows:

- If a target is located, partially or wholly, within the area of observed sediment contamination, evaluate it as subject to actual contamination, except as otherwise specified for fisheries in section 4.1.3.3 and wetlands in section 4.1.4.3.1.1.
  - –If a drinking water target is subject to actual contamination, evaluate it using Level II concentrations.

–If a human food chain target or environmental target is subject to actual contamination, evaluate it using Level I or Level II concentrations, as appropriate (see sections 4.1.3.3 and 4.1.4.3.1).

• If a target is located, partially or wholly, within the target distance limit for the watershed, but not within the area of observed sediment contamination, evaluate it as subject to potential contamination.

4.1.1.3 *Evaluation of overland/flood migration component.* Evaluate the drinking water threat, human food chain threat, and environmental threat for each watershed for this component based on three factor categories: likelihood of release, waste characteristics, and targets. Figure 4–1 indicates the factors included within each factor category for each type of threat.

Determine the overland/flood migration component score (S_{of}) for a watershed in terms of the factor category values as follows:

$$S_{of} = \sum_{i=1}^{3} \frac{(LR_i)(WC_i)(T_i)}{SF}$$

where:

LR_i = Likelihood of release factor category value for threat i (that is, drinking water, human food chain, or environmental threat).

WC_i = Waste characteristics factor category value for threat i.

T_i = Targets factor category value for threat i.

SF = Scaling factor.

Table 4–1 outlines the specific calculation procedure.

If the site is in only one watershed, assign the overland/flood migration score for that watershed as the overland/flood migration component score for the site.

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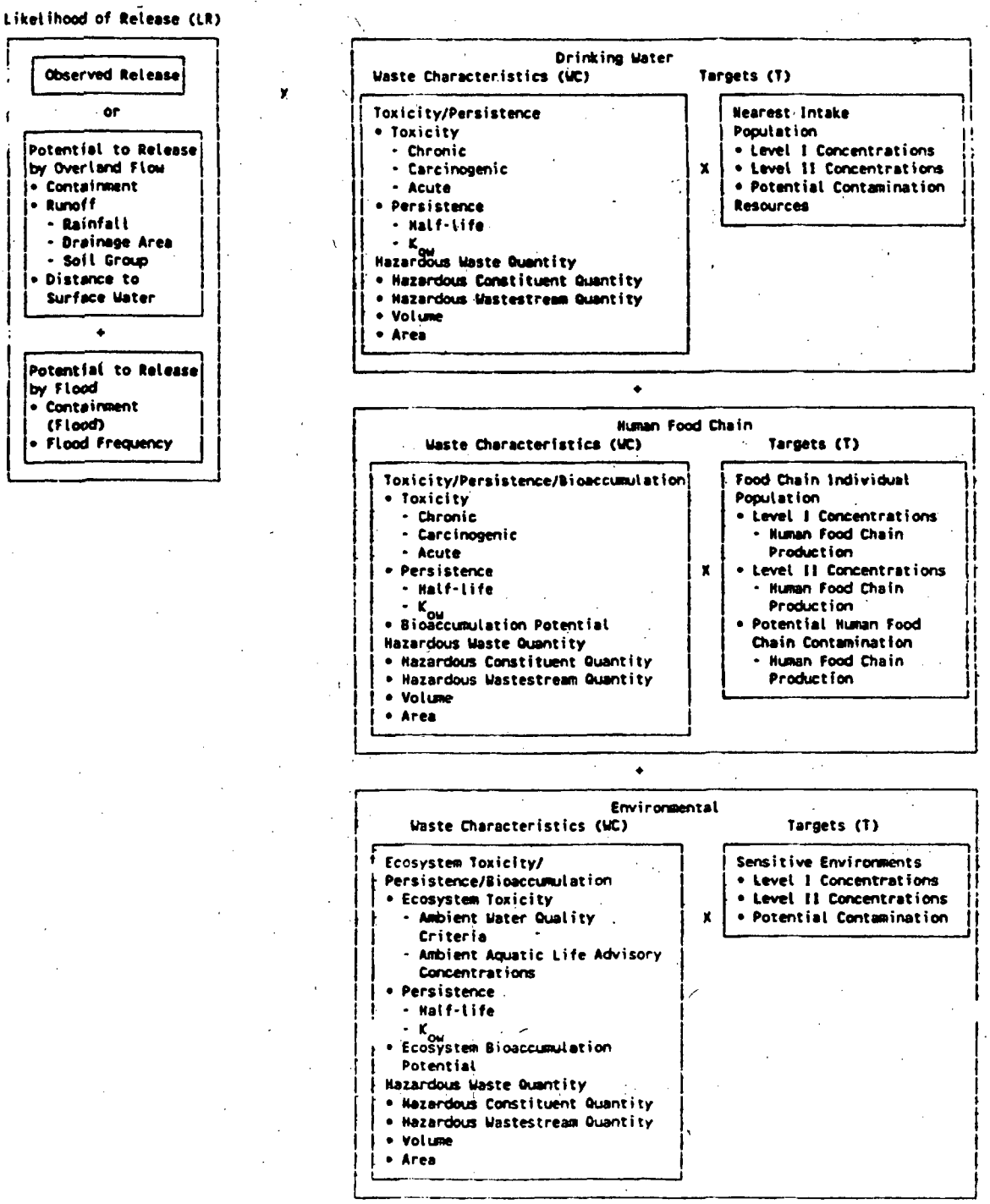

FIGURE 4-1
OVERVIEW OF SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT

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TABLE 4–1.—SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor categories and factors	Maximum value	Value assigned
Drinking Water Threat		
Likelihood of Release:		
1. Observed Release	550	
2. Potential to Release by Overland Flow:		
2a. Containment	10	
2b. Runoff	25	
2c. Distance to Surface Water	25	
2d. Potential to Release by Overland Flow (lines 2a[2b+2c])	500	
3. Potential to Release by Flood:		
3a. Containment (Flood)	10	
3b. Flood Frequency	50	
3c. Potential to Release by Flood (lines 3a×3b)	500	
4. Potential to Release (lines 2d+3c, subject to a maximum of 500)	500	
5. Likelihood of Release (higher of lines 1 and 4)	550	
Waste Characteristics:		
6. Toxicity/Persistence	(a)	
7. Hazardous Waste Quantity	(a)	
8. Waste Characteristics	100	
Targets:		
9. Nearest Intake	50	
10. Population		
10a. Level I Concentrations	(b)	
10b. Level II Concentrations	(b)	
10c. Potential Contamination	(b)	
10d. Population (lines 10a+10b+10c)	(b)	
11. Resources	5	
12. Targets (lines 9+10d+11)	(b)	
Drinking Water Threat Score:		
13. Drinking Water Threat Score ([lines 5×8×12]/82,500, subject to a maximum of 100)	100	
Human Food Chain Threat		
Likelihood of Release:		
14. Likelihood of Release (same value as line 5)	550	
Waste Characteristics:		
15. Toxicity/Persistence/Bioaccumulation	(a)	
16. Hazardous Waste Quantity	(a)	
17. Waste Characteristics	1,000	
Targets:		
18. Food Chain Individual	50	
19. Population		
19a. Level I Concentrations	(b)	
19b. Level II Concentrations	(b)	
19c. Potential Human Food Chain Contamination	(b)	
19d. Population (lines 19a+19b+19c)	(b)	
20. Targets (lines 18+19d)	(b)	
Human Food Chain Threat Score:		
21. Human Food Chain Threat Score ([lines 14×17×20]/82,500, subject to a maximum of 100)	100	
Environmental Threat		
Likelihood of Release:		
22. Likelihood of Release (same value as line 5)	550	
Waste Characteristics:		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	
24. Hazardous Waste Quantity	(a)	
25. Waste Characteristics	1,000	
Targets:		
26. Sensitive Environments		
26a. Level I Concentrations	(b)	
26b. Level II Concentrations	(b)	
26c. Potential Contamination	(b)	
26d. Sensitive Environments (lines 26a+26b+26c)	(b)	
27. Targets (value from line 26d)	(b)	
Environmental Threat Score:		
28. Environmental Threat Score ([lines 22×25×27]/82,500, subject to a maximum of 60)	60	
Surface Water Overland/Flood Migration Component Score for a Watershed		
29. Watershed Score [c] (lines 13+21+28, subject to a maximum of 100)	100	
Surface Water Overland/Flood Migration Component Score		
30. Component Score (S_{of}) [c] (highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100	

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

If the site is in more than one watershed:

• Calculate a separate overland/flood migration component score for each watershed, using likelihood of release, waste characteristics, and targets applicable to each watershed.

• Select the highest overland/flood migration component score from the watersheds evaluated and assign it as the overland/flood migration component score for the site.

4.1.2 *Drinking water threat.* Evaluate the drinking water threat for each watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.1.2.1 *Drinking water threat—likelihood of release.* Evaluate the likelihood of release factor category for each watershed in terms of an observed release factor or a potential to release factor.

4.1.2.1.1 *Observed release.* Establish an observed release to surface water for a watershed by demonstrating that the site has released a hazardous substance to the surface water in the watershed. Base this demonstration on either:

• Direct observation:

–A material that contains one or more hazardous substances has been seen entering surface water through migration or is known to have entered surface water through direct deposition, or

–A source area has been flooded at a time that hazardous substances were present, and one or more hazardous substances were in contact with the flood waters, or

–When evidence supports the inference of a release of a material that contains one or more hazardous substances by the site to surface water, demonstrated adverse effects associated with that release may also be used to establish an observed release.

• Chemical analysis:

–Analysis of surface water, benthic, or sediment samples indicates that the concentration of hazardous substance(s) has increased significantly above the background concentration for the site for that type of sample (see section 2.3).

– –Limit comparisons to similar types of samples and background concentrations—for example, compare surface water samples to surface water background concentrations.

– –For benthic samples, limit comparisons to essentially sessile organisms.

–Some portion of the significant increase must be attributable to the site to establish the observed release, except: when the site itself consists of contaminated sediments with no identified source, no separate attribution is required.

If an observed release can be established for a watershed, assign an observed release factor value of 550 to that watershed, enter this value in Table 4–1, and proceed to section 4.1.2.1.3. If no observed release can be established for the watershed, assign an observed release factor value of 0 to that watershed, enter this value in Table 4–1, and proceed to section 4.1.2.1.2.

4.1.2.1.2 *Potential to release.* Evaluate potential to release only if an observed release cannot be established for the watershed. Evaluate potential to release based on two components: potential to release by overland flow (see section 4.1.2.1.2.1) and potential to release by flood (see section 4.1.2.1.2.2). Sum the values for these two components to obtain the potential to release factor value for the watershed, subject to a maximum value of 500.

4.1.2.1.2.1 *Potential to release by overland flow.* Evaluate potential to release by overland flow for the watershed based on three factors: containment, runoff, and distance to surface water.

Assign potential to release by overland flow a value of 0 for the watershed if:

• No overland segment of the hazardous substance migration path can be defined for the watershed, or

• The overland segment of the hazardous substance migration path for the watershed exceeds 2 miles before surface water is encountered.

If either condition applies, enter a value of 0 in Table 4–1 and proceed to section 4.1.2.1.2.2 to evaluate potential to release by flood. If neither applies, proceed to section 4.1.2.1.2.1.1 to evaluate potential to release by overland flow.

4.1.2.1.2.1.1 *Containment.* Determine the containment factor value for the watershed as follows:

• If one or more sources is located in surface water in the watershed (for example, intact sealed drums in surface water), assign the containment factor a value of 10 for the watershed. Enter this value in Table 4–1.

• If none of the sources is located in surface water in the watershed, assign a containment factor value from Table 4–2 to each source at the site that can potentially release hazardous substances to the hazardous substance migration path for this watershed. Assign the containment factor value for the watershed as follows:

–Select the highest containment factor value assigned to those sources that meet the minimum size requirement described below. Assign this highest value as the containment factor value for the watershed. Enter this value in Table 4–1.

–If, for this watershed, no source at the site meets the minimum size requirement, then select the highest containment factor value assigned to the sources at the site eligible to be evaluated for this watershed and assign it as the containment factor value for the watershed. Enter this value in Table 4–1.

A source meets the minimum size requirement if its source hazardous waste quantity value (see section 2.4.2.1.5) is 0.5 or more. Do not include the minimum size requirement in evaluating any other factor of this surface water migration component, except potential to release by flood as specified in section 4.1.2.1.2.2.3.

4.1.2.1.2.1.2 *Runoff.* Evaluate runoff based on three components: rainfall, drainage area, and soil group.

TABLE 4–2.—CONTAINMENT FACTOR VALUES FOR SURFACE WATER MIGRATION PATHWAY

Source	Assigned value
All Sources (Except Surface Impoundments, Land Treatment, Containers, and Tanks)	
Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures)	10
No evidence of hazardous substance migration from source area *and*:	
(a) Neither of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system	10
(b) Any one of the two items in (a) present	9
(c) Any two of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) liner with functioning leachate collection and removal system immediately above liner.	7
(d) All items in (c) present	5
(e) All items in (c) present, plus no bulk or non-containerized liquids nor materials containing free liquids deposited in source area	3
No evidence of hazardous substance migration from source area, double liner with functioning leachate collection and removal system above and between liners, *and*:	
(f) Only one of the following deficiencies present in containment: (1) bulk or noncontainerized liquids or materials containing free liquids deposited in source area, or (2) no or nonfunctioning or nonmaintained run-on control system and runoff management system, or (3) no or nonmaintained engineered cover.	3
(g) None of the deficiencies in (f) present	0
Source area inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate is generated, liquids or materials containing free liquids not deposited in source area, and functioning and maintained run-on control present	

TABLE 4-2.—CONTAINMENT FACTOR VALUES FOR SURFACE WATER MIGRATION PATHWAY—Concluded

Source	Assigned value
Surface Impoundment	
Evidence of hazardous substance migration from surface impoundment	10
Free liquids present with either no diking, unsound diking, or diking that is not regularly inspected and maintained	10
No evidence of hazardous substance migration from surface impoundment, free liquids present, sound diking that is regularly inspected and maintained, adequate freeboard, *and*:	
(a) No liner	9
(b) Liner	7
(c) Liner with functioning leachate collection and removal system below liner	5
(d) Double liner with functioning leachate collection and removal system between liners	3
No evidence of hazardous substance migration from surface impoundment and all free liquids eliminated at closure (either by removal of liquids or solidification of remaining wastes and waste residues).	Evaluate using All Sources criteria (with no bulk or free liquids deposited).
Land Treatment	
Evidence of hazardous substance migration from land treatment zone	10
No functioning and maintained run-on control and runoff management system	10
No evidence of hazardous substance migration from land treatment zone *and*:	
(a) Functioning and maintained run-on control and runoff management system	7
(b) Functioning and maintained run-on control and runoff management system, and vegetative cover established over entire land treatment area.	5
(c) Land treatment area maintained in compliance with 40 CFR 264.280	0
Containers	
All containers buried	Evaluate using All Sources criteria.
Evidence of hazardous substance migration from container area (i.e., container area includes containers and any associated containment structures).	10
No diking (or no similar structure) surrounding container area	10
Diking surrounding container area unsound or not regularly inspected and maintained	10
No evidence of hazardous substance migration from container area and container area surrounded by sound diking that is regularly inspected and maintained.	9
No evidence of hazardous substance migration from container area, container area surrounded by sound diking that is regularly inspected and maintained, *and*:	9
(a) Essentially impervious base under container area with liquids collection and removal system	7
(b) Containment system includes essentially impervious base, liquids collection system, sufficient capacity to contain 10 percent of volume of all containers, and functioning and maintained run-on control; and spilled or leaked hazardous substances and accumulated precipitation removed in timely manner to prevent overflow of collection system, at least weekly inspection of containers, hazardous substances in leaking or deteriorating containers transferred to containers in good condition, and containers sealed except when waste is added or removed.	5
(c) Free liquids present, containment system has sufficient capacity to hold total volume of all containers and to provide adequate freeboard, and single liner under container area with functioning leachate collection and removal system below liner.	5
(d) Same as (c) except: double liner under container area with functioning leachate collection and removal system between liners	3
Containers inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any unsealed or ruptured containers, liquids or materials containing free liquids not deposited in any container, and functioning and maintained run-on control present.	0
No evidence of hazardous substance migration from container area, containers leaking, and all free liquids eliminated at closure (either by removal of liquids or solidification of remaining wastes and waste residues).	Evaluate using All Sources criteria (with no bulk or free liquids deposited).
Tank	
Below-ground tank	Evaluate using All Sources criteria
Evidence of hazardous substance migration from tank area (i.e., tank area includes tank, ancillary equipment such as piping, and any associated containment structures).	10
No diking (or no similar structure) surrounding tank and ancillary equipment	10
Diking surrounding tank and ancillary equipment unsound or not regularly inspected and maintained	10
No evidence of hazardous substance migration from tank area and tank and ancillary equipment surrounded by sound diking that is regularly inspected and maintained.	9
No evidence of hazardous substance migration from tank area, tank and ancillary equipment surrounded by sound diking that is regularly inspected and maintained, *and*:	
(a) Tank and ancillary equipment provided with secondary containment (e.g., liner under tank area, vault system, double-wall) with leak detection and collection system.	7
(b) Tank and ancillary equipment provided with secondary containment system that detects and collects spilled or leaked hazardous substances and accumulated precipitation and has sufficient capacity to contain 110 percent of volume of largest tank within containment area, spilled or leaked hazardous substances and accumulated precipitation removed in a timely manner, at least weekly inspection of tank and secondary containment system, and all leaking or unfit-for-use tank systems promptly responded to.	5
(c) Containment system has sufficient capacity to hold total volume of all tanks within the tank containment area and to provide adequate freeboard, and single liner under tank containment area with functioning leachate collection and removal system below liner.	5
(d) Same as (c) except: double liner under tank containment area with functioning leachate collection and removal system between liners.	3
Tank is above ground, and inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any material released from tank, liquids or materials containing free liquids not deposited in any tank, and functioning and maintained run-on control present.	0

Rainfall. Determine the 2-year, 24-hour rainfall for the site. Use site-specific, 2-year, 24-hour rainfall data if records are available for at least 20 years. If such site-specific data are not available, estimate the 2-year, 24-hour rainfall for the site from a rainfall-frequency map. Do not round the rainfall value to the nearest integer.

Drainage area. Determine the drainage area for the sources at the site. Include in this drainage area both the source areas and the area upgradient of the sources, but exclude any portion of this drainage area for which runoff is diverted from entering the sources by storm sewers or run-on control and/or runoff management systems. Assign a drainage area value for the watershed from Table 4–3.

Soil group. Based on the predominant soil group within the drainage area described above, assign a soil group designation for the watershed from Table 4–4 as follows:

- Select the predominant soil group as that type which comprises the largest total area within the applicable drainage area.
- If a predominant soil group cannot be delineated, select that soil group in the drainage area that yields the highest value for the runoff factor.

Calculation of runoff factor value. Assign a combined rainfall/runoff value for the watershed from Table 4–5, based on the 2-year, 24-hour rainfall and the soil group designation. Determine the runoff factor value for the watershed from Table 4–6, based on the rainfall/runoff and drainage area values. Enter the runoff factor value in Table 4–1.

TABLE 4–3.—DRAINAGE AREA VALUES

Drainage area (acres)	Assigned value
Less than 50	1
50 to 250	2
Greater than 250 to 1,000	3
Greater than 1,000	4

TABLE 4–4.—SOIL GROUP DESIGNATIONS

Surface soil description	Soil group designation
Coarse-textured soils with high infiltration rates (for example, sands, loamy sands).	A
Medium-textured soils with moderate infiltration rates (for example, sandy loams, loams).	B
Moderately fine-textured soils with low infiltration rates (for example, silty loams, silts, sandy clay loams).	C
Fine-textured soils with very low infiltration rates (for example, clays, sandy clays, silty clay loams, clay loams, silty clays); or impermeable surfaces (for example, pavement).	D

TABLE 4–5.—RAINFALL/RUNOFF VALUES

2-Year, 24-hour rainfall (inches)	Soil group designation			
	A	B	C	D
Less than 1.0	0	0	2	3
1.0 to less than 1.5	0	1	2	3
1.5 to less than 2.0	0	2	3	4
2.0 to less than 2.5	1	2	3	4
2.5 to less than 3.0	2	3	4	4
3.0 to less than 3.5	2	3	4	5
3.5 or greater	3	4	5	6

TABLE 4–6.—RUNOFF FACTOR VALUES

Drainage area value	Rainfall/runoff value						
	0	1	2	3	4	5	6
1	0	0	0	1	1	1	1
2	0	0	1	1	2	3	4
3	0	0	1	3	7	11	15
4	0	1	2	7	17	25	25

4.1.2.1.2.1.3 *Distance to surface water.* Evaluate the distance to surface water as the shortest distance, along the overland segment, from any source with a surface water containment factor value greater than 0 to either the mean high water level for tidal waters or the mean water level for other surface waters. Based on this distance, assign a value from Table 4–7 to the distance to surface water factor for the watershed. Enter this value in Table 4–1.

4.1.2.1.2.1.4 *Calculation of factor value for potential to release by overland flow.* Sum the factor values for runoff and distance to surface water for the watershed and multiply this sum by the factor value for containment. Assign the resulting product as the factor value for potential to release by overland flow for the watershed. Enter this value in Table 4–1.

4.1.2.1.2.2 *Potential to release by flood.* Evaluate potential to release by flood for each watershed as the product of two factors: containment (flood) and flood frequency. Evaluate potential to release by flood separately for each source that is within the watershed. Furthermore, for each source, evaluate potential to release by flood separately for each category of floodplain in which the source lies. (See section 4.1.2.1.2.2.2 for the applicable floodplain categories.) Calculate the value for the potential to release by flood factor as specified in 4.1.2.1.2.2.3.

4.1.2.1.2.2.1 *Containment (flood).* For each source within the watershed, separately evaluate the containment (flood) factor for each category of floodplain in which the source is partially or wholly located. Assign a containment (flood) factor value from Table 4–8 to each floodplain category applicable to that source. Assign a containment (flood) factor value of 0 to each floodplain category in which the source does not lie.

4.1.2.1.2.2.2 *Flood frequency.* For each source within the watershed, separately evaluate the flood frequency factor for each category of floodplain in which the source is partially or wholly located. Assign a flood frequency factor value from Table 4–9 to each floodplain category in which the source is located.

4.1.2.1.2.2.3 *Calculation of factor value for potential to release by flood.* For each source within the watershed and for each category of floodplain in which the source is partially or wholly located, calculate a separate potential to release by flood factor value. Calculate this value as the product of the containment (flood) value and the flood frequency value applicable to the source for the floodplain category. Select the highest value calculated for those sources that meet the minimum size requirement specified in section 4.1.2.1.2.1.1 and assign it as the value for the potential to release by flood factor for the watershed. However, if, for this watershed, no source at the site meets the minimum size requirement, select the highest value calculated for the sources at the site eligible to be evaluated for this watershed and assign it as the value for this factor.

TABLE 4–7.—DISTANCE TO SURFACE WATER FACTOR VALUES

Distance	Assigned value
Less than 100 feet	25
100 feet to 500 feet	20
Greater than 500 feet to 1,000 feet	16
Greater than 1,000 feet to 2,500 feet	9
Greater than 2,500 feet to 1.5 miles	6
Greater than 1.5 miles to 2 miles	3

TABLE 4–8.—CONTAINMENT (FLOOD) FACTOR VALUES

Containment criteria	Assigned value
Documentation that containment at the source is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by the flood being evaluated.	0
Other	10

TABLE 4–9.—FLOOD FREQUENCY FACTOR VALUES

Floodplain category	Assigned value
Source floods annually	50
Source in 10-year floodplain	50
Source in 100-year floodplain	25
Source in 500-year floodplain	7
None of above	0

Enter this highest potential to release by flood factor value for the watershed in Table 4–1, as well as the values for containment (flood) and flood frequency that yield this highest value.

4.1.2.1.2.3 *Calculation of potential to release factor value.* Sum the factor values assigned to the watershed for potential to release by overland flow and potential to release by flood. Assign this sum as the potential to release factor value for the watershed, subject to a maximum value of 500. Enter this value in Table 4–1.

4.1.2.1.3 *Calculation of drinking water threat-likelihood of release factor category value.* If an observed release is established for the watershed, assign the observed release factor value of 550 as the likelihood of release factor category value for that watershed. Otherwise, assign the potential to release factor value for that watershed as the likelihood of release factor category value for that watershed. Enter the value assigned in Table 4–1.

4.1.2.2 *Drinking water threat-waste characteristics.* Evaluate the waste characteristics factor category for each

watershed based on two factors: toxicity/persistence and hazardous waste quantity. Evaluate only those hazardous substances that are available to migrate from the sources at the site to surface water in the watershed via the overland/flood hazardous substance migration path for the watershed (see section 4.1.1.1). Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to surface water in the watershed.
- All hazardous substances associated with a source that has a surface water containment factor value greater than 0 for the watershed (see sections 2.2.2, 2.2.3, 4.1.2.1.2.1.1, and 4.1.2.1.2.2.1).

4.1.2.2.1 *Toxicity/persistence.* For each hazardous substance, assign a toxicity factor value, a persistence factor value, and a combined toxicity/persistence factor value as specified in sections 4.1.2.2.1.1 through 4.1.2.2.1.3. Select the toxicity/persistence factor value for the watershed as specified in section 4.1.2.2.1.3.

4.1.2.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in section 2.4.1.1.

4.1.2.2.1.2 *Persistence.* Assign a persistence factor value to each hazardous substance. In assigning this value, evaluate persistence based primarily on the half-life of the hazardous substance in surface water and secondarily on the sorption of the hazardous substance to sediments. The half-life in surface water is defined for HRS purposes as the time required to reduce the initial concentration in surface water by one-half as a result of the combined decay processes of biodegradation, hydrolysis, photolysis, and volatilization. Sorption to sediments is evaluated for the HRS based on the logarithm of the n-octanol-water partition coefficient (log K_{ow}) of the hazardous substance.

Estimate the half-life ($t_{1/2}$) of a hazardous substance as follows:

$$t_{1/2} = \frac{1}{\frac{1}{h} + \frac{1}{b} + \frac{1}{p} + \frac{1}{v}}$$

where:

h = Hydrolysis half-life.
b = Biodegradation half-life.
p = Photolysis half-life.
v = Volatilization half-life.

If one or more of these four component half-lives cannot be estimated for the hazardous substance from available data, delete that component half-life from the above equation. If none of these four component half-lives can be estimated for the hazardous substance from available data, use the default procedure indicated below. Estimate a half-life for the hazardous substance for lakes or for rivers, oceans, coastal tidal waters, and Great Lakes, as appropriate.

If a half-life can be estimated for a hazardous substance:

- Assign that hazardous substance a persistence factor value from the appropriate portion of Table 4-10 (that is lakes; or rivers, oceans, coastal tidal waters, and Great Lakes).
- Select the appropriate portion of Table 4-10 as follows:
  - If there is one or more drinking water intakes along the hazardous substance migration path for the watershed, select the nearest drinking water intake as measured from the probable point of entry. If the in-water segment between the probable point of entry and this selected intake includes both lakes and other water bodies, use the lakes portion of Table 4-10 only if more than half the distance to this selected intake lies in lake(s). Otherwise, use the rivers, oceans, coastal tidal waters, and Great Lakes portion of Table 4-10. For contaminated sediments with no identified source, use the point where measurement begins (see section 4.1.1.2) rather than the probable point of entry.
  - If there are no drinking water intakes but there are intakes or points of use for any of the resource types listed in section 4.1.2.3.3, select the nearest such intake or point of use. Select the portion of Table 4-10 based on this intake or point of use in the manner specified for drinking water intakes.
  - If there are no drinking water intakes and no specified resource intakes and points of use, but there is another type of resource listed in section 4.1.2.3.3 (for example, the water is usable for drinking water purposes even though not used), select the portion of Table 4-10 based on the nearest point of this resource in the manner specified for drinking water intakes.

TABLE 4-10.—PERSISTENCE FACTOR VALUES—HALF-LIFE

Surface water category	Substance half-life (days)	Assigned value *
Rivers, oceans, coastal tidal waters, and Great Lakes	Less than or equal to 0.2	0.0007
	Greater than 0.2 to 0.5	0.07
	Greater than 0.5 to 1.5	0.4
	Greater than 1.5	1
Lakes	Less than or equal to 0.02	0.0007
	Greater than 0.02 to 2	0.07
	Greater than 2 to 20	0.4
	Greater than 20	1

* Do not round to nearest integer.

If a half-life cannot be estimated for a hazardous substance from available data, use the following default procedure to assign a persistence factor value to that hazardous substance:

- For those hazardous substances that are metals (or metalloids), assign a persistence factor value of 1 as a default for all surface water bodies.
- For other hazardous substances (both organic and inorganic), assign a persistence factor value of 0.4 as a default for rivers, oceans, coastal tidal waters, and Great Lakes, and a persistence factor value of 0.07 as a default for lakes. Select the appropriate value in the same manner specified for using Table 4-10.

Use the persistence factor value assigned based on half-life or the default procedure unless the hazardous substance can be assigned a higher factor value from Table 4-11, based on its Log K_{ow}. If a higher value can be assigned from Table 4-11, assign this higher value as the persistence factor value for the hazardous substance.

TABLE 4-11.—PERSISTENCE FACTOR VALUES—LOG K_{ow}

Log K_{ow}	Assigned value *
Less than 3.5	0.0007
3.5 to less than 4.0	0.07
4.0 to 4.5	0.4

TABLE 4-11.—PERSISTENCE FACTOR VALUES—LOG K_{ow}—Concluded

Log K_{ow}	Assigned value *
Greater than 4.5	1

* Use for lakes, rivers, oceans, coastal tidal waters, and Great Lakes. Do not round to nearest integer.

4.1.2.2.1.3 *Calculation of toxicity/persistence factor value.* Assign each hazardous substance a toxicity/persistence factor value from Table 4-12, based on the values assigned to the hazardous substance for the toxicity and persistence factors. Use

the hazardous substance with the highest toxicity/persistence factor value for the watershed to assign the toxicity/persistence factor value for the drinking water threat for the watershed. Enter this value in Table 4–1.

4.1.2.2.2 *Hazardous waste quantity.* Assign a hazardous waste quantity factor value for the watershed as specified in section 2.4.2. Enter this value in Table 4–1.

4.1.2.2.3 *Calculation of drinking water threat-waste characteristics factor category value.* Multiply the toxicity/persistence and hazardous waste quantity factor values for the watershed, subject to a maximum product of 1 x 10^8. Based on this product, assign a value from Table 2–7 (section 2.4.3.1) to the drinking water threat-waste characteristics factor category for the watershed. Enter this value in Table 4–1.

TABLE 4–12.—TOXICITY/PERSISTENCE FACTOR VALUES [a]

Persistence factor value	Toxicity factor value					
	10,000	1,000	100	10	1	0
1.0	10,000	1,000	100	10	1	0
0.4	4,000	400	40	4	0.4	0
0.07	700	70	7	0.7	0.07	0
0.0007	7	0.7	0.07	0.007	0.0007	0

[a] Do not round to nearest integer.

4.1.2.3 *Drinking water threat-targets.* Evaluate the targets factor category for each watershed based on three factors: nearest intake, population, and resources.

To evaluate the nearest intake and population factors, determine whether the target surface water intakes are subject to actual or potential contamination as specified in section 4.1.1.2. Use either an observed release based on direct observation at the intake or the exposure concentrations from samples (or comparable samples) taken at or beyond the intake to make this determination (see section 4.1.2.1.1). The exposure concentrations for a sample (that is, surface water, benthic, or sediment sample) consist of the concentrations of those hazardous substances present that are significantly above background levels and attributable at least in part to the site (that is, those hazardous substance concentrations that meet the criteria for an observed release).

When an intake is subject to actual contamination, evaluate it using Level I concentrations or Level II concentrations. If the actual contamination is based on an observed release by direct observation, use Level II concentrations for that intake. However, if the actual contamination is based on an observed release from samples, determine which level applies for the intake by comparing the exposure concentrations from samples (or comparable samples) to health-based benchmarks as specified in sections 2.5.1 and 2.5.2. Use the health-based benchmarks from Table 3–10 (section 3.3.1) in determining the level of contamination from samples. For contaminated sediments with no identified source, evaluate the actual contamination using Level II concentrations (see section 4.1.1.2).

4.1.2.3.1 *Nearest intake.* Evaluate the nearest intake factor based on the drinking water intakes along the overland/flood hazardous substance migration path for the watershed. Include standby intakes in evaluating this factor only if they are used for supply at least once a year.

Assign the nearest intake factor a value as follows and enter the value in Table 4–1:

- If one or more of these drinking water intakes is subject to Level I concentrations as specified in section 4.1.2.3, assign a factor value of 50.
- If not, but if one or more of these drinking water intakes is subject to Level II concentrations, assign a factor value of 45.
- If none of these drinking water intakes is subject to Level I or Level II concentrations, determine the nearest of these drinking water intakes, as measured from the probable point of entry (or from the point where measurement begins for contaminated sediments with no identified source). Assign a dilution weight from Table 4–13 to this intake, based on the type of surface water body in which it is located. Multiply this dilution weight by 20, round the product to the nearest integer, and assign it as the factor value.

Assign the dilution weight from Table 4–13 as follows:

TABLE 4–13.—SURFACE WATER DILUTION WEIGHTS

Type of surface water body [a]		Assigned dilution weight [b]
Descriptor	Flow characteristics	
Minimal stream	Less than 10 cfs [c]	1
Small to moderate stream	10 to 100 cfs	0.1
Moderate to large stream	Greater than 100 to 1,000 cfs	0.01
Large stream to river	Greater than 1,000 to 10,000 cfs	0.001
Large river	Greater than 10,000 to 100,000 cfs	0.0001
Very large river	Greater than 100,000 cfs	0.00001
Coastal tidal waters [d]	Flow not applicable, depth not applicable	0.0001
Shallow ocean zone [e] or Great Lake	Flow not applicable, depth less than 20 feet	0.0001
Moderate depth ocean zone [e] or Great Lake	Flow not applicable, depth 20 to 200 feet	0.00001
Deep ocean zone [e] or Great Lake	Flow not applicable, depth greater than 200 feet	0.000005
3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

[a] Treat each lake as a separate type of water body and assign a dilution weight as specified in text.
[b] Do not round to nearest integer.
[c] cfs = cubic feet per second.
[d] Embayments, harbors, sounds, estuaries, back bays, lagoons, wetlands, etc., seaward from mouths of rivers and landward from baseline of Territorial Sea.
[e] Seaward from baseline of Territorial Sea. This baseline represents the generalized U.S. coastline. It is parallel to the seaward limit of the Territorial Sea and other maritime limits such as the inner boundary of the Federal fisheries jurisdiction and the limit of States jurisdiction under the Submerged Lands Act, as amended.

- For a river (that is, surface water body types specified in Table 4–13 as minimal stream through very large river), assign a dilution weight based on the average annual flow in the river at the intake. If available, use the average annual discharge as defined in the U.S. Geological Survey Water Resources Data Annual Report. Otherwise, estimate the average annual flow.
- For a lake, assign a dilution weight as follows:
  - –For a lake that has surface water flow entering the lake, assign a dilution weight based on the sum of the

average annual flows for the surface water bodies entering the lake up to the point of the intake.

–For a lake that has no surface water flow entering, but that does have surface water flow leaving, assign a dilution weight based on the sum of the average annual flows for the surface water bodies leaving the lake.

–For a closed lake (that is, a lake without surface water flow entering or leaving), assign a dilution weight based on the average annual ground water flow into the lake, if available, using the dilution weight for the corresponding river flow rate in Table 4–13. If not available, assign a default dilution weight of 1.

• For the ocean and the Great Lakes, assign a dilution weight based on depth.

• For coastal tidal waters, assign a dilution weight of 0.0001; do not consider depth or flow.

• For a quiet-flowing river that has average annual flow of 10 cubic feet per second (cfs) or greater and that contains the probable point of entry to surface water, apply a zone of mixing in assigning the dilution weight:

–Start the zone of mixing at the probable point of entry and extend it for 3 miles from the probable point of entry, except: if the surface water characteristics change to turbulent within this 3-mile distance, extend the zone of mixing only to the point at which the change occurs.

–Assign a dilution weight of 0.5 to any intake that lies within this zone of mixing.

–Beyond this zone of mixing, assign a dilution weight the same as for any other river (that is, assign the dilution weight based on average annual flow).

–Treat a quiet-flowing river with an average annual flow of less than 10 cfs the same as any other river (that is, assign it a dilution weight of 1).

In those cases where water flows from a surface water body with a lower assigned dilution weight (from Table 4–13) to a surface water body with a higher assigned dilution weight (that is, water flows from a surface water body with more dilution to one with less dilution), use the lower assigned dilution weight as the dilution weight for the latter surface water body.

4.1.2.3.2 *Population.* In evaluating the population factor, include only persons served by drinking water drawn from intakes that are along the overland/flood hazardous substance migration path for the watershed and that are within the target distance limit specified in section 4.1.1.2. Include residents, students, and workers who regularly use the water. Exclude transient populations such as customers and travelers passing through the area. When a standby intake is maintained on a regular basis so that water can be withdrawn, include it in evaluating the population factor.

In estimating residential population, when the estimate is based on the number of residences, multiply each residence by the average number of persons per residence for the county in which the residence is located.

In estimating the population served by an intake, if the water from the intake is blended with other water (for example, water from other surface water intakes or ground water wells), apportion the total population regularly served by the blended system to the intake based on the intake's relative contribution to the total blended system. In estimating the intake's relative contribution, assume each well or intake contributes equally and apportion the population accordingly, except: if the relative contribution of any one intake or well exceeds 40 percent based on average annual pumpage or capacity, estimate the relative contribution of the wells and intakes considering the following data, if available:

• Average annual pumpage from the ground water wells and surface water intakes in the blended system.

• Capacities of the wells and intakes in the blended system.

For systems with standby surface water intakes or standby ground water wells, apportion the total population regularly served by the blended system as described above, except:

• Exclude standby ground water wells in apportioning the population.

• When using pumpage data for a standby surface water intake, use average pumpage for the period during which the standby intake is used rather than average annual pumpage.

• For that portion of the total population that could be apportioned to a standby surface water intake, assign that portion of the population either to that standby intake or to the other surface water intake(s) and ground water well(s) that serve that population; do not assign that portion of the population both to the standby intake and to the other intake(s) and well(s) in the blended system. Use the apportioning that results in the highest population factor value. (Either include all standby intake(s) or exclude some or all of the standby intake(s) as appropriate to obtain this highest value.) Note that the specific standby intake(s) included or excluded and, thus, the specific apportioning may vary in evaluating different watersheds and in evaluating the ground water pathway.

4.1.2.3.2.1 *Level of contamination.* Evaluate the population factor based on three factors: Level I concentrations, Level II concentrations, and potential contamination. Determine which factor applies for an intake as specified in section 4.1.2.3. Evaluate intakes subject to Level I concentration as specified in section 4.1.2.3.2.2, intakes subject to Level II concentration as specified in section 4.1.2.3.2.3, and intakes subject to potential contamination as specified in section 4.1.2.3.2.4.

For the potential contamination factor, use population ranges in evaluating the factor as specified in section 4.1.2.3.2.4. For the Level I and Level II concentrations factors, use the population estimate, not population ranges, in evaluating both factors.

4.1.2.3.2.2 *Level I concentrations.* Sum the number of people served by drinking water from intakes subject to Level I concentrations. Multiply this sum by 10. Assign this product as the value for this factor. Enter this value in Table 4–1.

4.1.2.3.2.3 *Level II concentrations.* Sum the number of people served by drinking water from intakes subject to Level II concentrations. Do not include people already counted under the Level I concentrations factor. Assign this sum as the value for this factor. Enter this value in Table 4–1.

4.1.2.3.2.4 *Potential contamination.* For each applicable type of surface water body in Table 4–14, first determine the number of people served by drinking water from intakes subject to potential contamination in that type of surface water body. Do not include those people already counted under the Level I and Level II concentrations factors.

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TABLE 4-14

DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FACTOR FOR SURFACE WATER MIGRATION PATHWAY[a]

Type of Surface Water Body[b]	Number of People								
	0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000
Minimal stream (< 10 cfs)	0	4	17	53	164	522	1,633	5,214	16,325
Small to moderate stream (10 to 100 cfs)	0	0.4	2	5	16	52	163	521	1,633
Moderate to large stream (> 100 to 1,000 cfs)	0	0.04	0.2	0.5	2	5	16	52	163
Large stream to river (> 1,000 to 10,000 cfs)	0	0.004	0.02	0.05	0.2	0.5	2	5	16
Large river (> 10,000 to 100,000 cfs)	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2
Very large river (> 100,000 cfs)	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2
Shallow ocean zone or Great Lake (depth < 20 feet)	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2
Moderate ocean zone or Great Lake (depth 20 to 200 feet)	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2
Deep ocean zone or Great Lakes (depth > 200 feet)	0	0	0	0	0.001	0.003	0.008	0.03	0.08
3-mile mixing zone in quiet flowing river (≥ 10 cfs)	0	2	9	26	82	261	817	2,607	8,163

TABLE 4-14 (Concluded)

Type of Surface Water Body[b]	Number of People				
	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	3,000,001 to 10,000,000
Minimal stream (< 10 cfs)	52,137	163,246	521,360	1,632,455	5,213,590
Small to moderate stream (10 to 100 cfs)	5,214	16,325	52,136	163,245	521,359
Moderate to large stream (> 100 to 1,000 cfs)	521	1,633	5,214	16,325	52,136
Large stream to river (> 1,000 to 10,000 cfs)	52	163	521	1,632	5,214
Large river (> 10,000 to 100,000 cfs)	5	16	52	163	521
Very large river (> 100,000 cfs)	0.5	2	5	16	52
Shallow ocean zone or Great Lake (depth < 20 feet)	5	16	52	163	521
Moderate ocean zone or Great Lake (depth 20 to 200 feet)	0.5	2	5	16	52
Deep zone or Great Lake (depth > 200 feet)	0.3	1	3	8	26
3-mile mixing zone in quiet flowing river (≥ 10 cfs)	26,068	81,623	260,680	816,227	2,606,795

[a]Round the number of people to nearest integer. Do not round the assigned dilution-weighted population value to nearest integer.

[b]Treat each lake as a separate type of water body and assign it a dilution-weighted population value using the surface water body type with the same dilution weight from Table 4-13 as the lake. If drinking water is withdrawn from coastal tidal water or the ocean, assign a dilution-weighted population value to it using the surface water body type with the same dilution weight from Table 4-13 as the coastal tidal water or the ocean zone.

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For each type of surface water body, assign a dilution-weighted population value from Table 4–14, based on the number of people included for that type of surface water body. (Note that the dilution-weighted population values in Table 4–14 incorporate the dilution weights from Table 4–13. Do not multiply the values from Table 4–14 by these dilution weights.)

Calculate the value for the potential contamination factor (PC) for the watershed as follows:

$$PC = \frac{1}{10} \sum_{i=1}^{n} W_i$$

where:

W_i = Dilution-weighted population from Table 4–14 for surface water body type i.

n = Number of different surface water body types in the watershed.

If PC is less than 1, do not round it to the nearest integer; if PC is 1 or more, round to the nearest integer. Enter this value for the potential contamination factor in Table 4–1.

4.1.2.3.2.5 *Calculation of population factor value.* Sum the factor values for Level I concentrations, Level II concentrations, and potential contamination. Do not round this sum to the nearest integer. Assign this sum as the population factor value for the watershed. Enter this value in Table 4–1..

4.1.2.3.3 *Resources.* To evaluate the resources factor for the watershed, select the highest value below that applies to the watershed. Assign this value as the resources factor value for the watershed. Enter this value in Table 4–1.

Assign a value of 5 if, within the in-water segment of the hazardous substance migration path for the watershed, the surface water is used for one or more of the following purposes:

- Irrigation (5 acre minimum) of commercial food crops or commercial forage crops.
- Watering of commercial livestock.
- Ingredient in commercial food preparation.
- Major or designated water recreation area, excluding drinking water use.

Assign a value of 5 if, within the in-water segment of the hazardous substance migration path for the watershed, the surface water is not used for drinking water, but either of the following applies:

- Any portion of the surface water is designated by a State for drinking water use under section 305(a) of the Clean Water Act, as amended.
- Any portion of the surface water is usable for drinking water purposes.

Assign a value of 0 if none of the above applies.

4.1.2.3.4 *Calculation of drinking water threat-targets factor category value.* Sum the nearest intake, population, and resources factor values for the watershed. Do not round this sum to the nearest integer. Assign this sum as the drinking water threat-targets factor category value for the watershed. Enter this value in Table 4–1.

4.1.2.4 *Calculation of the drinking water threat score for a watershed.* Multiply the drinking water threat factor category values for likelihood of release, waste characteristics, and targets for the watershed, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum of 100, as the drinking water threat score for the watershed. Enter this value in Table 4–1.

4.1.3 *Human food chain threat.* Evaluate the human food chain threat for each watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.1.3.1 *Human food chain threat-likelihood of release.* Assign the same likelihood of release factor category value for the human food chain threat for the watershed as would be assigned in section 4.1.2.1.3 for the drinking water threat. Enter this value in Table 4–1.

4.1.3.2 *Human food chain threat-waste characteristics.* Evaluate the waste characteristics factor category for each watershed based on two factors: toxicity/persistence/bioaccumulation and hazardous waste quantity.

4.1.3.2.1 *Toxicity/persistence/bioaccumulation.* Evaluate all those hazardous substances eligible to be evaluated for toxicity/persistence in the drinking water threat for the watershed (see section 4.1.2.2).

4.1.3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in section 2.4.1.1.

4.1.3.2.1.2 *Persistence.* Assign a persistence factor value to each hazardous substance as specified for the drinking water threat (see section 4.1.2.2.1.2), except: use the predominant water category (that is, lakes; or rivers, oceans, coastal tidal waters, or Great Lakes) between the probable point of entry and the nearest fishery (not the nearest drinking water or resources intake) along the hazardous substance migration path for the watershed to determine which portion of Table 4–10 to use. Determine the predominant water category based on distance as specified in section 4.1.2.2.1.2. For contaminated sediments with no identified source, use the point where measurement begins rather than the probable point of entry.

4.1.3.2.1.3 *Bioaccumulation potential.* Use the following data hierarchy to assign a bioaccumulation potential factor value to each hazardous substance:

- Bioconcentration factor (BCF) data.
- Logarithm of the n-octanol-water partition coefficient (log K_{ow}) data.
- Water solubility data.

Assign a bioaccumulation potential factor value to each hazardous substance from Table 4–15.

If BCF data are available for any aquatic human food chain organism for the substance being evaluated, assign the bioaccumulation potential factor value to the hazardous substance as follows:

- If BCF data are available for both fresh water and salt water for the hazardous substance, use the BCF data that correspond to the type of water body (that is, fresh water or salt water) in which the fisheries are located to assign the bioaccumulation potential factor value to the hazardous substance.
- If, however, some of the fisheries being evaluated are in fresh water and some are in salt water, or if any are in brackish water, use the BCF data that yield the higher factor value to assign the bioaccumulation potential factor value to the hazardous substance.
- If BCF data are available for either fresh water or salt water, but not for both, use the available BCF data to assign the bioaccumulation potential factor value to the hazardous substance.

If BCF data are not available for the hazardous substance, use log K_{ow} data to assign a bioaccumulation potential factor value to organic substances, but not to inorganic substances. If BCF data are not available, and if either log K_{ow} data are not available, the log K_{ow} is available but exceeds 6.0, or the substance is an inorganic substance, use water solubility data to assign a bioaccumulation potential factor value.

TABLE 4–15.—BIOACCUMULATION POTENTIAL FACTOR VALUES [a]

If bioconcentration factor (BCF) data are available for any aquatic human food chain organism, assign a value as follows: [b]

BCF	Assigned value
Greater than or equal to 10,000	50,000
1,000 to less than 10,000	5,000
100 to less than 1,000	500
10 to less than 100	50
1 to less than 10	5
Less than 1	0.5

If BCF data are not available, and log K_{ow} data are available and do not exceed 6.0, assign a value to an organic hazardous substance as follows (for inorganic hazardous substances, skip this step and proceed to the next):

Log K_{ow}	Assigned value
5.5 to 6.0	50,000
4.5 to less than 5.5	5,000
3.2 to less than 4.5	500
2.0 to less than 3.2	50
0.8 to less than 2.0	5
Less than 0.8	0.5

If BCF data are not available, and if either Log K_{ow} data are not available, a log K_{ow} is available but exceeds 6.0, or the substance is an inorganic substance, assign a value as follows:

TABLE 4–15.—BIOACCUMULATION POTENTIAL FACTOR VALUES [a]— Concluded

Water solubility (mg/l)	Assigned value
Less than 25	50,000
25 to 500	5,000
Greater than 500 to 1,500	500
Greater than 1,500	0.5

If none of these data are available, assign a value of 0.5.

[a] Do not round to nearest integer.
[b] See text for use of freshwater and saltwater BCF data.

Do not distinguish between fresh water and salt water in assigning the bioaccumulation potential factor value based on log K_{ow} or water solubility data.

If none of these data are available, assign the hazardous substance a bioaccumulation potential factor value of 0.5.

4.1.3.2.1.4 *Calculation of toxicity/persistence/bioaccumulation factor value.* Assign each hazardous substance a toxicity/persistence factor value from Table 4–12, based on the values assigned to the hazardous substance for the toxicity and persistence factors. Then assign each hazardous substance a toxicity/persistence/bioaccumulation factor value from Table 4–16, based on the values assigned for the toxicity/persistence and bioaccumulation potential factors. Use the hazardous substance with the highest toxicity/persistence/bioaccumulation factor value for the watershed to assign the value to this factor. Enter this value in Table 4–1.

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TABLE 4-16
TOXICITY/PERSISTENCE/BIOACCUMULATION FACTOR VALUES[a]

Toxicity/ Persistence Factor Value	Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
10,000	5×10^8	5×10^7	5×10^6	5×10^5	5×10^4	5,000
4,000	2×10^8	2×10^7	2×10^6	2×10^5	2×10^4	2,000
1,000	5×10^7	5×10^6	5×10^5	5×10^4	5,000	500
700	3.5×10^7	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350
400	2×10^7	2×10^6	2×10^5	2×10^4	2,000	200
100	5×10^6	5×10^5	5×10^4	5,000	500	50
70	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350	35
40	2×10^6	2×10^5	2×10^4	2,000	200	20
10	5×10^5	5×10^4	5,000	500	50	5
7	3.5×10^5	3.5×10^4	3,500	350	35	3.5
4	2×10^5	2×10^4	2,000	200	20	2
1	5×10^4	5,000	500	50	5	0.5
0.7	3.5×10^4	3,500	350	35	3.5	0.35
0.4	2×10^4	2,000	200	20	2	0.2
0.07	3,500	350	35	3.5	0.35	0.035
0.007	350	35	3.5	0.35	0.035	0.0035
0.0007	35	3.5	0.35	0.035	0.0035	0.00035
0	0	0	0	0	0	0

[a]Do not round to nearest integer.

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4.1.3.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned in section 4.1.2.2.2 for the drinking water threat. Enter this value in Table 4–1.

4.1.3.2.3 *Calculation of human food chain threat-waste characteristics factor category value.* For the hazardous substance selected for the watershed in section 4.1.3.2.1.4, use its toxicity/persistence factor value and bioaccumulation potential factor value as follows to assign a value to the waste characteristics factor category. First, multiply the toxicity/persistence factor value and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^{8}. Then multiply this product by the bioaccumulation potential factor value for this hazardous substance, subject to a maximum product of 1×10^{12}. Based on this second product, assign a value from Table 2–7 (section 2.4.3.1) to the human food chain threat-waste characteristics factor category for the watershed. Enter this value in Table 4–1.

4.1.3.3 *Human food chain threat-targets.* Evaluate two target factors for each watershed: food chain individual and population. For both factors, determine whether the target fisheries are subject to actual or potential human food chain contamination.

Consider a fishery (or portion of a fishery) within the target distance limit of the watershed to be subject to actual human food chain contamination if any of the following apply:

- A hazardous substance having a bioaccumulation potential factor value of 500 or greater is present either in an observed release by direct observation to the watershed or in a surface water or sediment sample from the watershed at a level that meets the criteria for an observed release to the watershed from the site, and at least a portion of the fishery is within the boundaries of the observed release (that is, it is located either at the point of direct observation or at or between the probable point of entry and the most distant sampling point establishing the observed release).
- The fishery is closed, and a hazardous substance for which the fishery has been closed has been documented in an observed release to the watershed from the site, and at least a portion of the fishery is within the boundaries of the observed release.
- A hazardous substance is present in a tissue sample from an essentially sessile, benthic, human food chain organism from the watershed at a level that meets the criteria for an observed release to the watershed from the site, and at least a portion of the fishery is within the boundaries of the observed release.

For a fishery that meets any of these three criteria, but that is not wholly within the boundaries of the observed release, consider only the portion of the fishery that is within the boundaries of the observed release to be subject to actual human food chain contamination. Consider the remainder of the fishery within the target distance limit to be subject to potential food chain contamination.

In addition, consider all other fisheries that are partially or wholly within the target distance limit for the watershed, including fisheries partially or wholly within the boundaries of an observed release for the watershed that do not meet any of the three criteria listed above, to be subject to potential human food chain contamination. If only a portion of the fishery is within the target distance limit for the watershed, include only that portion in evaluating the targets factor category.

When a fishery (or portion of a fishery) is subject to actual food chain contamination, determine the part of the fishery subject to Level I concentrations and the part subject to Level II concentrations. If the actual food chain contamination is based on direct observation, evaluate it using Level II concentrations. However, if the actual food chain contamination is based on samples from the watershed, use these samples and, if available, additional tissue samples from aquatic human food chain organisms as specified below, to determine the part subject to Level I concentrations and the part subject to Level II concentrations:

- Determine the level of actual contamination from samples (including tissue samples from essentially sessile, benthic organisms) that meet the criteria for actual food chain contamination by comparing the exposure concentrations (see section 4.1.2.3) from these samples (or comparable samples) to the health-based benchmarks from Table 4–17, as described in section 2.5.1 and 2.5.2. Use only the exposure concentrations for those hazardous substances in the sample (or comparable samples) that meet the criteria for actual contamination of the fishery.
- In addition, determine the level of actual contamination from other tissue samples by comparing the concentrations of hazardous substances in the tissue samples (or comparable tissue samples) to the health-based benchmarks from Table 4–17, as described in sections 2.5.1 and 2.5.2. Use only those additional tissue samples and only those hazardous substances in the tissue samples that meet all the following criteria:
  - –The tissue sample is from a location that is within the boundaries of the actual food chain contamination for the site (that is, either at the point of direct observation or at or between the probable point of entry and the most distant sample point meeting the criteria for actual food chain contamination).
  - –The tissue sample is from a species of aquatic human food chain organism that spends extended periods of time within the boundaries of the actual food chain contamination for the site and that is not an essentially sessile, benthic organism.
  - –The hazardous substance is a substance that is also present in a surface water, benthic, or sediment sample from within the target distance limit for the watershed and, for such a sample, meets the criteria for actual food chain contamination.

TABLE 4–17.—HEALTH-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN HUMAN FOOD CHAIN

- Concentration corresponding to Food and Drug Administration Action Level (FDAAL) for fish or shellfish.
- Screening concentration for cancer corresponding to that concentration that corresponds to the 10^{-6} individual cancer risk for oral exposures.
- Screening concentration for noncancer toxicological responses corresponding to the Reference Dose (RfD) for oral exposures.

4.1.3.3.1 *Food chain individual.* Evaluate the food chain individual factor based on the fisheries (or portions of fisheries) within the target distance limit for the watershed. Assign this factor a value as follows:

- If any fishery (or portion of a fishery) is subject to Level I concentrations, assign a value of 50.
- If not, but if any fishery (or portion of a fishery) is subject to Level II concentrations, assign a value of 45.
- If not, but if there is an observed release of a hazardous substance having a bioaccumulation potential factor value of 500 or greater to surface water in the watershed and there is a fishery (or portion of a fishery) present anywhere within the target distance limit, assign a value of 20.
- If there is no observed release to surface water in the watershed or there is no observed release of a hazardous substance having a bioaccumulation potential factor value of 500 or greater, but there is a fishery (or portion of a fishery) present anywhere within the target distance limit, assign a value as follows:
  - –Using Table 4–13, determine the highest dilution weight (that is, lowest amount of dilution) applicable to the fisheries (or portions of fisheries) within the target distance limit. Multiply this dilution weight by 20 and round to the nearest integer.
  - –Assign this calculated value as the factor value.
- If there are no fisheries (or portions of fisheries) within the target distance limit of the watershed, assign a value of 0.

Enter the value assigned in Table 4–1.

4.1.3.3.2 *Population.* Evaluate the population factor for the watershed based on three factors: Level I concentrations, Level II concentrations, and potential human food chain contamination. Determine which factor applies for a fishery (or portion of a fishery) as specified in section 4.1.3.3.

4.1.3.3.2.1 *Level I concentrations.* Determine those fisheries (or portions of fisheries) within the watershed that are subject to Level I concentrations.

Estimate the human food chain population value for each fishery (or portion of a fishery) as follows:

- Estimate human food chain production for the fishery based on the estimated annual

production (in pounds) of human food chain organisms (for example, fish, shellfish) for that fishery, except: if the fishery is closed and a hazardous substance for which the fishery has been closed has been documented in an observed release to the fishery from a source at the site, use the estimated annual production for the period prior to closure of the fishery or use the estimated annual production from comparable fisheries that are not closed.

• Assign the fishery a value for human food chain population from Table 4–18, based on the estimated human food production for the fishery.

• Set boundaries between fisheries at those points where human food chain production changes or where the surface water dilution weight changes.

Sum the human food chain population value for each fishery (and portion of a fishery). Multiply this sum by 10. If the product is less than 1, do not round it to the nearest integer; if 1 or more, round to the nearest integer. Assign the resulting value as the Level I concentrations factor value. Enter this value in Table 4–1.

4.1.3.3.2.2 *Level II concentrations.* Determine those fisheries (or portions of fisheries) within the watershed that are subject to Level II concentrations. Do not include any fisheries (or portions of fisheries) already counted under the Level I concentrations factor.

Assign each fishery (or portion of a fishery) a value for human food chain population from Table 4–18, based on the estimated human food production for the fishery. Estimate the human food chain production for the fishery as specified in section 4.1.3.3.2.1.

Sum the human food chain population value for each fishery (and portion of a fishery). If this sum is less than 1, do not round it to the nearest integer; if 1 or more, round to the nearest integer. Assign the resulting value as the Level II concentrations factor value. Enter this value in Table 4–1.

TABLE 4–18.—HUMAN FOOD CHAIN POPULATION VALUES [a]

Human food chain production (pounds per year)	Assigned human food chain population value
0	0
Greater than 0 to 160	0.03
Greater than 160 to 1,000	0.3
Greater than 1,000 to 10,000	3
Greater than 10,000 to 100,000	31
Greater than 100,000 to 1,000,000	310
Greater than 10^6 to 10^7	3,100
Greater than 10^7 to 10^8	31,000
Greater than 10^8 to 10^9	310,000
Greater than 10^9	3,100,000

[a] Do not round to nearest integer.

4.1.3.3.2.3 *Potential human food chain contamination.* Determine those fisheries (or portions of fisheries) within the watershed that are subject to potential human food chain contamination. Do not include those fisheries (or portion of fisheries) already counted under the Level I or Level II concentrations factors.

Calculate the value for the potential human food chain contamination factor (PF) for the watershed as follows:

$$PF = \frac{1}{10} \sum_{i=1}^{n} P_i D_i$$

where:

P_i = Human food chain population value for fishery i.

D_i = Dilution weight from Table 4–13 for fishery i.

n = Number of fisheries subject to potential human food chain contamination.

In calculating PF:

• Estimate the human food chain population value (P_i) for a fishery (or portion of a fishery) as specified in section 4.1.3.3.2.1.

• Assign the fishery (or portion of a fishery) a dilution weight as indicated in Table 4–13 (section 4.1.2.3.1), except: do not assign a dilution weight of 0.5 for a "3-mile mixing zone in quiet flowing river"; instead assign a dilution weight based on the average annual flow.

If PF is less than 1, do not round it to the nearest integer; if PF is 1 or more, round to the nearest integer. Enter the value assigned in Table 4–1.

4.1.3.3.2.4 *Calculation of population factor value.* Sum the values for the Level I concentrations, Level II concentrations, and potential human food chain contamination factors for the watershed. Do not round this sum to the nearest integer. Assign it as the population factor value for the watershed. Enter this value in Table 4–1.

4.1.3.3.3 *Calculation of human food chain threat-targets factor category value.* Sum the food chain individual and population factor values for the watershed. Do not round this sum to the nearest integer. Assign it as the human food chain threat-targets factor category value for the watershed. Enter this value in Table 4–1.

4.1.3.4 *Calculation of human food chain threat score for a watershed.* Multiply the human food chain threat factor category values for likelihood of release, waste characteristics, and targets for the watershed, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum of 100, as the human food chain threat score for the watershed. Enter this score in Table 4–1.

4.1.4 *Environmental threat.* Evaluate the environmental threat for the watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.1.4.1 *Environmental threat-likelihood of release.* Assign the same likelihood of release factor category value for the environmental threat for the watershed as would be assigned in section 4.1.2.1.3 for the drinking water threat. Enter this value in Table 4–1.

4.1.4.2 *Environmental threat-waste characteristics.* Evaluate the waste characteristics factor category for each watershed based on two factors: ecosystem toxicity/persistence/bioaccumulation and hazardous waste quantity.

4.1.4.2.1 *Ecosystem toxicity/persistence/bioaccumulation.* Evaluate all those hazardous substances eligible to be evaluated for toxicity/persistence in the drinking water threat for the watershed (see section 4.1.2.2).

4.1.4.2.1.1 *Ecosystem toxicity.* Assign an ecosystem toxicity factor value from Table 4–19 to each hazardous substance on the basis of the following data hierarchy:

• EPA chronic Ambient Water Quality Criterion (AWQC) for the substance.

• EPA chronic Ambient Aquatic Life Advisory Concentrations (AALAC) for the substance.

• EPA acute AWQC for the substance.

• EPA acute AALAC for the substance.

• Lowest LC_{50} value for the substance.

In assigning the ecosystem toxicity factor value to the hazardous substance:

• If either an EPA chronic AWQC or AALAC is available for the hazardous substance, use it to assign the ecosystem toxicity factor value. Use the chronic AWQC in preference to the chronic AALAC when both are available.

• If neither is available, use the EPA acute AWQC or AALAC to assign the ecosystem toxicity factor value. Use the acute AWQC in preference to the acute AALAC.

• If none of the chronic and acute AWQCs and AALACs is available, use the lowest LC_{50} value to assign the ecosystem toxicity factor value.

• If an LC_{50} value is also not available, assign an ecosystem toxicity factor value of 0 to the hazardous substance and use other hazardous substances for which data are available in evaluating the pathway.

If an ecosystem toxicity factor value of 0 is assigned to all hazardous substances eligible to be evaluated for the watershed (that is, insufficient data are available for evaluating all the substances), use a default value of 100 as the ecosystem toxicity factor value for all these hazardous substances.

With regard to the AWQC, AALAC, or LC_{50} selected for assigning the ecosystem toxicity factor value to the hazardous substance:

• If values for the selected AWQC, AALAC, or LC_{50} are available for both fresh water and marine water for the hazardous substance, use the value that corresponds to the type of water body (that is, fresh water or salt water) in which the sensitive environments are located to assign the ecosystem toxicity factor value to the hazardous substance.

• If, however, some of the sensitive environments being evaluated are in fresh water and some are in salt water, or if any are in brackish water, use the value (fresh water or marine) that yields the higher factor value to assign the ecosystem toxicity factor value to the hazardous substance.

• If a value for the selected AWQC, AALAC, or LC_{50} is available for either fresh water or marine water, but not for both, use the available one to assign an ecosystem toxicity factor value to the hazardous substance.

TABLE 4–19.—ECOSYSTEM TOXICITY FACTOR VALUES

If an EPA chronic AWQC* or AALAC* is available, assign a value as follows:*

EPA chronic AWQC or AALAC	Assigned value
Less than 1 μg/l	10,000
1 to 10 μg/l	1,000
Greater than 10 to 100 μg/l	100
Greater than 100 to 1,000 μg/l	10
Greater than 1,000 μg/l	1

If neither an EPA chronic AWQC nor EPA chronic AALAC is available, assign a value based on the EPA acute AWQC or AALAC as follows:*

EPA acute AWQC or AALAC	Assigned value
Less than 100 μg/l	10,000
100 to 1,000 μg/l	1,000
Greater than 1,000 to 10,000 μg/l	100
Greater than 10,000 to 100,000 μg/l	10
Greater than 100,000 μg/l	1

TABLE 4–19. ECOSYSTEM TOXICITY FACTOR VALUES—Concluded

If neither an EPA chronic or acute AWQC nor EPA chronic or acute AALAC is available, assign a value from the LC_{50} as follows:

EPA acute AWQC or AALAC

LC_{50}	Assigned value
Less than 100 μg/l	10,000
100 to 1,000 μg/l	1,000
Greater than 1,000 to 10,000 μg/l	100
Greater than 10,000 to 100,000 μg/l	10
Greater than 100,000 μg/l	1

If none of the AWQCs and AALACs nor the LC_{50} is available, assign a value of 0.

* AWQC—Ambient Water Quality Criteria.
* AALAC—Ambient Aquatic Life Advisory Concentrations.
* Use the AWQC value in preference to the AALAC when both are available. See text for use of freshwater and marine values.

4.1.4.2.1.2 *Persistence.* Assign a persistence factor value to each hazardous substance as specified in section 4.1.2.2.1.2, except: use the predominant water category (that is lakes; or rivers, oceans, coastal tidal waters, or Great Lakes) between the probable point of entry and the nearest sensitive environment (not the nearest drinking water or resources intake) along the hazardous substance migration path for the watershed to determine which portion of Table 4–19 to use. Determine the predominant water category based on distance as specified in section 4.1.2.2.1.2. For contaminated sediments with no identified source, use the point where measurement begins rather than the probable point of entry.

4.1.4.2.1.3 *Ecosystem bioaccumulation potential.* Assign an ecosystem bioaccumulation potential factor value to each hazardous substance in the same manner specified for the bioaccumulation potential factor in section 4.1.3.2.1.3, except:

- Use BCF data for all aquatic organisms, not just for aquatic human food chain organisms.
- Use the BCF data that corresponds to the type of water body (that is, fresh water or salt water) in which the sensitive environments (not fisheries) are located.

4.1.4.2.1.4 *Calculation of ecosystem toxicity/persistence/bioaccumulation factor value.* Assign each hazardous substance an ecosystem toxicity/persistence factor value from Table 4–20, based on the values assigned to the hazardous substance for the ecosystem toxicity and persistence factors. Then assign each hazardous substance an ecosystem toxicity/persistence/bioaccumulation factor value from Table 4–21, based on the values assigned for the ecosystem toxicity/persistence and ecosystem bioaccumulation potential factors. Select the hazardous substance with the highest ecosystem toxicity/persistence/bioaccumulation factor value for the watershed and use it to assign the value to this factor. Enter this value in Table 4–1.

TABLE 4–20.—ECOSYSTEM TOXICITY/PERSISTENCE FACTOR VALUES *

Persistence factor value	Ecosystem toxicity factor value					
	10,000	1,000	100	10	1	0
1.0	10,000	1,000	100	10	1	0
0.4	4,000	400	40	4	0.4	0
0.07	700	70	7	0.7	0.07	0
0.0007	7	0.7	0.07	0.007	0.0007	0

* Do not round to nearest integer.

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TABLE 4-21
ECOSYSTEM TOXICITY/PERSISTENCE/BIOACCUMULATION FACTOR VALUES[a]

Ecosystem Toxicity/ Persistence Factor Value	Ecosystem Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
10,000	5×10^8	5×10^7	5×10^6	5×10^5	5×10^4	5,000
4,000	2×10^8	2×10^7	2×10^6	2×10^5	2×10^4	2,000
1,000	5×10^7	5×10^6	5×10^5	5×10^4	5,000	500
700	3.5×10^7	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350
400	2×10^7	2×10^6	2×10^5	2×10^4	2,000	200
100	5×10^6	5×10^5	5×10^4	5,000	500	50
70	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350	35
40	2×10^6	2×10^5	2×10^4	2,000	200	20
10	5×10^5	5×10^4	5,000	500	50	5
7	3.5×10^5	3.5×10^4	3,500	350	35	3.5
4	2×10^5	2×10^4	2,000	200	20	2
1	5×10^4	5,000	500	50	5	0.5
0.7	3.5×10^4	3,500	350	35	3.5	0.35
0.4	2×10^4	2,000	200	20	2	0.2
0.07	3,500	350	35	3.5	0.35	0.035
0.007	350	35	3.5	0.35	0.035	0.0035
0.0007	35	3.5	0.35	0.035	0.0035	0.00035
0	0	0	0	0	0	0

[a]Do not round to nearest integer.

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4.1.4.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned in section 4.1.2.2.2 for the drinking water threat. Enter this value in Table 4–1.

4.1.4.2.3 *Calculation of environmental threat-waste characteristics factor category value.* For the hazardous substance selected for the watershed in section 4.1.4.2.1.4, use its ecosystem toxicity/persistence factor value and ecosystem bioaccumulation potential factor value as follows to assign a value to the waste characteristics factor category. First, multiply the ecosystem toxicity/persistence factor value and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^8. Then multiply this product by the ecosystem bioaccumulation potential factor value for this hazardous substance, subject to a maximum product of 1×10^{12}. Based on this second product, assign a value from Table 2–7 (section 2.4.3.1) to the environmental threat-waste characteristics factor category for the watershed. Enter this value in Table 4–1.

TABLE 4–22.—ECOLOGICAL-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN SURFACE WATER

- Concentration corresponding to EPA Ambient Water Quality Criteria (AWQC) for protection of aquatic life (fresh water or marine).
- Concentration corresponding to EPA Ambient Aquatic Life Advisory Concentrations (AALAC).
- Select the appropriate AWQC and AALAC as follows:
  - –Use chronic value, if available; otherwise use acute value.
  - –If the sensitive environment being evaluated is in fresh water, use fresh water value, except: if no fresh water value is available, use marine value if available.
  - –If the sensitive environment being evaluated is in salt water, use marine value, except: if no marine value is available, use fresh water value if available.
  - –If the sensitive environment being evaluated is in both fresh water and salt water, or is in brackish water, use lower of fresh water or marine values.

TABLE 4–23.—SENSITIVE ENVIRONMENTS RATING VALUES

Sensitive environment	Assigned value
Critical habitat [a] for Federal designated endangered or threatened species	100
Marine Sanctuary	
National Park	
Designated Federal Wilderness Area	
Areas identified under Coastal Zone Management Act [b]	
Sensitive areas identified under National Estuary Program [c] or Near Coastal Waters Program [d]	
Critical areas identified under the Clean Lakes Program [e]	
National Monument [f]	
National Seashore Recreational Area	
National Lakeshore Recreational Area	
Habitat known to be used by Federal designated or proposed endangered or threatened species	75
National Preserve	
National or State Wildlife Refuge	
Unit of Coastal Barrier Resources System	
Coastal Barrier (undeveloped)	
Federal land designated for protection of natural ecosystems	
Administratively Proposed Federal Wilderness Area	
Spawning areas critical [g] for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters	
Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time	
Terrestrial areas utilized for breeding by large or dense aggregations of animals [h]	
National river reach designated as Recreational	
Habitat known to be used by State designated endangered or threatened species	50
Habitat known to be used by species under review as to its Federal endangered or threatened status	
Coastal Barrier (partially developed)	
Federal designated Scenic or Wild River	
State land designated for wildlife or game management	25
State designated Scenic or Wild River	
State designated Natural Areas	
Particular areas, relatively small in size, important to maintenance of unique biotic communities	
State designated areas for protection or maintenance of aquatic life [i]	5

[a] Critical habitat as defined in 50 CFR 424.02.
[b] Areas identified in State Coastal Zone Management plans as requiring protection because of ecological value.
[c] National Estuary Program study areas (subareas within estuaries) identified in Comprehensive Conservation and Management Plans as requiring protection because they support critical life stages of key estuarine species (Section 320 of Clean Water Act, as amended).
[d] Near Coastal Waters as defined in Sections 104(b)(3), 304(1), 319, and 320 of Clean Water Act, as amended.
[e] Clean Lakes Program critical areas (subareas within lakes, or in some cases entire small lakes) identified by State Clean Lake Plans as critical habitat (Section 314 of Clean Water Act, as amended).
[f] Use only for air migration pathway.
[g] Limit to areas described as being used for intense or concentrated spawning by a given species.
[h] For the air migration pathway, limit to terrestrial vertebrate species. For the surface water migration pathway, limit to terrestrial vertebrate species with aquatic or semiaquatic foraging habits.
[i] Areas designated under Section 305(a) of Clean Water Act, as amended.

TABLE 4-24.—WETLANDS RATING VALUES FOR SURFACE WATER MIGRATION PATHWAY

Total length of wetlands * (miles)	Assigned value
Less than 0.1	0
0.1 to 1	25
Greater than 1 to 2	50
Greater than 2 to 3	75
Greater than 3 to 4	100
Greater than 4 to 8	150
Greater than 8 to 12	250
Greater than 12 to 16	350
Greater than 16 to 20	450
Greater than 20	500

* Wetlands as defined in 40 CFR Section 230.3.

4.1.4.3 *Environmental threat-targets.* Evaluate the environmental threat-targets factor category for a watershed using one factor: sensitive environments.

4.1.4.3.1 *Sensitive environments.* Evaluate sensitive environments along the hazardous substance migration path for the watershed based on three factors: Level I concentrations, Level II concentrations, and potential contamination.

Determine which factor applies to each sensitive environment as specified in section 4.1.2.3, except: use ecological-based benchmarks (Table 4-22) rather than health-based benchmarks (Table 3-10) in determining the level of contamination from samples. In determining the level of actual contamination, use a point of direct observation anywhere within the sensitive environment or samples (that is, surface water, benthic, or sediment samples) taken anywhere within or beyond the sensitive environment (or anywhere adjacent to or beyond the sensitive environment if it is contiguous to the migration path).

4.1.4.3.1.1 *Level I concentrations.* Assign value(s) from Table 4-23 to each sensitive environment subject to Level I concentrations.

For those sensitive environments that are wetlands, assign an additional value from Table 4-24. In assigning a value from Table 4-24, include only those portions of wetlands located along the hazardous substance migration path in the area of Level I concentrations. If a wetland is located partially along the area of Level I concentrations and partially along the area of Level II concentrations and/or potential contamination, then solely for purposes of Table 4-24, count the portion(s) along the areas of Level II concentrations or potential contamination under the Level II concentrations factor (section 4.1.4.3.1.2) or potential contamination factor (section 4.1.4.3.1.3), as appropriate.

Estimate the total length of wetlands along the hazardous substance migration path (that is, wetland frontage) in the area of Level I concentrations and assign a value from Table 4-24 based on this total length. Estimate this length as follows:

- For an isolated wetland or for a wetland where the probable point of entry to surface water is in the wetland, use the perimeter of that portion of the wetland subject to Level I concentrations as the length.
- For rivers, use the length of the wetlands contiguous to the in-water segment of the hazardous substance migration path (that is, wetland frontage).
- For lakes, oceans, coastal tidal waters, and Great Lakes, use the length of the wetlands along the shoreline within the target distance limit (that is, wetland frontage along the shoreline).

Calculate the Level I concentrations factor value (SH) for the watershed as follows:

$$SH = 16(WH + \sum_{i=1}^{n} S_i)$$

where:

WH = Value assigned from Table 4-24 to wetlands along the area of Level I concentrations.

S_i = Value(s) assigned from Table 4-23 to sensitive environment i.

n = Number of sensitive environments from Table 4-23 subject to Level I concentrations.

Enter the value assigned in Table 4-1.

4.1.4.3.1.2 *Level II concentrations.* Assign value(s) from Table 4-23 to each sensitive environment subject to Level II concentrations. Do not include sensitive environments already counted for Table 4-23 under the Level I concentrations factor for this watershed.

For those sensitive environments that are wetlands, assign an additional value from Table 4-24. In assigning a value from Table 4-24, include only those portions of wetlands located along the hazardous substance migration path in the area of Level II concentrations, as specified in section 4.1.4.3.1.1.

Estimate the total length of wetlands along the hazardous substance migration path (that is, wetland frontage) in the area of Level II concentrations and assign a value from Table 4-24 based on this total length. Estimate this length as specified in section 4.1.4.3.1.1, except: for an isolated wetland or for a wetland where the probable point of entry to surface water is in the wetland, use the perimeter of that portion of the wetland subject to Level II (not Level I) concentrations as the length.

Calculate the Level II concentrations value (SL) for the watershed as follows:

$$SL = WL + \sum_{i=1}^{n} S_i$$

where:

WL = Value assigned from Table 4-24 to wetlands along the area of Level II concentrations.

S_i = Value(s) assigned from Table 4-23 to sensitive environment i.

n = Number of sensitive environments from Table 4-23 subject to Level II concentrations.

Enter the value assigned in Table 4-1.

4.1.4.3.1.3 *Potential contamination.* Assign value(s) from Table 4-23 to each sensitive environment subject to potential contamination. Do not include sensitive environments already counted for Table 4-23 under the Level I or Level II concentrations factors.

For each type of surface water body in Table 4-13 (section 4.1.2.3.1), sum the value(s) assigned from Table 4-23 to the sensitive environments along that type of surface water body, except: do not use the surface water body type "3-mile mixing zone in quiet flowing river." If a sensitive environment is along two or more types of surface water bodies (for example, Wildlife Refuge contiguous to both a moderate stream and a large river), assign the sensitive environment only to that surface water body type having the highest dilution weight value from Table 4-13.

For those sensitive environments that are wetlands, assign an additional value from Table 4-24. In assigning a value from Table 4-24, include only those portions of wetlands located along the hazardous substance migration path in the area of potential contamination, as specified in section 4.1.4.3.1.1. Aggregate these wetlands by type of surface water body, except: do not use the surface water body type "3-mile mixing zone in quiet flowing river." Treat the wetlands aggregated within each type of surface water body as separate sensitive environments solely for purposes of applying Table 4-24. Estimate the total length of the wetlands within each surface water body type as specified in section 4.1.4.3.1.1, except: for an isolated wetland or for a wetland where the probable point of entry to surface water is in the wetland, use the perimeter of that portion of the wetland subject to potential contamination (or the portion of that perimeter that is within the target distance limit) as the length. Assign a separate value from Table 4-24 for each type of surface water body in the watershed.

Calculate the potential contamination factor value (SP) for the watershed as follows:

$$SP = \frac{1}{10} \sum_{j=1}^{m} ([W_j + S_j]D_j)$$

where:

$$S_j = \sum_{i=1}^{n} S_{ij}$$

S_{ij} = Value(s) assigned from Table 4-23 to sensitive environment i in surface water body type j.

n = Number of sensitive environments from Table 4-23 subject to potential contamination.

W_j = Value assigned from Table 4-24 for wetlands along the area of potential contamination in surface water body type j.

D_j = Dilution weight from Table 4-13 for surface water body type j.

m = Number of different surface water body types from Table 4-13 in the watershed.

If SP is less than 1, do not round it to the nearest integer; if SP is 1 or more, round to the nearest integer. Enter this value for the potential contamination factor in Table 4-1.

4.1.4.3.1.4 *Calculation of environmental threat-targets factor category value.* Sum the values for the Level I concentrations, Level II concentrations, and potential contamination factors for the watershed. Do not round this sum to the nearest integer. Assign this sum as the environmental threat-targets factor category value for the watershed. Enter this value in Table 4–1.

4.1.4.4 *Calculation of environmental threat score for a watershed.* Multiply the environmental threat factor category values for likelihood of release, waste characteristics, and targets for the watershed, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum of 60, as the environmental threat score for the watershed. Enter this score in Table 4–1.

4.1.5 *Calculation of overland/flood migration component score for a watershed.* Sum the scores for the three threats for the watershed (that is, drinking water, human food chain, and environmental threats). Assign the resulting score, subject to a maximum value of 100, as the surface water overland/flood migration component score for the watershed. Enter this score in Table 4–1.

4.1.6 *Calculation of overland/flood migration component score.* Select the highest surface water overland/flood migration component score from the watersheds evaluated. Assign this score as the surface water overland/flood migration component score for the site, subject to a maximum score of 100. Enter this score in Table 4–1.

4.2 *Ground water to surface water migration component.* Use the ground water to surface water migration component to evaluate surface water threats that result from migration of hazardous substances from a source at the site to surface water via ground water. Evaluate three types of threats for this component: drinking water threat, human food chain threat, and environmental threat.

4.2.1 *General considerations.*

4.2.1.1 *Eligible surface waters.* Calculate ground water to surface water migration component scores only for surface waters (see section 4.0.2) for which all the following conditions are met:

- A portion of the surface water is within 1 mile of one or more sources at the site having a containment factor value greater than 0 (see section 4.2.2.1.2).
- No aquifer discontinuity is established between the source and the portion of the surface water within 1 mile of the source (see section 3.0.1.2.2). However, if hazardous substances have migrated across an apparent discontinuity within this 1 mile distance, do not consider a discontinuity present in scoring the site.
- The top of the uppermost aquifer is at or above the bottom of the surface water.

Do not evaluate this component for sites consisting solely of contaminated sediments with no identified source.

4.2.1.2 *Definition of hazardous substance migration path for ground water to surface water migration component.* The hazardous substance migration path includes both the ground water segment and the surface water in-water segment that hazardous substances would take as they migrate away from sources at the site:

- Restrict the ground water segment to migration via the uppermost aquifer between a source and the surface water.
- Begin the surface water in-water segment at the probable point of entry from the uppermost aquifer to the surface water. Identify the probable point of entry as that point of the surface water that yields the shortest straight-line distance, within the aquifer boundary (see section 3.0.1.2), from the sources at the site with a containment factor value greater than 0 to the surface water.
  - –For rivers, continue the in-water segment in the direction of flow (including any tidal flows) for the distance established by the target distance limit (see section 4.2.1.4).
  - –For lakes, oceans, coastal tidal waters, or Great Lakes, do not consider flow direction. Instead apply the target distance limit as an arc.
  - –If the in-water segment includes both rivers and lakes (or oceans, coastal tidal waters, or Great Lakes), apply the target distance limit to their combined in-water segments.

Consider a site to be in two or more watersheds for this component if two or more hazardous substance migration paths from the sources at the site do not reach a common point within the target distance limit. If the site is in more than one watershed, define a separate hazardous substance migration path for each watershed. Evaluate the ground water to surface water migration component for each watershed separately as specified in section 4.2.1.5.

4.2.1.3 *Observed release of a specific hazardous substance to surface water in-water segment.* Section 4.2.2.1.1 specifies the criteria for assigning values to the observed release factor for the ground water to surface water migration component. With regard to an individual hazardous substance, consider an observed release of that hazardous substance to be established for the surface water in-water segment of the ground water to surface water migration component only when the hazardous substance meets the criteria both for an observed release both to ground water (see section 4.2.2.1.1) and for an observed release by chemical analysis to surface water (see section 4.1.2.1.1).

If the hazardous substance meets the section 4.1.2.1.1 criteria for an observed release by chemical analysis to surface water but does not also meet the criteria for an observed release to ground water, do not use any samples of that hazardous substance from the surface water in-water segment in evaluating the factors of this component (for example, do not use the hazardous substance in establishing targets subject to actual contamination or in determining the level of actual contamination for a target).

4.2.1.4 *Target distance limit.* Determine the target distance limit for each watershed as specified in section 4.1.1.2, except: do not extend the target distance limit to a sample location beyond 15 miles unless at least one hazardous substance in a sample from that location meets the criteria in section 4.2.1.3 for an observed release to the surface water in-water segment.

Determine the targets eligible to be evaluated for each watershed and establish whether these targets are subject to actual or potential contamination as specified in section 4.1.1.2, except: do not establish actual contamination based on a sample location unless at least one hazardous substance in a sample from that location meets the criteria in section 4.2.1.3 for an observed release to the surface water in-water segment.

4.2.1.5 *Evaluation of ground water to surface water migration component.* Evaluate the drinking water threat, human food chain threat, and environmental threat for each watershed for this component based on three factor categories: likelihood of release, waste characteristics, and targets. Figure 4–2 indicates the factors included within each factor category for each type of threat.

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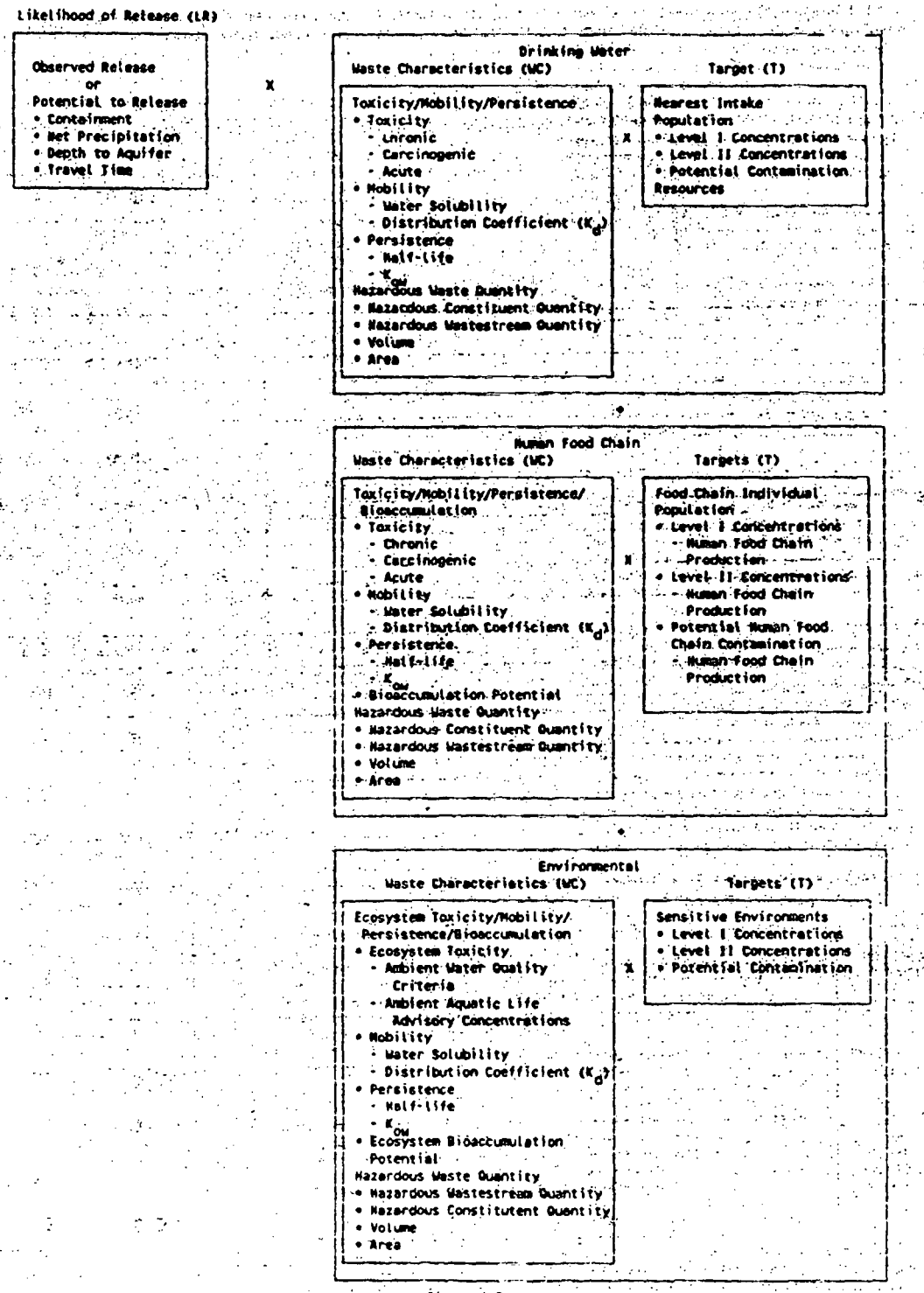

Figure 4-2
OVERVIEW OF GROUND WATER TO SURFACE WATER MIGRATION COMPONENT

Determine the ground water to surface water migration component score (S_{gs}) for a watershed in terms of the factor category values as follows:

$$S_{gs} = \frac{\sum_{i=1}^{3} (LR_i)(WC_i)(T_i)}{SF}$$

where:

LR_i = Likelihood of release factor category value for threat i (that is, drinking water, human food chain, or environmental threat).

WC_i = Waste characteristics factor category value for threat i.

T_i = Targets factor category value for threat i.

SF = Scaling factor.

Table 4-25 outlines the specific calculation procedure.

If the site is in only one watershed, assign the ground water to surface water migration component score for that watershed as the ground water to surface water migration component score for the site.

If the site is in more than one watershed:

- Calculate a separate ground water to surface water migration component score for each watershed, using likelihood of release, waste characteristics, and targets applicable to each watershed.
- Select the highest ground water to surface water migration component score from the watersheds evaluated and assign it as the ground water to surface water migration component score for the site.

TABLE 4-25.—GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET

Factor categories and factors	Maximum value	Value assigned
Drinking Water Threat		
Likelihood of Release to Aquifer:		
1. Observed Release	550	
2. Potential to Release:		
2a. Containment	10	
2b. Net Precipitation	10	
2c. Depth to Aquifer	5	
2d. Travel Time	35	
2e. Potential to Release (lines 2a[2b + 2c + 2d])	500	
3. Likelihood of Release (higher of lines 1 and 2e)	550	
Waste Characteristics:		
4. Toxicity/Mobility/Persistence	(a)	
5. Hazardous Waste Quantity	(a)	
6. Waste Characteristics	100	
Targets:		
7. Nearest Intake	50	
8. Population		
8a. Level I Concentrations	(b)	
8b. Level II Concentrations	(b)	
8c. Potential Contamination	(b)	
8d. Population (lines 8a + 8b + 8c)		
9. Resources	5	
10. Targets (lines 7 + 8d + 9)	(b)	
Drinking Water Threat Score:		
11. Drinking Water Threat Score ([lines 3 x 6 x 10]/82,500, subject to a maximum of 100)	100	
Human Food Chain Threat		
Likelihood of Release:		
12. Likelihood of Release (same value as line 3)	550	
Waste Characteristics:		
13. Toxicity/Mobility/Persistence/Bioaccumulation	(a)	
14. Hazardous Waste Quantity	(a)	
15. Waste Characteristics	1,000	
Targets:		
16. Food Chain Individual	50	
17. Population:		
17a. Level I Concentrations	(b)	
17b. Level II Concentrations	(b)	
17c. Potential Human Food Chain Contamination	(b)	
17d. Population (lines 17a + 17b + 17c)	(b)	
18 Targets (Lines 16 + 17d)	(b)	
Human Food Chain Threat Score:		
19. Human Food Chain Threat Score ([lines 12 x 15 x 18]/82,500, subject to a maximum of 100)	100	
Environmental Threat		
Likelihood of Release:		
20. Likelihood of Release (same value as line 3)	550	
Waste Characteristics:		
21 Ecosystem Toxicity/Mobility/Persistence/Bioaccumulation	(a)	
22. Hazardous Waste Quantity	(a)	
23. Waste Characteristics	1,000	
Targets:		
24. Sensitive Environments:		
24a. Level I Concentrations	(b)	
24b. Level II Concentrations	(b)	
24c. Potential Contamination	(b)	
24d. Sensitive Environments (lines 24a + 24b + 24c)	(b)	
25. Targets (value from line 24d)	(b)	

TABLE 4-25.—GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET—Continued

Factor categories and factors	Maximum value	Value assigned
Environmental Threat Score:		
26. Environmental Threat Score ([lines 20 x 23 x 25]/82,500, subject to a maximum of 60)	60	———
Ground Water to Surface Water Migration Component Score for a Watershed		
27. Watershed Score [c] (lines 11 + 19 + 26, subject to a maximum of 100)	100	———
28. Component Score (S_{gs}) [c] (highest score from Line 27 for all watersheds evaluated, subject to a maximum of 100)	100	———

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

4.2.2 *Drinking water threat.* Evaluate the drinking water threat for each watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.2.2.1 *Drinking water threat-likelihood of release.* Evaluate the likelihood of release factor category for each watershed in terms of an observed release factor or a potential to release factor.

4.2.2.1.1 *Observed release.* Establish an observed release to the uppermost aquifer as specified in section 3.1.1. If an observed release can be established for the uppermost aquifer, assign an observed release factor value of 550 to that watershed, enter this value in Table 4-25, and proceed to section 4.2.2.1.3. If no observed release can be established, assign an observed release factor value of 0, enter this value in Table 4-25, and proceed to section 4.2.2.1.2.

4.2.2.1.2 *Potential to release.* Evaluate potential to release only if an observed release cannot be established for the uppermost aquifer. Calculate a potential to release value for the uppermost aquifer as specified in section 3.1.2 and sections 3.1.2.1 through 3.1.2.5. Assign the potential to release value for the uppermost aquifer as the potential to release factor value for the watershed. Enter this value in Table 4-25.

4.2.2.1.3 *Calculation of drinking water threat-likelihood of release factor category value.* If an observed release is established for the uppermost aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for the watershed. Otherwise, assign the potential to release factor value as the likelihood of release factor category value for the watershed. Enter the value assigned in Table 4-25.

4.2.2.2 *Drinking water threat-waste characteristics.* Evaluate the waste characteristics factor category for each watershed based on two factors: toxicity/mobility/persistence and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to the uppermost aquifer (see section 3.2). Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to ground water.
- All hazardous substances associated with a source that has a ground water containment factor value greater than 0 (see sections 2.2.2, 2.2.3, and 3.1.2.1).

4.2.2.2.1 *Toxicity/mobility/persistence.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, a persistence factor value, and a combined toxicity/mobility/persistence factor value as specified in sections 4.2.2.2.1.1 through 4.2.2.2.1.4.

4.2.2.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in section 2.4.1.1.

4.2.2.2.1.2 *Mobility.* Assign a ground water mobility factor value to each hazardous substance as specified in section 3.2.1.2.

4.2.2.2.1.3 *Persistence.* Assign a surface water persistence factor value to each hazardous substance as specified in section 4.1.2.2.1.2.

4.2.2.2.1.4 *Calculation of toxicity/mobility/persistence factor value.* First, assign each hazardous substance a toxicity/mobility factor value from Table 3-9 (section 3.2.1.3), based on the values assigned to the hazardous substance for the toxicity and mobility factors. Then assign each hazardous substance a toxicity/mobility/persistence factor value from Table 4-26, based on the values assigned for the toxicity/mobility and persistence factors. Use the substance with the highest toxicity/mobility/persistence factor value for the watershed to assign the value to this factor. Enter this value in Table 4-25.

4.2.2.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned for the uppermost aquifer in section 3.2.2. Enter this value in Table 4-25.

4.2.2.2.3 *Calculation of drinking water threat-waste characteristics factor category value.* Multiply the toxicity/mobility/persistence and hazardous waste quantity factor values for the watershed, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2-7 (section 2.4.3.1) to the drinking water threat-waste characteristics factor category for the watershed. Enter this value in Table 4-25.

4.2.2.3 *Drinking water threat-targets.* Evaluate the targets factor category for each watershed based on three factors: nearest intake, population, and resources.

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TABLE 4-26
TOXICITY/MOBILITY/PERSISTENCE FACTOR VALUES[a]

Toxicity/Mobility Factor Value	Persistence Factor Value			
	1.0	0.4	0.07	0.0007
10,000	10,000	4,000	700	7
2,000	2,000	800	140	1.4
1,000	1,000	400	70	0.7
200	200	80	14	0.14
100	100	40	7	0.07
20	20	8	1.4	0.014
10	10	4	0.7	0.007
2	2	0.8	0.14	0.0014
1	1	0.4	0.07	7×10^{-4}
0.2	0.2	0.08	0.014	1.4×10^{-4}
0.1	0.1	0.04	0.007	7×10^{-5}
0.02	0.02	0.008	0.0014	1.4×10^{-5}
0.01	0.01	0.004	7×10^{-4}	7×10^{-6}
0.002	0.002	8×10^{-4}	1.4×10^{-4}	1.4×10^{-6}
0.001	0.001	4×10^{-4}	7×10^{-5}	7×10^{-7}
2×10^{-4}	2×10^{-4}	8×10^{-5}	1.4×10^{-5}	1.4×10^{-7}
1×10^{-4}	1×10^{-4}	4×10^{-5}	7×10^{-6}	7×10^{-8}
2×10^{-5}	2×10^{-5}	8×10^{-6}	1.4×10^{-6}	1.4×10^{-8}
2×10^{-6}	2×10^{-6}	8×10^{-7}	1.4×10^{-7}	1.4×10^{-9}
2×10^{-7}	2×10^{-7}	8×10^{-8}	1.4×10^{-8}	1.4×10^{-10}
2×10^{-8}	2×10^{-8}	8×10^{-9}	1.4×10^{-9}	1.4×10^{-11}
2×10^{-9}	2×10^{-9}	8×10^{-10}	1.4×10^{-10}	1.4×10^{-12}
0	0	0	0	0

[a]Do not round to nearest integer.

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For the nearest intake and population factors, determine whether the target surface water intakes are subject to actual or potential contamination as specified in section 4.1.1.2, subject to the restrictions specified in sections 4.2.1.3 and 4.2.1.4.

When the intake is subject to actual contamination, evaluate it using Level I concentrations or Level II concentrations. Determine which level applies for the intake by comparing the exposure concentrations from a sample (or comparable samples) to health-based benchmarks as specified in section 4.1.2.3, except use only those samples from the surface water in-water segment and only those hazardous substances in such samples that meet the conditions in sections 4.2.1.3 and 4.2.1.4.

4.2.2.3.1 *Nearest intake.* Assign a value to the nearest intake factor as specified in section 4.1.2.3.1 with the following modification. For the intake being evaluated, multiply its dilution weight from Table 4–13 (section 4.1.2.3.1) by a value selected from Table 4–27. Use the resulting product, not the value from Table 4–13, as the dilution weight for the intake for the ground water to surface water component. Do not round this product to the nearest integer.

Select the value from Table 4–27 based on the angle Θ, the angle defined by the sources at the site and either the two points at the intersection of the surface water body and the 1-mile distance ring of any two other points of the surface water body within the 1-mile distance ring, whichever results in the largest angle. (See Figure 4–3 for an example of how to determine Θ.) If the surface water body does not extend to the 1-mile ring at one or both ends, define Θ using the surface water endpoint(s) within the 1-mile ring or any two other points of the surface water body within the 1-mile distance ring, whichever results in the largest angle.

TABLE 4–27.—DILUTION WEIGHT ADJUSTMENTS

Angle Θ (degrees)	Assigned value [a]
0	0
Greater than 0 to 18	0.05
Greater than 18 to 54	0.1
Greater than 54 to 90	0.2
Greater than 90 to 126	0.3
Greater than 126 to 162	0.4
Greater than 162 to 198	0.5
Greater than 198 to 234	0.6
Greater than 234 to 270	0.7
Greater than 270 to 306	0.8
Greater than 306 to 342	0.9
Greater than 342 to 360	1.0

[a] Do not round to nearest integer.

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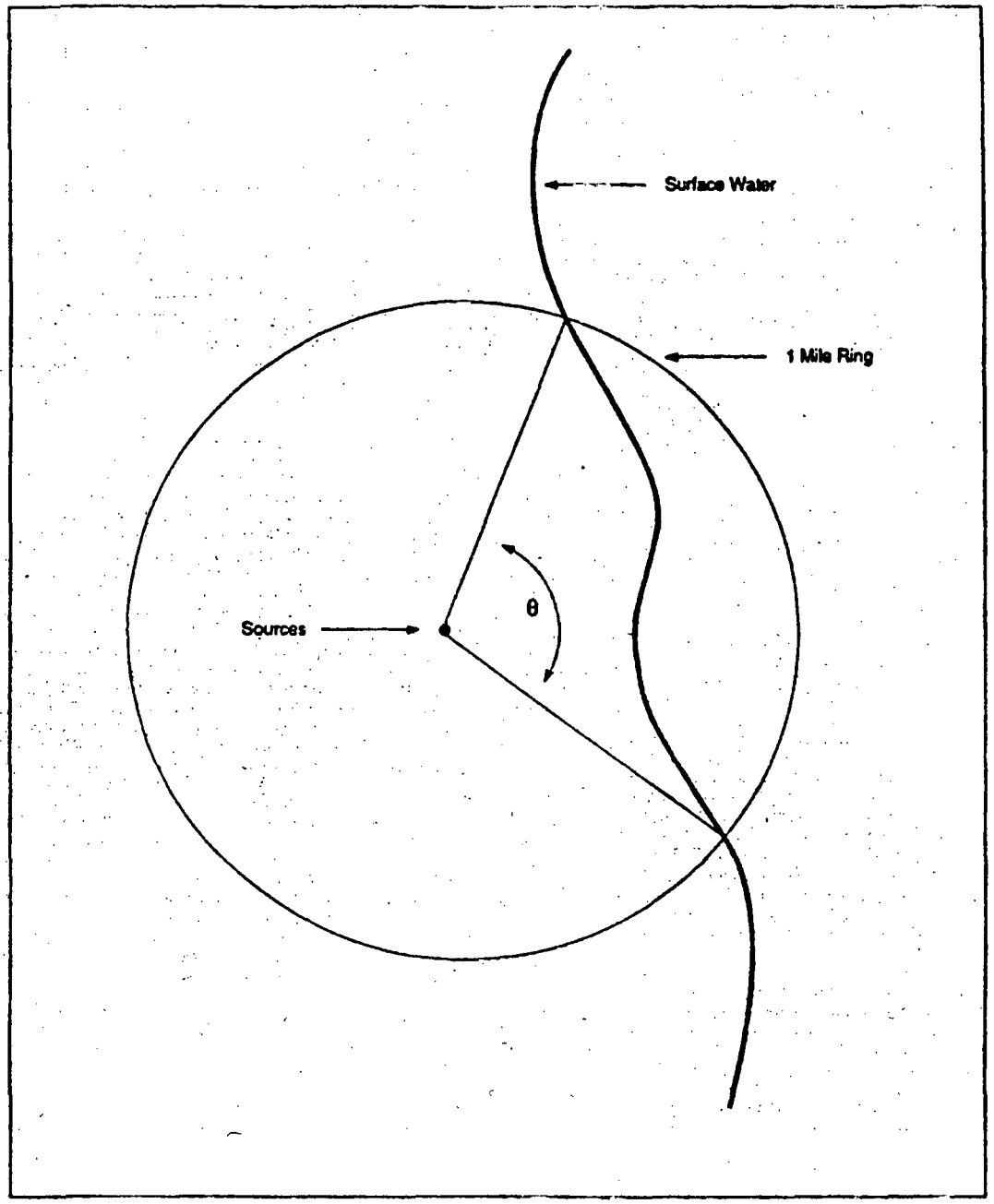

FIGURE 4-3
SAMPLE DETERMINATION OF GROUND WATER
TO SURFACE WATER ANGLE

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TABLE 4-28
TOXICITY/MOBILITY/PERSISTENCE/BIOACCUMULATION FACTOR VALUES[a]

Toxicity/ Mobility/ Persistence Factor Value	Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
10,000	5×10^8	5×10^7	5×10^6	5×10^5	5×10^4	5,000
4,000	2×10^8	2×10^7	2×10^6	2×10^5	2×10^4	2,000
2,000	1×10^8	1×10^7	1×10^6	1×10^5	1×10^4	1,000
1,000	5×10^7	5×10^6	5×10^5	5×10^4	5,000	500
800	4×10^7	4×10^6	4×10^5	4×10^4	4,000	400
700	3.5×10^7	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350
400	2×10^7	2×10^6	2×10^5	2×10^4	2,000	200
200	1×10^7	1×10^6	1×10^5	1×10^4	1,000	100
140	7×10^6	7×10^5	7×10^4	7,000	700	70
100	5×10^6	5×10^5	5×10^4	5,000	500	50
80	4×10^6	4×10^5	4×10^4	4,000	400	40
70	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350	35
40	2×10^6	2×10^5	2×10^4	2,000	200	20
20	1×10^6	1×10^5	1×10^4	1,000	100	10
14	7×10^5	7×10^4	7,000	700	70	7
10	5×10^5	5×10^4	5,000	500	50	5
8	4×10^5	4×10^4	4,000	400	40	4
7	3.5×10^5	3.5×10^4	3,500	350	35	3.5
4	2×10^5	2×10^4	2,000	200	20	2
2	1×10^5	1×10^4	1,000	100	10	1
1.4	7×10^4	7,000	700	70	7	0.7

TABLE 4-28 (Continued)

Toxicity/ Mobility/ Persistence Factor Value	Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
1.0	5×10^4	5,000	500	50	5	0.5
0.8	4×10^4	4,000	400	40	4	0.4
0.7	3.5×10^4	3,500	350	35	3.5	0.35
0.4	2×10^4	2,000	200	20	2	0.2
0.2	1×10^4	1,000	100	10	1	0.1
0.14	7,000	700	70	7	0.7	0.07
0.1	5,000	500	50	5	0.5	0.05
0.08	4,000	400	40	4	0.4	0.04
0.07	3,500	350	35	3.5	0.35	0.035
0.04	2,000	200	20	2	0.2	0.02
0.02	1,000	100	10	1	0.1	0.01
0.014	700	70	7	0.7	0.07	0.007
0.01	500	50	5	0.5	0.05	0.005
0.008	400	40	4	0.4	0.04	0.004
0.007	350	35	3.5	0.35	0.035	0.0035
0.004	200	20	2	0.2	0.02	0.002
0.002	100	10	1	0.1	0.01	0.001
0.0014	70	7	0.7	0.07	0.007	7×10^{-4}
0.001	50	5	0.5	0.05	0.005	5×10^{-4}
8×10^{-4}	40	4	0.4	0.04	0.004	4×10^{-4}
7×10^{-4}	35	3.5	0.35	0.035	0.0035	3.5×10^{-4}
4×10^{-4}	20	2	0.2	0.02	0.002	2×10^{-4}

TABLE 4-28 (Continued)

Toxicity/ Mobility/ Persistence Factor Value	Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
2×10^{-4}	10	1	0.1	0.01	0.001	1×10^{-4}
1.4×10^{-4}	7	0.7	0.07	0.007	7×10^{-4}	7×10^{-5}
1×10^{-4}	5	0.5	0.05	0.005	5×10^{-4}	5×10^{-5}
8×10^{-5}	4	0.4	0.04	0.004	4×10^{-4}	4×10^{-5}
7×10^{-5}	3.5	0.35	0.035	0.0035	3.5×10^{-4}	3.5×10^{-5}
4×10^{-5}	2	0.2	0.02	0.002	2×10^{-4}	2×10^{-5}
2×10^{-5}	1	0.1	0.01	0.001	1×10^{-4}	1×10^{-5}
1.4×10^{-5}	0.7	0.07	0.007	7×10^{-4}	7×10^{-5}	7×10^{-6}
8×10^{-6}	0.4	0.04	0.004	4×10^{-4}	4×10^{-5}	4×10^{-6}
7×10^{-6}	0.35	0.035	0.0035	3.5×10^{-4}	3.5×10^{-5}	3.5×10^{-6}
2×10^{-6}	0.1	0.01	0.001	1×10^{-4}	1×10^{-5}	1×10^{-6}
1.4×10^{-6}	0.07	0.007	7×10^{-4}	7×10^{-5}	7×10^{-6}	7×10^{-7}
8×10^{-7}	0.04	0.004	4×10^{-4}	4×10^{-5}	4×10^{-6}	4×10^{-7}
7×10^{-7}	0.035	0.0035	3.5×10^{-4}	3.5×10^{-5}	3.5×10^{-6}	3.5×10^{-7}
2×10^{-7}	0.01	0.001	1×10^{-4}	1×10^{-5}	1×10^{-6}	1×10^{-7}
1.4×10^{-7}	0.007	7×10^{-4}	7×10^{-5}	7×10^{-6}	7×10^{-7}	7×10^{-8}
8×10^{-8}	0.004	4×10^{-4}	4×10^{-5}	4×10^{-6}	4×10^{-7}	4×10^{-8}
7×10^{-8}	0.0035	3.5×10^{-4}	3.5×10^{-5}	3.5×10^{-6}	3.5×10^{-7}	3.5×10^{-8}
2×10^{-8}	0.001	1×10^{-4}	1×10^{-5}	1×10^{-6}	1×10^{-7}	1×10^{-8}
1.4×10^{-8}	7×10^{-4}	7×10^{-5}	7×10^{-6}	7×10^{-7}	7×10^{-8}	7×10^{-9}

TABLE 4-28 (Concluded)

Toxicity/ Mobility/ Persistence Factor Value	Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
8×10^{-9}	4×10^{-4}	4×10^{-5}	4×10^{-6}	4×10^{-7}	4×10^{-8}	4×10^{-9}
2×10^{-9}	1×10^{-4}	1×10^{-5}	1×10^{-6}	1×10^{-7}	1×10^{-8}	1×10^{-9}
1.4×10^{-9}	7×10^{-5}	7×10^{-6}	7×10^{-7}	7×10^{-8}	7×10^{-9}	7×10^{-10}
8×10^{-10}	4×10^{-5}	4×10^{-6}	4×10^{-7}	4×10^{-8}	4×10^{-9}	4×10^{-10}
1.4×10^{-10}	7×10^{-6}	7×10^{-7}	7×10^{-8}	7×10^{-9}	7×10^{-10}	4×10^{-11}
1.4×10^{-11}	7×10^{-7}	7×10^{-8}	7×10^{-9}	7×10^{-10}	7×10^{-11}	7×10^{-12}
1.4×10^{-12}	7×10^{-8}	7×10^{-9}	7×10^{-10}	7×10^{-11}	7×10^{-12}	7×10^{-13}
0	0	0	0	0	0	0

[a] Do not round to nearest integer.

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4.2.2.3.2 *Population.* Evaluate the population factor for the watershed based on three factors: Level I concentrations, Level II concentrations, and potential contamination. Determine which factor applies to an intake as specified in section 4.2.2.3. Determine the population to be counted for that intake as specified in section 4.1.2.3.2, using the target distance limits in section 4.2.1.4 and the hazardous substance migration path in section 4.2.1.2.

4.2.2.3.2.1 *Level I concentrations.* Assign a value to this factor as specified in section 4.1.2.3.2.2.

4.2.2.3.2.2 *Level II concentrations.* Assign a value to this factor as specified in section 4.1.2.3.2.3.

4.2.2.3.2.3 *Potential contamination.* For each applicable type of surface water body in Table 4–24, determine the dilution-weighted population value as specified in section 4.1.2.3.2.4. Select the appropriate dilution weight adjustment value from Table 4–27 as specified in section 4.2.2.3.1.

Calculate the value for the potential contamination factor (PC) for the watershed as follows:

$$PC = \frac{A}{10} \sum_{i=1}^{n} W_i$$

where:

A = Dilution weight adjustment value from Table 4–27.

W_i = Dilution-weighted population from Table 4–24 for surface water body type i.

n = Number of different surface water body types in the watershed.

If PC is less than 1, do not round it to the nearest integer; if PC is 1 or more, round to the nearest integer. Enter the value in Table 4–25.

4.2.2.3.2.4 *Calculation of population factor value.* Sum the factor values for Level I concentrations, Level II concentrations, and potential contamination. Do not round this sum to the nearest integer. Assign this sum as the population factor value for the watershed. Enter this value in Table 4–25.

4.2.2.3.3 *Resources.* Assign a value to the resources factor as specified in section 4.1.2.3.3.

4.2.2.3.4 *Calculation of drinking water threat-targets factor category value.* Sum the nearest intake, population, and resources factor values for the watershed. Do not round this sum to the nearest integer. Assign this sum as the drinking water threat-targets factor category value for the watershed. Enter this value in Table 4–25.

4.2.2.4 *Calculation of drinking water threat score for a watershed.* Multiply the drinking water threat factor category values for likelihood of release, waste characteristics, and targets for the watershed, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum of 100, as the drinking water threat score for the watershed. Enter this score in Table 4–25.

4.2.3 *Human food chain threat.* Evaluate the human food chain threat for a watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.2.3.1 *Human food chain threat-likelihood of release.* Assign the same likelihood of release factor category value for the human food chain threat for the watershed as would be assigned in section 4.2.2.1.3 for the drinking water threat. Enter this value in Table 4–25.

4.2.3.2 *Human food chain threat-waste characteristics.* Evaluate the waste characteristics factor category for each watershed based on two factors: toxicity/mobility/persistence/bioaccumulation and hazardous waste quantity.

4.2.3.2.1 *Toxicity/mobility/persistence/bioaccumulation.* Evaluate all those hazardous substances eligible to be evaluated for toxicity/mobility/persistence in the drinking water threat for the watershed (see section 4.2.2.2.1).

4.2.3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in section 2.4.1.1.

4.2.3.2.1.2 *Mobility.* Assign a ground water mobility factor value to each hazardous substance as specified for the drinking water threat (see section 4.2.2.2.1.2).

4.2.3.2.1.3 *Persistence.* Assign a surface water persistence factor value to each hazardous substance as specified for the drinking water threat (see section 4.2.2.2.1.3), except: use the predominant water category (that is, lakes; or rivers, oceans, coastal tidal waters, or Great Lakes) between the probable point of entry and the nearest fishery (not the nearest drinking water or resources intake) along the hazardous substance migration path for the watershed to determine which portion of Table 4–10 to use. Determine the predominant water category based on distance as specified in section 4.1.2.2.1.2.

4.2.3.2.1.4 *Bioaccumulation potential.* Assign a bioaccumulation potential factor value to each hazardous substance as specified in section 4.1.3.2.1.3.

4.2.3.2.1.5 *Calculation of toxicity/mobility/persistence/bioaccumulation factor value.* Assign each hazardous substance a toxicity/mobility factor value from Table 3–9 (section 3.2.1.3), based on the values assigned to the hazardous substance for the toxicity and mobility factors. Then assign each hazardous substance a toxicity/mobility/persistence factor value from Table 4–28, based on the values assigned for the toxicity/mobility and persistence factors. Then assign each hazardous substance a toxicity/mobility/persistence/bioaccumulation factor value from Table 4–28. Use the substance with the highest toxicity/mobility/persistence/bioaccumulation factor value for the watershed to assign the value to this factor for the watershed. Enter this value in Table 4–25.

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4.2.3.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned in section 4.2.2.2.2 for the drinking water threat. Enter this value in Table 4–25.

4.2.3.2.3 *Calculation of human food chain threat-waste characteristics factor category value.* For the hazardous substance selected for the watershed in section 4.2.3.2.1.5, use its toxicity/mobility/ persistence factor value and bioaccumulation potential factor value as follows to assign a value to the waste characteristics factor category. First, multiply the toxicity/mobility/persistence factor value and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^8. Then multiply this product by the bioaccumulation potential factor value for this hazardous substance, subject to a maximum product of 1×10^{12}. Based on this second product, assign a value from Table 2–7 (section 2.4.3.1) to the human food chain threat-waste characteristics factor category for the watershed. Enter this value in Table 4–25.

4.2.3.3 *Human food chain threat-targets.* Evaluate two target factors for the watershed: food chain individual and population.

For both factors, determine whether the target fisheries are subject to Level I concentrations, Level II concentrations, or potential human food chain contamination. Determine which applies to each fishery (or portion of a fishery) as specified in section 4.1.3.3, subject to the restrictions specified in sections 4.2.1.3 and 4.2.1.4.

4.2.3.3.1 *Food chain individual.* Assign a value to the food chain individual factor as specified in section 4.1.3.3.1 with the following modification. When a dilution weight is used, multiply the appropriate dilution weight from Table 4–13 by the adjustment value selected from Table 4–27, as specified in section 4.2.2.3.1. Use the resulting product, not the value from Table 4–13, as the dilution weight in assigning the factor value. Do not round this product to the nearest integer. Enter the value assigned in Table 4–25.

4.2.3.3.2 *Population.* Evaluate the population factor for the watershed based on three factors: Level I concentrations, Level II concentrations, and potential human food chain contamination. Determine which of these factors is to be applied to each fishery as specified in section 4.2.3.3.

4.2.3.3.2.1 *Level I concentrations.* Assign a value to this factor as specified in section 4.1.3.3.2.1. Enter this value in Table 4–25.

4.2.3.3.2.2 *Level II concentrations.* Assign a value to this factor as specified in section 4.1.3.3.2.2. Enter this value in Table 4–25.

4.2.3.3.2.3 *Potential human food chain contamination.* Assign a value to this factor as specified in section 4.1.3.3.2.3 with the following modification. For each fishery being evaluated, multiply the appropriate dilution weight for that fishery from Table 4–13 by the adjustment value selected from Table 4–27, as specified in section 4.2.2.3.1. Use the resulting product, not the value from Table 4–13, as the dilution weight for the fishery. Do not round this product to the nearest integer. Enter the value assigned in Table 4–25.

4.2.3.3.2.4 *Calculation of population factor value.* Sum the factor values for Level I concentrations, Level II concentrations, and potential human food chain contamination for the watershed. Do not round this sum to the nearest integer. Assign this sum as the population factor value for the watershed. Enter this value in Table 4–25.

4.2.3.3.3 *Calculation of human food chain threat-targets factor category value.* Sum the food chain individual and population factor values for the watershed. Do not round this sum to the nearest integer. Assign this sum as the human food chain threat-targets factor category value for the watershed. Enter this value in Table 4–25.

4.2.3.4 *Calculation of human food chain threat score for a watershed.* Multiply the human food chain threat factor category values for likelihood of release, waste characteristics, and targets for the watershed, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum of 100, as the human food chain threat score for the watershed. Enter this score in Table 4–25.

4.2.4 *Environmental threat.* Evaluate the environmental threat for the watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.2.4.1 *Environmental threat-likelihood of release.* Assign the same likelihood of release factor category value for the environmental threat for the watershed as would be assigned in section 4.2.2.1.3 for the drinking water threat. Enter this value in Table 4–25.

4.2.4.2 *Environmental threat-waste characteristics.* Evaluate the waste characteristics factor category for each watershed based on two factors: ecosystem toxicity/mobility/persistence/ bioaccumulation and hazardous waste quantity.

4.2.4.2.1 *Ecosystem toxicity/mobility/ persistence/bioaccumulation.* Evaluate all those hazardous substances eligible to be evaluated for toxicity/mobility/persistence in the drinking water threat for the watershed (see section 4.2.2.2.1).

4.2.4.2.1.1 *Ecosystem toxicity.* Assign an ecosystem toxicity factor value to each hazardous substance as specified in section 4.1.4.2.1.1.

4.2.4.2.1.2 *Mobility.* Assign a ground water mobility factor value to each hazardous substance as specified in section 4.2.2.2.1.2 for the drinking water threat.

4.2.4.2.1.3 *Persistence.* Assign a surface water persistence factor value to each hazardous substance as specified in section 4.2.2.2.1.3 for the drinking water threat, except: use the predominant water category (that is, lakes; or rivers, oceans, coastal tidal waters, or Great Lakes) between the probable point of entry and the nearest sensitive environment (not the nearest drinking water or resources intake) along the hazardous substance migration path for the watershed to determine which portion of Table 4–10 to use. Determine the predominant water category based on distance as specified in section 4.1.2.2.1.2.

4.2.4.2.1.4 *Ecosystem bioaccumulation potential.* Assign an ecosystem bioaccumulation potential factor value to each hazardous substance as specified in section 4.1.4.2.1.3.

4.2.4.2.1.5 *Calculation of ecosystem toxicity/mobility/persistence/ bioaccumulation factor value.* Assign each hazardous substance an ecosystem toxicity/ mobility factor value from Table 3–9 (section 3.2.1.3), based on the values assigned to the hazardous substance for the ecosystem toxicity and mobility factors. Then assign each hazardous substance an ecosystem toxicity/mobility/persistence factor value from Table 4–29, based on the values assigned for the ecosystem toxicity/mobility and persistence factors. Then assign each hazardous substance an ecosystem toxicity/ mobility/persistence/bioaccumulation factor value from Table 4–30, based on the values assigned for the ecosystem toxicity/mobility/ persistence and ecosystem bioaccumulation potential factors. Select the substance with the highest ecosystem toxicity/mobility/ persistence/bioaccumulation factor value for the watershed and use it to assign the value to this factor for the watershed. Enter this value in Table 4–25.

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TABLE 4-29
ECOSYSTEM TOXICITY/MOBILITY/PERSISTENCE FACTOR VALUES[a]

Ecosystem Toxicity/Mobility Factor Value	Persistence Factor Value			
	1.0	0.4	0.07	0.0007
10,000	10,000	4,000	700	7
2,000	2,000	800	140	1.4
1,000	1,000	400	70	0.7
200	200	80	14	0.14
100	100	40	7	0.07
20	20	8	1.4	0.014
10	10	4	0.7	0.007
2	2	0.8	0.14	0.0014
1	1	0.4	0.07	7×10^{-4}
0.2	0.2	0.08	0.014	1.4×10^{-4}
0.1	0.1	0.04	0.007	7×10^{-5}
0.02	0.02	0.008	0.0014	1.4×10^{-5}
0.01	0.01	0.004	7×10^{-4}	7×10^{-6}
0.002	0.002	8×10^{-4}	1.4×10^{-4}	1.4×10^{-6}
0.001	0.001	4×10^{-4}	7×10^{-5}	7×10^{-7}
2×10^{-4}	2×10^{-4}	8×10^{-5}	1.4×10^{-5}	1.4×10^{-7}
1×10^{-4}	1×10^{-4}	4×10^{-5}	7×10^{-6}	7×10^{-8}
2×10^{-5}	2×10^{-5}	8×10^{-6}	1.4×10^{-6}	1.4×10^{-8}
2×10^{-6}	2×10^{-6}	8×10^{-7}	1.4×10^{-7}	1.4×10^{-9}
2×10^{-7}	2×10^{-7}	8×10^{-8}	1.4×10^{-8}	1.4×10^{-10}
2×10^{-8}	2×10^{-8}	8×10^{-9}	1.4×10^{-9}	1.4×10^{-11}
2×10^{-9}	2×10^{-9}	8×10^{-10}	1.4×10^{-10}	1.4×10^{-12}
0	0	0	0	0

[a]Do not round to nearest integer.

TABLE 4-30
ECOSYSTEM TOXICITY/MOBILITY/PERSISTENCE/BIOACCUMULATION FACTOR VALUES[a]

Ecosystem Toxicity/ Mobility/ Persistence Factor Value	Ecosystem Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
10,000	5×10^8	5×10^7	5×10^6	5×10^5	5×10^4	5,000
4,000	2×10^8	2×10^7	2×10^6	2×10^5	2×10^4	2,000
2,000	1×10^8	1×10^7	1×10^6	1×10^5	1×10^4	1,000
1,000	5×10^7	5×10^6	5×10^5	5×10^4	5,000	500
800	4×10^7	4×10^6	4×10^5	4×10^4	4,000	400
700	3.5×10^7	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350
400	2×10^7	2×10^6	2×10^5	2×10^4	2,000	200
200	1×10^7	1×10^6	1×10^5	1×10^4	1,000	100
140	7×10^6	7×10^5	7×10^4	7,000	700	70
100	5×10^6	5×10^5	5×10^4	5,000	500	50
80	4×10^6	4×10^5	4×10^4	4,000	400	40
70	3.5×10^6	3.5×10^5	3.5×10^4	3,500	350	35
40	2×10^6	2×10^5	2×10^4	2,000	200	20
20	1×10^6	1×10^5	1×10^4	1,000	100	10
14	7×10^5	7×10^4	7,000	700	70	7
10	5×10^5	5×10^4	5,000	500	50	5
8	4×10^5	4×10^4	4,000	400	40	4
7	3.5×10^5	3.5×10^4	3,500	350	35	3.5
4	2×10^5	2×10^4	2,000	200	20	2
2	1×10^5	1×10^4	1,000	100	10	1
1.4	7×10^4	7,000	700	70	7	0.7

TABLE 4-30 (Continued)

Ecosystem Toxicity/ Mobility/ Persistence Factor Value	Esosystem Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
1.0	5×10^4	5,000	500	50	5	0.5
0.8	4×10^4	4,000	400	40	4	0.4
0.7	3.5×10^4	3,500	350	35	3.5	0.35
0.4	2×10^4	2,000	200	20	2	0.2
0.2	1×10^4	1,000	100	10	1	0.1
0.14	7,000	700	70	7	0.7	0.07
0.1	5,000	500	50	5	0.5	0.05
0.08	4,000	400	40	4	0.4	0.04
0.07	3,500	350	35	3.5	0.35	0.035
0.04	2,000	200	20	2	0.2	0.02
0.02	1,000	100	10	1	0.1	0.01
0.014	700	70	7	0.7	0.07	0.007
0.01	500	50	5	0.5	0.05	0.005
0.008	400	40	4	0.4	0.04	0.004
0.007	350	35	3.5	0.35	0.035	0.0035
0.004	200	20	2	0.2	0.02	0.002
0.002	100	10	1	0.1	0.01	0.001
0.0014	70	7	0.7	0.07	0.007	7×10^{-4}
0.001	50	5	0.5	0.05	0.005	5×10^{-4}
8×10^{-4}	40	4	0.4	0.04	0.004	4×10^{-4}
7×10^{-4}	35	3.5	0.35	0.035	0.0035	3.5×10^{-4}
4×10^{-4}	20	2	0.2	0.02	0.002	2×10^{-4}

TABLE 4-30 (Continued)

Ecosystem Toxicity/ Mobility/ Persistence Factor Value	Ecosystem Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
2×10^{-4}	10	1	0.1	0.01	0.001	1×10^{-4}
1.4×10^{-4}	7	0.7	0.07	0.007	7×10^{-4}	7×10^{-5}
1×10^{-4}	5	0.5	0.05	0.005	5×10^{-4}	5×10^{-5}
8×10^{-5}	4	0 4	0.04	0.004	4×10^{-4}	4×10^{-5}
7×10^{-5}	3.5	0.35	0.035	0.0035	3.5×10^{-4}	3.5×10^{-5}
4×10^{-5}	2	0.2	0.02	0.002	2×10^{-4}	2×10^{-5}
2×10^{-5}	1	0.1	0.01	0.001	1×10^{-4}	1×10^{-5}
1.4×10^{-5}	0.7	0.07	0.007	7×10^{-4}	7×10^{-5}	7×10^{-6}
8×10^{-6}	0.4	0.04	0.004	4×10^{-4}	4×10^{-5}	4×10^{-6}
7×10^{-6}	0.35	0.035	0.0035	3.5×10^{-4}	3.5×10^{-5}	3.5×10^{-6}
2×10^{-6}	0.1	0.01	0.001	1×10^{-4}	1×10^{-5}	1×10^{-6}
1.4×10^{-6}	0.07	0.007	7×10^{-4}	7×10^{-5}	7×10^{-6}	7×10^{-7}
8×10^{-7}	0.04	0.004	4×10^{-4}	4×10^{-5}	4×10^{-6}	4×10^{-7}
7×10^{-7}	0.035	0.0035	3.5×10^{-4}	3.5×10^{-5}	3.5×10^{-6}	3.5×10^{-7}
2×10^{-7}	0.01	0 001	1×10^{-4}	1×10^{-5}	1×10^{-6}	1×10^{-7}
1.4×10^{-7}	0.007	7×10^{-4}	7×10^{-5}	7×10^{-6}	7×10^{-7}	7×10^{-8}
8×10^{-8}	0.004	4×10^{-4}	4×10^{-5}	4×10^{-6}	4×10^{-7}	4×10^{-8}
7×10^{-8}	0.0035	3.5×10^{-4}	3.5×10^{-5}	3.5×10^{-6}	3.5×10^{-7}	3.5×10^{-8}
2×10^{-8}	0.001	1×10^{-4}	1×10^{-5}	1×10^{-6}	1×10^{-7}	1×10^{-8}
1.4×10^{-8}	7×10^{-4}	7×10^{-5}	7×10^{-6}	7×10^{-7}	7×10^{-8}	7×10^{-9}

TABLE 4-30 (Concluded)

Ecosystem Toxicity/ Mobility/ Persistence Factor Value	Ecosystem Bioaccumulation Potential Factor Value					
	50,000	5,000	500	50	5	0.5
8×10^{-9}	4×10^{-4}	4×10^{-5}	4×10^{-6}	4×10^{-7}	4×10^{-8}	4×10^{-9}
2×10^{-9}	1×10^{-4}	1×10^{-5}	1×10^{-6}	1×10^{-7}	1×10^{-8}	1×10^{-9}
1.4×10^{-9}	7×10^{-5}	7×10^{-6}	7×10^{-7}	7×10^{-8}	7×10^{-9}	7×10^{-10}
8×10^{-10}	4×10^{-5}	4×10^{-6}	4×10^{-7}	4×10^{-8}	4×10^{-9}	4×10^{-10}
1.4×10^{-10}	7×10^{-6}	7×10^{-7}	7×10^{-8}	7×10^{-9}	7×10^{-10}	4×10^{-11}
1.4×10^{-11}	7×10^{-7}	7×10^{-8}	7×10^{-9}	7×10^{-10}	7×10^{-11}	7×10^{-12}
1.4×10^{-12}	7×10^{-8}	7×10^{-9}	7×10^{-10}	7×10^{-11}	7×10^{-12}	7×10^{-13}
0	0	0	0	0	0	0

[a] Do not round to nearest integer.

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4.2.4.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned in section 4.2.2.2.2 for the drinking water threat. Enter this value in Table 4–25.

4.2.4.2.3 *Calculation of environmental threat-waste characteristics factor category value.* For the hazardous substance selected for the watershed in section 4.2.4.2.1.5, use its ecosystem toxicity/mobility/persistence factor value and ecosystem bioaccumulation potential factor value as follows to assign a value to the waste characteristics factor category. First, multiply the ecosystem toxicity/mobility/persistence factor value and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^8. Then multiply this product by the ecosystem bioaccumulation potential factor value for this hazardous substance, subject to a maximum product of 1×10^{12}. Based on this product, assign a value from Table 2–7 (section 2.4.3.1) to the environmental threat-waste characteristics category for the watershed. Enter the value in Table 4–25.

4.2.4.3 *Environmental threat-targets.* Evaluate the environmental threat-targets factor category for a watershed using one factor: sensitive environments.

4.2.4.3.1 *Sensitive environments.* Evaluate sensitive environments for the watershed based on three factors: Level I concentrations, Level II concentrations, and potential contamination. Determine which applies to each sensitive environment as specified in section 4.1.4.3.1, except: use only those samples from the surface water in-water segment and only those hazardous substances in such samples that meet the conditions in sections 4.2.1.3 and 4.2.1.4.

4.2.4.3.1.1 *Level I concentrations.* Assign a value to this factor as specified in section 4.1.4.3.1.1. Enter this value in Table 4–25.

4.2.4.3.1.2 *Level II concentrations.* Assign a value to this factor as specified in section 4.1.4.3.1.2. Enter this value in Table 4–25.

4.2.4.3.1.3 *Potential contamination.* Assign a value to this factor as specified in section 4.1.4.3.1.3 with the following modification. Multiply the appropriate dilution weight from Table 4–13 for the sensitive environments in each type of surface water body by the adjustment value selected from Table 4–27, as specified in section 4.2.2.3.1. Use the resulting product, not the value from Table 4–13, as the dilution weight for the sensitive environments in that type of surface water body. Do not round this product to the nearest integer. Enter the value assigned in Table 4–25.

4.2.4.3.1.4 *Calculation of environmental threat-targets factor category value.* Sum the values for Level I concentrations, Level II concentrations, and potential contamination for the watershed. Do not round this sum to the nearest integer. Assign this sum as the environmental threat targets factor category value for the watershed. Enter this value in Table 4–25.

4.2.4.4 *Calculation of environmental threat score for a watershed.* Multiply the environmental threat factor category values for likelihood of release, waste characteristics, and targets for the watershed, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum of 60, as the environmental threat score for the watershed. Enter this score in Table 4–25.

4.2.5 *Calculation of ground water to surface water migration component score for a watershed.* Sum the scores for the three threats for the watershed (that is, drinking water, human food chain, and environmental threats). Assign the resulting score, subject to a maximum value of 100, as the ground water to surface water migration component score for the watershed. Enter this score in Table 4–25.

4.2.6 *Calculation of ground water to surface water migration component score.* Select the highest ground water to surface water migration component score from the watersheds evaluated. Assign this score as the ground water to surface water migration component score for the site, subject to a maximum score of 100. Enter this score in Table 4–25.

4.3 *Calculation of surface water migration pathway score.* Determine the surface water migration pathway score as follows:

- If only one of the two surface water migration components (overland/flood or ground water to surface water) is scored, assign the score of that component as the surface water migration pathway score.
- If both components are scored, select the higher of the two component scores from sections 4.1.6 and 4.2.6. Assign that score as the surface water migration pathway score.

5.0 Soil Exposure Pathway

Evaluate the soil exposure pathway based on two threats: Resident population threat and nearby population threat. Evaluate both threats based on three factor categories: Likelihood of exposure, waste characteristics, and targets. Figure 5–1 indicates the factors included within each factor category for each type of threat.

Determine the soil exposure pathway score (S_s) in terms of the factor category values as follows:

$$S_s = \frac{\sum_{i=1}^{2} (LE_i)(WC_i)(T_i)}{SF}$$

where:

LE_i = Likelihood of exposure factor category value for threat i (that is, resident population threat or nearby population threat).

WC_i = Waste characteristics factor category value for threat i.

T_i = Targets factor category value for threat i.

SF = Scaling factor.

Table 5–1 outlines the specific calculation procedure.

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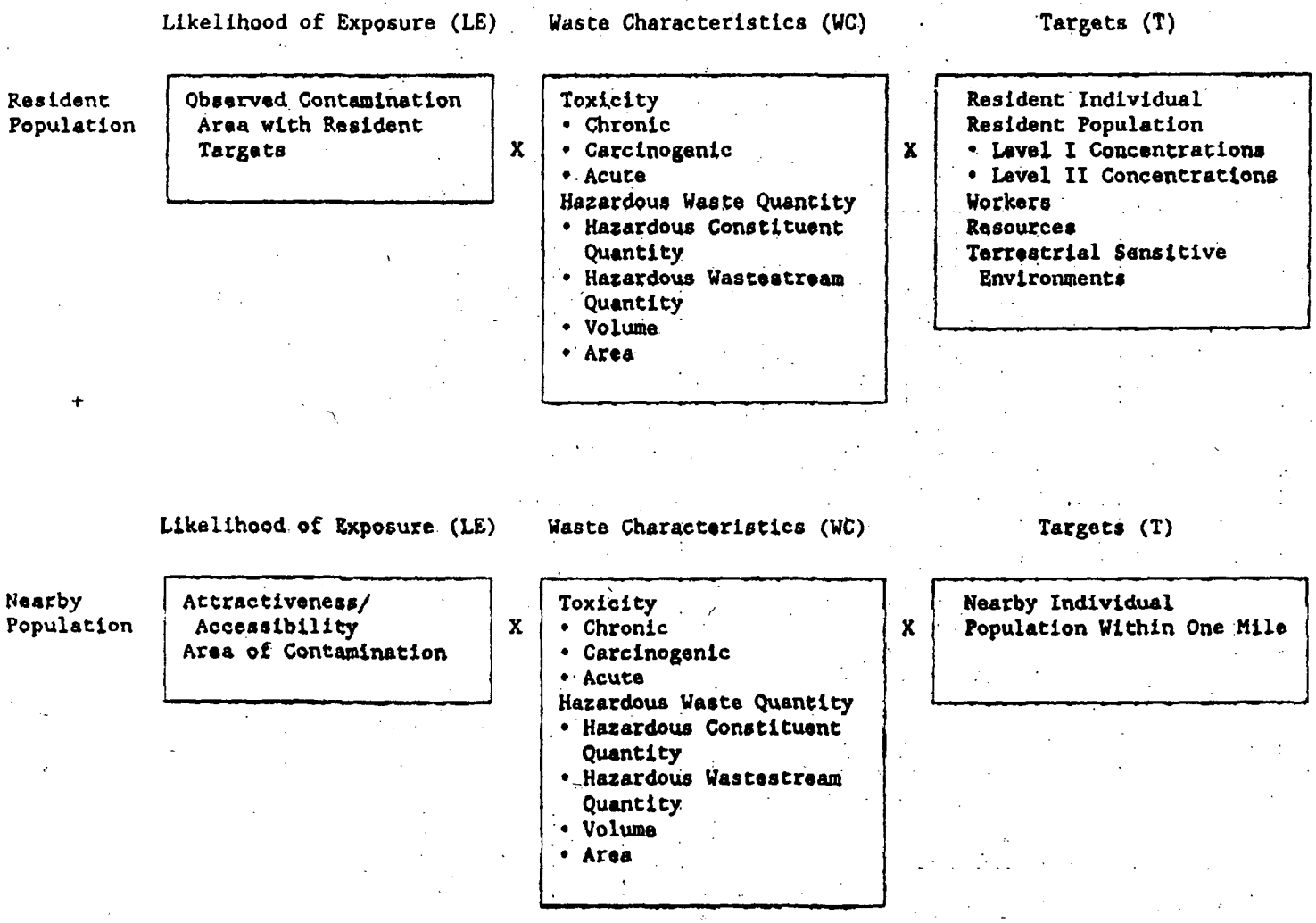

Figure 5-1
OVERVIEW OF SOIL EXPOSURE PATHWAY

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TABLE 5–1.—SOIL EXPOSURE PATHWAY SCORESHEET

Factor categories and factors	Maximum value	Value assigned
Resident Population Threat		
Likelihood of Exposure		
1. Likelihood of Exposure	550	
Waste Characteristics		
2. Toxicity	(a)	
3. Hazardous Waste Quantity	(a)	
4. Waste Characteristics	100	
Targets		
5. Resident Individual	50	
6. Resident Population:		
6a. Level I Concentrations	(b)	
6b. Level II Concentrations	(b)	
6c. Resident Population (lines 6a + 6b)	(b)	
7. Workers	15	
8. Resources	5	
9. Terrestrial Sensitive Environments	(c)	
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)	
Resident Population Threat Score		
11. Resident Population Threat (lines 1 × 4 × 10)	(b)	
Nearby Population Threat		
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	
13. Area of Contamination	100	
14. Likelihood of Exposure	500	
Waste Characteristics		
15. Toxicity	(a)	
16. Hazardous Waste Quantity	(a)	
17. Waste Characteristics	100	
Targets		
18. Nearby Individual	1	
19. Population Within 1 Mile	(b)	
20. Targets (lines 18 + 19)	(b)	
Nearby Population Threat Score		
21. Nearby Population Threat (lines 14 × 17 × 20)	(b)	
Soil Exposure Pathway Score		
22. Soil Exposure Pathway Score [d] (S_s), (lines [11+21] / 82,500, subject to a maximum of 100)	100	

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited to maximum of 60
[d] Do not round to nearest integer.

5.0.1 *General considerations.* Evaluate the soil exposure pathway based on areas of observed contamination:

- Consider observed contamination to be present at sampling locations where analytic evidence indicates that:
  - –A hazardous substance attributable to the site is present at a concentration significantly above background levels for the site (see Table 2–3 in section 2.3 for the criteria for determining analytical significance), *and*
  - –This hazardous substance, if not present at the surface, is covered by 2 feet or less of cover material (for example, soil).
- Establish areas of observed contamination based on sampling locations at which there is observed contamination as follows:
  - –For all sources except contaminated soil, if observed contamination from the site is present at any sampling location within the source, consider that entire source to be an area of observed contamination.
  - –For contaminated soil, consider both the sampling location(s) with observed contamination from the site and the area lying between such locations to be an area of observed contamination, unless available information indicates otherwise.
- If an area of observed contamination (or portion of such an area) is covered by a permanent, or otherwise maintained, essentially impenetrable material (for example, asphalt) that is not more than 2 feet thick, exclude that area (or portion of the area) in evaluating the soil exposure pathway.
- For an area of observed contamination, consider only those hazardous substances that meet the criteria for observed contamination for that area to be associated with that area in evaluating the soil exposure pathway (see section 2.2.2).

If there is observed contamination, assign scores for the resident population threat and the nearby population threat, as specified in sections 5.1 and 5.2. If there is no observed contamination, assign the soil exposure pathway a score of 0.

5.1 *Resident Population Threat.* Evaluate the resident population threat only if there is an area of observed contamination in one or more of the following locations:

- Within the property boundary of a residence, school, or day care center *and* within 200 feet of the respective residence, school, or day care center, or
- Within a workplace property boundary *and* within 200 feet of a workplace area, or
- Within the boundaries of a resource specified in section 5.1.3.4, or
- Within the boundaries of a terrestrial sensitive environment specified in section 5.1.3.5.

If not, assign the resident population threat a value of 0, enter this value in Table 5–1, and proceed to the nearby population threat (section 5.2).

5.1.1 *Likelihood of exposure.* Assign a value of 550 to the likelihood of exposure factor category for the resident population threat if there is an area of observed contamination in one or more locations listed in section 5.1. Enter this value in Table 5–1.

5.1.2 *Waste characteristics.* Evaluate waste characteristics based on two factors: toxicity and hazardous waste quantity. Evaluate only those hazardous substances that meet the criteria for observed contamination at the site (see section 5.0.1).

5.1.2.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in section 2.4.1.1. Use the hazardous substance with the highest toxicity factor value to assign the value to the toxicity factor for the resident population threat. Enter this value in Table 5–1.

5.1.2.2 *Hazardous waste quantity.* Assign hazardous waste quantity factor value as specified in section 2.4.2. In estimating the hazardous waste quantity, use Table 5–2 and

• Consider only the first 2 feet of depth of an area of observed contamination, except as specified for the volume measure.

• Use the volume measure (see section 2.4.2.1.3) only for those types of areas of observed contamination listed in Tier C of Table 5-2. In evaluating the volume measure for these listed areas of observed contamination, use the full volume, not just the volume within the top 2 feet.

• Use the area measure (see section 2.4.2.1.4), not the volume measure, for all other types of areas of observed contamination, even if their volume is known.

Enter the value assigned in Table 5-1.

TABLE 5-2.—HAZARDOUS WASTE QUANTITY EVALUATION EQUATIONS FOR SOIL EXPOSURE PATHWAY

Tier	Measure	Units	Equation for assigning value [a]
A	Hazardous Constituent Quantity (C)	lb	C
B [b]	Hazardous Wastestream Quantity (W)	lb	W/5,000
C [b]	Volume (V)		
	Surface Impoundment [c]	yd^3	V/2.5
	Drums [d]	gallon	V/500
	Tanks and Containers Other Than Drums	yd^3	V/2.5
D [b]	Area (A)		
	Landfill	ft^2	A/34,000
	Surface Impoundment	ft^2	A/13
	Surface Impoundment (Buried/backfilled)	ft^2	A/13
	Land treatment	ft^2	A/270
	Pile [e]	ft^2	A/34
	Contaminated Soil	ft^2	A/34,000

[a] Do not round nearest integer.

[b] Convert volume to mass when necessary: 1 ton = 2,000 pounds = 1 cubic yard = 4 drums = 200 gallons.

[c] Use volume measure only for surface impoundments containing hazardous substances present as liquids. Use area measures in Tier D for dry surface impoundments and for buried/backfilled surface impoundments.

[d] If actual volume of drums is unavailable, assume 1 drum = 50 gallons.

[e] Use land surface area under pile, not surface area of pile.

5.1.2.3 *Calculation of waste characteristics factor category value.* Multiply the toxicity and hazardous waste quantity factor values, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2-7 (section 2.4.3.1) to the waste characteristics factor category. Enter this value in Table 5-1.

5.1.3 *Targets.* Evaluate the targets factor category for the resident population threat based on five factors: resident individual, resident population, workers, resources, and terrestrial sensitive environments.

In evaluating the targets factor category for the resident population threat, count only the following as targets:

• Resident individual—a person living or attending school or day care on a property with an area of observed contamination *and* whose residence, school, or day care center, respectively, is on or within 200 feet of the area of observed contamination.

• Worker—a person working on a property with an area of observed contamination *and* whose workplace area is on or within 200 feet of the area of observed contamination.

• Resources located on an area of observed contamination, as specified in section 5.1.

• Terrestrial sensitive environments located on an area of observed contamination, as specified in section 5.1.

5.1.3.1 *Resident individual.* Evaluate this factor based on whether there is a resident individual, as specified in section 5.1.3, who is subject to Level I or Level II concentrations.

First, determine those areas of observed contamination subject to Level I concentrations and those subject to Level II concentrations as specified in sections 2.5.1 and 2.5.2. Use the health-based benchmarks from Table 5-3 in determining the level of contamination. Then assign a value to the resident individual factor as follows:

• Assign a value of 50 if there is at least one resident individual for one or more areas subject to Level I concentrations.

• Assign a value of 45 if there is no such resident individuals, but there is at least one resident individual for one or more areas subject to Level II concentrations.

• Assign a value of 0 if there is no resident individual.

Enter the value assigned in Table 5-1.

5.1.3.2 *Resident population.* Evaluate resident population based on two factors: Level I concentrations and Level II concentrations. Determine which factor applies as specified in sections 2.5.1 and 2.5.2, using the health-based benchmarks from Table 5-3. Evaluate populations subject to Level I concentrations as specified in section 5.1.3.2.1 and populations subject to Level II concentrations as specified in section 5.1.3.2.2.

TABLE 5-3.—HEALTH-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN SOILS

• Screening concentration for cancer corresponding to that concentration that corresponds to the 10^{-6} individual cancer risk for oral exposures.

• Screening concentration for noncancer toxicological responses corresponding to the Reference Dose (RfD) for oral exposures.

Count only those persons meeting the criteria for resident individual as specified in section 5.1.3. In estimating the number of people living on property with an area of observed contamination, when the estimate in based on the number of residences, multiply each residence by the average number of persons per residence for the county in which the residence is located.

5.1.3.2.1 *Level I concentrations.* Sum the number of resident individuals subject to Level I concentrations and multiply this sum by 10. Assign the resulting product as the value for this factor. Enter this value in Table 5-1.

5.1.3.2.2 *Level II concentrations.* Sum the number of resident individuals subject to Level II concentrations. Do not include those people already counted under the Level I concentrations factor. Assign this sum as the value for this factor. Enter this value in Table 5-1.

5.1.3.2.3 *Calculation of resident population factor value.* Sum the factor values for Level I concentrations and Level II concentrations. Assign this sum as the resident population factor value. Enter this value in Table 5-1.

5.1.3.3 *Workers.* Evaluate this factor based on the number of workers that meet the section 5.1.3 criteria. Assign a value for these workers using Table 5-4. Enter this value in Table 5-1.

TABLE 5-4.—FACTOR VALUES FOR WORKERS

Number of workers	Assigned value
0	0
1 to 100	5
101 to 1,000	10
Greater than 1,000	15

5.1.3.4 *Resources.* Evaluate the resources factor as follows:

• Assign a value of 5 to the resources factor if one or more of the following is present on an area of observed contamination at the site:

–Commercial agriculture.
–Commercial silviculture.
–Commercial livestock production or commercial livestock grazing.

• Assign a value of 0 if none of the above are present.

Enter the value assigned in Table 5-1.

5.1.3.5 *Terrestrial sensitive environments.* Assign value(s) from Table 5-5 to each terrestrial sensitive environment that meets the eligibility criteria of section 5.1.3.

Calculate a value (ES) for terrestrial sensitive environments as follows:

$$ES = \sum_{i=1}^{n} S_i$$

where:

S_i = Value(s) assigned from Table 5-5 to terrestrial sensitive environment i.

n=Number of terrestrial sensitive environments meeting section 5.1.3 criteria.

Because the pathway score based solely on terrestrial sensitive environments is limited to a maximum of 60, determine the value for the terrestrial sensitive environments factor as follows:

TABLE 5–5.—TERRESTRIAL SENSITIVE ENVIRONMENTS RATING VALUES

Terrestrial sensitive environments	Assigned value
Terrestrial critical habitat [a] for Federal designated endangered or threatened species	100
National Park Designated Federal Wilderness Area National Monument	
Terrestrial habitat known to be used by Federal designated or proposed threatened or endangered species	75
National Preserve (terrestrial) National or State Terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized for breeding by large or dense aggregations of animals [b]	
Terrestrial habitat known to be used by State designated endangered or threatened species	50
Terrestrial habitat known to be used by species under review as to its Federal designated endangered or threatened status	
State lands designated for wildlife or game management	25
State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	

[a] Critical habitat as defined in 50 CFR 424.02.
[b] Limit to vertebrate species.

• Multiply the values assigned to the resident population threat for likelihood of exposure (LE), waste characteristics (WC), and ES. Divide the product by 82,500.

–If the result is 60 or less, assign the value ES as the terrestrial sensitive environments factor value.

–If the result exceeds 60, calculate a value EC as follows:

$$EC = \frac{(60)(82{,}500)}{(LE)(WC)}$$

Assign the value EC as the terrestrial sensitive environments factor value. Do not round this value to the nearest interger.

Enter the value assigned for the terrestrial sensitive environments factor in Table 5–1.

5.1.3.6 *Calculation of resident population targets factor category value.* Sum the values for the resident individual, resident population, workers, resources, and terrestrial sensitive environments factors. Do not round to the nearest integer. Assign this sum as the targets factor category value for the resident population threat. Enter this value in Table 5–1.

5.1.4 *Calculation of resident population threat score.* Multiply the values for likelihood of exposure, waste characteristics, and targets for the resident population threat, and round the product to the nearest integer. Assign this product as the resident population threat score. Enter this score in Table 5–1.

5.2 *Nearby population threat.* Include in the nearby population only those individuals who live or attend school within a 1-mile travel distance of an area of observed contamination at the site and who do not meet the criteria for resident individual as specified in section 5.1.3.

Do not consider areas of observed contamination that have an attractiveness/accessibility factor value of 0 (see section 5.2.1.1) in evaluating the nearby population threat.

5.2.1 *Likelihood of exposure.* Evaluate two factors for the likelihood of exposure factor category for the nearby population threat: attractiveness/accessibility and area of contamination.

5.2.1.1. *Attractiveness/accessibility.* Assign a value for attractiveness/accessibility from Table 5–6 to each area of observed contamination, excluding any land used for residences. Select the highest value assigned to the areas evaluated and use it as the value for the attractiveness/accessibility factor. Enter this value in Table 5–1.

5.2.1.2 *Area of contamination.* Evaluate area of contamination based on the total area of the areas of observed contamination at the site. Count only the area(s) that meet the criteria in section 5.0.1 and that receive an attractiveness/accessibility value greater than 0. Assign a value to this factor from Table 5–7. Enter this value in Table 5–1.

TABLE 5–6.—ATTRACTIVENESS/ ACCESSIBILITY VALUES

Area of observed contamination	Assigned value
Designated recreational area	100
Regularly used for public recreation (for example, fishing, hiking, softball)	75
Accessible and unique recreational area (for example, vacant lots in urban area)	75
Moderately accessible (may have some access improvements—for example, gravel road), with some public recreation use	50
Slightly accessible (for example, extremely rural area with no road improvement), with some public recreation use	25
Accessible, with no public recreation use	10
Surrounded by maintained fence or combination of maintained fence and natural barriers	5
Physically inaccessible to public, with no evidence of public recreation use	0

TABLE 5–7.—AREA OF CONTAMINATION FACTOR VALUES

Total area of the areas of observed contamination (square feet)	Assigned value
Less than or equal to 5,000	5
Greater than 5,000 to 125,000	20
Greater than 125,000 to 250,000	40
Greater than 250,000 to 375,000	60
Greater than 375,000 to 500,000	80
Greater than 500,000	100

5.2.1.3 *Likelihood of exposure factor category value.* Assign a value from Table 5–8 to the likelihood of exposure factor category, based on the values assigned to the attractiveness/accessibility and area of contamination factors. Enter this value in Table 5–1.

TABLE 5–8.—NEARBY POPULATION LIKELIHOOD OF EXPOSURE FACTOR VALUES

Area of contamination factor value	Attractiveness/accessibility factor value						
	100	75	50	25	10	5	0
100	500	500	375	250	125	50	0
80	500	375	250	125	50	25	0
60	375	250	125	50	25	5	0
40	250	125	50	25	5	5	0
20	125	50	25	5	5	5	0
5	50	25	5	5	5	5	0

5.2.2 *Waste characteristics.* Evaluate waste characteristics based on two factors: toxicity and hazardous waste quantity. Evaluate only those hazardous substances that meet the criteria for observed contamination (see section 5.0.1) at areas that can be assigned an attractiveness/accessibility factor value greater than 0.

5.2.2.1 *Toxicity.* Assign a toxicity factor value as specified in section 2.4.1.1 to each hazardous substance meeting the criteria in section 5.2.2. Use the hazardous substance with the highest toxicity factor value to assign the value to the toxicity factor for the nearby population threat. Enter this value in Table 5–1.

5.2.2.2 *Hazardous waste quantity.* Assign a value to the hazardous waste quantity factor as specified in section 5.1.2.2, except consider only those areas of observed contamination that can be assigned an attractiveness/accessibility factor value greater than 0. Enter the value assigned in Table 5–1.

5.2.2.3 *Calculation of waste characteristics factor category value.* Multiply the toxicity and hazardous waste quantity factor values, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2–7 (section 2.4.3.1) to the waste characteristics factor category. Enter this value in Table 5–1.

5.2.3 *Targets.* Evaluate the targets factory category for the nearby population threat based on two factors: nearby individual and population within a 1-mile travel distance from the site.

5.2.3.1 *Nearby individual.* If one or more persons meet the section 5.1.3 criteria for a

resident individual, assign this factor a value of 0. Enter this value in Table 5–1.

If no person meets the criteria for a resident individual, determine the shortest travel distance from the site to any residence or school. In determining the travel distance, measure the shortest overland distance an individual would travel from a residence or school to the nearest area of observed contamination for the site with an attractiveness/accessibility factor value greater than 0. If there are no natural barriers to travel, measure the travel distance as the shortest straight-line distance from the residence or school to the area of observed contamination. If natural barriers exist (for example, a river), measure the travel distance as the shortest straight-line distance from the residence or school to the nearest crossing point and from there as the shortest straight-line distance to the area of observed contamination. Based on the shortest travel distance, assign a value from Table 5–9 to the nearest individual factor. Enter this value in Table 5–1.

TABLE 5–9.—NEARBY INDIVIDUAL FACTOR VALUES

Travel distance for nearby individual (miles)	Assigned value
Greater than 0 to ¼	1[a]
Greater than ¼ to 1	0

[a] Assign a value of 0 if one or more persons meet the section 5.1.3 criteria for resident individual.

5.2.3.2 *Population within 1 mile.* Determine the population within each travel distance category of Table 5–10. Count residents and students who attend school within this travel distance. Do not include those people already counted in the resident population threat. Determine travel distances as specified in section 5.2.3.1.

In estimating residential population, when the estimate is based on the number of residences, multiply each residence by the average number of persons per residence for the county in which the residence is located.

Based on the number of people included within a travel distance category, assign a distance-weighted population value for that travel distance from Table 5–10.

Calculate the value for the population within 1 mile factor (PN) as follows:

$$PN = \frac{1}{10} \sum_{i=1}^{3} W_i$$

where:

W_i = Distance-weighted population value from Table 5–10 for travel distance category i.

If PN is less than 1, do not round it to the nearest integer; if PN is 1 or more, round to the nearest integer. Enter this value in Table 5–1.

5.2.3.3 *Calculation of nearby population targets factor category value.* Sum the values for the nearby individual factor and the population within 1 mile factor. Do not round this sum to the nearest integer. Assign this sum as the targets factor category value for the nearby population threat. Enter this value in Table 5–1.

TABLE 5–10.—DISTANCE-WEIGHTED POPULATION VALUES FOR NEARBY POPULATION THREAT [a]

Travel distance category (miles)	Number of people within the travel distance category											
	0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000
Greater than 0 to ¼	0	0.1	0.4	1.0	4	13	41	130	408	1,303	4,081	13,034
Greater than ¼ to ½	0	0.05	0.2	0.7	2	7	20	65	204	652	2,041	6,517
Greater than ½ to 1	0	0.02	0.1	0.3	1	3	10	33	102	326	1,020	3,258

[a] Round the number of people present within a travel distance category to nearest integer. Do not round the assigned distance-weighted population value to nearest integer.

5.2.4 *Calculation of nearby population threat score.* Multiply the values for likelihood of exposure, waste characteristics, and targets for the nearby population threat, and round the product to the nearest integer. Assign this product as the nearby population threat score. Enter this score in Table 5–1.

5.3 *Calculation of soil exposure pathway score.* Sum the resident population threat score and the nearby population threat score, and divide the sum by 82,500. Assign the resulting value, subject to a maximum of 100, as the soil exposure pathway score (S_s). Enter this score in Table 5–1.

6.0 Air Migration Pathway

Evaluate the air migration pathway based on three factor categories: likelihood of release, waste characteristics, and targets. Figure 6–1 indicates the factors included within each factor category.

Determine the air migration pathway score (S_a) in terms of the factor category values as follows:

$$S_a = \frac{(LR)(WC)(T)}{SF}$$

where:

LR = Likelihood of release factor category value.

WC = Waste characteristics factor category value.

T = Targets factor category value.

SF = Scaling factor.

Table 6–1 outlines the specific calculation procedure.

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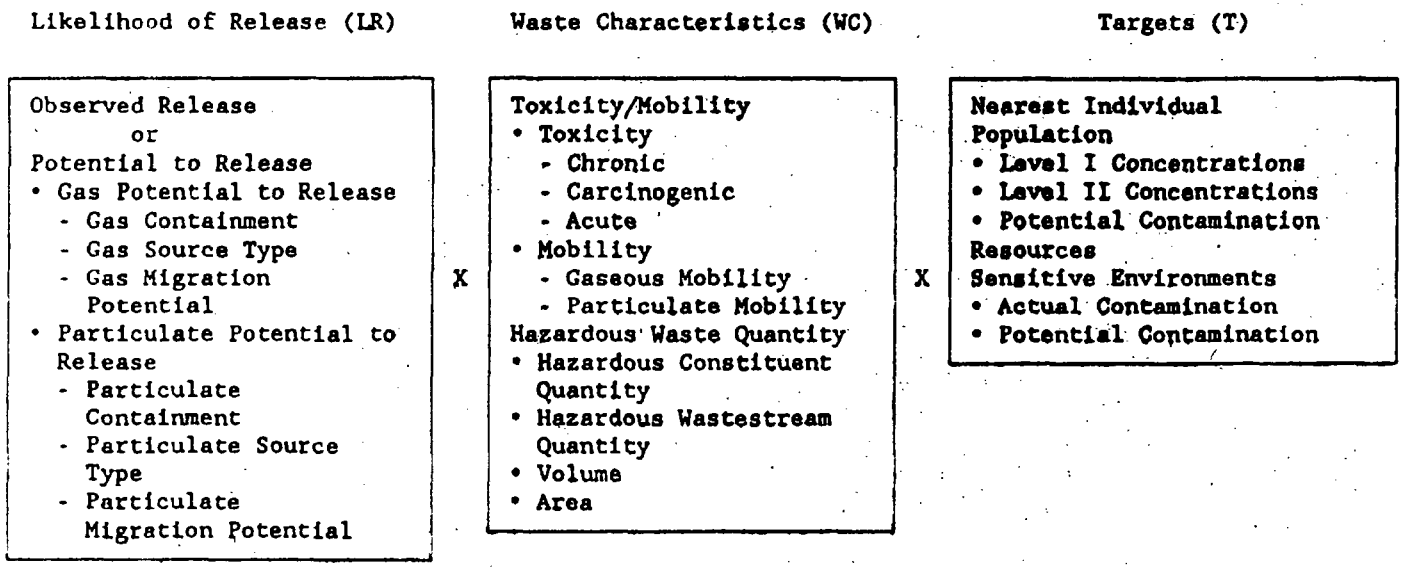

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FIGURE 6-1
OVERVIEW OF AIR MIGRATION PATHWAY

TABLE 6-1.—AIR MIGRATION PATHWAY SCORESHEET

Factor categories and factors	Maximum value	Value assigned
Likelihood of Release		
1. Observed Release	550	
2. Potential to Release:		
2a. Gas Potential to Release	500	
2b. Particulate Potential to Release	500	
2c. Potential to Release (higher of lines 2a and 2b)	500	
3. Likelihood of Release (higher of lines 1 and 2c)	550	
Waste Characteristics		
4. Toxicity/Mobility	(a)	
5. Hazardous Waste Quantity	(a)	
6. Waste Characteristics	100	
Targets		
7. Nearest Individual	50	
8. Population:		
8a. Level I Concentrations	(b)	
8b. Level II Concentrations	(b)	
8c. Potential Contamination	(b)	
8d. Population (lines 8a+8b+8c)	(b)	
9. Resources	5	
10. Sensitive Environments		
10a. Actual Contamination	(c)	
10b. Potential Contamination	(c)	
10c. Sensitive Environments (lines 10a+10b)	(c)	
11. Targets (lines 7+8d+9+10c)	(b)	
Air Migration Pathway Score		
12. Pathway Score (S_a) [(lines 3×6×11)/82,500] [d]	100	

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to maximum of 60.
[d] Do not round to nearest integer.

6.1 *Likelihood of Release.* Evaluate the likelihood of release factor category in terms of an observed release factor or a potential to release factor.

6.1.1 *Observed release.* Establish an observed release to the atmosphere by demonstrating that the site has released a hazardous substance to the atmosphere. Base this demonstration on either:

- Direct observation—a material (for example, particulate matter) that contains one or more hazardous substances has been seen entering the atmosphere directly. When evidence supports the inference of a release of a material that contains one or more hazardous substances by the site to the atmosphere, demonstrated adverse effects accumulated with that release may be used to establish an observed release.
- Chemical analysis—an analysis of air samples indicates that the concentration of ambient hazardous substance(s) has increased significantly above the background concentration for the site (see section 2.3). Some portion of the significant increase must be attributable to the site to establish the observed release.

If an observed release can be established, assign an observed release factor value of 550, enter this value in Table 6-1, and proceed to section 6.1.3. If an observed release cannot be established, assign an observed release factor value of 0, enter this value in Table 6-1, and proceed to section 6.1.2.

6.1.2 *Potential to release.* Evaluate potential to release only if an observed release cannot be established. Determine the potential to release factor value for the site by separately evaluating the gas potential to release and the particulate potential to release for each source at the site. Select the highest potential to release value (either gas or particulate) calculated for the sources evaluated and assign that value as the site potential to release factor value as specified below.

6.1.2.1 *Gas potential to release.* Evaluate gas potential to release for those sources that contain gaseous hazardous substances—that is, those hazardous substances with a vapor pressure greater than or equal to 10^{-6} torr.

Evaluate gas potential to release for each source based on three factors: gas containment, gas source type, and gas migration potential. Calculate the gas potential to release value as illustrated in Table 6-2. Combine sources with similar characteristics into a single source in evaluating the gas potential to release factors.

TABLE 6-2.—GAS POTENTIAL TO RELEASE EVALUATION

Source	Source type [a]	Gas containment factor value [b]	Gas source type factor value [c]	Gas migration potential factor value [d]	Sum	Gas source value
		A	B	C	(B+C)	A(B+C)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
Gas Potential to Release Factor (Select the Highest Gas Source Value)						

[a] Enter a Source Type listed in Table 6-4.
[b] Enter Gas Containment Factor Value from section 6.1.2.1.1.
[c] Enter Gas Source Type Factor Value from section 6.1.2.1.2.
[d] Enter Gas Migration Potential Factor Value from section 6.1.2.1.3.

6.1.2.1.1 *Gas containment.* Assign each source a value from Table 6–3 for gas containment. Use the lowest value from Table 6–3 that applies to the source, except: assign a value of 10 if there is evidence of biogas release or if there is an active fire within the source.

TABLE 6–3.—GAS CONTAINMENT FACTOR VALUES

Gas containment description	Assigned value
All situations except those specifically listed below	10
Evidence of biogas release	10 [a]
Active fire within source	10 [a]
Gas collection/treatment system functioning, regularly inspected, maintained, and completely covering source	0
Source substantially surrounded by engineering windbreak and no other containment specifically described in this table applies	7
Source covered with essentially impermeable, regularly inspected, maintained cover	0
Uncontaminated soil cover >3 feet:	
• Source substantially vegetated with little exposed soil	0
• Source lightly vegetated with much exposed soil	3
• Source substantially devoid of vegetation	7
Uncontaminated soil cover ≥1 foot and ≤3 feet:	
• Source heavily vegetated with essentially no exposed soil	
—Cover soil type resistant to gas migration [b]	3
—Cover soil type not resistant to gas migration [b] or unknown	7
• Source substantially vegetated with little exposed soil and cover soil type resistant to gas migration [b]	7
• Other	10
Uncontaminated soil cover <1 foot:	
• Source heavily vegetated with essentially no exposed soil and cover soil type resistant to gas migration [b]	7
• Other	10
Totally or partially enclosed within structurally intact building and no other containment specifically described in this table applies	7
Source consists solely of intact, sealed containers:	
• Totally protected from weather by regularly inspected, maintained cover	0
• Other	3

[a] This value must be used if applicable.
[b] Consider moist fine-grained and saturated coarse-grained soils resistant to gas migration. Consider all other soils nonresistant.

6.1.2.1.2 *Gas source type.* Assign a value for gas source type to each source as follows:

• Determine if the source meets the minimum size requirement based on the source hazardous waste quantity value (see section 2.4.2.1.5). If the source receives a source hazardous waste quantity value of 0.5 or more, consider the source to meet the minimum size requirement.

• If the source meets the minimum size requirement, assign it a value from Table 6–4 for gas source type.

• If the source does not meet the minimum size requirement, assign it a value of 0 for gas source type.

If no source at the site meets the minimum size requirement, assign each source at the site a value from Table 6–4 for gas source type.

TABLE 6–4.—SOURCE TYPE FACTOR VALUES

Source type	Assigned value	
	Gas	Particulate
Active fire area	14	30
Burn pit	19	22
Containers or tanks (buried/belowground):		
• Evidence of biogas release	33	22
• No evidence of biogas release	11	22
Containers or tanks, not elsewhere specified	28	14
Contaminated soil (excluding land treatment)	19	22
Landfarm/land treatment	28	22

TABLE 6–4.—SOURCE TYPE FACTOR VALUES—Concluded

Source type	Assigned value	
	Gas	Particulate
Landfill:		
• Evidence of biogas release	33	22
• No evidence of biogas release	11	22
Pile:		
• Tailings pile	6	28
• Scrap metal or junk pile	6	17
• Trash pile	6	6
• Chemical waste pile	11	28
• Other waste piles	17	28
Surface impoundments (buried/backfilled):		
• Evidence of biogas release	33	22
• No evidence of biogas release	11	22
Surface impoundment (not buried/backfilled):		
• Dry	19	22
• Other	28	0
Other types of sources, not elsewhere specified	0	0

6.1.2.1.3 *Gas migration potential.* Evaluate this factor for each source as follows:

• Assign a value for gas migration potential to each of the gaseous hazardous substances associated with the source (see section 2.2.2) as follows:

–Assign values from Table 6–5 for vapor pressure and Henry's constant to each hazardous substance. If Henry's constant cannot be determined for a hazardous substance, assign that hazardous substance a value of 2 for the Henry's constant component.

–Sum the two values assigned to the hazardous substance.

–Based on this sum, assign the hazardous substance a value from Table 6–6 for gas migration potential.

• Assign a value for gas migration potential to each source as follows:

–Select three hazardous substances associated with the source:

– –If more than three gaseous hazardous substances can be associated with the source, select three that have the highest gas migration potential values.

– –If fewer than three gaseous hazardous substances can be associated with a source, select all of them.

–Average the gas migration potential values assigned to the selected hazardous substances.

–Based on this average value, assign the source a gas migration potential value from Table 6–7.

TABLE 6–5.—VALUES FOR VAPOR PRESSURE AND HENRY'S CONSTANT

Vapor pressure (Torr)	Assigned value
Greater than 10	3
Greater than 10^{-3} to 10	2
10^{-6} to 10^{-3}	1
Less than 10^{-6}	0

Henry's constant (atm-m³/mol)	Assigned value
Greater than 10^{-3}	3
Greater than 10^{-6} to 10^{-3}	2
10^{-7} to 10^{-3}	1
Less than 10^{-7}	0

TABLE 6-6.—GAS MIGRATION POTENTIAL VALUES FOR A HAZARDOUS SUBSTANCE

Sum of values for vapor pressure and Henry's constant	Assigned value
0	0
1 or 2	6
3 or 4	11
5 or 6	17

TABLE 6-7.—GAS MIGRATION POTENTIAL VALUES FOR THE SOURCE

Average of gas migration potential values for three hazardous substances [a]	Assigned value
0 to < 3	0
3 to < 8	6
8 to < 14	11
14 to 17	17

[a] If fewer than three hazardous substances can be associated with the source, compute the average based only on those hazardous substances that can be associated.

6.1.2.1.4 *Calculation of gas potential to release value.* Determine the gas potential to release value for each source as illustrated in Table 6-2. For each source, sum the gas source type factor value and gas migration potential factor value and multiply this sum by the gas containment factor value. Select the highest product calculated for the sources evaluated and assign it as the gas potential to release value for the site. Enter this value in Table 6-1.

6.1.2.2 *Particulate potential to release.* Evaluate particulate potential to release for those sources that contain particulate hazardous substances—that is, those hazardous substances with a vapor pressure less than or equal to 10^{-1} torr.

Evaluate particulate potential to release for each source based on three factors: particulate containment, particulate source type, and particulate migration potential. Calculate the particulate potential to release value as illustrated in Table 6-8. Combine sources with similar characteristics into a single source in evaluating the particulate potential to release factors.

6.1.2.2.1 *Particulate containment.* Assign each source a value from Table 6-9 for particulate containment. Use the lowest value from Table 6-9 that applies to the source.

6.1.2.2.2 *Particulate source type.* Assign a value for particulate source type to each source in the same manner as specified for gas sources in section 6.1.2.1.2.

6.1.2.2.3 *Particulate migration potential.* Based on the site location, assign a value from Figure 6-2 for particulate migration potential. Assign this same value to each source at the site.

TABLE 6-8.—PARTICULATE POTENTIAL TO RELEASE EVALUATION

Source	Source type [a]	Particulate containment factor value [b]	Particulate type factor value [c]	Particulate migration potential factor value [d]	Sum	Particulate source value
		A	B	C	(B+C)	A (B+C)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
Particulate Potential to Release Factor Value (Select Highest Particulate Source Value)						

[a] Enter a Source Type listed in Table 6-4.
[b] Enter Particulate Containment Factor Value from section 6.1.2.2.1.
[c] Enter Particulate Source Type Factor Value from section 6.1.2.2.2.
[d] Enter Particulate Migration Potential Factor Value from section 6.1.2.2.3.

TABLE 6-9.—PARTICULATE CONTAINMENT FACTOR VALUES

Particulate containment description	Assigned value
All situations except those specifically listed below	10
Source contains only particulate hazardous substances totally covered by liquids	0
Source substantially surrounded by engineered windbreak and no other containment specifically described in this table applies	7
Source covered with essentially impermeable, regularly inspected, maintained cover	0
Uncontaminated soil cover > 3 feet:	
• Source substantially vegetated with little or no exposed soil	0
• Source lightly vegetated with much exposed soil	3
• Source substantially devoid of vegetation	7
Uncontaminated soil cover ≥ 1 foot and ≤ 3 feet:	
• Source heavily vegetated with essentially no exposed soil:	
—Cover soil type resistant to gas migration [a]	3
—Cover soil type not resistant to gas migration [a] or unknown	7
• Source substantially vegetated with little exposed soil and cover soil type resistant to gas migration [a]	7
• Other	10
Uncontaminated soil cover < 1 foot:	
• Source heavily vegetated with essentially no exposed soil and cover soil type resistant to gas migration [a]	7
• Other	10
Totally or partially enclosed within structurally intact building and no other containment specifically described in this table applies	7
Source consists solely of containers:	
• All containers contain only liquids	0
• All containers intact, sealed, and totally protected from weather by regularly inspected, maintained cover	0
• All containers intact and sealed	3
• Other	10

[a] Consider moist fine-grained and saturated coarse-grained soils resistant to gas migration. Consider all other soils nonresistant.

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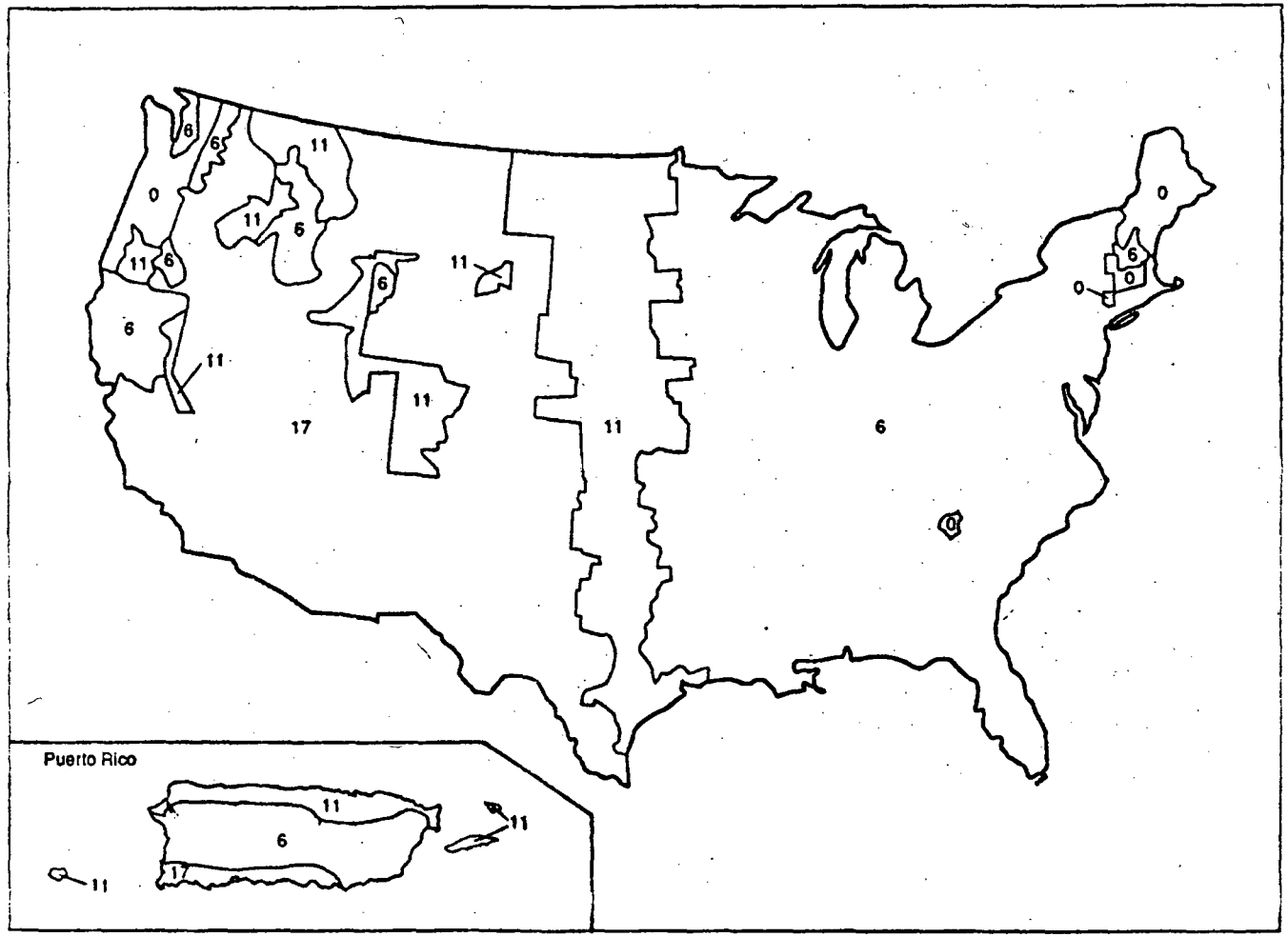

FIGURE 6-2
PARTICULATE MIGRATION POTENTIAL FACTOR VALUES

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FIGURE 6-2.—PARTICULATE MIGRATION POTENTIAL FACTOR VALUES—CONCLUDED

Location	Particulate migration potential assigned value
Hawaiian Islands	
Hilo, Hawaii	0
Honolulu, Oahu	17
Kahului, Maui	17
Lanai	17
Lihue, Kauai	11
Molokai	17
Pacific Islands	
Guam	6
Johnston Island	17
Koror Island	0
Kwajalein Island	6
Mujuro, Marshall Islands	0
Pago Pago, American Samoa	0
Poriapa Island	0
Truk, Caroline Islands	0
Wake Island	17
Yap Island	0
Alaska	
Anchorage	17
Annette	0
Barrow	17
Barter Island	17
Bethel	17
Bettles	17
Big Delta	17
Cold Bay	6
Fairbanks	17
Gulkana	17
Homer	11
Juneau	0
King Salmon	11
Kodiak	0
Kotzebue	17
McGrath	17
Nome	11
St. Paul Island	11
Talkeetna	6
Unalakleet	17
Valdez	0
Yakutat	0
American Virgin Islands	
St. Croix	17
St. John	11
St. Thomas	11
Puerto Rico	
Arecibo	6
Coloso	6
Fajardo	11
Humacao	6
Isabela Station	11
Ponce	17
San Juan	11

For site locations not on Figure 6-2, and for site locations near the boundary points on Figure 6-2, assign a value as follows. First, calculate a Thornthwaite P-E index using the following equation:

$$PE = \sum_{i=1}^{12} 115\,[P_i/(T_i-10)]^{10/9}$$

where:

PE = Thornthwaite P-E index.

P_i = Mean monthly precipitation for month i, in inches.

T_i = Mean monthly temperature for month i, in degrees Fahrenheit; for any month having a mean monthly temperature less than 28.4 °F, use 28.4 °F.

Based on the calculated Thornthwaite P-E index, assign a source particulate migration potential value to the site from Table 6-10. Assign this same value to each source at the site.

TABLE 6-10.—PARTICULATE MIGRATION POTENTIAL VALUES

Thornthwaite P-E Index	Assigned value
Greater than 150	0
85 to 150	6
50 to less than 85	11
Less than 50	17

6.1.2.2.4 *Calculation of particulate potential to release value.* Determine the particulate potential to release value for each source as illustrated in Table 6-8. For each source, sum its particulate source type factor value and particulate migration potential factor value and multiply this sum by its particulate containment factor value. Select the highest product calculated for the sources evaluated and assign it as the particulate potential to release value for the site. Enter the value in Table 6-1.

6.1.2.3 *Calculation of potential to release factor value for the site.* Select the higher of the gas potential to release value assigned in section 6.1.2.1.4 and the particulate potential to release value assigned in section 6.1.2.2.4. Assign the value selected as the site potential to release factor value. Enter this value in Table 6-1.

6.1.3 *Calculation of likelihood of release factor category value.* If an observed release is established, assign the observed release factor value of 550 as the likelihood of release factor category value. Otherwise, assign the site potential to release factor value as the likelihood of release factor category value. Enter the value in Table 6-1.

6.2 *Waste characteristics.* Evaluate the waste characteristics factor category based on two factors: toxicity/mobility and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to the atmosphere. Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to the atmosphere.
- All gaseous hazardous substances associated with a source that has a gas containment factor value greater than 0 (see section 2.2.2, 2.2.3, and 6.1.2.1.1).
- All particulate hazardous substances associated with a source that has a particulate containment factor value greater than 0 (see section 2.2.2, 2.2.3, and 6.1.2.2.1).

6.2.1 *Toxicity/mobility.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, and a combined toxicity/mobility factor value as specified below. Select the toxicity/mobility factor value for the air migration pathway as specified in section 6.2.1.3.

6.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in section 2.4.1.1.

6.2.1.2 *Mobility.* Assign a mobility factor value to each hazardous substance as follows:

- Gaseous hazardous substance.
  - –Assign a mobility factor value of 1 to each gaseous hazardous substance that meets the criteria for an observed release to the atmosphere.
  - –Assign a mobility factor value from Table 6-11, based on vapor pressure, to each gaseous hazardous substance that does not meet the criteria for an observed release.
- Particulate hazardous substance.
  - –Assign a mobility factor value of 0.02 to each particulate hazardous substance that meets the criteria for an observed release to the atmosphere.
  - –Assign a mobility factor value from Figure 6-3, based on the site's location, to each particulate hazardous substance that does not meet the criteria for an observed release. (Assign all such particulate hazardous substances this same value.)
  - –For site locations not on Figure 6-3 and for site locations near the boundary points on Figure 6-3, assign a mobility factor value to each particulate hazardous substance that does not meet the criteria for an observed release as follows:
  - –Calculate a value M:

    $M = 0.0182\,(U^3/[PE]^2)$

    where:

    U = Mean average annual wind speed (meters per second).

    PE = Thornthwaite P-E index from section 6.1.2.2.3.

  - –Based on the value M, assign a mobility factor value from Table 6-12 to each particulate hazardous substance.
- Gaseous and particulate hazardous substances.
  - –For a hazardous substance potentially present in both gaseous and particulate forms, select the higher of the factor values for gas mobility and particulate mobility for that substance and assign that value as the mobility factor value for the hazardous substance.

6.2.1.3 *Calculation of toxicity/mobility factor value.* Assign each hazardous substance a toxicity/mobility factor value from Table 6-13, based on the values assigned to the hazardous substance for the toxicity and mobility factors. Use the hazardous substance with the highest toxicity/mobility factor value to assign a value to the toxicity/mobility factor for the air migration pathway. Enter this value in Table 6-1.

TABLE 6–11.—GAS MOBILITY FACTOR VALUES

Vapor pressure (Torr)	Assigned value [a]
Greater than 10^{-1}	1.0
Greater than 10^{-2} to 10^{-1}	0.2
Greater than 10^{-3} to 10^{-2}	0.02

TABLE 6–11.—GAS MOBILITY FACTOR VALUES—Concluded

Vapor pressure (Torr)	Assigned value [a]
Greater than 10^{-3} to 10^{-5}	0.002
Less than or equal to 10^{-3}	0.0002

[a] Do not round to nearest integer.

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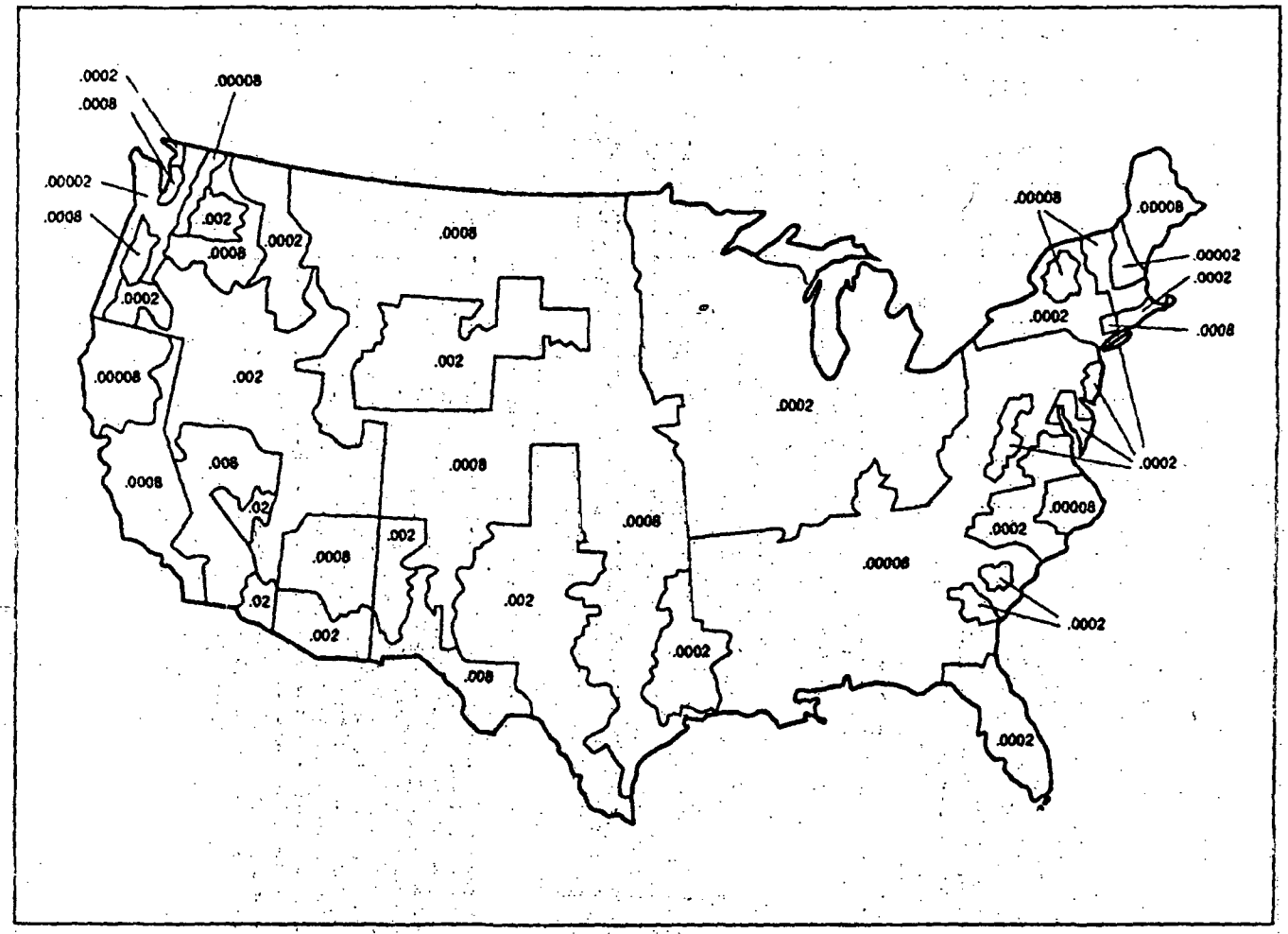
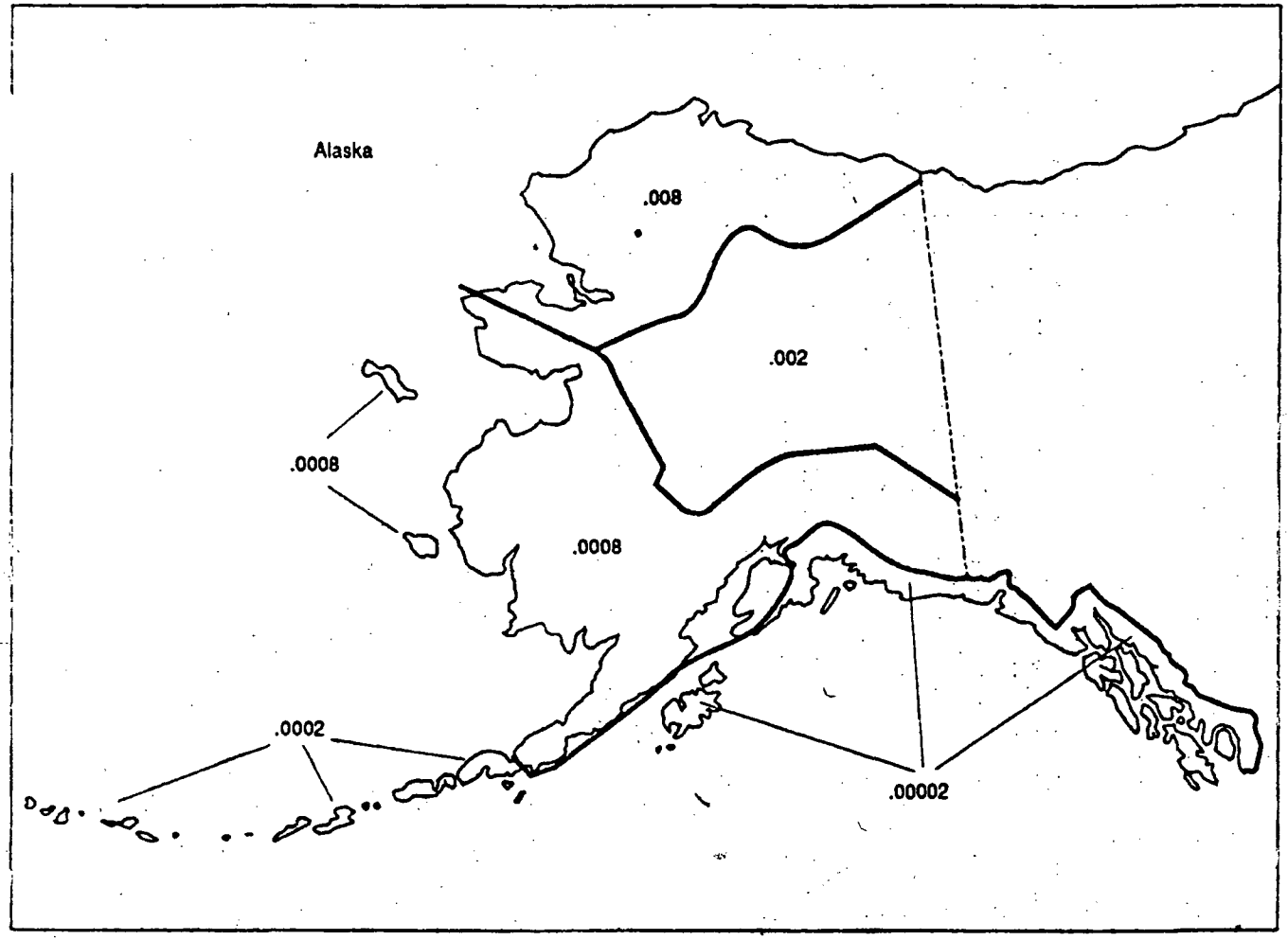


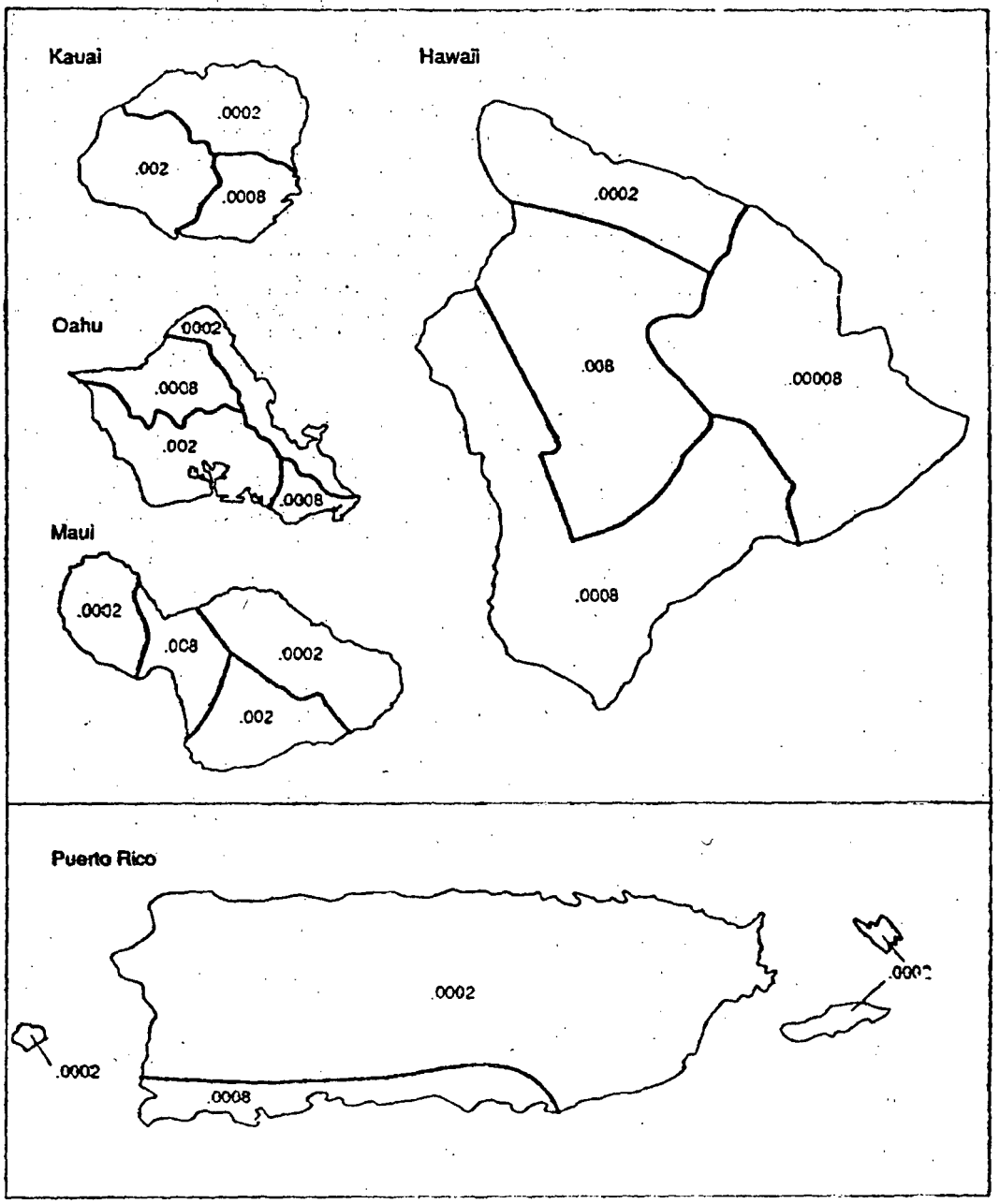
*Do not round to nearest integer.

FIGURE 6-3
PARTICULATE MOBILITY FACTOR VALUES*



[a] Do not round to nearest integer.

FIGURE 6-3
PARTICULATE MOBILITY FACTOR VALUES[a]
(CONTINUED)



[a] Do not round to nearest integer.

FIGURE 6-3
PARTICULATE MOBILITY FACTOR VALUES[a]
(CONTINUED)

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FIGURE 6-3.PARTICULATE MOBILITY FACTOR VALUES—CONTINUED

Location	Particulated mobility assigned value
Pacific Islands	
Guam	0.0002
Johnston Island	0.002
Koror Island	0.00008
Kwajalein Island	0.0002
Mujuro, Marshall Islands	0.00008
Pago Pago, American Samoa	0.00008
Ponape Island	0.00002
Truk, Caroline Islands	0.00008
Wake Island	0.002
Yap Island	0.00008

FIGURE 6-3.—PARTICULATE MOBILITY FACTOR VALUES—CONCLUDED

Location	Particulated mobility assigned value
American Virgin Islands	
St. Croix	0.0008
St. John	0.0002
St. Thomas	0.0002

TABLE 6-12.—PARTICULATE MOBILITY FACTOR VALUES

M	Assigned value [a]
Greater than 1.4×10^{-3}	0.02
Greater than 4.4×10^{-4} to 1.4×10^{-3}	0.008
Greater than 1.4×10^{-4} to 4.4×10^{-4}	0.002
Greater than 4.4×10^{-5} to 1.4×10^{-4}	0.0008
Greater than 1.4×10^{-5} to 4.4×10^{-5}	0.0002
Greater than 4.4×10^{-6} to 1.4×10^{-5}	0.00008
Less than or equal to 4.4×10^{-6}	0.00002

[a] Do not round to nearest integer.

TABLE 6-13.—TOXICITY/MOBILITY FACTOR VALUES [a]

Mobility factor value	Toxicity factor value					
	10,000	1,000	100	10	1	0
1.0	10,000	1,000	100	10	1	0
0.2	2,000	200	20	2	0.2	0
0.02	200	20	2	0.2	0.02	0
0.008	80	8	0.8	0.08	0.008	0
0.002	20	2	0.2	0.02	0.002	0
0.0008	8	0.8	0.08	0.008	0.0008	0
0.0002	2	0.2	0.02	0.002	0.0002	0
0.00008	0.8	0.08	0.008	0.0008	0.00008	0
0.00002	0.2	0.02	0.002	0.0002	0.00002	0

[a] Do not round to nearest integer.

6.2.2 *Hazardous waste quantity.* Assign a hazardous waste quantity factor value for the air migration pathway as specified in section 2.4.2. Enter this value in Table 6-1.

6.2.3 *Calculation of waste characteristics factor category value.* Multiply the toxicity/mobility factor value and the hazardous waste quantity factor value, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2-7 (section 2.4.3.1) to the waste characteristics factor category. Enter this value in Table 6-1.

6.3 *Targets.*

Evaluate the targets factor category based on four factors: nearest individual, population, resources, and sensitive environments. Include only those targets (for example, individuals; sensitive environments) located within the 4-mile target distance limit, except if an observed release is established beyond the 4-mile target distance limit, include those additional targets that are specified below in this section and in section 6.3.4.

Evaluate the nearest individual and population factors based on whether the target populations are subject to Level I concentrations, Level II concentrations, or potential contamination. Determine which applies to a target population as follows.

If no samples meet the criteria for an observed release to air and if there is no observed release by direct observation, consider the entire population within the 4-mile target distance limit to be subject to potential contamination.

If one or more samples meet the criteria for an observed release to air or if there is an observed release by direct observation, evaluate the population as follows:

- Determine the most distant sample location that meets the criteria for Level I concentrations as specified in sections 2.5.1 and 2.5.2 and the most distant location (that is, sample location or direct observation location) that meets the criteria for Level II concentrations. Use the health-based benchmarks from Table 6-14 in determining the level of contamination for sample locations. If the most distant Level II location is closer to a source than the most distant Level I sample location, do not consider the Level II location.
- Determine the single most distant location (sample location or direct observation location) that meets the criteria for Level I or Level II concentrations.
- If this single most distant location is within the 4-mile target distance limit, identify the distance categories from Table 6-15 in which the selected Level I concentrations sample and Level II concentrations sample (or direct observation location) are located:
  - –Consider the target population anywhere within this furthest Level I distance category, or anywhere within a distance category closer to a source at the site, as subject to Level I concentrations.
  - –Consider the target population located beyond any Level I distance categories, up to and including the population anywhere within the furthest Level II distance category, as subject to Level II concentrations.
  - –Consider the remainder of the target population within the 4-mile target distance limit as subject to potential contamination.
- If the single most distant location is beyond the 4-mile target distance limit, identify the distance at which the selected Level I concentrations sample and Level II concentrations sample (or direct observation location) are located:
  - –If the Level I sample location is within the 4-mile target distance limit, identify the target population subject to Level I concentrations as specified above.
  - –If the Level I sample location is beyond the 4-mile target distance limit, consider the target population located anywhere within a distance from the sources at the site equal to the distance to this sample location to be subject to Level I concentrations and include them in the evaluation.
  - –Consider the target population located beyond the Level I target population, but located anywhere within a distance from the sources at the site equal to the distance to the selected Level II location, to be subject to Level II concentrations and include them in the evaluation.

-Do not include any target population as subject to potential contamination.

TABLE 6-14.—HEALTH-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN AIR

- Concentration corresponding to National Ambient Air Quality Standard (NAAQS).
- Concentration corresponding to National Emission Standards for Hazardous Air Pollutants (NESHAPs).
- Screening concentration for cancer corresponding to that concentration that corresponds to the 10^{-6} individual cancer risk for inhalation exposures.
- Screening concentration for noncancer toxicological responses corresponding to the Reference Dose (RfD) for inhalation exposures.

TABLE 6-15.—AIR MIGRATION PATHWAY DISTANCE WEIGHTS

Distance category (miles)	Assigned distance weight [a]
0	1.0
Greater than 0 to ¼	0.25
Greater than ¼ to ½	0.054
Greater than ½ to 1	0.016
Greater than 1 to 2	0.0051
Greater than 2 to 3	0.0023
Greater than 3 to 4	0.0014
Greater than 4	0

[a] Do not round to nearest integer.

6.3.1 *Nearest individual.* Assign the nearest individual factor a value as follows:

- If one or more residences or regularly occupied buildings or areas is subject to Level I concentrations as specified in section 6.3, assign a value of 50.
- If not, but if one or more a residences or regularly occupied buildings or areas is subject to Level II concentrations, assign a value of 45.
- If none of the residences and regularly occupied buildings and areas is subject to Level I or Level II concentrations, assign a value to this factor based on the shortest distance to any residence or regularly occupied building or area, as measured from any source at the site with an air migration containment factor value greater than 0. Based on this shortest distance, assign a value from Table 6-16 to the nearest individual factor.

Enter the value assigned in Table 6-1.

TABLE 6-16.—NEAREST INDIVIDUAL FACTOR VALUES

Distance to nearest individual (miles)	Assigned value
Level I concentrations [a]	50
Level II concentrations [a]	45
0 to ¼	20
Greater than ¼ to ½	7
Greater than ½ to 1/2	2
Greater than ½ to 1	1
Greater than 1	0

[a] Distance does not apply.

6.3.2 *Population.* In evaluating the population factor, count residents, students, and workers regularly present within the target distance limit. Do not count transient populations such as customers and travelers passing through the area.

In estimating residential population, when the estimate is based on the number of residences, multiply each residence by the average number of persons per residence for the county in which the residence is located.

6.3.2.1 *Level of contamination.* Evaluate the population factor based on three factors: Level I concentrations, Level II concentrations, and potential contamination.

Evaluate the population subject to Level I concentrations (see section 6.3) as specified in section 6.3.2.2, the population subject to Level II concentrations as specified in section 6.3.2.3, and the population subject to potential contamination as specified in section 6.3.2.4.

For the potential contamination factor, use population ranges in evaluating the factor as specified in section 6.3.2.4. For the Level I and Level II concentrations factors, use the population estimate, not population ranges, in evaluating both factors.

6.3.2.2 *Level I concentrations.* Sum the number of people subject to Level I concentrations. Multiply this sum by 10. Assign the product as the value for this factor. Enter this value in Table 6-1.

6.3.2.3 *Level II concentrations.* Sum the number of people subject to Level II concentrations. Do not include those people already counted under the Level I concentrations factor. Assign this sum as the value for this factor. Enter this value in Table 6-1.

6.3.2.4 *Potential contamination.* Determine the number of people within each distance category of the target distance limit (see Table 6-15) who are subject to potential contamination. Do not include those people already counted under the Level I and Level II concentrations factors.

Based on the number of people present within a distance category, assign a distance-weighted population value for that distance category from Table 6-17. (Note that the distance-weighted population values in Table 6-17 incorporate the distance weights from Table 6-15. Do not multiply the values from Table 6-17 by these distance weights.)

Calculate the potential contamination factor value (PI) as follows:

$$PI = \frac{1}{10} \sum_{i=1}^{n} W_i$$

where:

W_i = Distance-weighted population from Table 6-17 for distance category i.

n = Number of distance categories.

If PI is less than 1, do not round it to the nearest integer; if PI is 1 or more, round to the nearest integer. Enter this value in Table 6-1.

6.3.2.5 *Calculation of population factor value.* Sum the factor values for Level I concentrations, Level II concentrations, and potential contamination. Do not round this sum to the nearest integer. Assign this sum as the population factor value. Enter this value in Table 6-1.

TABLE 6-17.—DISTANCE-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FACTOR FOR AIR PATHWAY [a]

Distance category (miles)	Number of people within the distance category												
	0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000
On a source	0	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
Greater than 0 to ¼	0	1	4	13	41	131	408	1,304	4,081	13,034	40,812	130,340	408,114
Greater than ¼ to ½	0	0.2	0.9	3	9	28	88	282	882	2,815	8,815	28,153	88,153
Greater than ½ to 1	0	0.06	0.3	0.9	3	8	26	83	261	834	2,612	8,342	26,119
Greater than 1 to 2	0	0.02	0.09	0.3	0.8	3	8	27	83	266	833	2,659	8,326
Greater than 2 to 3	0	0.009	0.04	0.1	0.4	1	4	12	38	120	375	1,199	3,755
Greater than 3 to 4	0	0.005	0.02	0.07	0.2	0.7	2	7	23	73	229	730	2,285

[a] Round the number of people present within a distance category to nearest integer. Do not round the assigned distance-weighted population value to nearest integer.

6.. 3 *Resources.* Evaluate the resources factor as follows:

[illegible] Assign a value of 5 if one or more of the following resources are present within one-half mile of a source at the site having an air

migration containment factor value greater than 0:

-Commercial agriculture.
-Commercial silviculture.
-Major or designated recreation area.

• Assign a value of 0 if none of these resources is present.

Enter the value assigned in Table 6-1.

6.3.4 *Sensitive environments.* Evaluate sensitive environments based on two factors: actual contamination and potential contamination. Determine which factor applies as follows.

If no samples meet the criteria for an observed release to air and if there is no observed release by direct observation, consider all sensitive environments located, partially or wholly, within the target distance limit to be subject to potential contamination.

If one or more samples meet the criteria for an observed release to air or if there is an observed release by direct observation, determine the most distant location (that is, sample location or direct observation location) that meets the criteria for an observed release:

• *If the most distant location meeting* the criteria for an observed release is within the 4-mile target distance limit, identify the distance category from Table 6-15 in which it is located:

-Consider sensitive environments located, partially or wholly, anywhere within this distance category or anywhere within a distance category closer to a source at the site as subject to actual contamination.
-Consider all other sensitive environments located, partially or wholly, within the target distance limit as subject to potential contamination.

• If the most distant location meeting the criteria for an observed release is beyond the 4-mile target distance limit, identify the distance at which it is located:

-Consider sensitive environments located, partially or wholly, anywhere within a distance from the sources at the site equal to the distance to this location to be subject to actual contamination and include all such sensitive environments in the evaluation.
-Do not include any sensitive environments as subject to potential contamination.

6.3.4.1 *Actual contamination.* Determine those sensitive environments subject to actual contamination (i.e., those located partially or wholly within a distance category subject to actual contamination). Assign value(s) from Table 4-23 (section 4.1.4.3.1.1) to each sensitive environment subject to actual contamination.

For those sensitive environments that are wetlands, assign an additional value from Table 6-18. In assigning a value from Table 6-18, include only those portions of wetlands located within distance categories subject to actual contamination. If a wetland is located partially in a distance category subject to actual contamination and partially in one subject to potential contamination, then solely for purposes of Table 6-18, count the portion in the distance category subject to potential contamination under the potential contamination factor in section 6.3.4.2. Determine the total acreage of wetlands within those distance categories subject to actual contamination and assign a value from Table 6-18 based on this total acreage.

Calculate the actual contamination factor value (EA) as follows:

$$EA = WA + \sum_{i=1}^{n} S_i$$

where:

WA = Value assigned from Table 6-18 for wetlands in distance categories subject to actual contamination.
S_i = Value(s) assigned from Table 4-23 to sensitive environment i.
n = Number of sensitive environments subject to actual contamination.

Enter the value assigned in Table 6-1.

TABLE 6-18.—WETLANDS RATING VALUES FOR AIR MIGRATION PATHWAY [a]

Wetland area (acres)	Assigned value
Less than 1	0
1 to 50	25
Greater than 50 to 100	75
Greater than 100 to 150	125
Greater than 150 to 200	175
Greater than 200 to 300	250
Greater than 300 to 400	350
Greater than 400 to 500	450
Greater than 500	500

[a] Wetlands as defined in 40 CFR section 230.3.

6.3.4.2 *Potential contamination.* Determine those sensitive environments located, partially or wholly, within the target distance limit that are subject to potential contamination. Assign value(s) from Table 4-23 to each sensitive environment subject to potential contamination. Do not include those sensitive environments already counted for Table 4-23 under the actual contamination factor.

For each distance category subject to potential contamination, sum the value(s) assigned from Table 4-23 to the sensitive environments in that distance category. If a sensitive environment is located in more than one distance category, assign the sensitive environment only to that distance category having the highest distance weighting value from Table 6-15.

For those sensitive environments that are wetlands, assign an additional value from Table 6-18. In assigning a value from Table 6-18, include only those portions of wetlands located within distance categories subject to potential contamination, as specified in section 6.3.4.1. Treat the wetlands in each separate distance category as separate sensitive environments solely for purposes of applying Table 6-18. Determine the total acreage of wetlands within each of these distance categories and assign a separate value from Table 6-18 for each distance category.

Calculate the potential contamination factor value (EP) as follows:

$$EP = \frac{1}{10} \sum_{j=1}^{m} ([W_j + S_j]D_j)$$

Where:

$$S_j = \sum_{i=1}^{n} S_{ij}$$

S_{ij} = Value(s) assigned from Table 4-23 to sensitive environment in distance category j.
n = Number of sensitive environments subject to potential contamination.
W_j = Value assigned from Table 6-18 for wetland area in distance category j.
D_j = Distance weight from Table 6-15 for distance category j.
m = Number of distance categories subject to potential contamination.

If EP is less than 1, do not round it to the nearest integer; if EP is 1 or more, round to the nearest integer. Enter the value assigned in Table 6-1.

6.3.4.3 *Calculation of sensitive environments factor value.* Sum the factor values for actual contamination and potential contamination. Do not round this sum, designated as EB, to the nearest integer.

Because the pathway score based solely on sensitive environments is limited to a maximum of 60, use the value EB to determine the value for the sensitive environments factor as follows:

• Multiply the values assigned to likelihood of release (LR), waste characteristics (WC), and EB. Divide the product by 82,500.

-If the result is 60 or less, assign the value EB as the sensitive environments factor value.
-If the result exceeds 60, calculate a value EC as follows:

$$EC = \frac{(60)(82{,}500)}{(LR)(WC)}$$

Assign the value EC as the sensitive environments factor value. Do not round this value to the nearest integer.

Enter the value assigned for the sensitive environments factor in Table 6-1.

6.3.5 *Calculation of targets factor category value.* Sum the nearest individual, population, resources, and sensitive environments factor values. Do not round this sum to the nearest integer. Assign this sum as the targets factor category value. Enter this value in Table 6-1.

6.4 *Calculation of air migration pathway score.* Multiply the values for likelihood of release, waste characteristics, and targets, and round the product to the nearest integer. Then divide by 82,500. Assign the resulting value, subject to a maximum value of 100, as the air migration pathway score (S_a). Enter this score in Table 6-1.

7.0 Sites Containing Radioactive Substances.

In general, radioactive substances are hazardous substances under CERCLA and should be considered in HRS scoring. Releases of certain radioactive substances are, however, excluded from the definition of "release" in section 101(22) of CERCLA, as amended, and should not be considered in HRS scoring.

Evaluate sites containing radioactive substances using the instructions specified in sections 2 through 6, supplemented by the instructions in this section. Those factors denoted with a "yes" in Table 7-1 are evaluated differently for sites containing radioactive substances than for sites containing only nonradioactive hazardous substances, while those denoted with a "no" are not evaluated differently and are not addressed in this section.

TABLE 7-1.—HRS FACTORS EVALUATED DIFFERENTLY FOR RADIONUCLIDES

Ground water pathway	Status [a]	Surface water pathway	Status [a]	Soil exposure pathway	Status [a]	Air pathway	Status [a]
Likelihood of Release		**Likelihood of Release**		**Likelihood of Exposure**		**Likelihood of Release**	
Observed Release	Yes	Observed Release	Yes	Observed Contamination	Yes	Observed Release	Yes
Potential to Release	No	Potential to Release	No	Attractiveness/Accessibility to Nearby Residents	No	Gas Potential to Release	No
Containment	No	Overland Flow Containment	No			Gas Containment	No
Net Precipitation	No	Runoff	No	Area of Contamination	No	Gas Source Type	No
Depth to Aquifer	No	Distance to Surface Water	No			Gas Migration Potential	No
Travel Time	No	Flood Frequency	No			Particulate Potential to Release	No
		Flood Containment	No			Particulate Containment	No
						Particulate Source Type	No
						Particulate Migration Potential	No
Waste Characteristics		**Waste Characteristics**		**Waste Characteristics**		**Waste Characteristics**	
Toxicity	Yes	Toxicity/Ecotoxicity	Yes/Yes	Toxicity	Yes	Toxicity	Yes
Mobility	No	Persistence/Mobility	Yes/No	Hazardous Waste Quantity	Yes	Mobility	No
Hazardous Waste Quantity	Yes	Bioaccumulation Potential	No			Hazardous Waste Quantity	Yes
		Hazardous Waste Quantity	Yes				
Targets		**Targets**		**Targets**		**Targets**	
Nearest Well	Yes [b]	Nearest Intake	Yes [b]	Resident Individual	Yes [b]	Nearest Individual	Yes [b]
Population	Yes [b]	Drinking Water Population	Yes [b]	Resident Population	Yes [b]	Population	Yes [b]
Resources	No	Resources	No	Workers	No	Resources	No
Wellhead Protection Area	No	Sensitive Environments	Yes [b]	Resources	No	Sensitive Environments	No
		Human Food Chain Individual	Yes [b]	Terrestrial Sensitive Environments	No		
		Human Food Chain Population	Yes [b]				
				Nearby Individual	No		
				Population Within 1 Mile	No		

[a] Factors evaluated differently are denoted by "yes"; factors not evaluated differently are denoted by "no."
[b] Difference is in the determination of Level I and Level II concentrations.

In general, sites containing mixed radioactive and other hazardous substances involve more evaluation than sites containing only radionuclides. For sites containing mixed radioactive and other hazardous substances, HRS factors are evaluated based on considerations of both the radioactive substances and the other hazardous substances in order to derive a single set of factor values for each factor category in each of the four pathways. Thus, the HRS score for these sites reflects the combined potential hazards posed by both the radioactive and other hazardous substances.

Section 7 is organized by factor category, similar to sections 3 through 6. Pathway-specific differences in evaluation criteria are specified under each factor category, as appropriate. These differences apply largely to the soil exposure pathway and to sites containing mixed radioactive and other hazardous substances. All evaluation criteria specified in sections 2 through 6 must be met, except where modified in section 7.

7.1 *Likelihood of release/likelihood of exposure.* Evaluate likelihood of release for the three migration pathways and likelihood of exposure for the soil exposure pathway as specified in sections 2 through 6, except: establish an observed release and observed contamination as specified in section 7.1.1. When an observed release cannot be established for a migration pathway, evaluate potential to release as specified in section 7.1.2. When observed contamination cannot be established, do not evaluate the soil exposure pathway.

7.1.1 *Observed release/observed contamination.* For radioactive substances, establish an observed release for each migration pathway by demonstrating that the site has released a radioactive substance to the pathway (or watershed or aquifer, as appropriate); establish observed contamination for the soil exposure pathway as indicated below. Base these demonstrations on one or more of the following, as appropriate to the pathway being evaluated:

- Direct observation:
  - –For each migration pathway, a material that contains one or more radionuclides has been seen entering the atmosphere, surface water, or ground water, as appropriate, or is known to have entered ground water or surface water through direct deposition, or
  - –For the surface water migration pathway, a source area containing radioactive substances has been flooded at a time that radioactive substances were present and one or more radioactive substances were in contact with the flood waters.
- Analysis of radionuclide concentrations in samples appropriate to the pathway (that is, ground water, soil, air, surface water, benthic, or sediment samples):
  - –For radionuclides that occur naturally and for radionuclides that are ubiquitous in the environment:
    - –Measured concentration (in units of activity, for example, pCi per kilogram [pCi/kg], pCi per liter [pCi/l], pCi per cubic meter [pCi/m^3]) of a given radionuclide in the sample are at a level that:
      - –Equals or exceeds a value 2 standard deviations above the mean site-specific background concentration for that

radionuclide in that type of sample, or

---Exceeds the upper-limit value of the range of regional background concentration values for that specific radionuclide in that type of sample.

--Some portion of the increase must be attributable to the site to establish the observed release (or observed contamination), and

--For the soil exposure pathway only, the radionuclide must also be present at the surface or covered by 2 feet or less of cover material (for example, soil) to establish observed contamination.

-For man-made radionuclides without ubiquitous background concentrations in the environment:

--Measured concentration (in units of activity) of a given radionuclide in a sample equals or exceeds the sample quantitation limit for that specific radionuclide in that type of media and is attributable to the site.

--However, if the radionuclide concentration equals or exceeds its sample quantitation limit, but its release can also be attributed to one or more neighboring sites, then the measured concentration of that radionuclide must also equal or exceed a value either 2 standard deviations above the mean concentration of that radionuclide contributed by those neighboring sites or 3 times its background concentration, whichever is lower.

--If the sample quantitation limit cannot be established:

---If the sample analysis was performed under the EPA Contract Laboratory Program, use the EPA contract-required quantitation limit (CRQL) in place of the sample quantitation limit in establishing an observed release (or observed contamination).

---If the sample analysis is not performed under the EPA Contract Labatory Program, use the detection limit in place of the sample quantitation limit.

--For the soil exposure pathway only, the radionuclide must also be present at the surface or covered by 2 feet or less of cover material (for example, soil) to establish observed contamination.

• Gamma radiation measurements (applies only to observed contamination for the soil exposure pathway):

-The gamma radiation exposure rate, as measured in microroentgens per hour (μR/hr) using a survey instrument held 1 meter above the ground surface (or 1 meter away from an aboveground source), equals or exceeds 2 times the site-specific background gamma radiation exposure rate.

-Some portion of the increase must be attributable to the site to establish observed contamination. The gamma-emitting radionuclides do not have to be within 2 feet of the surface of the source.

For the three migration pathways, if an observed release can be established for the pathway (or aquifer or watershed, as appropriate), assign the pathway (or aquifer or watershed) an observed release factor value of 550 and proceed to section 7.2. If an observed release cannot be established, assign an observed release factor value of 0 and proceed to section 7.1.2.

For the soil exposure pathway, if observed contamination can be established, assign the likelihood of exposure factor for resident population a value of 550 if there is an area of observed contamination in one or more locations listed in section 5.1; evaluate the likelihood of exposure factor for nearby population as specified in section 5.2.1; and proceed to section 7.2. If observed contamination cannot be established, do not evaluate the soil exposure pathway.

At sites containing mixed radioactive and other hazardous substances, evaluate observed release (or observed contamination) separately for radionuclides as described in this section and for other hazardous substances as described in sections 2 through 6.

For the three migration pathways, if an observed release can be established based on either radionuclides or other hazardous substances, or both, assign the pathway (or aquifer or watershed) an observed release factor value of 550 and proceed to section 7.2. If an observed release cannot be established based on either radionuclides or other hazardous substances, assign an observed release factor value of 0 and proceed to section 7.1.2.

For the soil exposure pathway, if observed contamination can be established based on either radionuclides or other hazardous substances, or both, assign the likelihood of exposure factor for resident population a value of 550 if there is an area of observed contamination in one or more locations listed in section 5.1; evaluate the likelihood of exposure factor for nearby population as specified in section 5.2.1; and proceed to section 7.2. If observed contamination cannot be established based on either radionuclides or other hazardous substances, do not evaluate the soil exposure pathway.

7.1.2 *Potential to release.* For the three migration pathways, evaluate potential to release for sites containing radionuclides in the same manner as specified for sites containing other hazardous substances. Base the evaluation on the physical and chemical properties of the radionuclides, not on their level of radioactivity.

For sites containing mixed radioactive and other hazardous substances, evaluate potential to release considering radionuclides and other hazardous substances together. Evaluate potential to release for each migration pathway as specified in sections 3, 4, or 6, as appropriate.

7.2 *Waste characteristics.* For radioactive substances, evaluate the human toxicity factor, the ecosystem toxicity factor, the surface water persistence factor, and the hazardous waste quantity factor as specified in the following sections. Evaluate all other waste characteristic factors as specified in sections 2 through 6.

7.2.1 Human toxicity. For radioactive substances, evaluate the human toxicity factor as specified below, not as specified in section 2.4.1.1.

Assign human toxicity factor values to those radionuclides available to the pathway based on quantitative dose-response parameters for cancer risks as follows:

• Evaluate radionuclides only on the basis of carcinogenicity and assign all radionuclides to weight-of-evidence category A.

• Assign a human toxicity factor value from Table 7-2 to each radionuclide based on its slope factor (also referred to as cancer potency factor).

-For each radionuclide, use the higher of the slope factors for inhalation and ingestion to assign the factor value.

-If only one slope factor is available for the radionuclide, use it to assign the toxicity factor value.

-If no slope factor is available for the radionuclide, assign that radionuclide a toxicity factor value of 0 and use other radionuclides for which a slope factor is available to evaluate the pathway.

• If all radionuclides available to a particular pathway are assigned a human toxicity factor value of 0 (that is, no slope factor is available for all the radionuclides), use a default human toxicity factor value of 1,000 as the human toxicity factor value for all radionuclides available to the pathway.

At sites containing mixed radioactive and other hazardous substances, evaluate the toxicity factor separately for the radioactive and other hazardous substances and assign each a separate toxicity factor value. This applies regardless of whether the radioactive and other hazardous substances are physically separated, combined chemically, or simply mixed together. Assign toxicity factor values to the radionuclides as specified above and to the other hazardous substances as specified in section 2.4.1.1.

At sites containing mixed radioactive and other hazardous substances, if all radionuclides available to a particular pathway are assigned a human toxicity factor value of 0, use a default human toxicity factor value of 1,000 for all those radionuclides even if nonradioactive hazardous substances available to the pathway are assigned human toxicity factor values greater than 0. Similarly, if all nonradioactive hazardous substances available to the pathway are assigned a human toxicity factor value of 0, use a default human toxicity factor value of 100 for all these nonradioactive hazardous substances even if radionuclides available to the pathway are assigned human toxicity factor values greater than 0.

7.2.2 *Ecosystem toxicity.* For the surface water environmental threat (see sections 4.1.4 and 4.2.4), assign an ecosystem toxicity factor value to radionuclides (alone or combined chemically or mixed with other hazardous substances) using the same slope factors and

procedures specified for the human toxicity factor in section 7.2.1, except: use a default of 100, not 1,000, if all radionuclides eligible to be evaluated for ecosystem toxicity receive an ecosystem toxicity factor value of 0.

TABLE 7-2.—TOXICITY FACTOR VALUES FOR RADIONUCLIDES

Cancer slope factor * (SF) $(pCi)^{-1}$	Assigned value
$3\times10^{-11} \leq SF$	10,000
$3\times10^{-12} \leq SF < 3\times10^{-11}$	1,000
$SF < 3\times10^{-12}$	100
SF not available for the radionuclide	0

* Radionuclide slope factors are estimates of age-averaged, individual lifetime total excess cancer risk per picocurie of radionuclide inhaled or ingested.

At sites containing mixed radioactive and other hazardous substances, evaluate the ecosystem toxicity factor separately for the radioactive and other hazardous substances and assign each a separate ecosystem toxicity factor value. This applies regardless of whether the radioactive and other hazardous substances are physically separated, combined chemically, or simply mixed together. Assign ecosystem toxicity factor values to the radionuclides as specified above and to the other hazardous substances as specified in sections 4.1.4.2.1.1 and 4.2.4.2.1.1. If all radionuclides available to a particular pathway are assigned an ecosystem toxicity factor value of 0, use a default ecosystem toxicity factor value of 100 for all these radionuclides even if nonradioactive hazardous substances available to the pathway are assigned ecosystem toxicity factor values greater than 0. Similarly, if all nonradioactive hazardous substances available to the pathway are assigned an ecosystem toxicity factor value of 0, use a default ecosystem toxicity factor value of 100 for all these nonradioactive hazardous substances even if radionuclides available to the pathway are assigned ecosystem toxicity factor values greater than 0.

7.2.3 *Persistence.* For radionuclides, evaluate the surface water persistence factor based solely on half-life; do not include sorption to sediments in the evaluation as is done for nonradioactive hazardous substances. Assign a persistence factor value from Table 4-10 (section 4.1.2.2.1.2) to each radionuclide based on half-life ($t_{1/2}$) calculated as follows:

$$t_{1/2} = \frac{1}{\frac{1}{r} + \frac{1}{v}}$$

where:

r = Radioactive half-life.

v = Volatilization half-life.

If the volatilization half-life cannot be estimated for a radionuclide from available data, delete it from the equation. Select the portion of Table 4-10 to use in assigning the persistence factor value as specified in section 4.1.2.2.1.2.

At sites containing mixed radioactive and other hazardous substances, evaluate the persistence factor separately for each radionuclide and for each nonradioactive hazardous substance, even if the available data indicate that they are combined chemically. Assign a persistence factor value to each radionuclide as specified in this section and to each nonradioactive hazardous substance as specified in section 4.1.2.2.1.2. When combined chemically, assign a single persistence factor value based on the higher of the two values assigned (individually) to the radioactive and nonradioactive components.

7.2.4 *Selection of substance potentially posing greatest hazard.* For each migration pathway (threat, aquifer, or waterbed, as appropriate), select the radioactive substance or nonradioactive hazardous substance that potentially poses the greatest hazard based on its toxicity factor value, combined with the applicable mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential factor values. Combine these factor values as specified in sections 2, 3, 4, and 8. For the soil exposure pathway, base the selection on the toxicity factor alone (see sections 2 and 5).

7.2.5 *Hazardous waste quantity.* To calculate the hazardous waste quantity factor value for sites containing radioactive substances, evaluate source hazardous waste quantity (see section 2.4.2.1) using only the following two measures in the following hierarchy (these measures are consistent with Tiers A and B for nonradioactive hazardous substances in sections 2.4.2.1.1 and 2.4.2.1.2):

- Radionuclide constituent quantity (Tier A).
- Radionuclide wastestream quantity (Tier B).

7.2.5.1 *Source hazardous waste quantity for radionuclides.* For each migration pathway, assign a source hazardous waste quantity value to each source having a containment factor value greater than 0 for the pathway being evaluated. For the soil exposure pathway, assign a source hazardous waste quantity value to each area of observed contamination, as applicable to the threat being evaluated. Allocate hazardous substances and hazardous wastestreams to specific sources (or areas of observed contamination) as specified in section 2.4.2.

7.2.5.1.1 *Radionuclide constituent quantity (Tier A).* Evaluate radionuclide constituent quantity for each source (or area of observed contamination) based on the activity content of the radionuclides allocated to the source (or area of observed contamination) as follows:

- Estimate the net activity content (in curies) for the source (or area of observed contamination) based on:
  - –Manifests, or
  - –Either of the following equations, as applicable:

$$N = 9.1\times10^{-7}(V)\sum_{i=1}^{n} AC_i$$

where:

N = Estimated net activity content (in curies) for the source (or area of observed contamination).

V = Total volume of material (in cubic yards) in a source (or area of observed contamination) containing radionuclides.

AC_i = Activity concentration above the respective background concentration (in pCi/g) for each radionuclide i allocated to the source (or area of observed contamination).

n = Number of radionuclides allocated to the source (or area of observed contamination) above the respective background concentrations.

or,

$$N = 3.8\times10^{-12}(V)\sum_{i=1}^{n} AC_i$$

where:

N = Estimated net activity content (in curies) for the source (or area of observed contamination).

V = Total volume of material (in gallons) in a source (or area of observed contamination) containing radionuclides.

AC_i = Activity concentration above the respective background concentration (in pCi/l) for each radionuclide i allocated to the source (or area of observed contamination).

n = Number of radionuclides allocated to the source (or area of observed contamination) above the respective background concentrations.

- –Estimate volume for the source (or volume for the area of observed contamination) based on records or measurements.
- –For the soil exposure pathway, in estimating the volume for areas of observed contamination, do not include more than the first 2 feet of depth, except: for those types of areas of observed contamination listed in Tier C of Table 5-2 (section 5.1.2.2), include the entire depth, not just that within 2 feet of the surface.

- Convert from curies of radionuclides to equivalent pounds of nonradioactive hazardous substances by multiplying the activity estimate for the source (or area of observed contamination) by 1,000.
- Assign this resulting product as the radionuclide constituent quantity value for the source (or area of observed contamination).

If the radionuclide constituent quantity for the source (or area of observed

contamination) is adequately determined (that is, the total activity of all radionuclides in the source and releases from the source (or in the area of observed contamination) is known or is estimated with reasonable confidence), do not evaluate the radionuclide wastestream quantity measure in section 7.2.5.1.2. Instead, assign radionuclide wastestream quantity a value of 0 and proceed to section 7.2.5.1.3. If the radionuclide constituent quantity is not adequately determined, assign the source (or area of observed contamination) a value for radionuclide constituent quantity based on the available data and proceed to section 7.2.5.1.2.

7.2.5.1.2 *Radionuclide wastestream quantity (Tier B).* Evaluate radionuclide wastestream quantity for the source (or area of observed contamination) based on the activity content of radionuclide wastestreams allocated to the source (or area of observed contamination) as follows:

- Estimate the total volume (in cubic yards or in gallons) of wastestreams containing radionuclides allocated to the source (or area of observed contamination).
- Divide the volume in cubic yards by 0.55 (or the volume in gallons by 110) to convert to the activity content expressed in terms of equivalent pounds of nonradioactive hazardous substances.
- Assign the resulting value as the radionuclide wastestream quantity value for the source (or area of observed contamination).

7.2.5.1.3 *Calculation of source hazardous waste quantity value for radionuclides.* Select the higher of the values assigned to the source (or area of observed contamination) for radionuclide constituent quantity and radionuclide wastestream quantity. Assign this value as the source hazardous waste quantity value for the source (or area of observed contamination). Do not round to th nearest integer.

7.2.5.2 *Calculation of hazardous waste quantity factor value for radionuclides.* Sum the source hazardous waste quantity values assigned to all sources (or areas of observed contamination) for the pathway being evaluated and round this sum to the nearest integer, except: if the sum is greater than 0, but less than 1, round it to 1. Based on this value, select a hazardous waste quantity factor value for this pathway from Table 2–6 (section 2.4.2.2).

For a migration pathway, if the radionuclide constituent quantity is adequately determined (see section 7.2.5.1.1) for all sources (or all portions of sources and releases remaining after a removal action), assign the value from Table 2–6 as the hazardous waste quantity factor value for the pathway. If the radionuclide constituent quantity is not adequately determined for one or more sources (or one or more portions of sources or releases remaining after a removal action), assign a factor value as follows:

- If any target for that migration pathway is subject to Level I or Level II concentration (see section 7.3), assign either the value from Table 2–6 or a value of 100, whichever is greater, as the hazardous waste quantity factor value for that pathway.
- If none of the targets for that pathway is subject to Level I or Level II concentrations, assign a factor value as follows:
  - If there has been no removal action, assign either the value from Table 2–6 or a value of 10, whichever is greater, as the hazardous waste quantity factor value for that pathway.
  - If there has been a removal action:
    - Determine values from Table 2–6 with and without consideration of the removal action.
    - If the value that would be assigned from Table 2–6 without consideration of the removal action would be 100 or greater, assign either the value from Table 2–6 with consideration of the removal action or a value of 100, whichever is greater, as the hazardous waste quantity factor value for the pathway.
    - If the value that would be assigned from Table 2–6 without consideration of the removal action would be less than 100, assign a value of 10 as the hazardous waste quantity factor value for the pathway.

For the soil exposure pathway, if the radionuclide constituent quantity is adequately determined for all areas of observed contamination, assign the value from Table 2–6 as the hazardous waste quantity factor value. If the radionuclide constituent quantity is not adequately determined for one or more areas of observed contamination, assign either the value from Table 2–6 or a value of 10, whichever is greater, as the hazardous waste quantity factor value.

7.2.5.3 *Calculation of hazardous waste quantity factor value for sites containing mixed radioactive and other hazardous substances.* For each source (or area of observed contamination) containing mixed radioactive and other hazardous substances, calculate two source hazardous waste quantity values—one based on radionuclides as specified in sections 7.2.5.1 through 7.2.5.1.3 and the other based on the nonradioactive hazardous substances as specified in sections 2.4.2.1 through 2.4.2.1.5 (that is, determine each value as if the other type of substance was not present). Sum the two values to determine a combined source hazardous waste quantity value for the source (or area of observed contamination). Do not round this value to the nearest integer.

Use this combined source hazardous waste quantity value to calculate the hazardous waste quantity factor value for the pathway as specified in section 2.4.2.2, except: if either the hazardous constituent quantity or the radionuclide constituent quantity, or both, are not adequately determined for one or more sources (or one or more portions of sources or releases remaining after a removal action) or for one or more areas of observed contamination, as applicable, assign the value from Table 2–6 or the default value applicable for the pathway, whichever is greater, as the hazardous waste quantity factor value for the pathway.

7.3 *Targets.* For radioactive substances, evaluate the targets factor category as specified in section 2.5 and sections 3 through 6, except: establish Level I and Level II concentrations at sampling locations as specified in sections 7.3.1 and 7.3.2.

For all pathways (and threats), use the same target distance limits for sites containing radioactive substances as is specified in sections 3 through 6 for sites containing nonradioactive hazardous substances. At sites containing mixed radioactive and other hazardous substances, include all sources (or areas of observed contamination) at the site in identifying the applicable targets for the pathway.

7.3.1 *Level of contamination at a sampling location.* Determine whether Level I or Level II concentrations apply at a sampling location (and thus to the associated targets) as follows:

- Select the benchmarks from section 7.3.2 applicable to the pathway (or threat) being evaluated.
- Compare the concentrations of radionuclides in the sample (or comparable samples) to their benchmark concentrations for the pathway (or threat) as specified in section 7.3.2. Treat comparable samples as specified in section 2.5.1.
- Determine which level applies based on this comparison.
- If none of the radionuclides eligible to be evaluated for the sampling location have an applicable benchmark, assign Level II to the actual contamination at that sampling location for the pathway (or threat).
- In making the comparison, consider only those samples, and only those radionuclides in the sample, that meet the criteria for an observed release (or observed contamination) for the pathway, except: tissue samples from aquatic human food chain organisms may also be used for the human food chain threat of the surface water pathway as specified in sections 4.1.3.3 and 4.2.3.3.

7.3.2 *Comparison to benchmarks.* Use the following media specific benchmarks (expressed in activity units, for example, pCi/l for water, pCi/kg for soil and for aquatic human food chain organisms, and pCi/m^3 for air) for making the comparisons for the indicated pathway (or threat):

- Maximum Contaminant Levels (MCLs)—ground water migration pathway and drinking water threat in surface water migration pathway.
- Uranium Mill Tailings Radiation Control Act (UMTRCA) standards—soil exposure pathway only.
- Screening concentration for cancer corresponding to that concentration that corresponds to the 10^{-6} individual cancer risk for inhalation exposures (air migration pathway) or for oral exposures (ground water migration pathway; drinking water or human food chain threats in surface water migration pathway; and soil exposure pathway).
  - For the soil exposure pathway, include two screening concentrations for cancer—one for ingestion of surface materials and one for external radiation exposures from gamma-emitting radionuclides in surface materials.

Select the benchmark(s) applicable to the pathway (or threat) being evaluated. Compare the concentration of each radionuclide from the sampling location to its benchmark concentration(s) for that pathway (or threat). Use only those samples and only those radionuclides in the sample that meet the criteria for an observed release (or observed contamination) for the pathway, except: tissue samples from aquatic human food chain organisms may be used as specified in sections 4.1.3.3 and 4.2.3.3. If the concentration of any applicable radionuclide from any sample equals or exceeds its benchmark concentration, consider the sampling location to be subject to Level I concentrations for that pathway (or threat). If more than one benchmark applies to the radionuclide, assign Level I if the radionuclide concentration equals or exceeds the lowest applicable benchmark concentration. In addition, for the soil exposure pathway, assign Level I concentrations at the sampling location if measured gamma radiation exposure rates equal or exceed 2 times the background level (see section 7.1.1).

If no radionuclide individually equals or exceeds its benchmark concentration, but more than one radionuclide either meets the criteria for an observed release (or observed contamination) for the sample or is eligible to be evaluated for a tissue sample (see sections 4.1.3.3 and 4.2.3.3), calculate a value for index I for these radionuclides as specified in section 2.5.2. If I equals or exceeds 1, assign Level I to the sampling location. If I is less than 1, assign Level II.

At sites containing mixed radioactive and other hazardous substances, establish the level of contamination for each sampling location considering radioactive substances and nonradioactive hazardous substances separately. Compare the concentration of each radionuclide and each nonradioactive hazardous substance from the sampling location to its respective benchmark concentration(s). Use only those samples and only those substances in the sample that meet the criteria for an observed release (or observed contamination) for the pathway except: tissue samples from aquatic human food chain organisms may be used as specified in sections 4.1.3.3 and 4.2.3.3. If the concentration of one or more applicable radionuclides or other hazardous substances from any sample equals or exceeds its benchmark concentration, consider the sampling location to be subject to Level I concentrations. If more than one benchmark applies to a radionuclide or other hazardous substance, assign Level I if the concentration of the radionuclide or other hazardous substance equals or exceeds its lowest applicable benchmark concentration.

If no radionuclide or other hazardous substance individually exceed a benchmark concentration, but more than one radionuclide or other hazardous substance either meets the criteria for an observed release (or observed contamination) for the sample or is eligible to be evaluated for a tissue sample, calculate an index I for both types of substances as specified in section 2.5.2. Sum the index I values for the two types of substances. If the value, individually or combined, equals or exceeds 1, assign Level I to the sample location. If it is less than 1, calculate an index J for the nonradioactive hazardous substances as specified in section 2.5.2. If J equals or exceeds 1, assign Level I to the sampling location. If J is less than 1, assign Level II.

[FR Doc. 90-27195 Filed 12-13-90; 8:45 am]
BILLING CODE 6560-50-M

REFERENCE 2

SUPERFUND CHEMICAL DATA MATRIX METHODOLOGY

Prepared For EPA
January 2004

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1.0 INTRODUCTION

The Superfund Chemical Data Matrix (SCDM) is a database containing factor values and benchmark values used for applying the Hazard Ranking System (HRS; 40 CFR Part 300 Appendix A, 55 *FR* 51583) to evaluate potential National Priorities List (NPL) sites. The HRS assigns factor values for toxicity, gas migration potential, gas and ground water mobility, surface water persistence, and bioaccumulation potential. These assignments are based on the physical, chemical, ecological, toxicological, and radiological properties of hazardous substances present at a site. Hazardous substances, as defined for HRS purposes, includes both hazardous substances referenced in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) section 101(14), which are substances specifically listed under other federal laws and are known as "CERCLA hazardous substances," and "pollutants or contaminants" as defined in CERCLA itself in section 101(33).

SCDM contains HRS factor values and benchmarks for those hazardous substances frequently found at sites that are evaluated using the HRS. SCDM also contains the physical, chemical, toxicological, and radiological input data used to calculate the factors and benchmarks. The input data presented in SCDM are taken directly from peer reviewed, generally accepted literature sources and databases and/or EPA developed literature sources and databases; or are calculated using procedures set forth by EPA and in the HRS. Further HRS procedures are then applied to the input data to determine a factor value or benchmark. The HRS also assigns extra weight to targets with exposure levels to hazardous substances that are at or above benchmarks. These benchmarks include both risk-based screening concentrations and concentrations specified in regulatory limits for the hazardous substances present at a site for a particular migration pathway.

Chapter 2.0, *Data Selection Methodology*, of this document explains how data are selected and prioritized into a hierarchy for assigning SCDM values. Chapter 3.0, *Calculations in SCDM*, describes how some types of data (i.e., volatilization half-lives, distribution coefficients, and screening concentrations) are internally calculated using data in SCDM and methodologies from published literature or regulatory guidance documents. Chapter 4.0, *Chemical Data, Factor Values, and Benchmarks*, describes how SCDM data, HRS factor values, and benchmark values are presented. The factor values and benchmark values are listed, substance by substance, in Appendix A. Appendix B contains the HRS factor values and benchmark tables (organized by pathway) for both nonradiological hazardous substances and radionuclides. Please note that *National Recommended Water Quality Criteria (NRWQC)* Chronic Criteria Continuous Concentration (CCC) and Acute Criteria Maximum Concentration (CMC) values have endnotes associated with them listed at the end of Appendix B. Appendix C contains a cross-reference index of substance name synonyms.

SUPERFUND CHEMICAL DATA MATRIX

Date: 1/28/2004
Chemical: Lead
CAS Number: 007439-92-1

TOXICITY

Parameter	Value		Unit	Source
Oral RfD:			mg/kg/day	
Inhal RfD:			mg/kg/day	
Oral Slope:			(mg/kg/day)^-1	
Oral Wt-of-Evid:				
Inhal Slope:			(mg/kg/day)^-1	
Inhal Wt-of-Evid:				
Oral ED10:			mg/kg/day	
Oral ED10 Wgt:				
Inhal ED10:			mg/kg/day	
Inhal ED10 Wgt:				
Oral LD50:			mg/kg	
Dermal LD50:			mg/kg	
Gas Inhal LC50:			ppm	
Dust Inhal LC50:			mg/L	
ACUTE				
Fresh CMC:	6.5E+1	D, E, bb, gg	µg/L	WATCRIT
Salt CMC:	2.1E+2	D, bb	µg/L	WATCRIT
CHRONIC				
Fresh CCC:	2.5E+0	D, E, bb, gg	µg/L	WATCRIT
Salt CCC:	8.1E+0	D, bb	µg/L	WATCRIT
Fresh Ecol LC50:	4.4E+2		µg/L	ECOTOX
Salt Ecol LC50:	1.1E+2		µg/L	ECOTOX

PERSISTENCE

Parameter	Value	Unit	Source
LAKE - Halflives			
Hydrolysis:		days	
Volatility:		days	
Photolysis:		days	
Biodeg:		days	
Radio:		days	
RIVER - Halflives			
Hydrolysis:		days	
Volatility:		days	
Photolysis:		days	
Biodeg:		days	
Radio:		days	
Log Kow:	7.3E-1		PHYSPROP

PHYSICAL CHARACTERISTICS

Parameter	Value		
Metal Contain:	Yes		
Organic:	No		
Gas:	No		
Particulate:	Yes		
Radionuclide:	No		
Rad. Element:	No		
Molecular Weight:	2.1E+2		
Density:	1.1E+1	g/mL @	C

MOBILITY

Parameter	Value	Unit	Source
Vapor Press:		Torr	
Henry's Law:	2.5E-2	atm-m3/mol	PHYSPROP
Water Solub:		mg/L	
Distrib Coef:	9.0E+2	ml/g	BAES_KD
Geo Mean Sol:	8.7E+2	mg/L	CALC

BIOACCUMULATION

Parameter	Value	Unit	Source
FOOD CHAIN			
Fresh BCF:	8.7E+0		ECOTOX
Salt BCF:	5.0E+3		ECOTOX
ENVIRONMENTAL			
Fresh BCF:	1.7E+4		ECOTOX
Salt BCF:	5.0E+3		ECOTOX
Log Kow:	7.3E-1		PHYSPROP
Water Solub:			
Geo Mean Sol:	8.7E+2	mg/L	CALC

OTHER DATA

Melting Point:	3.3E+2	C
Boiling Point:	1.7E+3	C
Formula:	Pb	

CLASS INFORMATION

Class	Parent Substance

SUPERFUND CHEMICAL DATA MATRIX

Date: 1/28/2004
Chemical: Lead
CAS Number: 007439-92-1

ASSIGNED FACTOR VALUES

AIR PATHWAY

Parameter	Value
Toxicity:	10000
Gas Mobility:	
Gas Migration:	

GROUND WATER PATHWAY

Parameter		Value
Toxicity:		10000
Water Solub:		
Distrib:		9.0E+2
Geo Mean Sol:		8.7E+2
Mobility:		
Liquid	Karst:	1.0E+0
	Non Karst:	1.0E-2
Non Liq.	Karst:	1.0E+0
	Non Karst:	1.0E-2

SOIL EXPOSURE PATHWAY

Parameter	Value
Toxicity:	10000

SURFACE WATER PATHWAY

DRINKING WATER

Parameter	Value
Toxicity:	10000
Persistence	
River:	1.0000
Lake:	1.0000

HUMAN FOOD CHAIN

Parameter	Value
Toxicity:	10000
Persistence	
River:	1.0000
Lake:	1.0000
Bioaccumulation	
Fresh:	5.0
Salt:	5000.0

ENVIRONMENTAL

Parameter	Value
Fresh Tox:	1000
Salt Tox:	1000
Persistence	
River:	1.0000
Lake:	1.0000
Bioaccumulation	
Fresh:	50000.0
Salt:	5000.0

BENCHMARKS

AIR PATHWAY

Parameter	Value	Unit
NAAQS/NESHAPS:	1.5E+0	µg/m3
Cancer Risk:		mg/m3
Non Cancer Risk:		mg/m3

GROUND WATER PATHWAY

Parameter	Value	Unit
MCL/MCLG:	1.5E-2	mg/L
Cancer Risk:		mg/L
Non Cancer Risk:		mg/L

SOIL EXPOSURE PATHWAY

Parameter	Value	Unit
Cancer Risk:		mg/kg
Non Cancer Risk:		mg/kg

RADIONUCLIDE

Parameter	Value	Unit
MCL:		pCi/L
UMTRCA:		pCi/kg
CANCER RISK		
Air:		pCi/m3
DW:		pCi/L
FC:		pCi/kg
Soil Ing:		pCi/kg
Soil Gam:		pCi/kg

SURFACE WATER PATHWAY

DRINKING WATER

Parameter	Value	Unit
MCL/MCLG:	1.5E-2	mg/L
Cancer Risk:		mg/L
Non Cancer Risk:		mg/L

HUMAN FOOD CHAIN

Parameter	Value	Unit
FDAAL:		ppm
Cancer Risk:		mg/kg
Non Cancer Risk:		mg/kg

ENVIRONMENTAL

Parameter	Value	Unit
ACUTE		
Fresh CMC:	6.5E+1 [D, E, bb, gg]	µg/L
Salt CMC:	2.1E+2 [D, bb]	µg/L
CHRONIC		
Fresh CCC:	2.5E+0 [D, E, bb, gg]	µg/L
Salt CCC:	8.1E+0 [D, bb]	µg/L

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values

			Ground Water Mobility				Persistence		Bioaccumulation				Ecotoxicity					
			Liquid		Non-Liquid				Food Chain		Environment				Air Gas	Air Gas		
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Migration	Mobility	Gas	Part
Hexachlorodibenzofuran 2,3,4,6,7,8-	060851-34-5	10000	1.00E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	0	0	...	...	No	Yes
Hydrazine	000302-01-2	10000	1.00E+00	1.00E+00	1.00E+00	1.00E+00	0.4000*	0.0700*	0.5	0.5	0.5	0.5	10000	100	11*	1.0000	Yes	No
Hydrogen sulfide	007783-06-4	1000*	1.00E+00	1.00E+00	1.00E+00	1.00E+00	0.0007*	0.0700	0.5	0.5	0.5	0.5	1000	1000	17	1.0000	Yes	No
Indeno(1,2,3-cd)pyrene	000193-39-5	1000	1.00E+00	1.00E-04	2.00E-05	2.00E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	0	0	...	...	No	Yes
Iron	007439-89-6	1	1.00E+00	1.00E-02	1.00E+00	1.00E-02	1.0000	1.0000	5000.0*	5000.0*	5000.0*	5000.0*	10	10	...	...	No	Yes
Lead	007439-92-1	10000	1.00E+00	1.00E-02	1.00E+00*	1.00E-02*	1.0000	1.0000	5.0*	5000.0	50000.0*	5000.0	1000	1000	...	...	No	Yes
Lead chromate**	007758-97-6	10000	1.00E+00	...	2.00E-03	...	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	0	0	...	...	No	Yes
Lindane	000058-89-9	10000	1.00E+00	1.00E+00	2.00E-01	2.00E-01	1.0000	1.0000	50000.0*	5000.0*	50000.0*	5000.0*	10000	10000	11	0.0200	Yes	Yes
Manganese	007439-96-5	10000	1.00E+00	1.00E-02	1.00E+00	1.00E-02	1.0000	1.0000	50000.0*	50000.0*	50000.0	50000.0	0	0	...	...	No	Yes
Mercury	007439-97-6	10000	1.00E+00	1.00E-02	1.00E+00*	1.00E-02*	1.0000*	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	17	0.2000	Yes	Yes
Methoxychlor	000072-43-5	100	1.00E+00	1.00E-04*	2.00E-03	2.00E-07*	1.0000	1.0000	5.0*	50000.0*	5000.0*	50000.0*	10000	10000	6	0.0020	Yes	Yes
Methyl Parathion	000298-00-0	10000	1.00E+00	1.00E-02*	2.00E-01	2.00E-03*	1.0000	0.4000	50.0	50.0	50.0	50.0	10000	10000	6	0.0200	Yes	Yes
Methyl ethyl ketone	000078-93-3	1*	1.00E+00	1.00E+00	1.00E+00	1.00E+00	0.4000	0.4000	0.5	0.5	0.5	0.5	1	1	17	1.0000	Yes	No
Methyl isobutyl ketone	000108-10-1	10*	1.00E+00	1.00E+00	1.00E+00	1.00E+00	0.4000	0.4000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No

* Indicates difference between previous version of chemical data (JUN 96) and current version of chemical data (JAN04).
** Indicates new hazardous substance in current version of chemical data (JAN04).

REFERENCE 3

U.S. ENVIRONMENTAL PROTECTION AGENCY

Superfund Information Systems

Superfund Site Information

Site Documents

Data Element Dictionary (DED)

Order Superfund Products

Superfund Site Information

RARITAN BAY SLAG

Site Information

Site Info | Aliases | Operable Units | Contacts
Actions | Contaminants | Site-Specific Documents

Site Name: RARITAN BAY SLAG
Street: CORNER OF SHORLINE CIRCLE AND LAURENCE PARKWAY
City / State / ZIP: OLD BRIDGE, NJ

NPL Status: Not on the NPL
Non-NPL Status: Status Not Specified

EPA ID: NJN000206276
EPA Region: 02
County: MIDDLESEX

Federal Facility Flag: Not a Federal Facility

Return to Search Results

Return to Search Superfund Site Information

DISCLAIMER: Be advised that the data contained in these profiles are intended solely for informational purposes use by employees of the U.S. Environmental Protection Agency for management of the Superfund program. They are not intended for use in calculating Cost Recovery Statutes of Limitations and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. EPA reserves the right to change these data at any time without public notice.

URL: http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm
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U.S. ENVIRONMENTAL PROTECTION AGENCY

Superfund Information Systems

Superfund Site Information

Site Documents

Data Element Dictionary (DED)

Order Superfund Products

Superfund Site Information

RARITAN BAY SLAG

Actions

Site Info | Aliases | Operable Units | Contacts
Actions | Contaminants | Site-Specific Documents

OU	Action Name	Qualifier	Lead	Actual Start	Actual Completion
00	DISCOVERY		F		07/09/2008

Return to Search Results

Return to Search Superfund Site Information

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URL: http://cfpub.epa.gov/supercpad/cursites/cactinfo.cfm
This page design was last updated on Tuesday, October 16, 2007
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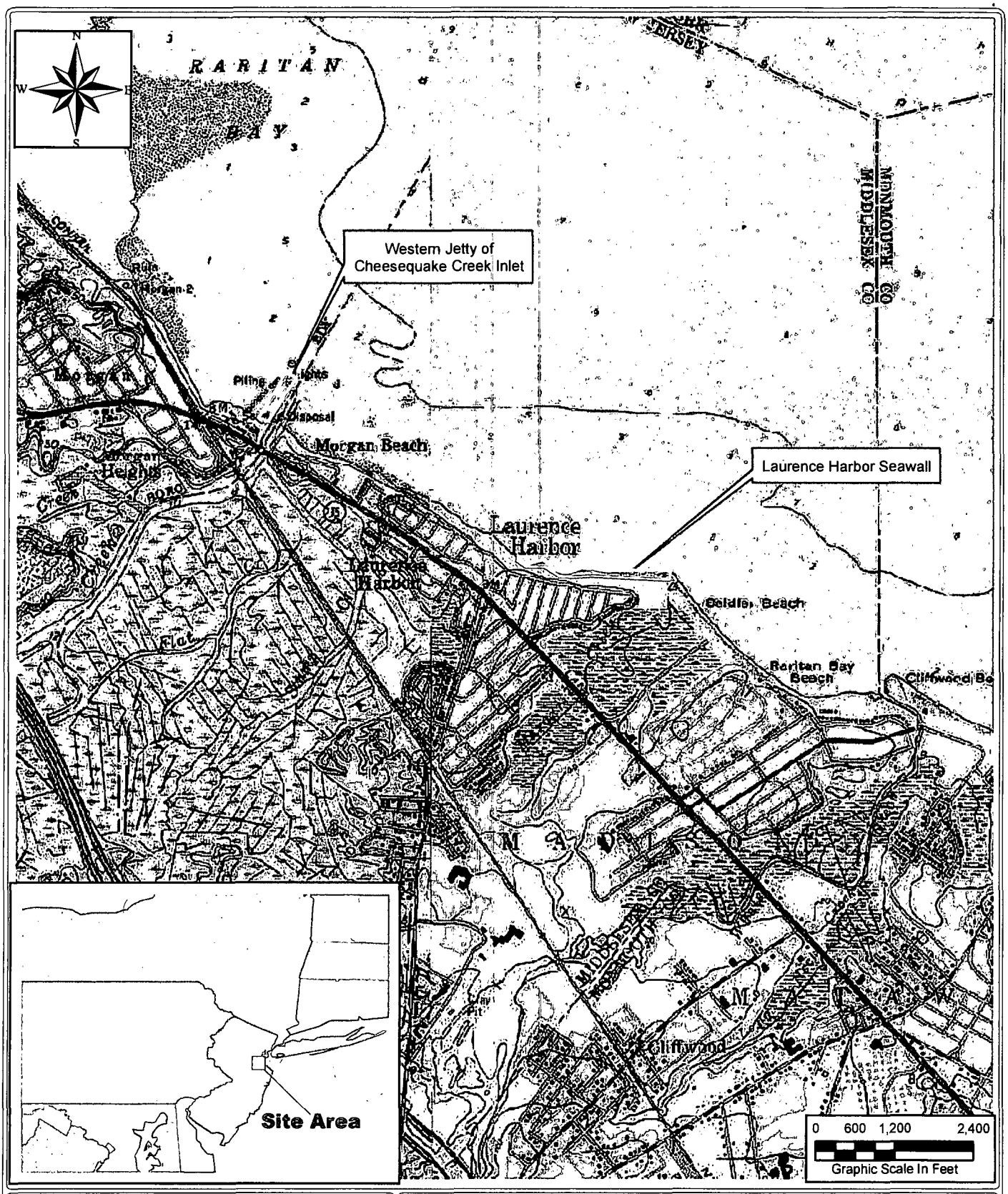
REFERENCE 4



LEGEND:

Site Location

National Geographic TOPO! U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangles: Keyport, NJ, 1977 and South Amboy, NJ, 1995.

PROJECT:
Raritan Bay Slag

CLIENT NAME:
EPA

TITLE:

Site Location Map
Raritan Bay Slag
Old Bridge Township and Sayreville, NJ

WESTON SOLUTIONS

DATE:
October 13, 2008

FIGURE #:
1

P:\SAT2\Raritan_Bay_Slag\MXD\06084_Site_Loc_101308.mxd

Location

etation Boundary

y

SCALE:

240 120 0 240 480

Graphic Scale In Feet

Jersey Office of Information Technology, Office of Geographic Information Systems. http://njgin.nj.gov/OIT_IW/index.jsp.
books: RST2-02-F-0674; RST2-02-F-0675; and RST2-02-F-0676, September 10-16, 2008.
n and attached CLP Data Assessment, Subject: CLP [Inorganic] Data Package for Quality Assurance Review,
41. October 2, 2008.

WESTON SOLUTIONS SM

Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

N W E S

REPORT DATE: December 2008	PROJECT MANAGER: D. Foerter	CLIENT NAME: EPA	DRAWING TITLE: Old B
DRAWING: 06305_Aerial_TCLP_Sample.mxd PATH: P:/SAT2/Raritan_Bay_Slag/MXD	CHECKED BY: D. Foerter		
REVISION No. 0	CONTRACT No. EP-S5-06-04	PROJECT NAME: Raritan Bay Slag	FIGURE: 2
WORK ORDER No. 20405.012.013.2523.00	DRAWN/MODIFIED BY: M. Capriglione DATE CREATED: 10/13/2008		

15 Mile Target Distance Limit
For Western Jetty – Cheesequake Creek Inlet

15 Mile Target Distance Limit
For Laurence Harbor Seawall

15 Mile Target Distance Limit
For Western Jetty – Cheesequake Creek Inlet

15 Mile Target Distance Limit
For Laurence Harbor Seawall

15 Mile Target Distance Limit
For Western Jetty – Cheesequake Creek Inlet

15 Mile Target Distance Limit
For Laurence Harbor Seawall

Western Jetty – Cheesequake Creek Inlet

Laurence Harbor Seawall

Sandy Hook

15 Mile Target Distance Limit
For Western Jetty – Cheesequake Creek Inlet

15 Mile Target Distance Limit
For Laurence Harbor Seawall

ke Creek Inlet
.86
52

.07
22

ake Creek Inlet
e Marker

e Marker

ake Creek Inlet
Pathway

Pathway

S). 7.5 Minute Series
n, NY, 1995; Chatham, NJ,
old, NJ, 1981; Jamesburg, NJ,
NJ, 1995; New Brunswick, NJ,
Long Branch
5; Sandy Hook East,
, 1995; and The Narrows,

St. Petersburg, FL.
unknown; downloaded

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SOLUTIONS

Solutions, Inc.
ve Edison, New Jersey 08837-3939
7-5800 Fax: (732) 417-5801
w.westonsolutions.com

N
W E
S

REPORT DATE: February 2009	PROJECT MANAGER: D. Foerter	CLIENT NAME: EPA	DRAWING TITLE: 15-Mile Surface W Raritan E Old Bridge / S
DRAWING: 06395_RBS_15_Mile_Pathway_020509.mxd PATH: P:/SAT2/Raritan_Bay_Slag/MXD	CHECKED BY: D. Gaughan		
REVISION No. 0	CONTRACT No. EP-S5-06-04 DELIVERY ORDER NO.	PROJECT NAME: Raritan Bay Slag Site	
WORK ORDER No. 20405.012.013.0523.00	DRAWN/MODIFIED BY: J. Lynes DATE CREATED: 02/05/2009		FIGURE: 3 / SCALE: 1" =

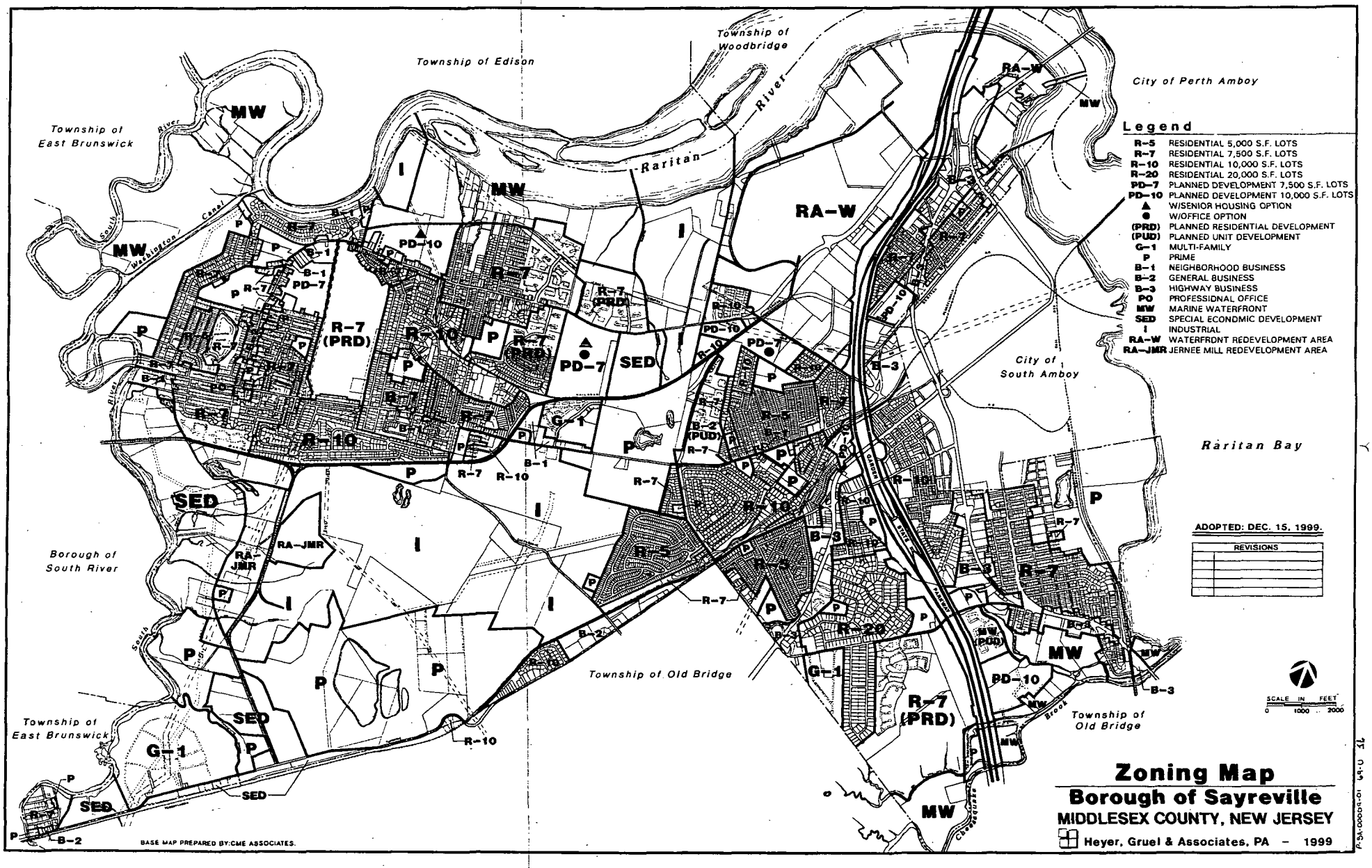

Township of Edison
Township of Woodbridge
City of Perth Amboy
Township of East Brunswick
Raritan River
South Washington Canal
City of South Amboy
Raritan Bay
Borough of South River
Township of Old Bridge
Township of East Brunswick
Township of Old Bridge
Legend
R-5 RESIDENTIAL 5,000 S.F. LOTS
R-7 RESIDENTIAL 7,500 S.F. LOTS
R-10 RESIDENTIAL 10,000 S.F. LOTS
R-20 RESIDENTIAL 20,000 S.F. LOTS
PD-7 PLANNED DEVELOPMENT 7,500 S.F. LOTS
PD-10 PLANNED DEVELOPMENT 10,000 S.F. LOTS
▲ W/SENIOR HOUSING OPTION
● W/OFFICE OPTION
(PRD) PLANNED RESIDENTIAL DEVELOPMENT
(PUD) PLANNED UNIT DEVELOPMENT
G-1 MULTI-FAMILY
P PRIME
B-1 NEIGHBORHOOD BUSINESS
B-2 GENERAL BUSINESS
B-3 HIGHWAY BUSINESS
PO PROFESSIONAL OFFICE
MW MARINE WATERFRONT
SED SPECIAL ECONDMIC DEVELOPMENT
I INDUSTRIAL
RA-W WATERFRONT REDEVELOPMENT AREA
RA-JMR JERNEE MILL REDEVELOPMENT AREA
ADOPTED: DEC. 15, 1999.
REVISIONS
SCALE IN FEET
0 1000 2000
Zoning Map
Borough of Sayreville
MIDDLESEX COUNTY, NEW JERSEY
Heyer, Gruel & Associates, PA - 1999
BASE MAP PREPARED BY:CME ASSOCIATES.

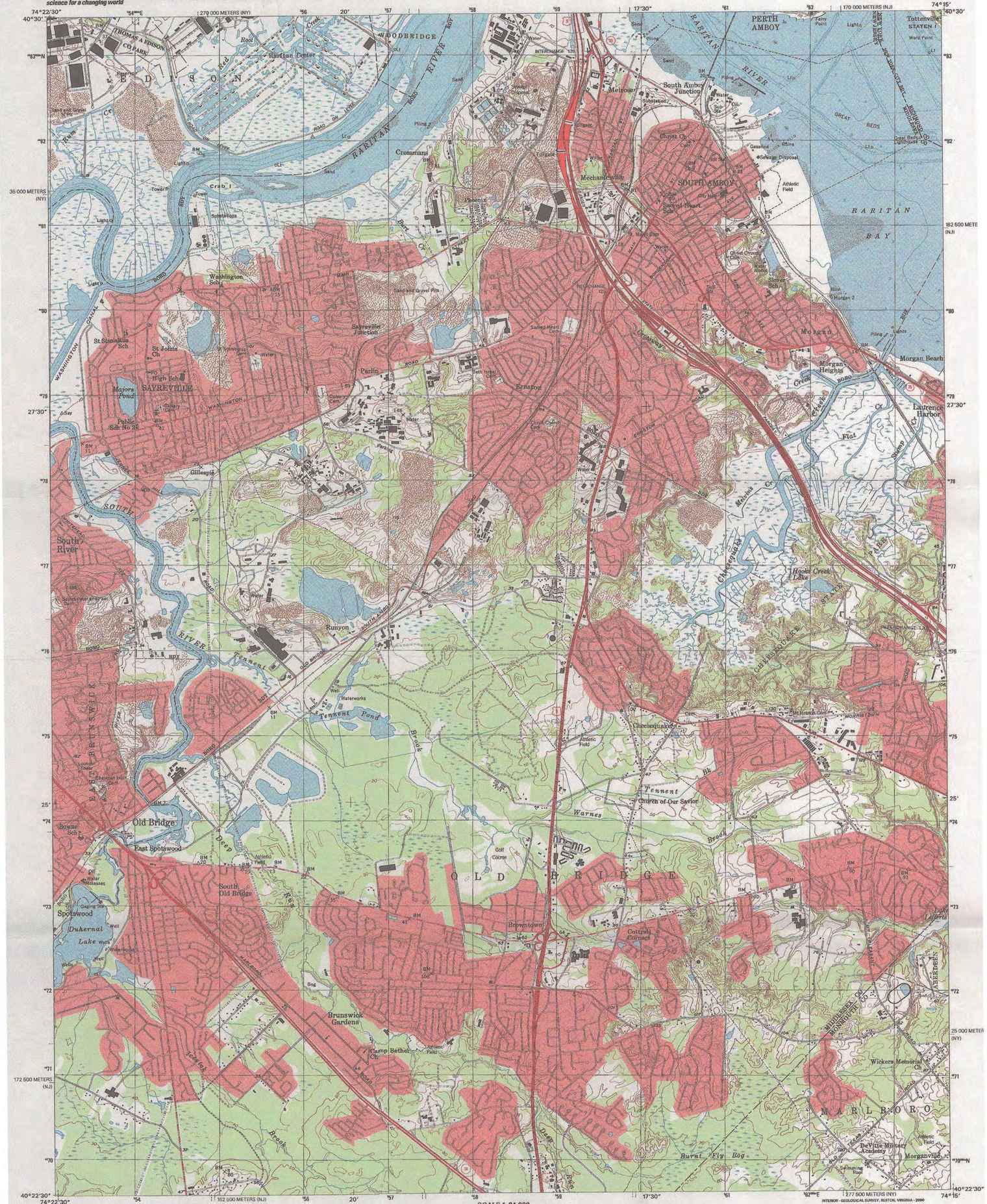
FIGURE 4

REFERENCE 5

USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

SOUTH AMBOY QUADRANGLE
NEW JERSEY-NEW YORK
7.5-MINUTE SERIES (TOPOGRAPHIC)



Produced by the United States Geological Survey

Topography compiled 1938. Planimetry derived from imagery taken 1995 and other sources. Survey control current as of 1954

Selected hydrographic data compiled from NOS Charts 286 (1954) and 375 (1953). This information is not intended for navigational purposes

North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 18
2 500-meter ticks: New Jersey Coordinate System of 1983 and New York Coordinate System of 1983 (Long Island zone)

North American Datum of 1927 (NAD 27) is shown by dashed corner ticks. The values of the shift between NAD 83 and NAD 27 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Landmark buildings verified 1954

UTM GRID AND 1999 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

13° 231 MILS
0° 27' 8 MILS

28% TOTAL RECOVERED FIBER

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 0 METERS 1000 2000
1 0.5 0 MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048
DEPTH CURVES AND SOUNDINGS IN FEET, DATUM IS MEAN LOWER LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
THE MEAN RANGE OF TIDE IS APPROXIMATELY 5.3 FEET

FOR SALE BY U.S. GEOLOGICAL SURVEY, P.O. BOX 25286, DENVER, COLORADO 80225
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

NEW JERSEY
QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 Plainfield
2 Perth Amboy
3 Arthur Kill
4 New Brunswick
5 Keyport
6 Jamesburg
7 Freehold
8 Marlboro

ADJOINING 7.5' QUADRANGLE NAMES

INTERIOR - GEOLOGICAL SURVEY, RESTON, VIRGINIA - 2000

ROAD CLASSIFICATION

Primary highway hard surface	Light-duty road, hard or improved surface
Secondary highway hard surface	Unimproved road

Interstate Route · U.S. Route · State Route

SOUTH AMBOY, NJ-NY
1995
NIMA 6164 IV NE-SERIES V822

9 780607 903690
ISBN 0-607-90369-0

REFERENCE 6

USGS
science for a changing world
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
KEYPORT QUADRANGLE
NEW JERSEY-NEW YORK
7.5-MINUTE SERIES (TOPOGRAPHIC)
RARITAN BAY
WEST REACH
RED BANK REACH
Bound Shoal
WARD POINT BEND (EAST)
Project Depth 35 Feet
WARD POINT SECONDARY CHANNEL
NEW YORK
NEW JERSEY
BOUNDARY
NEW YORK CITY
RICHMOND CO
MONMOUTH CO
MIDDLESEX CO
RARITAN BAY
Laurence Harbor
Seidler Beach
Raritan Bay Beach
Cliffwood Beach
Conaskonk Point
Point Comfort
KEANSBURG
Union Beach
Matawan Point
KEYPORT HARBOR
Cliffwood Beach
OLDBRIDGE
ABERDEEN
Cliffwood
KEYPORT
Van Marters Corner
Naco
Lake
Mechanicsville
HAZLET
Matawan
Hazlet
Centerville
Philips Mills
Strathmore
ABERDEEN
MARLBORO
Morganville
HOLMDEL
Crawford Corners
Middletown
Holland
Seabrook Hill
Rocky Hill
172 500 METERS (NJ)
287 500 METERS (NY)
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048
DEPTH CURVES AND SOUNDINGS IN FEET, DATUM IS MEAN LOWER LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
THE MEAN RANGE OF TIDE IS APPROXIMATELY 4 FEET
Produced by the United States Geological Survey
Topography compiled 1941. Planimetry derived from imagery taken 1995 and other sources. Survey control current as of 1954
Selected hydrographic data compiled from NOS Charts 286 and 369 (1954). This information is not intended for navigational purposes
North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 18
2 500-meter ticks: New Jersey Coordinate System of 1983 and New York Coordinate System of 1983 (Long Island zone)
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Landmark buildings verified 1989
UTM GRID AND 1999 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
29% TOTAL RECOVERED FIBER
FOR SALE BY U.S. GEOLOGICAL SURVEY, P.O. BOX 25286, DENVER, COLORADO 80225
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
QUADRANGLE LOCATION
ADJOINING 7.5' QUADRANGLE NAMES
1 Perth Amboy
2 Arthur Kill
3 The Narrows
4 South Amboy
5 Sandy Hook
6 Freehold
7 Marlboro
8 Long Branch
INTERIOR - GEOLOGICAL SURVEY, RESTON, VIRGINIA - 2000
ROAD CLASSIFICATION
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Secondary highway hard surface
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Unimproved road
Interstate Route
U.S. Route
State Route
KEYPORT, NJ-NY
1995
NIMA 6164 I NW-SERIES V822
ISBN 0-607-90370-6
9 780607 903706

REFERENCE 7

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

APR 24 2008

Susan Janowiak, Acting Director
Emergency and Remedial Response Division
United States Environmental Protection Agency
Region II
290 Broadway
New York, New York 10007-1866

Re: Removal Action Site Consideration for Lead Contamination along Laurence Harbor Seawall

Dear Director Janowiak:

The New Jersey Department of Environmental Protection (NJDEP) submits the seawall portion of the Margaret's Creek and Laurence Harbor Seawall site in Old Bridge, New Jersey for removal action consideration under the federal Comprehensive Environmental Response and Cleanup Liability Act (CERCLA). NJDEP is concerned that limited site access restrictions previously implemented at the site will not adequately protect public health and the environment for an extended time. This is due to uncontrolled lead contamination that remains on a seawall and on a portion of a public beach, both part of Waterfront Park along the Raritan Bay in the Laurence Harbor section of Old Bridge.

NJDEP specifically recommends that the U.S. Environmental Protection Agency (USEPA) evaluate a removal action to address lead waste associated with fill incorporated in the seawall along Laurence Harbor. Sediment in the Raritan Bay also would need to be evaluated and removed, if necessary, as part of this action to avoid recontamination issues.

Removal of the lead contamination in the beach sand and seawall will provide greater protection to residents and visitors who frequent the Laurence Harbor bay-front location. The New Jersey Department of Health and Senior Services' Hazardous Site Health Evaluation Program recommended access restrictions to the seawall and portion of the public beach as a temporary measure to prevent exposure to the lead waste after evaluating site conditions using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children.

Old Bridge Township officials worked with DEP to notify the public in writing about health concerns for the lead waste material and restrict access through signage and some fencing. However, due physical constraints, it is not practical to completely fence off this area and public access to contaminated areas remains a concern. Also, this location is a

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public park frequented by numerous residents and transient visitors that has been effectively placed off limits.

Negotiations with a potential responsible party, NL Industries, Inc. (NL), to conduct necessary remedial work have been unsuccessful to date as evidenced by the company's failure to provide DEP with funding for past investigative work or to sign an Administrative Consent Order (ACO) for remediation of the seawall area. In addition, DEP continues to pursue action by NL under an ACO for an adjacent property along Margaret's Creek where related lead contamination has been found.

Site and Enforcement Background

The Margaret's Creek and Laurence Harbor Seawall site occupies at least 60 acres off of Route 35.

In September 1972, DEP was advised by a local environmental commission member that lead bearing waste material was being disposed of along the Laurence Harbor beach front on Raritan Bay. By letter to DEP dated December 7, 1972, NL acknowledged that "slag which consists of non-recoverable low yield metallic waste from blast furnace and blast furnace rubble are disposed of by Liberty Trucking Company at their property in Madison Township, Route 35, New Jersey." Madison Township is now known as Old Bridge Township. NL used battery plates from lead/acid storage batteries as the principal feed material for the blast furnace located at its plant in Perth Amboy.

The Margaret's Creek portion of the site was proposed for acquisition by the State of New Jersey under the Green Acres Program in 2006. During a preliminary assessment phase of the Green Acres review process, historical aerial photos revealed the filling of approximately 20 acres of the site by 1974.

On December 13, 2006, a limited site investigation was conducted to visually characterize fill material via excavation of test pits. Waste materials were evident in numerous locations across the surface of the site, including large quantities of what appeared to be shredded automotive battery casings and refractory brick and slag. On March 14, 2007, the Department collected soil samples at the portion of the Margaret's Creek portion of the site. Lead was detected at concentrations ranging from 701 to146,000 parts per million (ppm), which are above the state's unrestricted use and restricted use Soil Cleanup Criteria.

On May 23, 2007 the Department conducted further soil sampling. Antimony was detected at concentrations above state criteria, ranging from 17.8 ppm to 12,900 ppm. Arsenic was detected at concentrations above state criteria, ranging from 23.6 ppm to 3,350 ppm. Lead was detected at concentrations above state criteria, ranging from 647 ppm to 142,000 ppm. On July 24, 2007 the Department conducted its most recent round of soil sampling in a preliminary attempt to identify the boundary of contaminated soils in public areas.

In addition to the removal action request, DEP has determined that it is necessary to conduct a remedial investigation at the site to fully delineate the nature and extent of the problem presented by the lead-bearing waste. Upon completion of the remedial investigation, it will be necessary to implement a remedial action to address the discharges at the site.

The substances found at the site are hazardous substances pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11b.

Summary

NJDEP recently provided background and site assessment files related to contamination at the subject site to your removal action branch staff. If you have any questions or would like to discuss these issues in further detail, please contact Fred Mumford, Superfund coordinator in the Publicly Funded Remediation Element, at (609) 984-3074.

Sincerely,

Irene Kropp
Assistant Commissioner
Site Remediation and Waste Management

C: Joseph Rotola, Branch Chief, Removal Action Branch, USEPA Region II
Ed Putnam, Assistant Director, Publicly Funded Remediation Element, NJDEP
James Brownlee, Director, Consumer and Environmental Health, NJDHSS
Michael Jacobs, Business Administrator, Old Bridge Township

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REFERENCE 8

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 1 October 2008

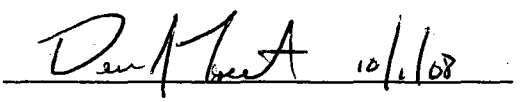
SUBJECT: NJDEP Surface Soil Sampling Along Old Bridge Waterfront Park Walkway

Attached to this project note are the following:

- New Jersey Department of Environmental Protection (NJDEP) memorandum from Jerry Schoenleber, the Environmental Measurements Section, to Fred Mumford, Remedial Response Element, dated August 6, 2007 ***(page 2 of this project note)***
- Global Positioning System data points ***(page 3-4 of this project note)***
- Sample Location Maps ***(pages 5-6 of this project note)***
- Quality Assurance Reviews of analytical data ***(pages 7-58 of this project note)***

The above information documents the details and analytical results from NJDEP surface soil sampling events conducted along the Old Bridge Waterfront Park Walkway on May 23, 2007 and July 24, 2007.

This information was submitted by the NJDEP Site Remediation and Waste Management Program, Division of Remediation Support, Bureau of Environmental Measurements and Site Assessment to Nick Magriples, who is an On-Scene Coordinator under the U.S. Environmental Protection Agency Removal Program.

Signature/Date  10/1/08

State of New Jersey

JON S. CORZINE
Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE REMEDIATION AND WASTE MANAGEMENT PROGRAM
DIVISION OF REMEDIATION SUPPORT
BUREAU OF ENVIRONMENTAL MEASUREMENTS AND SITE ASSESSMENT
P.O. BOX 407
TRENTON, NEW JERSEY 08625-0407

LISA P. JACKSON
Commissioner

Memorandum

To: Fred Mumford, Case Manager
Remedial Response Element

AUG 6 2007

From: Jerry R. Schoenleber, Section Chief JRS
Environmental Measurements Section

Subject: Margaret's Creek Lead Contamination – A4639300
Soil Sampling – July 24, 2007

At your request the Environmental Measurements Section conducted surface soil sampling at the Old Bridge Waterfront Walkway at Laurence Harbor on July 24th, 2007. This event constitutes the second round of sampling, the first being conducted in May of this year. Soil associated with the seawall analyzed during the first event revealed elevated levels of lead, antimony and arsenic. This prompted a second round of surface soil sampling to further investigate the expanse associated with the park where exposure to walkway users would most likely occur. Thirty-one locations were chosen over the park area including an expanse of beach east of the footbridge over Margaret's Creek. The attached maps depict sample locations that were fixed using global positioning satellites. All samples were collected from the 0-6 inch depth interval using dedicated decontaminated stainless steel trowels.

As a precautionary measure, a radiation meter (Micro R/Model 19 w/ Gamma probe) was used to scan the crucible slag waste material along the seawall between S29 and S30 and again at locations S34 and S35. Reading never went above the background measurement of 5-6 mR/hr. Based on these observations, it may be assumed that the crucible slag presents no immediate radiological concerns.

Samples were shipped to Test America in Burlington, Vermont for trace metals analysis per state contract A57425 line item #50. Results should be available on or about August 26th. If you have any questions regarding sample collection or the status of samples analysis please contact the writer @ 588-3104.

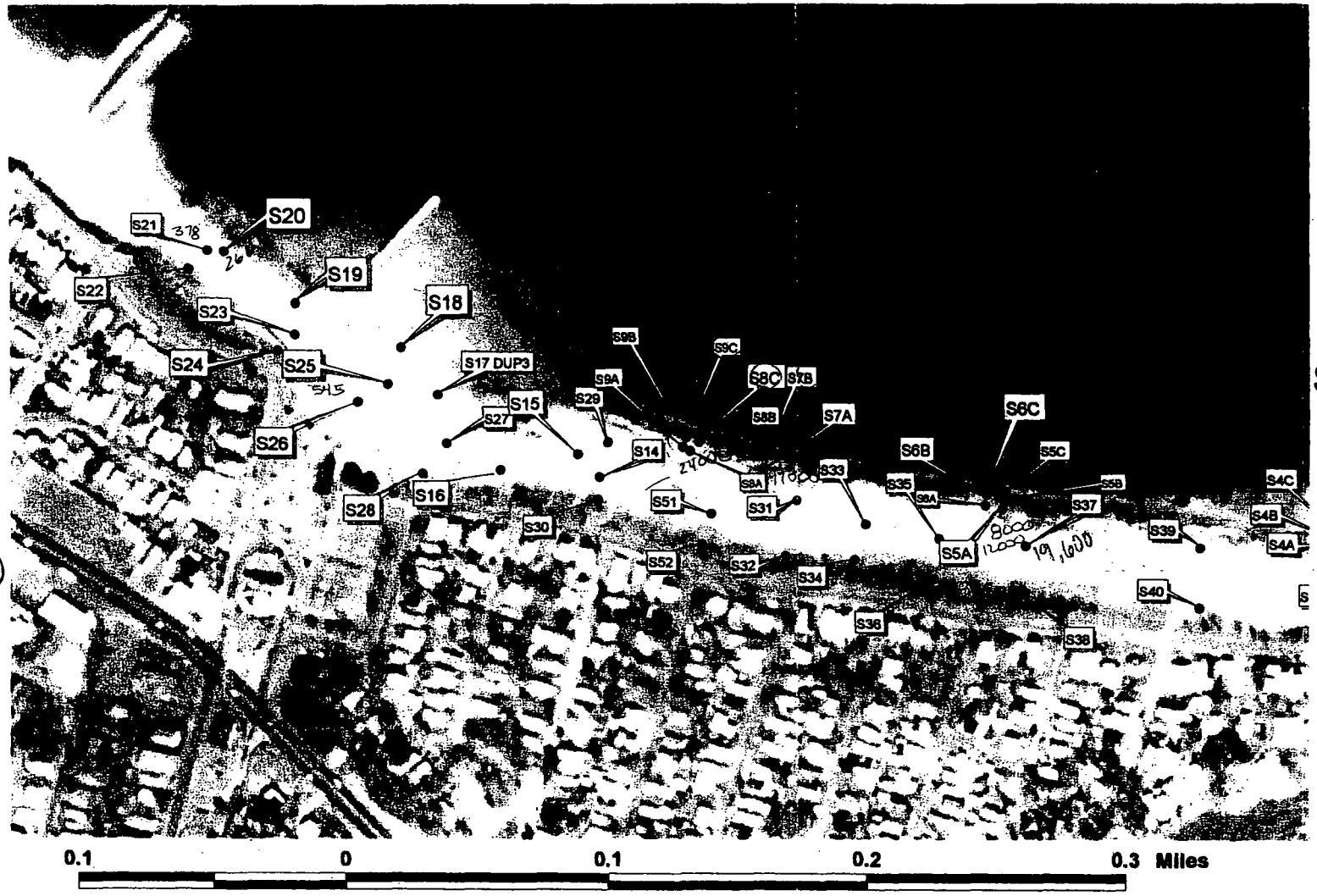
C: Ed Putnam, Assistant Director, RRE, w/attachments
William Lowry, Chief, BEMSA
Chron

(2)

COMMENT	XCOORD	YCOORD
S12	565268.5645	591313.9679
S13	565314.2268	591317.4684
S1A	565378.8678	591587.4065
S1B	565376.2869	591612.2413
S1C	565375.0954	591623.7261
S2A	565207.4269	591614.7405
S2B	565212.4060	591636.5734
S3A	564911.5569	591660.8651
S3B	564919.7720	591666.5750
S3C	564922.6459	591692.2527
S4A	564851.0748	591676.1494
S4B	564847.9786	591685.8139
S4C	564848.0152	591705.8968
S5A	564178.1662	591745.4872
S5B	564179.2532	591764.5172
S5C	564179.2824	591776.3766
S6A	564143.3375	591752.1182
S6B	564145.0557	591774.0528
S6C	564145.5280	591786.3696
S7A	563689.4428	591828.1323
S7B	563689.6124	591853.5723
S8A	563538.4737	591863.1821
S8B	563556.9352	591880.8704
S8C	563559.6347	591892.2699
S9C	563534.9434	591896.3434
S9B	563529.4923	591890.4343
S9A	563524.3062	591871.1108
S16	563159.9851	591825.8764
S15	563314.1525	591856.8058
S14	563357.2374	591812.0040
S17 DUP3	563034.6560	591977.9685
S18	562960.2502	592073.2847
S19	562749.5245	592161.5944
S20	562606.7368	592265.5047

COMMENT	XCOORD	YCOORD
S45	565428.5205	591518.9818
S46	565355.8366	591497.9430
S47	565687.8592	591385.1547
S48	565600.3526	591358.5484
S49	565851.6195	591135.9984
S50	565724.3899	591062.2330
S43	565158.7851	591531.5993
S44	565019.5120	591430.8981
S42	564938.2106	591552.6515
S41	564906.9549	591484.5920
S39	564576.3324	591666.3468
S40	564576.1592	591543.8674
S37	564225.3226	591670.0381
S38	564199.7583	591579.8214
S36	564038.7688	591603.4004
S35	564049.0882	591685.2389
S34	563875.7393	591641.4886
S33	563898.8211	591715.1638
S31	563756.1585	591762.7248
S32	563732.8528	591650.7729
S52	563564.5046	591673.8873
S51	563582.1411	591736.3480
S30	563354.0575	591766.5132
S29	563374.6423	591681.3881
S27	563051.3960	591880.3714
S28	563003.3300	591819.7736
S25	562935.3352	592000.0592
S26	562873.5856	591964.0915
S23	562749.0658	592099.7828
S26A	562873.6861	591965.2195
S24	562713.1933	592067.7102
S21	562573.6921	592266.5386
S22	562536.4547	592228.2025

Laurence Harbor



New Jersey Department of Environmental Protection

Site Remediation Program

Western Quadrant Sampling Locations

● May 23, 2007 Sampling Locations

● July 24, 2007 Sampling Locations

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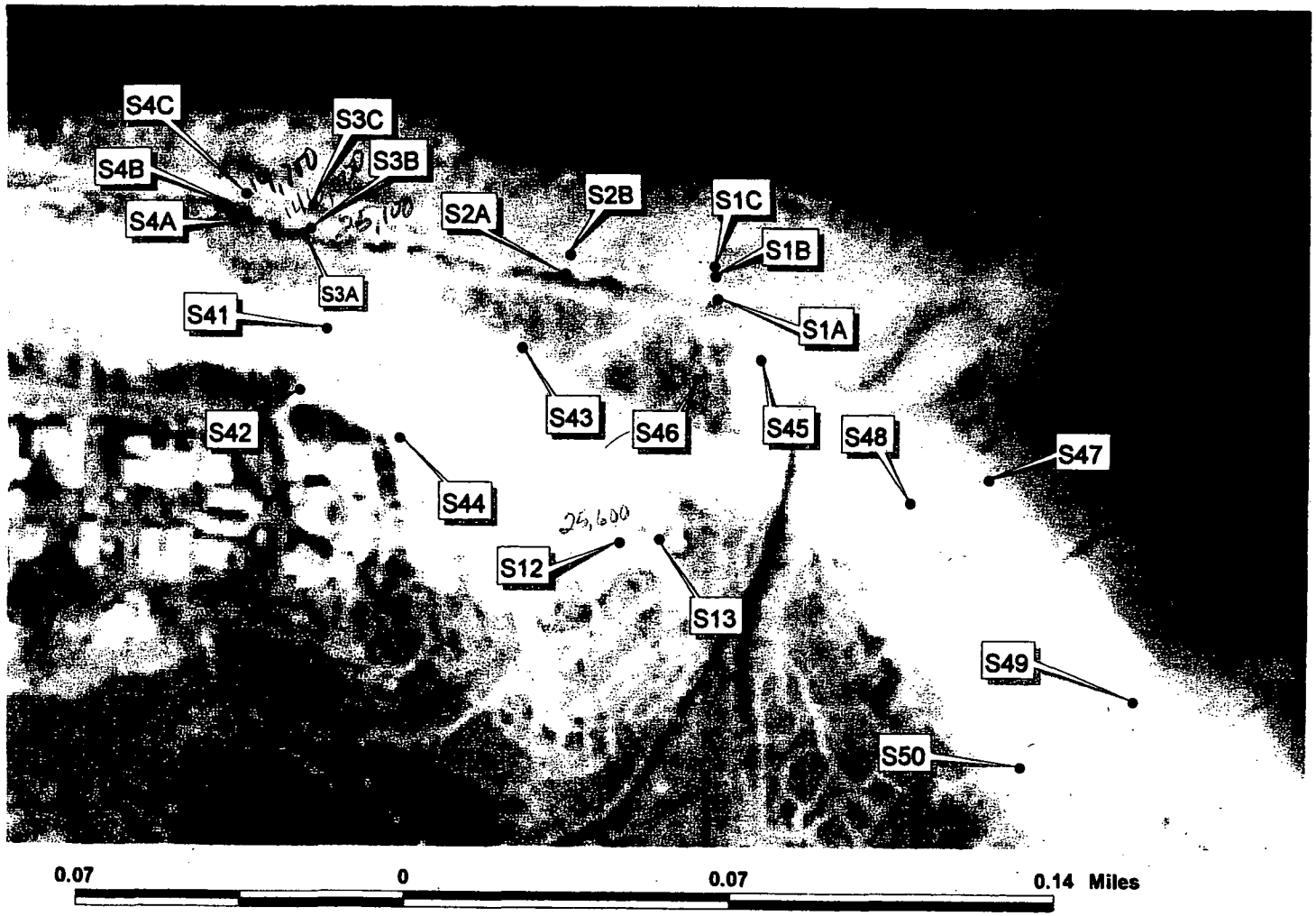
Map I

Laurence Harbor



New Jersey Department of Environmental Protection

Site Remediation Program

Eastern Quadrant Sampling Locations

May 23, 2007
● Sampling Locations

July 24, 2007
● Sampling Locations

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State of New Jersey
Department of Environmental Protection
Jon S. Corzine
Governor
Lisa P. Jackson
Commissioner

MEMORANDUM

TO: Kevin Schick, Bureau Chief
Bureau of Environmental Evaluation and Risk Assessment

THROUGH: Greg Toffoli, Section Chief GT 9/4/07
Office of Data Quality
Hazardous Site Science Element

SEP 04 2007

FROM: Carol Pillsbury CP 9/4/07
Office of Data Quality
Hazardous Site Science Element

SUBJECT: Quality Assurance Review –**Margaret Creek Lead Contamination (SDG 121058)** Site. STL Burlington, Colchester, VT analyzed sixteen nonaqueous samples for TAL Metals according to USEPA CLP SOW ILM05.3.

Field ID	Laboratory ID	Sample Date	Matrix
S37	718739	07/24/2007	NONAQUEOUS
S38	718740	07/24/2007	NONAQUEOUS
S39	718741	07/24/2007	NONAQUEOUS
S40	718742	07/24/2007	NONAQUEOUS
S41	718743	07/24/2007	NONAQUEOUS
S42	718744	07/24/2007	NONAQUEOUS
S43	718745	07/24/2007	NONAQUEOUS
S44	718746	07/24/2007	NONAQUEOUS
S45	718747	07/24/2007	NONAQUEOUS
S46	718748	07/24/2007	NONAQUEOUS
S47	718749	07/24/2007	NONAQUEOUS
S48	718750	07/24/2007	NONAQUEOUS
S49	718751	07/24/2007	NONAQUEOUS
S50	718752	07/24/2007	NONAQUEOUS
S51	718753	07/24/2007	NONAQUEOUS
S52	718754	07/24/2007	NONAQUEOUS

The Office of Data Quality, Hazardous Site Science Element, Division of Remediation Management and Response has reviewed the above listed nonaqueous samples according to Full CLP Deliverable Requirements as specified in the Technical Requirements for Site Remediation, N.J.A.C. 7:26E. A Target Analyte Summary List is provided for your convenience. Specific comments are provided below:

Metals

The metals data are acceptable with the qualifications resulting from QA/QC outliers in the following analyses: sample spike, sample duplicate, serial dilution, negative drifting and preparation blank.

Should you have any questions regarding this review, please contact this office at 633-0752.

C. Ed Putnam, RPDE
Jerry Schoenleber, EMS
Mindy Mumford, OCR

Project Name: A4639300
SDG: 121058
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time - NT Only	QA Decision	Footnotes
Field ID Num: S52; Lab ID Num: 718754; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	86.9		86.9			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	4820		4820			
Antimony	7440-36-0	5.3	UJ	5.3		Qualify	4
Arsenic	7440-38-2	6.3		6.3			
Barium	7440-39-3	18.8		18.8			
Beryllium	7440-41-7	0.24	J	0.24		Qualify	1
Cadmium	7440-43-9	0.2	J	0.2		Qualify	1
Calcium	7440-70-2	507		507			
Chromium	7440-47-3	11.5		11.5			
Cobalt	7440-48-4	1.4	J	1.4		Qualify	1
Copper	7440-50-8	10		10			
Iron	7439-89-6	11400	J	11400		Qualify	5
Magnesium	7439-95-4	579		579			
Manganese	7439-96-5	74.6		74.6			
Nickel	7440-02-0	4.4		4.4			
Potassium	7440-09-7	710		710			
Selenium	7782-49-2	3.1	UJ	3.1		Qualify	2
Lead	7439-92-1	25.1	J	25.1		Qualify	5
Vanadium	7440-62-2	24.9		24.9			
Zinc	7440-66-6	23.6	J	23.6		Qualify	6
Field ID Num: S51; Lab ID Num: 718753; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	92		92			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	7170		7170			
Antimony	7440-36-0	5	UJ	5		Qualify	4
Arsenic	7440-38-2	9		9			
Barium	7440-39-3	34.4		34.4			
Beryllium	7440-41-7	0.42		0.42			
Cadmium	7440-43-9	0.28	J	0.28		Qualify	1
Calcium	7440-70-2	669		669			
Chromium	7440-47-3	24.5		24.5			
Cobalt	7440-48-4	3.6	J	3.6		Qualify	1
Copper	7440-50-8	27.3		27.3			
Iron	7439-89-6	23100	J	23100		Qualify	5
Magnesium	7439-95-4	1370		1370			
Manganese	7439-96-5	85.4		85.4			
Nickel	7440-02-0	9.5		9.5			
Potassium	7440-09-7	1120		1120			
Selenium	7782-49-2	2.9	UJ	2.9		Qualify	2
Lead	7439-92-1	40.1	J	40.1		Qualify	5
Sodium	7440-23-5	73.3	J	73.3		Qualify	1
Thallium	7440-28-0	0.55	J	0.55		Qualify	1
Vanadium	7440-62-2	35.7		35.7			
Zinc	7440-66-6	32.3	J	32.3		Qualify	6

Project Name: A4639300
SDG: 121058
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Field ID Num: S50; Lab ID Num: 718752; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	90.4		90.4			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2470		2470			
Antimony	7440-36-0	5	UJ	5		Qualify	4
Arsenic	7440-38-2	10.2		10.2			
Barium	7440-39-3	6.9	J	6.9		Qualify	1
Beryllium	7440-41-7	0.21	J	0.21		Qualify	1
Cadmium	7440-43-9	0.37	J	0.37		Qualify	1
Calcium	7440-70-2	64.2	J	64.2		Qualify	1
Chromium	7440-47-3	20.8		20.8			
Cobalt	7440-48-4	0.73	J	0.73		Qualify	1
Copper	7440-50-8	31.8		31.8			
Iron	7439-89-6	42000	J	42000		Qualify	5
Magnesium	7439-95-4	213	J	213		Qualify	1
Manganese	7439-96-5	30.3		30.3			
Nickel	7440-02-0	3.8		3.8			
Potassium	7440-09-7	332	J	332		Qualify	1
Selenium	7782-49-2	2.9	UJ	2.9		Qualify	2
Lead	7439-92-1	24.8	J	24.8		Qualify	5
Thallium	7440-28-0	0.41	J	0.41		Qualify	1
Vanadium	7440-62-2	38.1		38.1			
Zinc	7440-66-6	33	J	33		Qualify	6
Field ID Num: S49; Lab ID Num: 718751; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	95.1		95.1			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	443		443			
Antimony	7440-36-0	4.8	UJ	4.8		Qualify	4
Arsenic	7440-38-2	2.3		2.3			
Barium	7440-39-3	2.2	J	2.2		Qualify	1
Beryllium	7440-41-7	0.094	J	0.094		Qualify	1
Calcium	7440-70-2	468		468			
Chromium	7440-47-3	5		5			
Cobalt	7440-48-4	0.26	J	0.26		Qualify	1
Copper	7440-50-8	3.7		3.7			
Iron	7439-89-6	3870	J	3870		Qualify	5
Magnesium	7439-95-4	150	J	150		Qualify	1
Manganese	7439-96-5	30.2		30.2			
Nickel	7440-02-0	0.82	J	0.82		Qualify	1
Potassium	7440-09-7	81.4	J	81.4		Qualify	1
Selenium	7782-49-2	2.8	UJ	2.8		Qualify	2
Lead	7439-92-1	4.1	J	4.1		Qualify	5
Sodium	7440-23-5	388	J	388		Qualify	1
Vanadium	7440-62-2	6.5		6.5			
Zinc	7440-66-6	10.7	J	10.7		Qualify	6
Field ID Num: S48; Lab ID Num: 718750; Sampling Date: 07/24/2007; Matrix: SOIL							

Project Name: A4639300
SDG: 121058
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	LQ	QA Reported Conc.	Retention Time (RT) Only	QA Decision	Footnotes
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	97.8		97.8			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	238		238			
Antimony	7440-36-0	4.7	UJ	4.7		Qualify	4
Arsenic	7440-38-2	1.3		1.3			
Barium	7440-39-3	1.1	J	1.1		Qualify	1
Beryllium	7440-41-7	0.063	J	0.063		Qualify	1
Calcium	7440-70-2	42.8	JB	42.8		Qualify	1,3
Chromium	7440-47-3	2.8		2.8			
Copper	7440-50-8	1	J	1		Qualify	1
Iron	7439-89-6	2600	J	2600		Qualify	5
Magnesium	7439-95-4	39	J	39		Qualify	1
Manganese	7439-96-5	16.8		16.8			
Nickel	7440-02-0	0.52	J	0.52		Qualify	1
Potassium	7440-09-7	42.6	J	42.6		Qualify	1
Selenium	7782-49-2	2.8	UJ	2.8		Qualify	2
Lead	7439-92-1	3.1	J	3.1		Qualify	5
Vanadium	7440-62-2	4.2		4.2			
Zinc	7440-66-6	7.2	J	7.2		Qualify	6
Field ID Num: S47; Lab ID Num: 718749; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	92.4		92.4			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1360		1360			
Antimony	7440-36-0	5	UJ	5		Qualify	4
Arsenic	7440-38-2	8.7		8.7			
Barium	7440-39-3	1.8	J	1.8		Qualify	1
Beryllium	7440-41-7	0.22	J	0.22		Qualify	1
Cadmium	7440-43-9	0.38	J	0.38		Qualify	1
Calcium	7440-70-2	573		573			
Chromium	7440-47-3	11.7		11.7			
Cobalt	7440-48-4	1.6	J	1.6		Qualify	1
Copper	7440-50-8	3.9		3.9			
Iron	7439-89-6	32800	J	32800		Qualify	5
Magnesium	7439-95-4	392	J	392		Qualify	1
Manganese	7439-96-5	66		66			
Nickel	7440-02-0	4.2		4.2			
Potassium	7440-09-7	166	J	166		Qualify	1
Selenium	7782-49-2	2.9	UJ	2.9		Qualify	2
Lead	7439-92-1	6.5	J	6.5		Qualify	5
Sodium	7440-23-5	867		867			
Vanadium	7440-62-2	29.3		29.3			
Zinc	7440-66-6	34.4	J	34.4		Qualify	6
Field ID Num: S46; Lab ID Num: 718748; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
olids, Percent	SRP 141	82.7		82.7			

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Project Name: A4639300
SDG: 121058
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	LQ	QA Reported Conc	Retention Time (RT Only)	QA Decision	Footnotes
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	892		892			
Antimony	7440-36-0	5.5	UJ	5.5		Qualify	4
Arsenic	7440-38-2	4.7		4.7			
Barium	7440-39-3	6.2	J	6.2		Qualify	1
Beryllium	7440-41-7	0.089	J	0.089		Qualify	1
Cadmium	7440-43-9	0.061	J	0.061		Qualify	1
Calcium	7440-70-2	284	J	284		Qualify	1
Chromium	7440-47-3	3.7		3.7			
Cobalt	7440-48-4	0.29	J	0.29		Qualify	1
Copper	7440-50-8	7.5		7.5			
Iron	7439-89-6	4510	J	4510		Qualify	5
Magnesium	7439-95-4	82.1	J	82.1		Qualify	1
Manganese	7439-96-5	7.2		7.2			
Nickel	7440-02-0	1.7	J	1.7		Qualify	1
Potassium	7440-09-7	166	J	166		Qualify	1
Selenium	7782-49-2	3.2	UJ	3.2		Qualify	2
Lead	7439-92-1	36.2	J	36.2		Qualify	5
Vanadium	7440-62-2	8.2		8.2			
Zinc	7440-66-6	8.1	J	8.1		Qualify	6
Field ID Num: S45; Lab ID Num: 718747; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	87		87			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1400		1400			
Antimony	7440-36-0	0.42	J	0.42		Qualify	1,4
Arsenic	7440-38-2	7.3		7.3			
Barium	7440-39-3	4.5	J	4.5		Qualify	1
Beryllium	7440-41-7	0.16	J	0.16		Qualify	1
Cadmium	7440-43-9	0.34	J	0.34		Qualify	1
Calcium	7440-70-2	434	J	434		Qualify	1
Chromium	7440-47-3	21.5		21.5			
Cobalt	7440-48-4	2.5	J	2.5		Qualify	1
Copper	7440-50-8	26.2		26.2			
Iron	7439-89-6	26600	J	26600		Qualify	5
Lead	7439-92-1	63.8	J	63.8		Qualify	5
Magnesium	7439-95-4	334	J	334		Qualify	1
Manganese	7439-96-5	56.9		56.9			
Nickel	7440-02-0	5.2		5.2			
Potassium	7440-09-7	188	J	188		Qualify	1
Selenium	7782-49-2	3.1	UJ	3.1		Qualify	2
Sodium	7440-23-5	164	J	164		Qualify	1
Vanadium	7440-62-2	26.2		26.2			
Zinc	7440-66-6	36.4	J	36.4		Qualify	6
Field ID Num: S44; Lab ID Num: 718746; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	82.6		82.6			
ICPAES Metals (mg/Kg)							

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Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Dilution Factor: 1.00							
Aluminum	7429-90-5	3540		3540			
Antimony	7440-36-0	5.5	UJ	5.5		Qualify	4
Arsenic	7440-38-2	4.6		4.6			
Barium	7440-39-3	14.5	J	14.5		Qualify	1
Beryllium	7440-41-7	0.17	J	0.17		Qualify	1
Cadmium	7440-43-9	0.12	J	0.12		Qualify	1
Calcium	7440-70-2	736		736			
Chromium	7440-47-3	7.8		7.8			
Cobalt	7440-48-4	1	J	1		Qualify	1
Copper	7440-50-8	9		9			
Iron	7439-89-6	9720	J	9720		Qualify	5
Lead	7439-92-1	24.1	J	24.1		Qualify	5
Magnesium	7439-95-4	455	J	455		Qualify	1
Manganese	7439-96-5	54.8		54.8			
Nickel	7440-02-0	3	J	3		Qualify	1
Potassium	7440-09-7	418	J	418		Qualify	1
Selenium	7782-49-2	3.2	UJ	3.2		Qualify	2
Vanadium	7440-62-2	16.6		16.6			
Zinc	7440-66-6	19.9	J	19.9		Qualify	6
Field ID Num: S43; Lab ID Num: 718745; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	69.3		69.3			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	5990		5990			
Antimony	7440-36-0	6.7	UJ	6.7		Qualify	4
Arsenic	7440-38-2	3.7		3.7			
Barium	7440-39-3	38.6		38.6			
Beryllium	7440-41-7	0.27	J	0.27		Qualify	1
Cadmium	7440-43-9	0.27	J	0.27		Qualify	1
Calcium	7440-70-2	12700		12700			
Chromium	7440-47-3	17.5		17.5			
Cobalt	7440-48-4	1.7	J	1.7		Qualify	1
Copper	7440-50-8	27.5		27.5			
Iron	7439-89-6	8850	J	8850		Qualify	5
Lead	7439-92-1	34	J	34		Qualify	5
Magnesium	7439-95-4	924		924			
Manganese	7439-96-5	120		120			
Nickel	7440-02-0	6.5		6.5			
Potassium	7440-09-7	729		729			
Selenium	7782-49-2	3.9	UJ	3.9		Qualify	2
Silver	7440-22-4	0.5	J	0.5		Qualify	1
Vanadium	7440-62-2	18.1		18.1			
Zinc	7440-66-6	50.7	J	50.7		Qualify	6
Field ID Num: S42; Lab ID Num: 718744; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	85.2		85.2			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							

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Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Aluminum	7429-90-5	1910		1910			
Antimony	7440-36-0	5.3	UJ	5.3		Qualify	4
Arsenic	7440-38-2	2.8		2.8			
Barium	7440-39-3	10.7	J	10.7		Qualify	1
Beryllium	7440-41-7	0.1	J	0.1		Qualify	1
Cadmium	7440-43-9	0.13	J	0.13		Qualify	1
Calcium	7440-70-2	378	J	378		Qualify	1
Chromium	7440-47-3	6.9		6.9			
Cobalt	7440-48-4	0.37	J	0.37		Qualify	1
Copper	7440-50-8	8.2		8.2			
Iron	7439-89-6	16500	J	16500		Qualify	5
Lead	7439-92-1	22.7	J	22.7		Qualify	5
Magnesium	7439-95-4	196	J	196		Qualify	1
Manganese	7439-96-5	20.9		20.9			
Nickel	7440-02-0	1.8	J	1.8		Qualify	1
Potassium	7440-09-7	200	J	200		Qualify	1
Selenium	7782-49-2	3.1	UJ	3.1		Qualify	2
Vanadium	7440-62-2	14.5		14.5			
Zinc	7440-66-6	22.9	J	22.9		Qualify	6
Field ID Num: S41; Lab ID Num: 718743; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	62.2		62.2			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	8390		8390			
Antimony	7440-36-0	7.3	UJ	7.3		Qualify	4
Arsenic	7440-38-2	3.5		3.5			
Barium	7440-39-3	50.8		50.8			
Beryllium	7440-41-7	0.33	J	0.33		Qualify	1
Cadmium	7440-43-9	0.29	J	0.29		Qualify	1
Calcium	7440-70-2	5360		5360			
Chromium	7440-47-3	23.3		23.3			
Cobalt	7440-48-4	3.3	J	3.3		Qualify	1
Copper	7440-50-8	39.7		39.7			
Iron	7439-89-6	14400	J	14400		Qualify	5
Lead	7439-92-1	33.9	J	33.9		Qualify	5
Magnesium	7439-95-4	1620		1620			
Manganese	7439-96-5	213		213			
Nickel	7440-02-0	9.9		9.9			
Potassium	7440-09-7	920		920			
Selenium	7782-49-2	4.3	UJ	4.3		Qualify	2
Silver	7440-22-4	0.5	J	0.5		Qualify	1
Sodium	7440-23-5	247	J	247		Qualify	1
Vanadium	7440-62-2	23.2		23.2			
Zinc	7440-66-6	51.6	J	51.6		Qualify	6
Field ID Num: S40; Lab ID Num: 718742; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	91.6		91.6			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							

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Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	LQ	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Aluminum	7429-90-5	873		873			
Antimony	7440-36-0	5	UJ	5		Qualify	4
Arsenic	7440-38-2	2.4		2.4			
Barium	7440-39-3	4	J	4		Qualify	1
Beryllium	7440-41-7	0.073	J	0.073		Qualify	1
Cadmium	7440-43-9	0.07	J	0.07		Qualify	1
Calcium	7440-70-2	241	J	241		Qualify	1
Chromium	7440-47-3	5		5			
Cobalt	7440-48-4	0.31	J	0.31		Qualify	1
Copper	7440-50-8	3.4		3.4			
Iron	7439-89-6	5990	J	5990		Qualify	5
Lead	7439-92-1	35.6	J	35.6		Qualify	5
Magnesium	7439-95-4	86.5	J	86.5		Qualify	1
Manganese	7439-96-5	8.6		8.6			
Nickel	7440-02-0	1	J	1		Qualify	1
Potassium	7440-09-7	120	J	120		Qualify	1
Selenium	7782-49-2	2.9	UJ	2.9		Qualify	2
Vanadium	7440-62-2	8.7		8.7			
Zinc	7440-66-6	4.9	JB	4.9		Qualify	1,3,6
Field ID Num: S39; Lab ID Num: 718741; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	93.1		93.1			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	9150		9150			
Antimony	7440-36-0	5	UJ	5		Qualify	4
Arsenic	7440-38-2	6		6			
Barium	7440-39-3	43.3		43.3			
Beryllium	7440-41-7	0.55		0.55			
Cadmium	7440-43-9	0.37	J	0.37		Qualify	1
Calcium	7440-70-2	1940		1940			
Chromium	7440-47-3	17.7		17.7			
Cobalt	7440-48-4	5.4		5.4			
Copper	7440-50-8	35.3		35.3			
Iron	7439-89-6	17300	J	17300		Qualify	5
Lead	7439-92-1	48	J	48		Qualify	5
Magnesium	7439-95-4	1640		1640			
Manganese	7439-96-5	244		244			
Nickel	7440-02-0	13		13			
Potassium	7440-09-7	1080		1080			
Selenium	7782-49-2	2.9	UJ	2.9		Qualify	2
Sodium	7440-23-5	228	J	228		Qualify	1
Vanadium	7440-62-2	27.8		27.8			
Zinc	7440-66-6	38.9	J	38.9		Qualify	6
Field ID Num: S38; Lab ID Num: 718740; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	83.4		83.4			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1230		1230			

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Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Aluminum	7429-90-5	9150		9150			
Arsenic	7440-38-2	6		6			
Barium	7440-39-3	43.3		43.3			
Beryllium	7440-41-7	0.55		0.55			
Cadmium	7440-43-9	0.37	J	0.37			
Calcium	7440-70-2	1940		1940			
Chromium	7440-47-3	17.7		17.7			
Cobalt	7440-48-4	5.4		5.4			
Copper	7440-50-8	35.3		35.3			
Iron	7439-89-6	17300		17300			
Lead	7439-92-1	48		48			
Magnesium	7439-95-4	1640		1640			
Manganese	7439-96-5	244		244			
Nickel	7440-02-0	13		13			
Potassium	7440-09-7	1080		1080			
Sodium	7440-23-5	228	J	228			
Vanadium	7440-62-2	27.8		27.8			
Zinc	7440-66-6	38.9		38.9			
Field ID Num: S38; Lab ID Num: 718740; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	83.4		83.4			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1230		1230			
Arsenic	7440-38-2	2.8		2.8			
Barium	7440-39-3	7.8	J	7.8			
Beryllium	7440-41-7	0.083	J	0.083			
Cadmium	7440-43-9	0.084	J	0.084			
Calcium	7440-70-2	211	J	211			
Chromium	7440-47-3	4.8		4.8			
Cobalt	7440-48-4	0.23	J	0.23			
Copper	7440-50-8	6.3		6.3			
Iron	7439-89-6	5530		5530			
Lead	7439-92-1	59.9		59.9			
Magnesium	7439-95-4	103	J	103			
Manganese	7439-96-5	9.2		9.2			
Nickel	7440-02-0	1.5	J	1.5			
Potassium	7440-09-7	153	J	153			
Vanadium	7440-62-2	9.2		9.2			
Zinc	7440-66-6	10		10			
Field ID Num: S37; Lab ID Num: 718739; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	87.2		87.2			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	6030		6030			
Arsenic	7440-38-2	6.1		6.1			
Barium	7440-39-3	19.4		19.4			
Beryllium	7440-41-7	0.31	J	0.31			
Cadmium	7440-43-9	0.53		0.53			

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Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time (RT Only)	QA Decision	Footnotes
Calcium	7440-70-2	122	J	122			
Chromium	7440-47-3	20.8		20.8			
Cobalt	7440-48-4	0.83	J	0.83			
Copper	7440-50-8	10.1		10.1			
Iron	7439-89-6	19600		19600			
Lead	7439-92-1	17.8		17.8			
Magnesium	7439-95-4	214	J	214			
Manganese	7439-96-5	21.6		21.6			
Nickel	7440-02-0	3.1	J	3.1			
Potassium	7440-09-7	437	J	437			
Thallium	7440-28-0	0.46	J	0.46			
Vanadium	7440-62-2	29.7		29.7			
Zinc	7440-66-6	11		11			

FOOTNOTES

1. The reported concentration is quantitatively qualified because it is above the Method Detection Level (MDL) but below the Contract Required Quantitation Limit (CRQL).

2. The positive result is qualified "J" and may be biased low, the nondetected results are qualified "UJ" and the detection limits may be estimated due to negative drifting of this analyte in the preparation blank.

3. The reported concentration in the sample is greater than 3X the value in the method/preparation blank and is considered "real". However, the reported value must be quantitatively qualified "J" due to method/preparation blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte in the method/preparation blank.

4. The reported concentration is quantitatively qualified and may be biased low or the detection limit for the nondetected result may be estimated because the %recovery for the sample spike analysis was below the QA/QC limits of 75-125%.

5. The reported concentration is quantitatively qualified because the Relative %Difference between the sample and sample duplicate results was greater than 20%.

6. The reported concentration is quantitatively qualified because the %Difference between the sample result and the Sample Serial Dilution result for this analyte was greater than 10%.

State of New Jersey
Department of Environmental Protection
Jon S. Corzine
Governor
Lisa P. Jackson
Commissioner

MEMORANDUM

TO: Kevin Schick, Bureau Chief
Bureau of Environmental Evaluation and Risk Assessment

THROUGH: Greg Toffoli, Section Chief GT 9/4/07
Office of Data Quality
Hazardous Site Science Element

SEP 04 2007

FROM: Carol Pillsbury CP 9/4/07
Office of Data Quality
Hazardous Site Science Element

SUBJECT: Quality Assurance Review –**Margaret Creek Lead Contamination (SDG 121055)** Site. STL Burlington, Colchester, VT analyzed eighteen nonaqueous samples for TAL Metals according to USEPA CLP SOW ILM05.3.

Field ID	Laboratory ID	Sample Date	Matrix
S21	718700	07/23/2007	NONAQUEOUS
S22	718701	07/23/2007	NONAQUEOUS
S23	718702	07/23/2007	NONAQUEOUS
S24	718703	07/23/2007	NONAQUEOUS
S25	718704	07/23/2007	NONAQUEOUS
S26	718705	07/23/2007	NONAQUEOUS
S27	718706	07/23/2007	NONAQUEOUS
DUP2	718707	07/23/2007	NONAQUEOUS
S28	718708	07/23/2007	NONAQUEOUS
S29	718709	07/23/2007	NONAQUEOUS
S30	718710	07/23/2007	NONAQUEOUS
S31	718711	07/23/2007	NONAQUEOUS
S32	718712	07/23/2007	NONAQUEOUS
S33	718713	07/23/2007	NONAQUEOUS
S34	718714	07/23/2007	NONAQUEOUS
DUP1	718715	07/23/2007	NONAQUEOUS
S35	718716	07/23/2007	NONAQUEOUS
S36	718717	07/23/2007	NONAQUEOUS

The Office of Data Quality, Hazardous Site Science Element, Division of Remediation Management and Response has reviewed the above listed nonaqueous samples according to Full CLP Deliverable Requirements as specified in the Technical Requirements for Site Remediation, N.J.A.C. 7:26E. A Target Analyte Summary List is provided for your convenience. Specific comments are provided below:

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Metals

The metals data are acceptable with the qualifications resulting from QA/QC outliers in the following analyses: sample spike, sample duplicate, serial dilution, negative drifting and preparation blank.

Should you have any questions regarding this review, please contact this office at 633-0752.

C. Ed Putnam, RPDE
Jerry Schoenleber, EMS
Mindy Mumford, OCR

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time (N Only)	QA Decision	Footnotes
Field ID Num: S36; Lab ID Num: 718717; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	82.2		82.2			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1870		1870			
Antimony	7440-36-0	0.87	J	0.87		Qualify	1,3
Arsenic	7440-38-2	3.7		3.7			
Barium	7440-39-3	9.1	J	9.1		Qualify	1
Beryllium	7440-41-7	0.058	J	0.058		Qualify	1
Calcium	7440-70-2	782	J	782		Qualify	4
Cobalt	7440-48-4	0.53	J	0.53		Qualify	1
Chromium	7440-47-3	6.1		6.1			
Copper	7440-50-8	6		6			
Iron	7439-89-6	7940		7940			
Magnesium	7439-95-4	247	J	247		Qualify	1
Manganese	7439-96-5	26.5	J	26.5		Qualify	4
Sodium	7440-23-5	12.5	J	12.5		Qualify	1,5
Nickel	7440-02-0	1.6	J	1.6		Qualify	1
Lead	7439-92-1	33.1	J	33.1		Qualify	4
Potassium	7440-09-7	226	J	226		Qualify	1
Vanadium	7440-62-2	12.1		12.1			
Zinc	7440-66-6	14.3		14.3			
Field ID Num: S35; Lab ID Num: 718716; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	85.3		85.3			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3470		3470			
Antimony	7440-36-0	1.1	J	1.1		Qualify	1,3
Arsenic	7440-38-2	7.3		7.3			
Barium	7440-39-3	13.8	J	13.8		Qualify	1
Beryllium	7440-41-7	0.22	J	0.22		Qualify	1
Calcium	7440-70-2	137	J	137		Qualify	1,4
Cobalt	7440-48-4	0.97	J	0.97		Qualify	1
Chromium	7440-47-3	17.5		17.5			
Copper	7440-50-8	9		9			
Iron	7439-89-6	21900		21900			
Magnesium	7439-95-4	147	J	147		Qualify	1
Manganese	7439-96-5	20.3	J	20.3		Qualify	4
Sodium	7440-23-5	28.6	J	28.6		Qualify	1,5
Nickel	7440-02-0	2.3	J	2.3		Qualify	1
Lead	7439-92-1	12.9	J	12.9		Qualify	4
Potassium	7440-09-7	461		461			
Vanadium	7440-62-2	28		28			
Zinc	7440-66-6	13.2		13.2			
Field ID Num: DUP1; Lab ID Num: 718715; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Dilution Factor: 1.0							
Solids, Percent	SRP 141	86.6		86.6			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	9030		9030			
Antimony	7440-36-0	1.3	J	1.3		Qualify	1,3
Arsenic	7440-38-2	8.4		8.4			
Barium	7440-39-3	40		40			
Beryllium	7440-41-7	0.43	J	0.43		Qualify	1
Calcium	7440-70-2	1710	J	1710		Qualify	4
Cadmium	7440-43-9	0.076	J	0.076		Qualify	1
Cobalt	7440-48-4	6		6			
Chromium	7440-47-3	34.4		34.4			
Copper	7440-50-8	24		24			
Iron	7439-89-6	24300		24300			
Magnesium	7439-95-4	1750		1750			
Manganese	7439-96-5	179	J	179		Qualify	4
Sodium	7440-23-5	106	J	106		Qualify	1,5
Nickel	7440-02-0	10.2		10.2			
Lead	7439-92-1	52.8	J	52.8		Qualify	4
Potassium	7440-09-7	1150		1150			
Vanadium	7440-62-2	41.5		41.5			
Zinc	7440-66-6	54.1		54.1			
Field ID Num: S34; Lab ID Num: 718714; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	86.9		86.9			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	8610		8610			
Antimony	7440-36-0	1.3	J	1.3		Qualify	1,3
Arsenic	7440-38-2	7.5		7.5			
Barium	7440-39-3	40.9		40.9			
Beryllium	7440-41-7	0.43	J	0.43		Qualify	1
Calcium	7440-70-2	2040	J	2040		Qualify	4
Cadmium	7440-43-9	0.1	J	0.1		Qualify	1
Cobalt	7440-48-4	5.3		5.3			
Chromium	7440-47-3	22.9		22.9			
Copper	7440-50-8	23		23			
Iron	7439-89-6	22300		22300			
Magnesium	7439-95-4	1970		1970			
Manganese	7439-96-5	193	J	193		Qualify	4
Sodium	7440-23-5	136	J	136		Qualify	1,5
Nickel	7440-02-0	10.3		10.3			
Lead	7439-92-1	53.6	J	53.6		Qualify	4
Potassium	7440-09-7	1140		1140			
Vanadium	7440-62-2	34.8		34.8			
Zinc	7440-66-6	50.9		50.9			
Field ID Num: S33; Lab ID Num: 718713; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time NT Only	QA Decision	Footnotes
Dilution Factor: 1.0							
Solids, Percent	SRP 141	88.1		88.1			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3040		3040			
Antimony	7440-36-0	1.1	J	1.1		Qualify	1,3
Arsenic	7440-38-2	5.6		5.6			
Barium	7440-39-3	12.7	J	12.7		Qualify	1
Beryllium	7440-41-7	0.2	J	0.2		Qualify	1
Calcium	7440-70-2	509	J	509		Qualify	4
Cobalt	7440-48-4	1.3	J	1.3		Qualify	1
Chromium	7440-47-3	12.7		12.7			
Copper	7440-50-8	13.6		13.6			
Iron	7439-89-6	19300		19300			
Magnesium	7439-95-4	305	J	305		Qualify	1
Manganese	7439-96-5	29.4	J	29.4		Qualify	4
Sodium	7440-23-5	27.5	J	27.5		Qualify	1,5
Nickel	7440-02-0	3	J	3		Qualify	1
Lead	7439-92-1	23.6	J	23.6		Qualify	4
Potassium	7440-09-7	359	J	359		Qualify	1
Vanadium	7440-62-2	16.9		16.9			
Zinc	7440-66-6	20		20			
Field ID Num: S32; Lab ID Num: 718712; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	85.3		85.3			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3280		3280			
Antimony	7440-36-0	0.5	J	0.5		Qualify	1,3
Arsenic	7440-38-2	2.6		2.6			
Barium	7440-39-3	13.9	J	13.9		Qualify	1
Beryllium	7440-41-7	0.1	J	0.1		Qualify	1
Calcium	7440-70-2	368	J	368		Qualify	1,4
Cobalt	7440-48-4	1.4	J	1.4		Qualify	1
Chromium	7440-47-3	7.8		7.8			
Copper	7440-50-8	8.6		8.6			
Iron	7439-89-6	8860		8860			
Magnesium	7439-95-4	359	J	359		Qualify	1
Manganese	7439-96-5	45.5	J	45.5		Qualify	4
Sodium	7440-23-5	30.9	J	30.9		Qualify	1,5
Nickel	7440-02-0	2.8	J	2.8		Qualify	1
Lead	7439-92-1	20.3	J	20.3		Qualify	4
Potassium	7440-09-7	314	J	314		Qualify	1
Vanadium	7440-62-2	13.9		13.9			
Zinc	7440-66-6	14.4		14.4			
Field ID Num: S31; Lab ID Num: 718711; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	82		82			

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	6890		6890			
Antimony	7440-36-0	1.6	J	1.6		Qualify	1,3
Arsenic	7440-38-2	6.7		6.7			
Barium	7440-39-3	33.8		33.8			
Beryllium	7440-41-7	0.27	J	0.27		Qualify	1
Calcium	7440-70-2	2250	J	2250		Qualify	4
Cadmium	7440-43-9	0.15	J	0.15		Qualify	1
Cobalt	7440-48-4	3.7	J	3.7		Qualify	1
Chromium	7440-47-3	16.2		16.2			
Copper	7440-50-8	25.7		25.7			
Iron	7439-89-6	16300		16300			
Magnesium	7439-95-4	1390		1390			
Manganese	7439-96-5	118	J	118		Qualify	4
Sodium	7440-23-5	93.7	J	93.7		Qualify	1,5
Nickel	7440-02-0	7.7		7.7			
Lead	7439-92-1	74.7	J	74.7		Qualify	4
Potassium	7440-09-7	866		866			
Vanadium	7440-62-2	27		27			
Zinc	7440-66-6	47.2		47.2			
Field ID Num: S30; Lab ID Num: 718710; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	86.3		86.3			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	11800		11800			
Antimony	7440-36-0	1.4	J	1.4		Qualify	1,3
Arsenic	7440-38-2	19.5		19.5			
Barium	7440-39-3	25.6		25.6			
Beryllium	7440-41-7	0.49		0.49			
Calcium	7440-70-2	440	J	440		Qualify	1,4
Cobalt	7440-48-4	2.7	J	2.7		Qualify	1
Chromium	7440-47-3	26.2		26.2			
Copper	7440-50-8	14.2		14.2			
Iron	7439-89-6	30800		30800			
Magnesium	7439-95-4	1210		1210			
Manganese	7439-96-5	58.2	J	58.2		Qualify	4
Sodium	7440-23-5	64.4	J	64.4		Qualify	1,5
Nickel	7440-02-0	6.1		6.1			
Lead	7439-92-1	18.4	J	18.4		Qualify	4
Potassium	7440-09-7	2040		2040			
Vanadium	7440-62-2	64.9		64.9			
Zinc	7440-66-6	30.1		30.1			
Field ID Num: S29; Lab ID Num: 718709; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	89.3		89.3			
ICPAES Metals (mg/Kg)							

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time, NT Only	QA Decision	Footnotes
Dilution Factor: 1.00							
Aluminum	7429-90-5	6370		6370			
Antimony	7440-36-0	1.3	J	1.3		Qualify	1,3
Arsenic	7440-38-2	6.4		6.4			
Barium	7440-39-3	27.4		27.4			
Beryllium	7440-41-7	0.3	J	0.3		Qualify	1
Calcium	7440-70-2	922	J	922		Qualify	4
Cadmium	7440-43-9	0.051	J	0.051		Qualify	1
Cobalt	7440-48-4	3.3	J	3.3		Qualify	1
Chromium	7440-47-3	17		17			
Copper	7440-50-8	20.8		20.8			
Iron	7439-89-6	16200		16200			
Magnesium	7439-95-4	1300		1300			
Manganese	7439-96-5	97.6	J	97.6		Qualify	4
Sodium	7440-23-5	76.9	J	76.9		Qualify	1,5
Nickel	7440-02-0	6.9		6.9			
Lead	7439-92-1	63.1	J	63.1		Qualify	4
Potassium	7440-09-7	1080		1080			
Vanadium	7440-62-2	24.3		24.3			
Zinc	7440-66-6	37.7		37.7			
Field ID Num: S28; Lab ID Num: 718708; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	88.6		88.6			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2070		2070			
Antimony	7440-36-0	1.7	J	1.7		Qualify	1,3
Arsenic	7440-38-2	4.6		4.6			
Barium	7440-39-3	9.9	J	9.9		Qualify	1
Beryllium	7440-41-7	0.14	J	0.14		Qualify	1
Calcium	7440-70-2	267	J	267		Qualify	1,4
Cobalt	7440-48-4	1	J	1		Qualify	1
Chromium	7440-47-3	8.9		8.9			
Copper	7440-50-8	8.6		8.6			
Iron	7439-89-6	10100		10100			
Magnesium	7439-95-4	407	J	407		Qualify	1
Manganese	7439-96-5	35.1	J	35.1		Qualify	4
Sodium	7440-23-5	28.4	J	28.4		Qualify	1,5
Nickel	7440-02-0	3.2	J	3.2		Qualify	1
Lead	7439-92-1	59	J	59		Qualify	4
Potassium	7440-09-7	382	J	382		Qualify	1
Vanadium	7440-62-2	13.8		13.8			
Zinc	7440-66-6	14.6		14.6			
Field ID Num: DUP2; Lab ID Num: 718707; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	89.5		89.5			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Aluminum	7429-90-5	4700		4700			
Antimony	7440-36-0	2.3	J	2.3		Qualify	1,3
Arsenic	7440-38-2	5.5		5.5			
Barium	7440-39-3	19.8		19.8			
Beryllium	7440-41-7	0.16	J	0.16		Qualify	1
Calcium	7440-70-2	878	J	878		Qualify	4
Cadmium	7440-43-9	0.032	J	0.032		Qualify	1
Cobalt	7440-48-4	1.5	J	1.5		Qualify	1
Chromium	7440-47-3	12.1		12.1			
Copper	7440-50-8	19.1		19.1			
Iron	7439-89-6	14900		14900			
Magnesium	7439-95-4	843		843.			
Manganese	7439-96-5	43.2	J	43.2		Qualify	4
Sodium	7440-23-5	36.6	J	36.6		Qualify	1,5
Nickel	7440-02-0	4.2		4.2			
Lead	7439-92-1	82.3	J	82.3		Qualify	4
Potassium	7440-09-7	736		736			
Vanadium	7440-62-2	23.2		23.2			
Zinc	7440-66-6	27.8		27.8			
Field ID Num: S27; Lab ID Num: 718706; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	88.7		88.7			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	4370		4370			
Antimony	7440-36-0	1.6	J	1.6		Qualify	1,3
Arsenic	7440-38-2	5.4		5.4			
Barium	7440-39-3	18.6		18.6			
Beryllium	7440-41-7	0.14	J	0.14		Qualify	1
Calcium	7440-70-2	1330	J	1330		Qualify	4
Cadmium	7440-43-9	0.03	J	0.03		Qualify	1
Cobalt	7440-48-4	1.9	J	1.9		Qualify	1
Chromium	7440-47-3	17.8		17.8			
Copper	7440-50-8	44		44			
Iron	7439-89-6	14900		14900			
Magnesium	7439-95-4	823		823			
Manganese	7439-96-5	45.5	J	45.5		Qualify	4
Sodium	7440-23-5	38.3	J	38.3		Qualify	1,5
Nickel	7440-02-0	3.7		3.7			
Lead	7439-92-1	72.5	J	72.5		Qualify	4
Potassium	7440-09-7	701		701			
Vanadium	7440-62-2	23.4		23.4			
Zinc	7440-66-6	22.6		22.6			
Field ID Num: S26; Lab ID Num: 718705; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	87.4		87.4			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	VQ	QA Reported Conc.	Retention Time NT Only	QA Decision	Footnotes
Aluminum	7429-90-5	3130		3130			
Antimony	7440-36-0	0.58	J	0.58		Qualify	1,3
Arsenic	7440-38-2	3.7		3.7			
Barium	7440-39-3	20.8		20.8			
Beryllium	7440-41-7	0.14	J	0.14		Qualify	1
Calcium	7440-70-2	109	J	109		Qualify	1,4
Cobalt	7440-48-4	0.61	J	0.61		Qualify	1
Chromium	7440-47-3	10.1		10.1			
Copper	7440-50-8	9.7		9.7			
Iron	7439-89-6	9290		9290			
Magnesium	7439-95-4	182	J	182		Qualify	1
Manganese	7439-96-5	11.4	J	11.4		Qualify	4
Sodium	7440-23-5	20.7	J	20.7		Qualify	1,5
Nickel	7440-02-0	1.9	J	1.9		Qualify	1
Lead	7439-92-1	15.9	J	15.9		Qualify	4
Potassium	7440-09-7	388	J	388		Qualify	1
Vanadium	7440-62-2	21.2		21.2			
Zinc	7440-66-6	9.7		9.7			
Field ID Num: S25; Lab ID Num: 718704; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	93.3		93.3			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2070		2070			
Antimony	7440-36-0	19.2	J	19.2		Qualify	3
Arsenic	7440-38-2	24.5		24.5			
Barium	7440-39-3	14.3	J	14.3		Qualify	1
Beryllium	7440-41-7	0.22	J	0.22		Qualify	1
Calcium	7440-70-2	1600	J	1600		Qualify	4
Cobalt	7440-48-4	0.8	J	0.8		Qualify	1
Chromium	7440-47-3	19.3		19.3			
Copper	7440-50-8	26.9		26.9			
Iron	7439-89-6	29100		29100			
Magnesium	7439-95-4	255	J	255		Qualify	1
Manganese	7439-96-5	29.3	J	29.3		Qualify	4
Sodium	7440-23-5	30.6	J	30.6		Qualify	1,5
Nickel	7440-02-0	3.8		3.8			
Lead	7439-92-1	545	J	545		Qualify	4
Potassium	7440-09-7	432		432			
Vanadium	7440-62-2	36.7		36.7			
Zinc	7440-66-6	22.2		22.2			
Field ID Num: S24; Lab ID Num: 718703; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	90		90			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1450		1450			
Antimony	7440-36-0	1.5	J	1.5		Qualify	1,3

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time N Only	QA Decision	Footnotes
Arsenic	7440-38-2	12.8		12.8			
Barium	7440-39-3	6.5	J	6.5		Qualify	1,2
Beryllium	7440-41-7	0.097	J	0.097		Qualify	1
Calcium	7440-70-2	444	J	444		Qualify	4
Cobalt	7440-48-4	0.66	J	0.66		Qualify	1
Chromium	7440-47-3	16.6		16.6			
Copper	7440-50-8	29.4		29.4			
Iron	7439-89-6	6590		6590			
Magnesium	7439-95-4	234	J	234		Qualify	1
Manganese	7439-96-5	17.7	J	17.7		Qualify	4
Sodium	7440-23-5	16.3	J	16.3		Qualify	1,5
Nickel	7440-02-0	1.8	J	1.8		Qualify	1
Lead	7439-92-1	61.5	J	61.5		Qualify	4
Potassium	7440-09-7	346	J	346		Qualify	1
Vanadium	7440-62-2	11.1		11.1			
Zinc	7440-66-6	20		20			
Field ID Num: S23; Lab ID Num: 718702; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	92.7		92.7			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2040		2040			
Antimony	7440-36-0	0.73	J	0.73		Qualify	1,3
Arsenic	7440-38-2	3.3		3.3			
Barium	7440-39-3	4.3	J	4.3		Qualify	1,2
Beryllium	7440-41-7	0.2	J	0.2		Qualify	1
Calcium	7440-70-2	2430	J	2430		Qualify	4
Cobalt	7440-48-4	1.6	J	1.6		Qualify	1
Chromium	7440-47-3	9.7		9.7			
Copper	7440-50-8	3.5		3.5			
Iron	7439-89-6	8390		8390			
Magnesium	7439-95-4	885		885			
Manganese	7439-96-5	41.5	J	41.5		Qualify	4
Sodium	7440-23-5	47.6	J	47.6		Qualify	1,5
Nickel	7440-02-0	3.7		3.7			
Lead	7439-92-1	15.8	J	15.8		Qualify	4
Potassium	7440-09-7	928		928			
Vanadium	7440-62-2	11.2		11.2			
Zinc	7440-66-6	11.2		11.2			
Field ID Num: S22; Lab ID Num: 718701; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	80.6		80.6			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	5820		5820			
Antimony	7440-36-0	1.9	J	1.9		Qualify	1,3
Arsenic	7440-38-2	8.6		8.6			
Barium	7440-39-3	60.7		60.7			

Project Name: A4639300
SDG: 121055
Project Number: A4639300

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time Nt Only	QA Decision	Footnotes
Beryllium	7440-41-7	0.18	J	0.18		Qualify	1
Calcium	7440-70-2	661	J	661		Qualify	4
Cobalt	7440-48-4	1.1	J	1.1		Qualify	1
Chromium	7440-47-3	18.8		18.8			
Copper	7440-50-8	17.5		17.5			
Iron	7439-89-6	19400		19400			
Magnesium	7439-95-4	657		657			
Manganese	7439-96-5	23.6	J	23.6		Qualify	4
Sodium	7440-23-5	172	J	172		Qualify	1,5
Nickel	7440-02-0	3.4	J	3.4		Qualify	1
Lead	7439-92-1	61.6	J	61.6		Qualify	4
Potassium	7440-09-7	973		973			
Vanadium	7440-62-2	34.6		34.6			
Zinc	7440-66-6	15		15			
Field ID Num: S21; Lab ID Num: 718700; Sampling Date: 07/24/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	98.9		98.9			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1160		1160			
Antimony	7440-36-0	20.2	J	20.2		Qualify	3
Arsenic	7440-38-2	16.1		16.1			
Barium	7440-39-3	8.7	J	8.7		Qualify	1
Beryllium	7440-41-7	0.18	J	0.18		Qualify	1
Calcium	7440-70-2	698	J	698		Qualify	4
Cobalt	7440-48-4	1.1	J	1.1		Qualify	1
Chromium	7440-47-3	11.9		11.9			
Copper	7440-50-8	13.4		13.4			
Iron	7439-89-6	19200		19200			
Magnesium	7439-95-4	472		472			
Manganese	7439-96-5	60.4	J	60.4		Qualify	4
Sodium	7440-23-5	91.5	J	91.5		Qualify	1,5
Nickel	7440-02-0	3.6		3.6			
Lead	7439-92-1	378	J	378		Qualify	4
Potassium	7440-09-7	186	J	186		Qualify	1
Vanadium	7440-62-2	18.9		18.9			
Zinc	7440-66-6	33.1		33.1			

FOOTNOTES

1. The reported concentration is quantitatively qualified because it is above the Method Detection Level (MDL) but below the Contract Required Quantitation Limit (CRQL).

2. The positive result is qualified "J" and may be biased low, the nondetected results are qualified "UJ" and the detection limits may be estimated due to negative drifting of this analyte in the preparation blank.

3. The reported concentration is quantitatively qualified and may be biased low or the detection limit for the nondetected result may be estimated because the %recovery for the sample spike analysis was below the QA/QC limits of 75-125%.

4. The reported concentration is quantitatively qualified because the Relative %Difference between the sample and sample duplicate results was greater than 20%.

5. The reported concentration is quantitatively qualified because the %Difference between the sample result and the Sample Serial Dilution result for this analyte was greater than 10%.

State of New Jersey
Department of Environmental Protection

Jon S. Corzine
Governor

Lisa P. Jackson
Commissioner

MEMORANDUM

TO: Ed Putnam
Remedial Planning and Design Element

THROUGH: Greg Toffoli, Section Chief 8/22/07
Office of Data Quality
Hazardous Site Science Element

AUG 2 2 2007

FROM: Carol Pillsbury 8/22/07
Office of Data Quality
Hazardous Site Science Element

SUBJECT: Quality Assurance Review –**Laurence Harbor Petroleum (SDG 120127)** Site. STL Burlington, Colchester, VT analyzed twenty nonaqueous samples for TAL Metals according to USEPA CLP SOW ILM05.3.

Field ID	Laboratory ID	Sample Date	Matrix
S1A	711236	05/23/2007	NONAQUEOUS
S1B	711237	05/23/2007	NONAQUEOUS
S1C	711238	05/23/2007	NONAQUEOUS
S2B	711239	05/23/2007	NONAQUEOUS
S2A	711240	05/23/2007	NONAQUEOUS
S3A	711241	05/23/2007	NONAQUEOUS
S3B	711242	05/23/2007	NONAQUEOUS
S3C	711243	05/23/2007	NONAQUEOUS
S4A	711244	05/23/2007	NONAQUEOUS
S4B	711245	05/23/2007	NONAQUEOUS
S4C	711246	05/23/2007	NONAQUEOUS
S16	711247	05/23/2007	NONAQUEOUS
S15	711248	05/23/2007	NONAQUEOUS
S14	711249	05/23/2007	NONAQUEOUS
S17	711250	05/23/2007	NONAQUEOUS
S19	711251	05/23/2007	NONAQUEOUS
S18	711252	05/23/2007	NONAQUEOUS
S20	711253	05/23/2007	NONAQUEOUS
S12	711254	05/23/2007	NONAQUEOUS
S5B	711255	05/23/2007	NONAQUEOUS

The Office of Data Quality, Hazardous Site Science Element, Division of Remediation Management and Response has reviewed the above listed nonaqueous samples according to Full CLP Deliverable Requirements as specified in the Technical Requirements for Site

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Remediation, N.J.A.C. 7:26E. A Target Analyte Summary List is provided for your convenience. Specific comments are provided below:

Metals

Samples S1A (711236), S3B (711242), S3C (711243) and S12 (711254) were analyzed undiluted and at 100 fold dilutions because lead, sodium and zinc were present at levels above the linear range of the instrument. The dilution analyses were sufficient to bring the concentrations of lead and zinc within the linear range. The dilutions were too extensive for sodium in the above listed samples and the detection limits were elevated above the Contract Required Quantitation Limits (CRQLs). A 50-fold dilution would have been more appropriate for sodium. The nondetected results and detection levels for sodium in the above mentioned samples are suspect.

The remaining metals data are acceptable with the qualifications resulting from QA/QC outliers in the following analyses: sample spike, sample duplicate, serial dilution, preparation blank and negative drifting.

Should you have any questions regarding this review, please contact this office at 633-0752.

C. Dave Diblee, SAS

Project Name: 32950000
SDG: 120127
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time NT Only	QA Decision	Footnotes
Field ID Num: S5B; Lab ID Num: 711255; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	94.2		94.2			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.039	UJ	0.039		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3040		3040			
Antimony	7440-36-0	98.9		98.9			
Arsenic	7440-38-2	103	J	103		Qualify	4
Barium	7440-39-3	30.7		30.7			
Beryllium	7440-41-7	0.51	J	0.51		Qualify	5
Cadmium	7440-43-9	0.76	J	0.76		Qualify	5
Calcium	7440-70-2	1620	J	1620		Qualify	1
Chromium	7440-47-3	34.9	J	34.9		Qualify	2,4
Cobalt	7440-48-4	3.1	J	3.1		Qualify	1,5
Copper	7440-50-8	51.1	J	51.1		Qualify	3
Iron	7439-89-6	55100		55100			
Lead	7439-92-1	734		734			
Magnesium	7439-95-4	689		689			
Manganese	7439-96-5	150	J	150		Qualify	4
Nickel	7440-02-0	11.3		11.3			
Potassium	7440-09-7	352	J	352		Qualify	1
Sodium	7440-23-5	681		681			
Thallium	7440-28-0	0.64	J	0.64		Qualify	1
Vanadium	7440-62-2	62.5		62.5			
Zinc	7440-66-6	109		109			
Field ID Num: S12; Lab ID Num: 711254; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	95.3		95.3			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.034	J	0.034		Qualify	1,8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1230		1230			
Antimony	7440-36-0	962		962			
Arsenic	7440-38-2	141	J	141		Qualify	4
Barium	7440-39-3	176		176			
Beryllium	7440-41-7	0.16	J	0.16		Qualify	1,5
Cadmium	7440-43-9	11.9	J	11.9		Qualify	5
Calcium	7440-70-2	486	J	486		Qualify	1
Chromium	7440-47-3	6.8	J	6.8		Qualify	2,4
Cobalt	7440-48-4	3.5	J	3.5		Qualify	1,5
Copper	7440-50-8	130	J	130		Qualify	3
Iron	7439-89-6	15200		15200			
Lead	7439-92-1	25600		25600			
Magnesium	7439-95-4	93.5	J	93.5		Qualify	1
Manganese	7439-96-5	89.5	J	89.5		Qualify	4

Project Name: 32950000
SDG: 120127
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Nickel	7440-02-0	13.9		13.9			
Potassium	7440-09-7	212	J	212		Qualify	1
Selenium	7782-49-2	0.69	J	0.69		Qualify	1
Silver	7440-22-4	1.1		1.1			
Sodium	7440-23-5	4010	UJ	4010		Suspect	10
Thallium	7440-28-0	1.6	J	1.6		Qualify	1
Vanadium	7440-62-2	8.9		8.9			
Zinc	7440-66-6	170		170			
Field ID Num: S20; Lab ID Num: 711253; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	96		96			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.047	UJ	0.047		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1790		1790			
Antimony	7440-36-0	9.3		9.3			
Arsenic	7440-38-2	15.3	J	15.3		Qualify	4
Barium	7440-39-3	52.1		52.1			
Beryllium	7440-41-7	0.25	J	0.25		Qualify	1,5
Cadmium	7440-43-9	0.51	J	0.51		Qualify	5
Calcium	7440-70-2	3670	J	3670		Qualify	1
Chromium	7440-47-3	10.6	J	10.6		Qualify	2,4
Cobalt	7440-48-4	1.4	J	1.4		Qualify	1,5
Copper	7440-50-8	24.2	J	24.2		Qualify	3
Iron	7439-89-6	21600		21600			
Lead	7439-92-1	260		260			
Magnesium	7439-95-4	481		481			
Manganese	7439-96-5	113	J	113		Qualify	4
Nickel	7440-02-0	4.5		4.5			
Potassium	7440-09-7	243	J	243		Qualify	1
Sodium	7440-23-5	497		497			
Vanadium	7440-62-2	32.4		32.4			
Zinc	7440-66-6	53.1		53.1			
Field ID Num: S18; Lab ID Num: 711252; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	94.9		94.9			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.053	UJ	0.053		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1790		1790			
Antimony	7440-36-0	17.8		17.8			
Arsenic	7440-38-2	26	J	26		Qualify	4
Barium	7440-39-3	8.1	J	8.1		Qualify	1
Beryllium	7440-41-7	0.32	J	0.32		Qualify	1,5
Cadmium	7440-43-9	0.36	J	0.36		Qualify	1,5
Calcium	7440-70-2	13500		13500			

Project Name: 32950000
SDG: 120127
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time, NT Only	QA Decision	Footnotes
Chromium	7440-47-3	23.7	J	23.7		Qualify	2,4
Cobalt	7440-48-4	2	J	2		Qualify	1,5
Copper	7440-50-8	29.6	J	29.6		Qualify	3
Iron	7439-89-6	20200		20200			
Lead	7439-92-1	334		334			
Magnesium	7439-95-4	685		685			
Manganese	7439-96-5	104	J	104		Qualify	4
Nickel	7440-02-0	6.3		6.3			
Potassium	7440-09-7	273	J	273		Qualify	1
Sodium	7440-23-5	645		645			
Vanadium	7440-62-2	34.4		34.4			
Zinc	7440-66-6	56.1		56.1			
Field ID Num: S19; Lab ID Num: 711251; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	95.2		95.2			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.037	UJ	0.037		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2830		2830			
Antimony	7440-36-0	17.9		17.9			
Arsenic	7440-38-2	23.6	J	23.6		Qualify	4
Barium	7440-39-3	8.8	J	8.8		Qualify	1
Beryllium	7440-41-7	0.25	J	0.25		Qualify	1,5
Cadmium	7440-43-9	0.35	J	0.35		Qualify	1,5
Calcium	7440-70-2	8830		8830			
Chromium	7440-47-3	11.7	J	11.7		Qualify	2,4
Cobalt	7440-48-4	1.9	J	1.9		Qualify	1,5
Copper	7440-50-8	37	J	37		Qualify	3
Iron	7439-89-6	27600		27600			
Lead	7439-92-1	245		245			
Magnesium	7439-95-4	560		560			
Manganese	7439-96-5	68.8	J	68.8		Qualify	4
Nickel	7440-02-0	7.1		7.1			
Potassium	7440-09-7	330	J	330		Qualify	1
Sodium	7440-23-5	622		622			
Vanadium	7440-62-2	25.9		25.9			
Zinc	7440-66-6	39		39			
Field ID Num: S17; Lab ID Num: 711250; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	93.7		93.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.051	UJ	0.051		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1360		1360			
Antimony	7440-36-0	67.6		67.6			
Arsenic	7440-38-2	39.3	J	39.3		Qualify	4

Project Name: 32950000
SDG: 120127
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time NT Only	QA Decision	Footnotes
Barium	7440-39-3	16.8		16.8			
Beryllium	7440-41-7	0.23	J	0.23		Qualify	1,5
Cadmium	7440-43-9	0.32	J	0.32		Qualify	1,5
Calcium	7440-70-2	2320	J	2320		Qualify	1
Chromium	7440-47-3	13.2	J	13.2		Qualify	2,4
Cobalt	7440-48-4	1.3	J	1.3		Qualify	1,5
Copper	7440-50-8	71.3	J	71.3		Qualify	3
Iron	7439-89-6	17100		17100			
Lead	7439-92-1	647		647			
Magnesium	7439-95-4	353	J	353		Qualify	1
Manganese	7439-96-5	65.1	J	65.1		Qualify	4
Nickel	7440-02-0	5.9		5.9			
Potassium	7440-09-7	233	J	233		Qualify	1
Sodium	7440-23-5	402	J	402		Qualify	1
Vanadium	7440-62-2	32.8		32.8			
Zinc	7440-66-6	65.5		65.5			
Field ID Num: S14; Lab ID Num: 711249; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	81.3		81.3			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.079	J	0.079		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	9930		9930			
Antimony	7440-36-0	0.86	JB	0.86		Negate	6
Arsenic	7440-38-2	13	J	13		Qualify	4
Barium	7440-39-3	58.3		58.3			
Beryllium	7440-41-7	0.6	J	0.6		Qualify	5
Cadmium	7440-43-9	0.27	J	0.27		Qualify	1,5
Calcium	7440-70-2	2960	J	2960		Qualify	1
Chromium	7440-47-3	28.7	J	28.7		Qualify	2,4
Cobalt	7440-48-4	5.4	J	5.4		Qualify	5
Copper	7440-50-8	24.9	J	24.9		Qualify	3
Iron	7439-89-6	27800		27800			
Magnesium	7439-95-4	2520		2520			
Manganese	7439-96-5	168	J	168		Qualify	4
Nickel	7440-02-0	12.8		12.8			
Potassium	7440-09-7	1490		1490			
Lead	7439-92-1	70.5		70.5			
Sodium	7440-23-5	157	J	157		Qualify	1
Vanadium	7440-62-2	40.1		40.1			
Zinc	7440-66-6	57.1		57.1			
Field ID Num: S15; Lab ID Num: 711248; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	91.5		91.5			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.055	UJ	0.055		Qualify	8
ICPAES Metals (mg/Kg)							

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Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Dilution Factor: 1.00							
Aluminum	7429-90-5	3080		3080			
Antimony	7440-36-0	1.5	JB	1.5		Negate	6
Arsenic	7440-38-2	2	J	2		Qualify	4
Barium	7440-39-3	13.6	J	13.6		Qualify	1
Beryllium	7440-41-7	0.24	J	0.24		Qualify	1,5
Calcium	7440-70-2	442		442			
Chromium	7440-47-3	6.6	J	6.6		Qualify	2,4
Cobalt	7440-48-4	0.32	J	0.32		Qualify	1,5
Copper	7440-50-8	4.2	JB	4.2		Qualify	3,7
Iron	7439-89-6	2680		2680			
Magnesium	7439-95-4	107	J	107		Qualify	1
Manganese	7439-96-5	17.7	J	17.7		Qualify	4
Nickel	7440-02-0	0.52	J	0.52		Qualify	1
Potassium	7440-09-7	330	J	330		Qualify	1
Lead	7439-92-1	8.1		8.1			
Vanadium	7440-62-2	6		6			
Zinc	7440-66-6	4.1	JB	4.1		Negate	6
Field ID Num: S16; Lab ID Num: 711247; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	94.4		94.4			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.05	UJ	0.05		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	7510		7510			
Antimony	7440-36-0	2.8	JB	2.8		Qualify	1,7
Arsenic	7440-38-2	6.1	J	6.1		Qualify	4
Barium	7440-39-3	17.6		17.6			
Beryllium	7440-41-7	0.24	J	0.24		Qualify	1,5
Cadmium	7440-43-9	0.17	J	0.17		Qualify	1,5
Calcium	7440-70-2	5280		5280			
Chromium	7440-47-3	21.9	J	21.9		Qualify	2,4
Cobalt	7440-48-4	3.5	J	3.5		Qualify	1,5
Copper	7440-50-8	23.8	J	23.8		Qualify	3
Iron	7439-89-6	12600		12600			
Magnesium	7439-95-4	2370		2370			
Manganese	7439-96-5	93.4	J	93.4		Qualify	4
Nickel	7440-02-0	9.9		9.9			
Potassium	7440-09-7	609		609			
Lead	7439-92-1	27.1		27.1			
Sodium	7440-23-5	431		431			
Vanadium	7440-62-2	32.5		32.5			
Zinc	7440-66-6	24.5		24.5			
Field ID Num: S4C; Lab ID Num: 711246; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	94.7		94.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							

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Analyte	CAS Number	Laboratory Reported Conc	LQ	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Mercury	7439-97-6	0.06	J	0.06		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3260		3260			
Antimony	7440-36-0	633		633			
Arsenic	7440-38-2	386	J	386		Qualify	4
Barium	7440-39-3	100		100			
Beryllium	7440-41-7	0.57	J	0.57		Qualify	5
Cadmium	7440-43-9	3.8	J	3.8		Qualify	5
Calcium	7440-70-2	3500		3500			
Chromium	7440-47-3	27.6	J	27.6		Qualify	2,4
Cobalt	7440-48-4	18.4	J	18.4		Qualify	5
Copper	7440-50-8	770	J	770		Qualify	3
Iron	7439-89-6	74000		74000			
Lead	7439-92-1	14700		14700			
Magnesium	7439-95-4	1090		1090			
Manganese	7439-96-5	433	J	433		Qualify	4
Nickel	7440-02-0	80.6		80.6			
Potassium	7440-09-7	518		518			
Selenium	7782-49-2	0.47	J	0.47		Qualify	1
Silver	7440-22-4	0.65	J	0.65		Qualify	1
Sodium	7440-23-5	1110	J	1110		Qualify	9
Thallium	7440-28-0	1	J	1		Qualify	1
Vanadium	7440-62-2	64.5		64.5			
Zinc	7440-66-6	319		319			
Field ID Num: S4B; Lab ID Num: 711245; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	98		98			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.42		0.42			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3170		3170			
Antimony	7440-36-0	4730		4730			
Arsenic	7440-38-2	3350	J	3350		Qualify	4
Barium	7440-39-3	289		289			
Beryllium	7440-41-7	0.26	J	0.26		Qualify	1,5
Cadmium	7440-43-9	6.4	J	6.4		Qualify	5
Calcium	7440-70-2	2150		2150			
Chromium	7440-47-3	44.3	J	44.3		Qualify	2,4
Cobalt	7440-48-4	24.9	J	24.9		Qualify	5
Copper	7440-50-8	3590	J	3590		Qualify	3
Iron	7439-89-6	217000		217000			
Lead	7439-92-1	25100		25100			
Magnesium	7439-95-4	479		479			
Manganese	7439-96-5	499	J	499		Qualify	4
Nickel	7440-02-0	286		286			
Potassium	7440-09-7	630		630			
Selenium	7782-49-2	15.7		15.7			
Silver	7440-22-4	1.4		1.4			

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time NT Only	QA Decision	Footnotes
Sodium	7440-23-5	638	J	638		Qualify	9
Thallium	7440-28-0	2.6		2.6			
Vanadium	7440-62-2	52.9		52.9			
Zinc	7440-66-6	655		655			
Field ID Num: S4A; Lab ID Num: 711244; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	95.6		95.6			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.54		0.54			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1790		1790			
Antimony	7440-36-0	145		145			
Arsenic	7440-38-2	92.1	J	92.1		Qualify	4
Barium	7440-39-3	45		45			
Beryllium	7440-41-7	0.14	J	0.14		Qualify	1,5
Cadmium	7440-43-9	1.1	J	1.1		Qualify	5
Calcium	7440-70-2	576		576			
Chromium	7440-47-3	9.2	J	9.2		Qualify	2,4
Cobalt	7440-48-4	1.1	J	1.1		Qualify	1,5
Copper	7440-50-8	131	J	131		Qualify	3
Iron	7439-89-6	11600		11600			
Lead	7439-92-1	4970		4970			
Magnesium	7439-95-4	258	J	258		Qualify	1
Manganese	7439-96-5	41.8	J	41.8		Qualify	4
Nickel	7440-02-0	7.9		7.9			
Potassium	7440-09-7	290	J	290		Qualify	1
Selenium	7782-49-2	0.56	J	0.56		Qualify	1
Silver	7440-22-4	1		1			
Sodium	7440-23-5	92.5	J	92.5		Qualify	1
Thallium	7440-28-0	0.39	J	0.39		Qualify	1
Vanadium	7440-62-2	13.6		13.6			
Zinc	7440-66-6	55.7		55.7			
Field ID Num: S3C; Lab ID Num: 711243; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	88.9		88.9			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.054	J	0.054		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2710		2710			
Antimony	7440-36-0	12900		12900			
Arsenic	7440-38-2	850	J	850		Qualify	4
Barium	7440-39-3	24.9		24.9			
Beryllium	7440-41-7	0.46	J	0.46		Qualify	5
Cadmium	7440-43-9	6.4	J	6.4		Qualify	5
Calcium	7440-70-2	4890		4890			
Chromium	7440-47-3	30.4	J	30.4		Qualify	2,4

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Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Cobalt	7440-48-4	10.2	J	10.2		Qualify	5
Copper	7440-50-8	1220	J	1220		Qualify	3
Iron	7439-89-6	101000		101000			
Lead	7439-92-1	142000		142000			
Magnesium	7439-95-4	701		701			
Manganese	7439-96-5	325	J	325		Qualify	4
Nickel	7440-02-0	59.2		59.2			
Potassium	7440-09-7	286	J	286		Qualify	1
Selenium	7782-49-2	2.1	J	2.1		Qualify	1
Silver	7440-22-4	11.8		11.8			
Sodium	7440-23-5	42900	UJ	42900		Suspect	10
Thallium	7440-28-0	2.8		2.8			
Vanadium	7440-62-2	51.3		51.3			
Zinc	7440-66-6	347	J	347		Qualify	9
Field ID Num: S3B; Lab ID Num: 711242; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	94.5		94.5			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	1.3		1.3			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	5100		5100			
Antimony	7440-36-0	864		864			
Arsenic	7440-38-2	544	J	544		Qualify	4
Barium	7440-39-3	525		525			
Beryllium	7440-41-7	0.27	J	0.27		Qualify	1,5
Cadmium	7440-43-9	3.2	J	3.2		Qualify	5
Calcium	7440-70-2	1050		1050			
Chromium	7440-47-3	47.5	J	47.5		Qualify	2,4
Cobalt	7440-48-4	6.6	J	6.6		Qualify	5
Copper	7440-50-8	1130	J	1130		Qualify	3
Iron	7439-89-6	78100		78100			
Lead	7439-92-1	39900		39900			
Magnesium	7439-95-4	522		522			
Manganese	7439-96-5	469	J	469		Qualify	4
Nickel	7440-02-0	41.7		41.7			
Potassium	7440-09-7	704		704			
Selenium	7782-49-2	2.8	J	2.8		Qualify	1
Silver	7440-22-4	1.7		1.7			
Sodium	7440-23-5	4010	UJ	4010		Suspect	10
Thallium	7440-28-0	2.5		2.5			
Vanadium	7440-62-2	49.4		49.4			
Zinc	7440-66-6	394		394			
Field ID Num: S3A; Lab ID Num: 711241; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	89		89			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.035	J	0.035		Qualify	1,8

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Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	5770		5770			
Antimony	7440-36-0	4.6	JB	4.6		Qualify	1,7
Arsenic	7440-38-2	35.4	J	35.4		Qualify	4
Barium	7440-39-3	50.3		50.3			
Beryllium	7440-41-7	0.35	J	0.35		Qualify	1,5
Cadmium	7440-43-9	0.37	J	0.37		Qualify	1,5
Calcium	7440-70-2	1760		1760			
Chromium	7440-47-3	17.2	J	17.2		Qualify	2,4
Cobalt	7440-48-4	2.9	J	2.9		Qualify	1,5
Copper	7440-50-8	121	J	121		Qualify	3
Iron	7439-89-6	10500		10500			
Lead	7439-92-1	324		324			
Magnesium	7439-95-4	1360		1360			
Manganese	7439-96-5	168	J	168		Qualify	4
Nickel	7440-02-0	11.5		11.5			
Potassium	7440-09-7	612		612			
Silver	7440-22-4	0.15	J	0.15		Qualify	1
Sodium	7440-23-5	128	J	128		Qualify	1
Vanadium	7440-62-2	34.4		34.4			
Zinc	7440-66-6	33.2		33.2			
Field ID Num: S2A; Lab ID Num: 711240; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	97.1		97.1			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.049	J	0.049		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	4660		4660			
Antimony	7440-36-0	7.6		7.6			
Arsenic	7440-38-2	30.7	J	30.7		Qualify	4
Barium	7440-39-3	53.4		53.4			
Beryllium	7440-41-7	0.26	J	0.26		Qualify	1,5
Cadmium	7440-43-9	0.34	J	0.34		Qualify	1,5
Calcium	7440-70-2	1030		1030			
Chromium	7440-47-3	8.7	J	8.7		Qualify	2,4
Cobalt	7440-48-4	1.9	J	1.9		Qualify	1,5
Copper	7440-50-8	199	J	199		Qualify	3
Iron	7439-89-6	10400		10400			
Lead	7439-92-1	672		672			
Magnesium	7439-95-4	563		563			
Manganese	7439-96-5	87	J	87		Qualify	4
Nickel	7440-02-0	12.5		12.5			
Potassium	7440-09-7	648		648			
Selenium	7782-49-2	0.85	J	0.85		Qualify	1
Silver	7440-22-4	0.64	J	0.64		Qualify	1
Sodium	7440-23-5	173	J	173		Qualify	1
Vanadium	7440-62-2	46.1		46.1			
Zinc	7440-66-6	38.7		38.7			

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Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NTOnly	QA Decision	Footnotes
Field ID Num: S2B; Lab ID Num: 711239; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	91.4		91.4			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.05	UJ	0.05		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2950		2950			
Antimony	7440-36-0	8.6		8.6			
Arsenic	7440-38-2	29.4	J	29.4		Qualify	4
Barium	7440-39-3	5.6	J	5.6		Qualify	1
Beryllium	7440-41-7	0.6	J	0.6		Qualify	5
Cadmium	7440-43-9	0.57	J	0.57		Qualify	5
Calcium	7440-70-2	298	J	298		Qualify	1
Chromium	7440-47-3	44.3	J	44.3		Qualify	2,4
Cobalt	7440-48-4	1.9	J	1.9		Qualify	1,5
Copper	7440-50-8	42.7	J	42.7		Qualify	3
Iron	7439-89-6	47700		47700			
Lead	7439-92-1	155		155			
Magnesium	7439-95-4	513		513			
Manganese	7439-96-5	79.5	J	79.5		Qualify	4
Nickel	7440-02-0	8.8		8.8			
Potassium	7440-09-7	374	J	374		Qualify	1
Sodium	7440-23-5	147	J	147		Qualify	1
Vanadium	7440-62-2	65.5		65.5			
Zinc	7440-66-6	89.2		89.2			
Field ID Num: S1C; Lab ID Num: 711238; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	90.7		90.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.039	J	0.039		Qualify	1,8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3740		3740			
Antimony	7440-36-0	628		628			
Arsenic	7440-38-2	228	J	228		Qualify	4
Barium	7440-39-3	58.1		58.1			
Beryllium	7440-41-7	0.56	J	0.56		Qualify	5
Cadmium	7440-43-9	1.2	J	1.2		Qualify	5
Calcium	7440-70-2	2720		2720			
Chromium	7440-47-3	43	J	43		Qualify	2,4
Cobalt	7440-48-4	67.6	J	67.6		Qualify	5
Copper	7440-50-8	821	J	821		Qualify	3
Iron	7439-89-6	91100		91100			
Lead	7439-92-1	6120		6120			
Magnesium	7439-95-4	1670		1670			
Manganese	7439-96-5	480	J	480		Qualify	4
Nickel	7440-02-0	244		244			

Project Name: 32950000
SDG: 120127
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time NT Only	QA Decision	Footnotes
Potassium	7440-09-7	507		507			
Silver	7440-22-4	0.4	J	0.4		Qualify	1
Sodium	7440-23-5	1280		1280			
Thallium	7440-28-0	0.63	J	0.63		Qualify	1
Vanadium	7440-62-2	85.6		85.6			
Zinc	7440-66-6	339		339			
Field ID Num: S1B; Lab ID Num: 711237; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	95.5		95.5			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.048	UJ	0.048		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2710		2710			
Antimony	7440-36-0	68.1		68.1			
Arsenic	7440-38-2	54	J	54		Qualify	4
Barium	7440-39-3	118		118			
Beryllium	7440-41-7	0.31	J	0.31		Qualify	1,5
Cadmium	7440-43-9	0.71	J	0.71		Qualify	5
Calcium	7440-70-2	7370		7370			
Chromium	7440-47-3	19.9	J	19.9		Qualify	2,4
Cobalt	7440-48-4	2.3	J	2.3		Qualify	1,5
Copper	7440-50-8	180	J	180		Qualify	3
Iron	7439-89-6	44600		44600			
Lead	7439-92-1	1670		1670			
Magnesium	7439-95-4	2470		2470			
Manganese	7439-96-5	135	J	135		Qualify	4
Nickel	7440-02-0	16.4		16.4			
Potassium	7440-09-7	314	J	314		Qualify	1
Silver	7440-22-4	0.45	J	0.45		Qualify	1
Sodium	7440-23-5	824		824			
Vanadium	7440-62-2	47.9		47.9			
Zinc	7440-66-6	146		146			
Field ID Num: S1A; Lab ID Num: 711236; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	89.7		89.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.61	J	0.61		Qualify	8
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	6990		6990			
Antimony	7440-36-0	562		562			
Arsenic	7440-38-2	147	J	147		Qualify	4
Barium	7440-39-3	311		311			
Beryllium	7440-41-7	0.46	J	0.46		Qualify	5
Cadmium	7440-43-9	7.1	J	7.1		Qualify	5
Calcium	7440-70-2	2090		2090			
Chromium	7440-47-3	22.3	J	22.3		Qualify	2,4

Project Name: 32950000
SDG: 120127
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Cobalt	7440-48-4	5.8	J	5.8		Qualify	5
Copper	7440-50-8	321	J	321		Qualify	3
Iron	7439-89-6	39300		39300			
Lead	7439-92-1	7630		7630			
Magnesium	7439-95-4	1360		1360			
Manganese	7439-96-5	247		247		Qualify	4
Nickel	7440-02-0	40.9		40.9			
Potassium	7440-09-7	1290		1290			
Selenium	7782-49-2	0.72	J	0.72		Qualify	1
Silver	7440-22-4	1.6		1.6			
Sodium	7440-23-5	4290	UJ	4290		Suspect	10
Thallium	7440-28-0	0.82	J	0.82		Qualify	1
Vanadium	7440-62-2	104		104			
Zinc	7440-66-6	422		422			

FOOTNOTES

1. The reported concentration is quantitatively qualified because it is above the Method Detection Level (MDL) but below the Contract Required Quantitation Limit (CRQL).

2. The reported concentration is quantitatively qualified and may be biased low or the detection limit for the nondetected result may be estimated because the %recovery for the sample spike analysis was below the QA/QC limits of 75-125%.

3. The reported concentration is quantitatively qualified and may be biased high because the %recovery for the sample spike analysis was above the QA/QC limits of 75-125%.

4. The reported concentration is quantitatively qualified because the Relative %Difference between the sample and sample duplicate results was greater than 20%.

5. The reported concentration is quantitatively qualified because the %Difference between the sample result and the Sample Serial Dilution result for this analyte was greater than 10%.

6. The reported concentration in the sample is less than 3 X the value in the method/preparation blank. It is the policy of ODQ to negate the reported value due to probable contamination unrelated to the actual sample.

7. The reported concentration in the sample is greater than 3X the value in the method/preparation blank and is considered "real". However, the reported value must be quantitatively qualified "J" due to method/preparation blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte in the method/preparation blank.

8. The positive result is qualified "J" and may be biased low, the nondetected results are qualified "UJ" and the detection limits may be estimated due to negative drifting of this analyte in the preparation blank.

9. The reported concentration of this analyte is taken from a dilution analysis. The concentration is above the MDL but below the elevated CRQL.

10. The non detected result for this analyte is suspect because the sample was diluted too extensively.

State of New Jersey
Department of Environmental Protection

Jon S. Corzine
Governor

Lisa P. Jackson
Commissioner

MEMORANDUM

TO: Ed Putnam
Remedial Planning and Design Element

THROUGH: Greg Toffoli, Section Chief GT 8/16/07
Office of Data Quality
Hazardous Site Science Element

AUG 16 2007

FROM: Carol Pillsbury CP 8/16/07
Office of Data Quality
Hazardous Site Science Element

SUBJECT: Quality Assurance Review –**Laurence Harbor Petroleum (SDG 120128)** Site. STL Burlington, Colchester, VT analyzed seventeen nonaqueous samples for TAL Metals according to USEPA CLP SOW ILM05.3.

Field ID	Laboratory ID	Sample Date	Matrix
S13	711256	05/23/2007	NONAQUEOUS
S5A	711257	05/23/2007	NONAQUEOUS
S5C	711258	05/23/2007	NONAQUEOUS
S6A	711259	05/23/2007	NONAQUEOUS
S6B	711260	05/23/2007	NONAQUEOUS
S6C	711261	05/23/2007	NONAQUEOUS
S7A	711262	05/23/2007	NONAQUEOUS
S7B	711263	05/23/2007	NONAQUEOUS
S8A	711264	05/23/2007	NONAQUEOUS
S8B	711265	05/23/2007	NONAQUEOUS
S8C	711266	05/23/2007	NONAQUEOUS
S9A	711267	05/23/2007	NONAQUEOUS
S9B	711268	05/23/2007	NONAQUEOUS
S9C	711269	05/23/2007	NONAQUEOUS
DUP1	711270	05/23/2007	NONAQUEOUS
DUP2	711271	05/23/2007	NONAQUEOUS
DUP3	711272	05/23/2007	NONAQUEOUS

The Office of Data Quality, Hazardous Site Science Element, Division of Remediation Management and Response has reviewed the above listed nonaqueous samples according to Full CLP Deliverable Requirements as specified in the Technical Requirements for Site Remediation, N.J.A.C. 7:26E. A Target Analyte Summary List is provided for your convenience. Specific comments are provided below:

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Metals

Samples S6B (711260), S7B (711263), S8B (711265), S9B (711268), S9C (711269), DUP1 (711270) and DUP2 (711271) were analyzed undiluted and at 100 fold dilutions because lead, sodium and zinc were present at levels above the linear range of the instrument. The dilution analyses were sufficient to bring the concentrations of lead and zinc within the linear range. The dilutions were too extensive for sodium in the above listed samples and the detection limits were elevated above the Contract Required Quantitation Limits (CRQLs). A 50-fold dilution would have been more appropriate for sodium. The nondetected results and detection levels for sodium in the above mentioned samples are suspect.

The remaining metals data are acceptable with the qualifications resulting from QA/QC outliers in the following analyses: sample spike, sample duplicate, serial dilution and preparation blank.

Should you have any questions regarding this review, please contact this office at 633-0752.

C. Dave Diblee, SAS

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Field ID Num: DUP3; Lab ID Num: 711272; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	92.5		92.5			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1670	J	1670		Qualify	3
Antimony	7440-36-0	68.3	J	68.3		Qualify	2,3
Arsenic	7440-38-2	54.5	J	54.5		Qualify	3,7
Barium	7440-39-3	9.4	J	9.4		Qualify	1,3
Beryllium	7440-41-7	0.32	JB	0.32		Qualify	1,5
Cadmium	7440-43-9	0.22	J	0.22		Qualify	1
Calcium	7440-70-2	4810	J	4810		Qualify	3
Chromium	7440-47-3	14.3		14.3			
Cobalt	7440-48-4	1.9	J	1.9		Qualify	1
Copper	7440-50-8	47.2	J	47.2		Qualify	3
Iron	7439-89-6	30600	J	30600		Qualify	3
Magnesium	7439-95-4	436		436			
Manganese	7439-96-5	160	J	160		Qualify	2,3
Nickel	7440-02-0	7.1		7.1			
Potassium	7440-09-7	225	JB	225		Qualify	1,5
Lead	7439-92-1	1090	J	1090		Qualify	3
Sodium	7440-23-5	479		479			
Vanadium	7440-62-2	30.3	J	30.3		Qualify	3
Zinc	7440-66-6	66.9	J	66.9		Qualify	3,4
Field ID Num: DUP2; Lab ID Num: 711271; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	86		86			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.041	J	0.041		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1470	J	1470		Qualify	3
Antimony	7440-36-0	934	J	934		Qualify	2,3
Arsenic	7440-38-2	161	J	161		Qualify	3,7
Barium	7440-39-3	173	J	173		Qualify	3
Beryllium	7440-41-7	0.22	JB	0.22		Qualify	1,5
Cadmium	7440-43-9	10.3		10.3			
Calcium	7440-70-2	633	J	633		Qualify	3
Chromium	7440-47-3	8.2		8.2			
Cobalt	7440-48-4	3.9	J	3.9		Qualify	1
Copper	7440-50-8	140	J	140		Qualify	3
Iron	7439-89-6	16800	J	16800		Qualify	3
Magnesium	7439-95-4	137	J	137		Qualify	1
Manganese	7439-96-5	87.5	J	87.5		Qualify	2,3
Nickel	7440-02-0	15.2		15.2			

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Potassium	7440-09-7	266	JB	266		Qualify	1,5
Lead	7439-92-1	43700	J	43700		Qualify	3
Silver	7440-22-4	1.4		1.4			
Selenium	7782-49-2	0.95	J	0.95		Qualify	1
Thallium	7440-28-0	1.2	J	1.2		Qualify	1
Vanadium	7440-62-2	11.7	J	11.7		Qualify	3
Zinc	7440-66-6	274	J	274		Qualify	3,4,8
Field ID Num: DUP1; Lab ID Num: 711270; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	92.2		92.2			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.04	J	0.04		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3520	J	3520		Qualify	3
Antimony	7440-36-0	833	J	833		Qualify	2,3
Arsenic	7440-38-2	391	J	391		Qualify	3,7
Barium	7440-39-3	197	J	197		Qualify	3
Beryllium	7440-41-7	0.46		0.46			
Cadmium	7440-43-9	1		1			
Calcium	7440-70-2	4240	J	4240		Qualify	3
Chromium	7440-47-3	41		41			
Cobalt	7440-48-4	56.7		56.7			
Copper	7440-50-8	903	J	903		Qualify	3
Iron	7439-89-6	87400	J	87400		Qualify	3
Magnesium	7439-95-4	1530		1530			
Manganese	7439-96-5	436	J	436		Qualify	2,3
Nickel	7440-02-0	227		227			
Potassium	7440-09-7	462	J	462		Qualify	5
Lead	7439-92-1	12600	J	12600		Qualify	3
Silver	7440-22-4	0.73	J	0.73		Qualify	1
Vanadium	7440-62-2	81.3	J	81.3		Qualify	3
Zinc	7440-66-6	470	J	470		Qualify	3,4,8
Field ID Num: S9C; Lab ID Num: 711269; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	93.7		93.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.024	J	0.024		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3020	J	3020		Qualify	3
Antimony	7440-36-0	1240	J	1240		Qualify	2,3
Arsenic	7440-38-2	227	J	227		Qualify	3,7
Barium	7440-39-3	208	J	208		Qualify	3
Beryllium	7440-41-7	0.47		0.47			
Cadmium	7440-43-9	2		2			

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time - NT Only	QA Decision	Footnotes
Calcium	7440-70-2	2310	J	2310		Qualify	3
Chromium	7440-47-3	36.9		36.9			
Cobalt	7440-48-4	4.6		4.6			
Copper	7440-50-8	609	J	609		Qualify	3
Iron	7439-89-6	65400	J	65400		Qualify	3
Magnesium	7439-95-4	926		926			
Manganese	7439-96-5	260	J	260		Qualify	2,3
Nickel	7440-02-0	23.4		23.4			
Potassium	7440-09-7	480	JB	480		Qualify	5
Lead	7439-92-1	24000	J	24000		Qualify	3
Silver	7440-22-4	0.87		0.87			
Thallium	7440-28-0	0.42	J	0.42		Qualify	1
Vanadium	7440-62-2	52.4	J	52.4		Qualify	3
Zinc	7440-66-6	428	J	428		Qualify	3,4,8
Field ID Num: S9B; Lab ID Num: 711268; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	86.8		86.8			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.026	J	0.026		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	4360	J	4360		Qualify	3
Antimony	7440-36-0	738	J	738		Qualify	2,3
Arsenic	7440-38-2	362	J	362		Qualify	3,7
Barium	7440-39-3	95.4	J	95.4		Qualify	3
Beryllium	7440-41-7	0.54		0.54			
Cadmium	7440-43-9	2.8		2.8			
Calcium	7440-70-2	6910	J	6910		Qualify	3
Chromium	7440-47-3	35		35			
Cobalt	7440-48-4	7.5		7.5			
Copper	7440-50-8	709	J	709		Qualify	3
Iron	7439-89-6	106000	J	106000		Qualify	3
Magnesium	7439-95-4	3020		3020			
Manganese	7439-96-5	294	J	294		Qualify	2,3
Nickel	7440-02-0	69.8		69.8			
Potassium	7440-09-7	482	JB	482		Qualify	5
Lead	7439-92-1	19600	J	19600		Qualify	3
Silver	7440-22-4	0.95		0.95			
Selenium	7782-49-2	0.24	J	0.24		Qualify	1
Vanadium	7440-62-2	72.7	J	72.7		Qualify	3
Zinc	7440-66-6	480	J	480		Qualify	3,4,8
Field ID Num: S9A; Lab ID Num: 711267; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	93.4		93.4			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.068		0.068			

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	6380	J	6380		Qualify	3
Antimony	7440-36-0	2.8	J	2.8		Qualify	1,2,3
Arsenic	7440-38-2	10.3	J	10.3		Qualify	3,7
Barium	7440-39-3	31.6	J	31.6		Qualify	3
Beryllium	7440-41-7	0.43		0.43			
Calcium	7440-70-2	258	J	258		Qualify	3
Chromium	7440-47-3	25.6		25.6			
Cobalt	7440-48-4	2.6	J	2.6		Qualify	1
Copper	7440-50-8	16.6	J	16.6		Qualify	3
Iron	7439-89-6	24900	J	24900		Qualify	3
Lead	7439-92-1	38.3	J	38.3		Qualify	3
Magnesium	7439-95-4	1280		1280			
Manganese	7439-96-5	64.1	J	64.1		Qualify	2,3
Nickel	7440-02-0	6.7		6.7			
Potassium	7440-09-7	1330		1330			
Sodium	7440-23-5	312	JB	312		Qualify	1,5
Vanadium	7440-62-2	37.2	J	37.2		Qualify	3
Zinc	7440-66-6	26.4	J	26.4		Qualify	3,4
Field ID Num: S8C; Lab ID Num: 711266; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	91.2		91.2			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	1680	J	1680		Qualify	3
Antimony	7440-36-0	285	J	285		Qualify	2,3
Arsenic	7440-38-2	225	J	225		Qualify	3,7
Barium	7440-39-3	15.7	J	15.7		Qualify	1,3
Beryllium	7440-41-7	0.33	J	0.33		Qualify	1
Cadmium	7440-43-9	1.1		1.1			
Calcium	7440-70-2	469	J	469		Qualify	3
Chromium	7440-47-3	21.8		21.8			
Cobalt	7440-48-4	2.8	J	2.8		Qualify	1
Copper	7440-50-8	204	J	204		Qualify	3
Iron	7439-89-6	34000	J	34000		Qualify	3
Lead	7439-92-1	4690	J	4690		Qualify	3
Magnesium	7439-95-4	517		517			
Manganese	7439-96-5	99.7	J	99.7		Qualify	2,3
Nickel	7440-02-0	17.1		17.1			
Potassium	7440-09-7	268	J	268		Qualify	1
Silver	7440-22-4	0.29	J	0.29		Qualify	1
Sodium	7440-23-5	1230		1230			
Vanadium	7440-62-2	35	J	35		Qualify	3
Zinc	7440-66-6	112	J	112		Qualify	3,4
Field ID Num: S8B; Lab ID Num: 711265; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Dilution Factor: 1.0							
Solids, Percent	SRP 141	95.2		95.2			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2490	J	2490		Qualify	3
Antimony	7440-36-0	5870	J	5870		Qualify	2,3
Arsenic	7440-38-2	521	J	521		Qualify	3,7
Barium	7440-39-3	37.5	J	37.5		Qualify	3
Beryllium	7440-41-7	0.45		0.45			
Cadmium	7440-43-9	2.9		2.9			
Calcium	7440-70-2	3910	J	3910		Qualify	3
Chromium	7440-47-3	29		29			
Cobalt	7440-48-4	4.2		4.2			
Copper	7440-50-8	332	J	332		Qualify	3
Iron	7439-89-6	42800	J	42800		Qualify	3
Magnesium	7439-95-4	805		805			
Manganese	7439-96-5	147	J	147		Qualify	2,3
Nickel	7440-02-0	21.8		21.8			
Potassium	7440-09-7	285	J	285		Qualify	1
Lead	7439-92-1	78900	J	78900		Qualify	3
Silver	7440-22-4	5.7		5.7			
Thallium	7440-28-0	1.7	J	1.7		Qualify	1
Vanadium	7440-62-2	55.2	J	55.2		Qualify	3
Zinc	7440-66-6	240	J	240		Qualify	3,4,8
Field ID Num: S8A; Lab ID Num: 711264; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	91.7		91.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.017	J	0.017		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3490	J	3490		Qualify	3
Antimony	7440-36-0	22.8	J	22.8		Qualify	2,3
Arsenic	7440-38-2	23.9	J	23.9		Qualify	3,7
Barium	7440-39-3	17.5	J	17.5		Qualify	3
Beryllium	7440-41-7	0.28	J	0.28		Qualify	1
Cadmium	7440-43-9	0.31	J	0.31		Qualify	1
Calcium	7440-70-2	1350	J	1350		Qualify	3
Chromium	7440-47-3	19.1		19.1			
Cobalt	7440-48-4	3.3	J	3.3		Qualify	1
Copper	7440-50-8	244	J	244		Qualify	3
Iron	7439-89-6	17400	J	17400		Qualify	3
Lead	7439-92-1	1240	J	1240		Qualify	3
Magnesium	7439-95-4	908		908			
Manganese	7439-96-5	77.9	J	77.9		Qualify	2,3
Nickel	7440-02-0	11.5		11.5			

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Potassium	7440-09-7	433		433			
Silver	7440-22-4	0.25	J	0.25		Qualify	1
Sodium	7440-23-5	103	JB	103		Negate	6
Vanadium	7440-62-2	25.9	J	25.9		Qualify	3
Zinc	7440-66-6	54.1	J	54.1		Qualify	3,4
Field ID Num: S7B; Lab ID Num: 711263; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	87.7		87.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	5420	J	5420		Qualify	3
Antimony	7440-36-0	294	J	294		Qualify	2,3
Arsenic	7440-38-2	286	J	286		Qualify	3,7
Barium	7440-39-3	239	J	239		Qualify	3
Beryllium	7440-41-7	1		1			
Cadmium	7440-43-9	2		2			
Calcium	7440-70-2	2740	J	2740		Qualify	3
Chromium	7440-47-3	54.4		54.4			
Cobalt	7440-48-4	4.7		4.7			
Copper	7440-50-8	210	J	210		Qualify	3
Iron	7439-89-6	70900	J	70900		Qualify	3
Lead	7439-92-1	16800	J	16800		Qualify	3
Magnesium	7439-95-4	918		918			
Manganese	7439-96-5	542	J	542		Qualify	2,3
Nickel	7440-02-0	29.5		29.5			
Potassium	7440-09-7	565		565			
Silver	7440-22-4	0.4	J	0.4		Qualify	1
Thallium	7440-28-0	0.89	J	0.89		Qualify	1
Vanadium	7440-62-2	103	J	103		Qualify	3
Zinc	7440-66-6	683	J	683		Qualify	3,4
Field ID Num: S7A; Lab ID Num: 711262; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	96.3		96.3			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.13		0.13			
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	6780	J	6780		Qualify	3
Antimony	7440-36-0	1.5	J	1.5		Qualify	1,2,3
Arsenic	7440-38-2	7.3	J	7.3		Qualify	3,7
Barium	7440-39-3	41.5	J	41.5		Qualify	3
Beryllium	7440-41-7	0.45		0.45			
Cadmium	7440-43-9	0.17	J	0.17		Qualify	1
Calcium	7440-70-2	770	J	770		Qualify	3
Chromium	7440-47-3	19.2		19.2			

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc.	Q	QA Reported Conc.	Retention Time - NT Only	QA Decision	Footnotes
Cobalt	7440-48-4	4		4			
Copper	7440-50-8	19.4	J	19.4		Qualify	3
Iron	7439-89-6	16900	J	16900		Qualify	3
Lead	7439-92-1	83.6	J	83.6		Qualify	3
Magnesium	7439-95-4	1510		1510			
Manganese	7439-96-5	108	J	108		Qualify	2,3
Nickel	7440-02-0	8.8		8.8			
Potassium	7440-09-7	1080		1080			
Sodium	7440-23-5	251	J	251		Qualify	1
Vanadium	7440-62-2	30.5	J	30.5		Qualify	3
Zinc	7440-66-6	35.3	J	35.3		Qualify	3,4
Field ID Num: S6C; Lab ID Num: 711261; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	92.3		92.3			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.022	J	0.022		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2500	J	2500		Qualify	3
Antimony	7440-36-0	331	J	331		Qualify	2,3
Arsenic	7440-38-2	123	J	123		Qualify	3,7
Barium	7440-39-3	14.2	J	14.2		Qualify	1,3
Beryllium	7440-41-7	0.46		0.46			
Cadmium	7440-43-9	0.49		0.49			
Calcium	7440-70-2	576	J	576		Qualify	3
Chromium	7440-47-3	29.3		29.3			
Cobalt	7440-48-4	2.8	J	2.8		Qualify	1
Copper	7440-50-8	117	J	117		Qualify	3
Iron	7439-89-6	44700	J	44700		Qualify	3
Lead	7439-92-1	8300	J	8300		Qualify	3
Magnesium	7439-95-4	702		702			
Manganese	7439-96-5	101	J	101		Qualify	2,3
Nickel	7440-02-0	17.2		17.2			
Potassium	7440-09-7	492		492			
Silver	7440-22-4	0.24	J	0.24		Qualify	1
Sodium	7440-23-5	1700		1700			
Vanadium	7440-62-2	62.6	J	62.6		Qualify	3
Zinc	7440-66-6	90.7	J	90.7		Qualify	3,4
Field ID Num: S6B; Lab ID Num: 711260; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	82.6		82.6			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.02	J	0.02		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	3430	J	3430		Qualify	3

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Antimony	7440-36-0	246	J	246		Qualify	2,3
Arsenic	7440-38-2	205	J	205		Qualify	3,7
Barium	7440-39-3	64	J	64		Qualify	3
Beryllium	7440-41-7	0.58		0.58			
Cadmium	7440-43-9	6.8		6.8			
Calcium	7440-70-2	8290	J	8290		Qualify	3
Chromium	7440-47-3	46.8		46.8			
Cobalt	7440-48-4	4.4	J	4.4		Qualify	1
Copper	7440-50-8	411	J	411		Qualify	3
Iron	7439-89-6	62900	J	62900		Qualify	3
Lead	7439-92-1	12800	J	12800		Qualify	3
Magnesium	7439-95-4	833		833			
Manganese	7439-96-5	171	J	171		Qualify	2,3
Nickel	7440-02-0	23.8		23.8			
Potassium	7440-09-7	410	J	410		Qualify	1
Silver	7440-22-4	0.62	J	0.62		Qualify	1
Thallium	7440-28-0	0.79	J	0.79		Qualify	1
Vanadium	7440-62-2	75.1	J	75.1		Qualify	3
Zinc	7440-66-6	234	J	234		Qualify	3,4,8
Field ID Num: S6A; Lab ID Num: 711259; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	93.3		93.3			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.048	J	0.048		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	4850	J	4850		Qualify	3
Antimony	7440-36-0	4.8	J	4.8		Qualify	1,2,3
Arsenic	7440-38-2	9.7	J	9.7		Qualify	3,7
Barium	7440-39-3	21.5	J	21.5		Qualify	3
Beryllium	7440-41-7	0.38	J	0.38		Qualify	1
Cadmium	7440-43-9	0.76		0.76			
Calcium	7440-70-2	1100	J	1100		Qualify	3
Chromium	7440-47-3	13.2		13.2			
Cobalt	7440-48-4	2.5	J	2.5		Qualify	1
Copper	7440-50-8	39.4	J	39.4		Qualify	3
Iron	7439-89-6	15500	J	15500		Qualify	3
Lead	7439-92-1	962	J	962		Qualify	3
Magnesium	7439-95-4	1330		1330			
Manganese	7439-96-5	71.4	J	71.4		Qualify	2,3
Nickel	7440-02-0	8		8			
Potassium	7440-09-7	682		682			
Silver	7440-22-4	0.16	J	0.16		Qualify	1
Sodium	7440-23-5	126	JB	126		Negate	6
Vanadium	7440-62-2	25.5	J	25.5		Qualify	3
Zinc	7440-66-6	79.7	J	79.7		Qualify	3,4
Field ID Num: S5C; Lab ID Num: 711258; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location: Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Dilution Factor: 1.0							
Solids, Percent	SRP 141	85.3		85.3			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2810	J	2810		Qualify	3
Antimony	7440-36-0	94.1	J	94.1		Qualify	2,3
Arsenic	7440-38-2	61.3	J	61.3		Qualify	3,7
Barium	7440-39-3	16.9	J	16.9		Qualify	1,2,3
Beryllium	7440-41-7	0.51		0.51			
Cadmium	7440-43-9	0.8		0.8			
Calcium	7440-70-2	808	J	808		Qualify	3
Chromium	7440-47-3	50.2		50.2			
Cobalt	7440-48-4	3.3	J	3.3		Qualify	1
Copper	7440-50-8	147	J	147		Qualify	3
Iron	7439-89-6	60500	J	60500		Qualify	3
Lead	7439-92-1	3470	J	3470		Qualify	3
Magnesium	7439-95-4	806		806			
Manganese	7439-96-5	107	J	107		Qualify	2,3
Nickel	7440-02-0	17.5		17.5			
Potassium	7440-09-7	385	J	385		Qualify	1
Silver	7440-22-4	0.21	J	0.21		Qualify	1
Sodium	7440-23-5	1900		1900			
Vanadium	7440-62-2	58.7	J	58.7		Qualify	3
Zinc	7440-66-6	105	J	105		Qualify	3,4
Field ID Num: S5A; Lab ID Num: 711257; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	85.7		85.7			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
Mercury	7439-97-6	0.037	J	0.037		Qualify	1
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	5930	J	5930		Qualify	3
Antimony	7440-36-0	3.3	J	3.3		Qualify	1,2,3
Arsenic	7440-38-2	7.7	J	7.7		Qualify	3,7
Barium	7440-39-3	28.7	J	28.7		Qualify	3
Beryllium	7440-41-7	0.38	J	0.38		Qualify	1
Cadmium	7440-43-9	0.12	J	0.12		Qualify	1
Calcium	7440-70-2	657	J	657		Qualify	3
Chromium	7440-47-3	14.3		14.3			
Cobalt	7440-48-4	3.3	J	3.3		Qualify	1
Copper	7440-50-8	21.4	J	21.4		Qualify	3
Iron	7439-89-6	15600	J	15600		Qualify	3
Lead	7439-92-1	182	J	182		Qualify	3
Magnesium	7439-95-4	1230		1230			
Manganese	7439-96-5	141	J	141		Qualify	2,3
Nickel	7440-02-0	6.4		6.4			

Project Name: 32950000
SDG: 120128
Project Number: 32950000

Laboratory Name: STL-Burlington
Laboratory Location:. Colchester, VT

Analyte	CAS Number	Laboratory Reported Conc	Q	QA Reported Conc	Retention Time NT Only	QA Decision	Footnotes
Potassium	7440-09-7	886		886			
Sodium	7440-23-5	975		975			
Vanadium	7440-62-2	25.6	J	25.6		Qualify	3
Zinc	7440-66-6	37.2	J	37.2		Qualify	3,4
Field ID Num: S13; Lab ID Num: 711256; Sampling Date: 05/23/2007; Matrix: SOIL							
Solids (%)							
Dilution Factor: 1.0							
Solids, Percent	SRP 141	87		87			
Mercury (mg/Kg)							
Dilution Factor: 1.00							
ICPAES Metals (mg/Kg)							
Dilution Factor: 1.00							
Aluminum	7429-90-5	2350	J	2350		Qualify	3
Antimony	7440-36-0	29.3	J	29.3		Qualify	2,3
Arsenic	7440-38-2	18.4	J	18.4		Qualify	3,7
Barium	7440-39-3	31.1	J	31.1		Qualify	3
Beryllium	7440-41-7	0.15	J	0.15		Qualify	1
Cadmium	7440-43-9	0.64		0.64			
Calcium	7440-70-2	100	JB	100		Qualify	1,3,5
Chromium	7440-47-3	8.2		8.2			
Cobalt	7440-48-4	0.69	J	0.69		Qualify	1
Copper	7440-50-8	47.1	J	47.1		Qualify	3
Iron	7439-89-6	5190	J	5190		Qualify	3
Lead	7439-92-1	3740	J	3740		Qualify	3
Magnesium	7439-95-4	80.3	J	80.3		Qualify	1
Manganese	7439-96-5	19.9	J	19.9		Qualify	2,3
Nickel	7440-02-0	2.5	J	2.5		Qualify	1
Potassium	7440-09-7	395	J	395		Qualify	1
Selenium	7782-49-2	0.26	J	0.26		Qualify	1
Vanadium	7440-62-2	19.2	JB	19.2		Qualify	3
Zinc	7440-66-6	16	JB	16		Qualify	3,4,5

FOOTNOTES

1. The reported concentration is quantitatively qualified because it is above the Method Detection Level (MDL) but below the Contract Required Quantitation Limit (CRQL).

2. The reported concentration is quantitatively qualified and may be biased low or the detection limit for the nondetected result may be estimated because the %recovery for the sample spike analysis was below the QA/QC limits of 75-125%.

3. The reported concentration is quantitatively qualified because the Relative %Difference between the sample and sample duplicate results was greater than 20%.

4. The reported concentration is quantitatively qualified because the %Difference between the sample result and the Sample Serial Dilution result for this analyte was greater than 10%.

5. The reported concentration in the sample is greater than 3X the value in the method/preparation blank and is considered "real". However, the reported value must be quantitatively qualified "J" due to method/preparation blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte in the method/preparation blank.

6. The reported concentration in the sample is less than 3 X the value in the method/preparation blank. It is the policy of ODQ to negate the reported value due to probable contamination unrelated to the actual sample.

7. The reported concentration is quantitatively qualified and may be biased high because the %recovery for the sample spike analysis was above the QA/QC limits of 75-125%.

8. The reported concentration of this analyte is taken from a dilution analysis. The concentration is above the MDL but below the elevated CRQL.

9. The non detected result for this analyte is suspect because the sample was diluted too extensively.

REFERENCE 9

FIELD LOGBOOK

RARITAN BAY SLAG HRS

OLD BRIDGE TWP., Middlesex County

NJ

W.O. No: 20405.012.013.0523

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(2)

(1)

Raritan Bay Slag HRS

October 1, 2008

0955 SAT2 arrives at western Jetty to Cheesequake Inlet. Weather: sunny ~75°F
Personnel on site: Dennis Fealea
Dan Gaughan

1000 Dan Gaughan conducts Health and Safety Tailgate Meeting.
DF & DG walk out onto western Jetty of Cheesequake Creek inlet, which extends into Raritan Bay. Slag material is noted to be in Direct Contact with Raritan Bay Throughout the Jetty.

1003 Photo 1 - Photo of Slag in contact with Cheesequake Creek inlet.
Note: According to www.saltwatertides.com High Tide occured at 9:53 am.

1006 Photo 2 - Photo of slag of western Jetty of Cheesequake Inlet in direct contact with Raritan Bay

1010 Photo 3,4 - Photos of slag from western Jetty of Cheesequake Creek Inlet in direct contact with Raritan Bay during High tide.

1015 DG uses GPS to get a point at ~~[illegible]~~ (08) approximate center of western Jetty of Cheesequake Creek Inlet.
Dan Gaughan 10/1/08

(2)

10/1/08 Raritan Bay Slag HRS

1020 DF & DG drive over to Lawrence Harbor Beach, which is east of the eastern Jetty of Cheesequake Creek Inlet.

1040 Interview Barry Cotton, who is fishing adjacent to the eastern Jetty to Cheesequake Inlet. Mr. Cotton says he has been fishing here for 50 years. He does not eat what he catches, but says that people do fish in Raritan Bay and eat what they catch. Species fished for include Fluke, Bluefish, snappers, and striped Bass.

(3)

1045 Interview Jason Lee of Edison, NJ. Mr. Lee says he fishes the Raritan Bay along the entire extent of Lawrence Harbor Beach. He fishes for snappers, Bluefish and striped Bass. He says that he does eat what he catches. Mr. Lee was fishing near the eastern Jetty of Cheesequake Creek Inlet at the time of the interview.

[signature] 10/1/08

(3)

10/1/08 Raritan Bay Slag HRS

1050 DF & DG interview Mr. Jose Perez, who is fishing in Raritan Bay from the Lawrence Harbor Beach Shoreline. Mr. Perez fishes for Blue Fish, snappers, and Striped Bass. Mr. Perez does eat what he catches from this portion of Raritan Bay.

1052 Photo 5 Photo of snappers caught by Jose Perez.

1055 Interview Neiva Fernandes of Parlin, NJ. She is fishing in Raritan Bay from the Lawrence Harbor Beach. She said that she fishes for Blue Fish and she eats what she catches from this area of Raritan Bay.

1100 DF and DG drive over to Lawrence Harbor Seawall area. As we arrive, fishermen are located adjacent to the Lawrence Harbor Seawall, which is observed to consist of slag.

NOTE: Photo 6 taken by DG at 1058, of fishing activity along the Lawrence Harbor Beach (looking west).

[signature] 10/1/08

(4) 10/1/08 Raritan Bay Shag HRS

1110 Interview Stan Thei, who lives in South Plainfield, NJ. Mr. Thei is fishing along the Laurence Harbor Seawall from Raritan Bay. They fish for Blue Fish and Striped Bass and Fish from this location about once per week. He says that he eats what he catches.

1115 DF notes that there are several areas in the area where Mr. Thei is fishing from where slag deposits are in direct contact with Raritan Bay. In addition, as the tide is moving out, you can see the high water line where slag is located.

1115 Photo 7 Photo of slag from Laurence HARbor Seawall in contact with Raritan Bay.

1117 Photo 8 - Photo of fisherman fishing off Laurence Harbor Seawall in Raritan Bay.

1120 DF & DG walk along the Laurence Harbor seawall, east toward Margaret's Creek. In several areas of the seawall, slag was

(5) 10/1/08 Raritan Bay Shag HRS

observed to be in contact with Raritan Bay. In some areas, small Battery Casing Fragments were observed. The fragments were all fortunately (with in 1/2".

1130 Photo 9 - Photo of slag in contact with Raritan Bay along the eastern portion of the Laurence Harbor Seawall, near Margaret's creek confluence with Raritan Bay.

1131 Photo 10 - Photo of Slag in contact with Raritan Bay along eastern portion of Laurence Harbor Seawall.

~~1135 DF & DG Drive at [redacted]~~

1135 DF & DG drive to Laurence Parkway access to Raritan Bay. The parking lot is currently being resurfaced.

1140 DF interviews Duke Evelgan, an employee of Skippy's Bait Shop. Mr. Evelgan said that people fish the Raritan Bay from Margaret's Creek to the western jetty of Cheesequake Creek Inlet and beyond. People do eat what they catch, including Blue Fish and STRIPED BASS.

(6)

10/1/08 Raritan Bay Slag HRS

Mr. Evergun says that crabbing is slow this year on Raritan Bay and that people are not allowed to take clams or mussels from the Bay.

1150 OF & DG arrive at western portion of Lawrence Harbor seawall. Slag deposits are noted; however the deposits appear to be smaller than in other portions of the seawall.

1152 Photo 15 - Photo of Slag deposits at ~~Port~~ (27) western portion of Lawrence Harbor seawall in contact with Raritan Bay.

1200 DF and DG depart site.

NOTE: During the 10/1/08 event, DG used GPS to document:

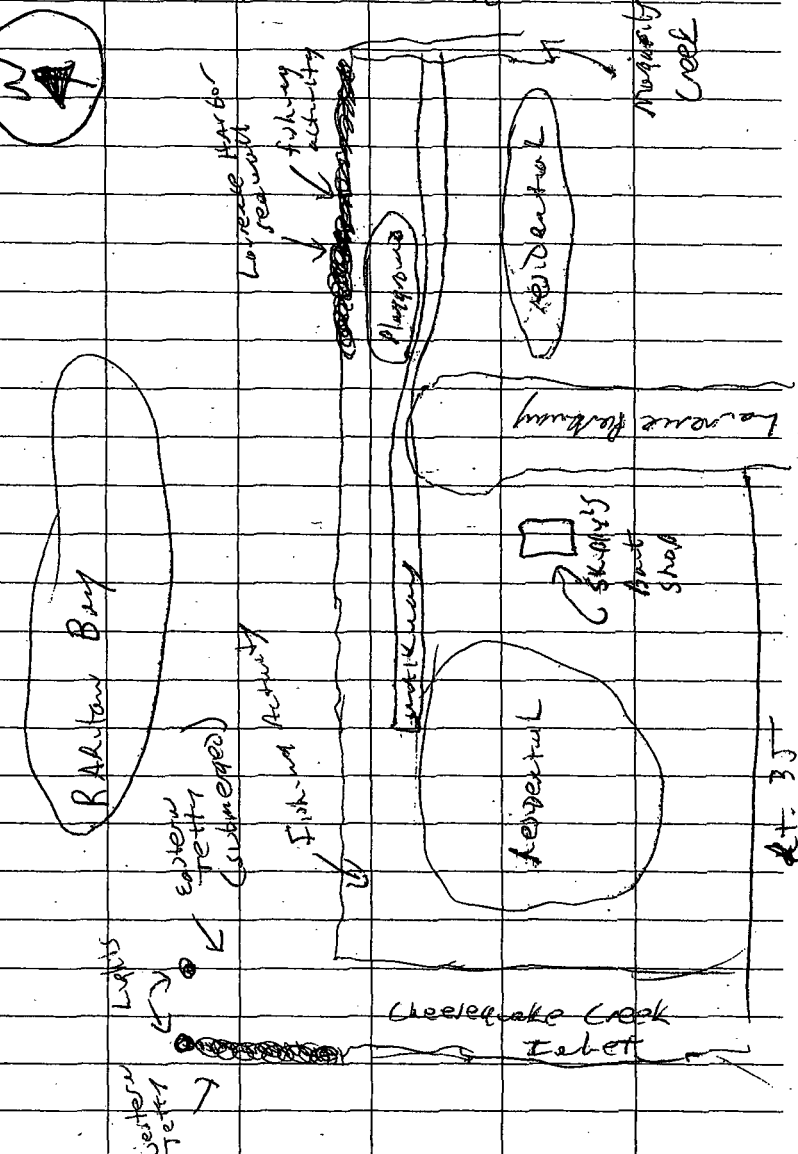
- center of western jetty to Cheesequake Creek inlet
- eastern & western points of Lawrence Harbor seawall
- Eastern/western extent of wetland along Lawrence Harbor seawall —
- Location of fishing on Lawrence Harbor seawall.

(5)

(7)

10/1/08 Raritan Bay Slag HRS.

NAD - not to scale



(8)

10/3/08

0930 Dan Gaughan (DG) and Michele Caprig-
lione (MC) depart Weston office for
Raritan Bay Slag site. Weather - sunny,
cool approx. 65°F. DG + MC will
determine salinity of water from
various locations of Raritan Bay Slag
(RBS) site.

0950 Arrive at Western Jetty of Cheesequake
Creek inlet. DG conducts H+S briefing.
Use a calibrated YSI-556, serial
No. 08F100707 for salinity readings.
Instrument uses conductivity and
temperature to determine salinity.

1000 Collect readings on western jetty
in bay and inlet

1030 Collect readings in inlet from
eastern jetty

1045 Collect readings from Margaret's
Creek.

1100 Collect readings along sea wall.

1115 Collect readings from first jetty
at main beach area.

1130 DG + MC return to office.

Daniel R 10/3/08

(9)

10/3/08

Location	Temp. °C	Salinity (ppt)
West of Western Jetty, southern portion	17.73°C	18.04
West of Western Jetty, mid-point	17.60°C	18.03
East of Western Jetty, mid-point	18.26°C	18.41
West of Eastern Jetty, inlet	18.16°C	18.58
Margaret Creek, footbridge	14.75°C	0.09
Seawall, West of Margaret Creek	17.24°C	17.84
Seawall, midway point	17.60°C	17.99
First Jetty, Beach area	17.34°C	18.00

ppt - parts per thousand

Daniel R 10/3/08

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
SAMPLING PHOTO LOG
OCTOBER 1, 2008

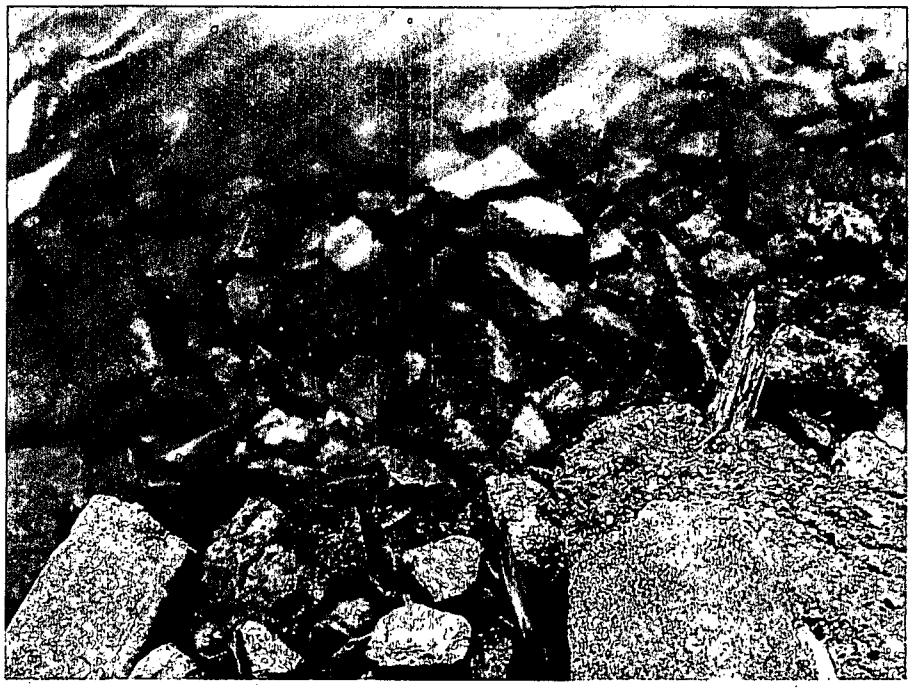


Photo 1 – Photo of slag associated with the western jetty of Cheesequake Creek Inlet in contact with Cheesequake Inlet where it enters Raritan Bay at high tide.

Photo 2 – Slag from western jetty of Cheesequake Creek Inlet in contact with Raritan Bay during high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
SAMPLING PHOTO LOG
OCTOBER 1, 2008

Photo 3 – Slag from western jetty of Cheesequake Inlet in contact with Raritan Bay during high tide.

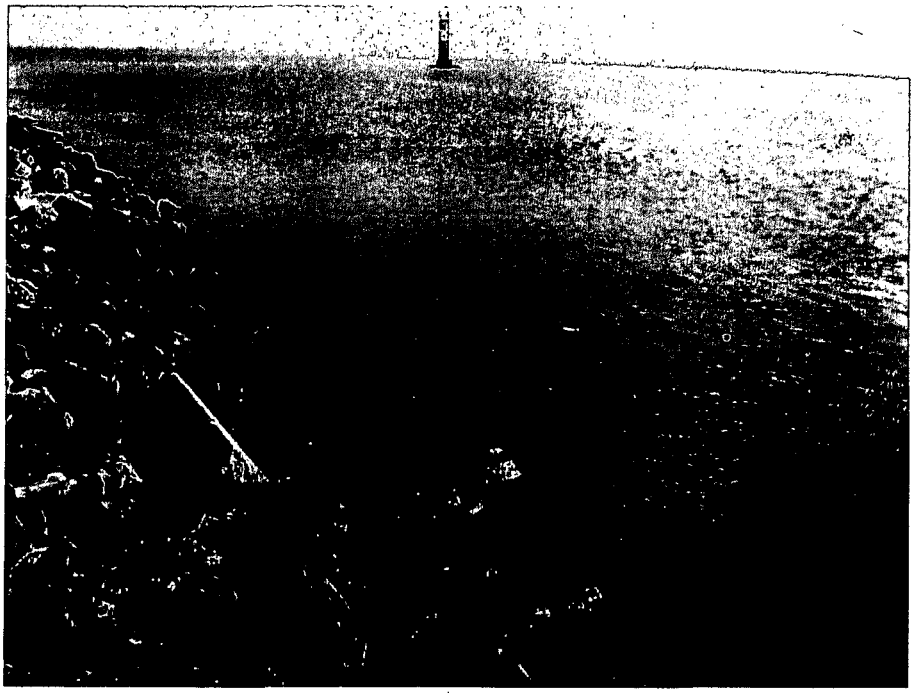


Photo 4 - Slag from western jetty of Cheesequake Inlet in contact with Raritan Bay during high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
SAMPLING PHOTO LOG
OCTOBER 1, 2008

Photo 5 – Snappers caught by local fisherman from Raritan Bay.

Photo 6 – Western view of fishing activity from Raritan Bay at Laurence Harbor beach; note western jetty of Cheesequake Creek Inlet in background.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
SAMPLING PHOTO LOG
OCTOBER 1, 2008

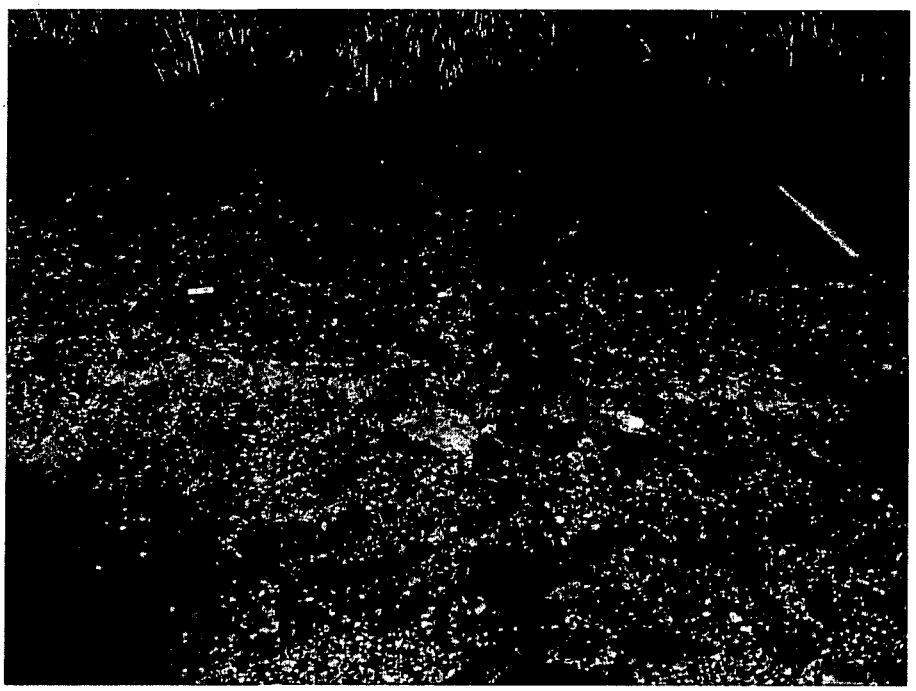


Photo 7 – Slag from Laurence Harbor seawall in contact with Raritan Bay during high tide.

Photo 8 – fisherman fishing from Raritan Bay along the Laurence Harbor seawall, looking west.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
SAMPLING PHOTO LOG
OCTOBER 1, 2008

Photo 9 - Slag from eastern portion of Laurence Harbor seawall in contact with Raritan Bay during high tide.

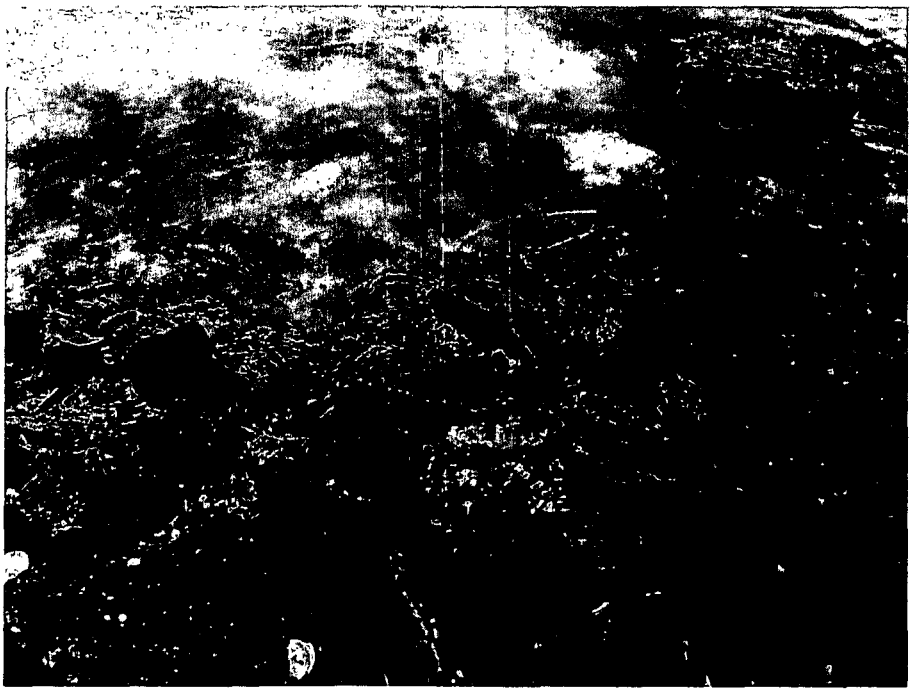


Photo 10 - Slag from eastern portion of Laurence Harbor seawall in contact with Raritan Bay during high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
SAMPLING PHOTO LOG
OCTOBER 1, 2008

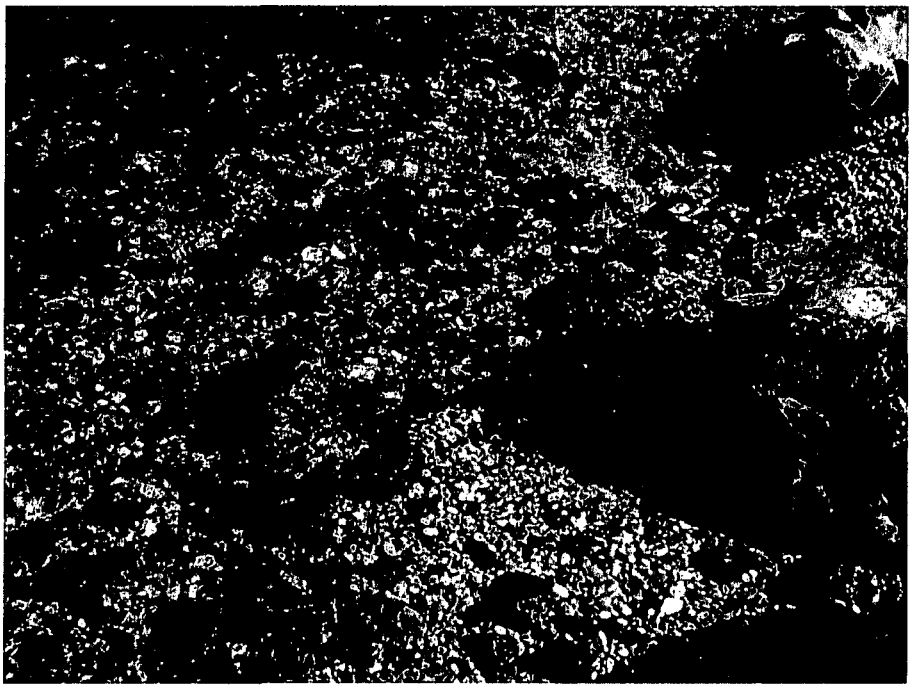


Photo 11 - Slag from western portion of Laurence Harbor seawall in contact with Raritan Bay during high tide.

(10)

Raritan Bay Slag HRS
JANUARY 16, 2009

0920 Arrive at western Jetty to Cheesequake Creek Inlet.
weather: Partly cloudy, ~13° F

Weston personnel on site
Dennis Foore - PM HRS (DF)
Kelli Lucarino - GPS (KL)
DF had tailgate Health & Safety meeting, Go over hazards including cold stress and slips, trips and falls. Also nearest hospital.
KL used GPS to navigate to TCLP sample location RBS-559A.

0930 Arrive at Location 559A, The location is dry and is located in an area where ice has formed. There are alot of large chunks of broken ice in this area; likely from previous tide surges.
Photo 1 - Photo of sample location RBS-559A prior to high tide.

0934 Arrive at TCLP sample location RBS-560A. The sample is already submerged within Raritan Bay.

Dan Tent 1/16/09

(11)

Photo 2 - TCLP waste/soil sample Location RBS-560A prior to high tide.

0940 Arrive at TCLP waste/soil sample location RBS-507A. The sample location is dry and located in an area of large chunks of ice from previous tidal surges along the shoreline.
Photo 4 - Photo of TCLP waste sample Location RBS-507A prior to high tide
NOTE: Photo 3 was taken at 0935, The Photo was an eastern view of the Southern shoreline of Raritan Bay west of the western Jetty to the Cheesequake Creek Inlet.

0945 DF & KL walk out on the western Jetty to locate locations 597 and 598.

0949 Photo 5 - TCLP waste/soil Location RBS-597 prior to high tide

0950 Photo 6 - TCLP waste/soil Location RBS-598 prior to high tide.

0955 Photo 7 - North view of western Jetty of Cheesequake Creek Inlet - note high tide water line on western side of Jetty where ice has formed

Dan Tent 1/16/09

(12)

0956 Drive to Lawrence Harbor Seawall.

1000 DF & KL arrive in Old Bridge waterfront park. DF & KL use GPS to navigate to TCLP/waste/soil locations along the Lawrence Harbor Seawall.

1010 Arrive at Location RBS-S01A. The location is dry, but the tide is approaching the location.

Photo 8 - Photo of TCLP sample location RBS-S01A prior to high tide.

1020 Arrive at TCLP waste/soil sample location RBS-S02A. Location is dry.

Photo 9 Photo of TCLP waste/soil sample location RBS-S02A prior to high tide.

1025 Arrive at TCLP/waste/soil sample location RBS-S03A. Sample location is dry.

Photo 10 - Photo of sample location RBS-S03A prior to high tide.

NOTE: For locations S01, S02, and S03A, you can see ice from previous tides which indicates that these locations were previously submerged.

[signature] 1/16/09

(13)

1030 DF & KL drive over to western portion of the Lawrence Harbor seawall, near Lawrence Parkway.

1040 Sample locations RBS S09A and RBS-S10A are located and flagged.

Photo 11 Sample location RBS-S09A prior to high tide.

1041 Photo 12 Sample location RBS-S10A prior to high tide.

1045 DF & KL drive back to location RBS-S01A to see if it is submerged in Raritan Bay.

1050 Arrive at sample location RBS-S01A. The sample location is submerged within Raritan Bay.

1053 Photos 13 & 14 Photos of sample location RBS-S01A submerged in Raritan Bay

1055 DF & KL drive to western jetty of Cheesequake Creek Inlet to see if locations are submerged in Raritan Bay.

1105 Arrive at western jetty of Cheesequake Creek Inlet.

[signature] 1/16/09

(14)

1110 Arrive at TCLP waste/soil sample location RBS-S07A. The sample location is submerged in Raritan Bay.

1110 Photo 15 - sample location RBS-S07A submerged in Raritan Bay.

1111 walk over to sample location RBS-S59A. This sample location is also submerged by the incoming tide of Raritan Bay.

1111 & 1112 Photos 16 & 17 Photos of TCLP waste/soil sample location RBS-S9A submerged in Raritan Bay.

1113 Photo 18 - Photo of sample location RBS-S07A submerged in Raritan Bay.

Note: Sample locations ~~RBS-S97~~ (27) 1/16/09 RBS-S97 and RBS-S98 were collected on the top middle portion of the jetty and are not expected to be submerged in Raritan Bay at high tide.

1115 DF & KL drive back to Lawrence Harbor Seawall.

1120 Arrive at seawall walk over to locations S02A & S03A.

[signature] 1/16/09

(15)

Sample locations S02A and S03A are not submerged at this time. DF & KL go over to location S01A.

1125 Photos 19 & 20 - Photos of TCLP waste/soil sample location RBS-S01A submerged in Raritan Bay at approximate high tide.

DF & KL walk over to TCLP waste/soil sample location RBS-S03A. The tide is just about at this location. An occasional surge goes over the sample location, but the location is not submerged for any period of time.

1130 Photos 21-23 Photo of TCLP waste/soil sample location RBS-S03A, adjacent to incoming tide from Raritan Bay.

1140 walk over to TCLP waste/soil sample location RBS-S02A. This location ~~does not appear to~~ (27) 1/16/09 appears to be dry and the tide will not likely submerge the location today. The icing from previous tides indicates that this location was covered by the Raritan Bay in the past

[signature] 1/16/09

1145 Photo 24 - Photo of TCLP waste/soil sample location RBS-S02A at high tide in Raritan Bay.

1146 DF & KL drive over to sample locations S09A & S10A.

1150 Arrive at sample locations S09A and S10A. The high tide line today will not reach either location, as high tide is expected to be at 11:57.

Photo 25 - Photo of sample location S09A at approximate high tide of Raritan Bay.

NOTE - The ice on the vicinity of samples S09A and S10A indicates that previous tides have previously submerged location S09A.

1200 DF & KL Depart site.

SUMMARY

Weston mobilized to the site to document direct contact of the Raritan Bay with samples which had TCLP lead concentrations above the regulatory level of 5 mg/L.

[signature] 1/16/04

The following was observed:

Western Jetty of Cheesequake Creek Inlet

* ~~Inlet~~ 1/16/04 Samples RBS-S07A, RBS-S59A and RBS-S60A were observed to be submerged in Raritan Bay
* Samples RBS-S97 and RBS-S98 were collected from the middle of the jetty and these locations are not expected to be submerged in Raritan Bay, except under flooding conditions when the Bay covers the entire jetty

Laurence Harbor Seawall

* Samples RBS-S01A and RBS-S03A were observed to come in contact from incoming Raritan Bay tides. Sample RBS-S01A was completely submerged.
* Samples RBS-S02A and RBS-S09A did not come into contact with the Raritan Bay on 1/16/04; however, icing along the shoreline indicates that previous tides covered these sample locations
* Sample location S10A did not come in contact with the Bay.
* Based on field observations, Raritan Bay is tidal, ~6 hours separates high and low tides.

[signature] 1/16/04

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

Photo 1 – Photo of TCLP Waste/Soil sample location RBS-S59A prior to high tide.

Photo 2 – Photo of TCLP Waste/Soil sample location RBS-S60A prior to high tide. Note sample location is already submerged in Raritan Bay.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

Photo 3 – Photo looking east of the southern shoreline of Raritan Bay west of the Western Jetty of the Cheesequake Creek Inlet.

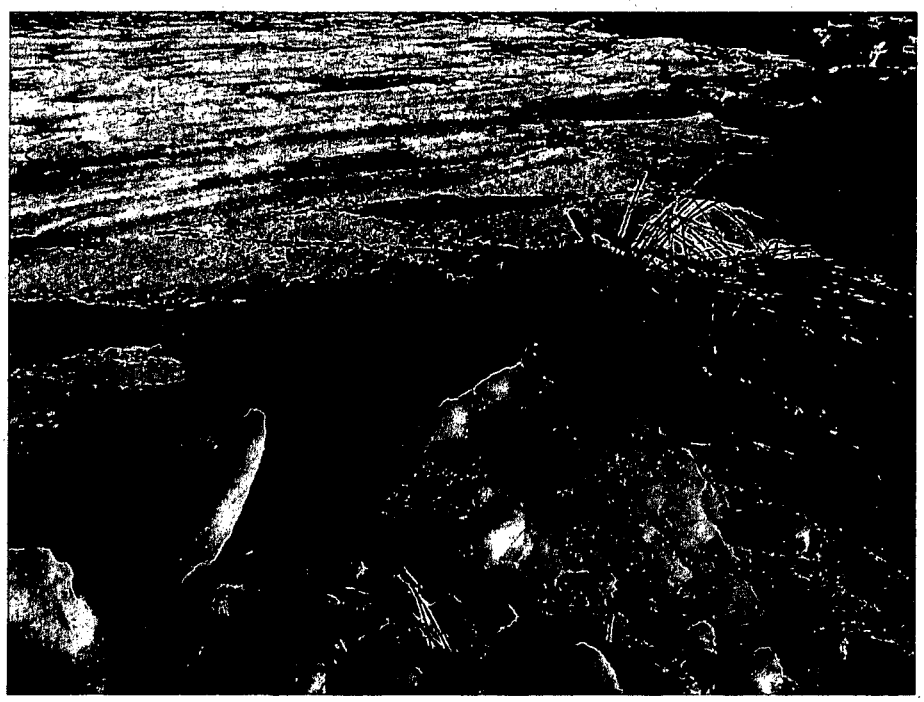


Photo 4 - Photo of TCLP Waste/Soil sample location RBS-S07A prior to high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

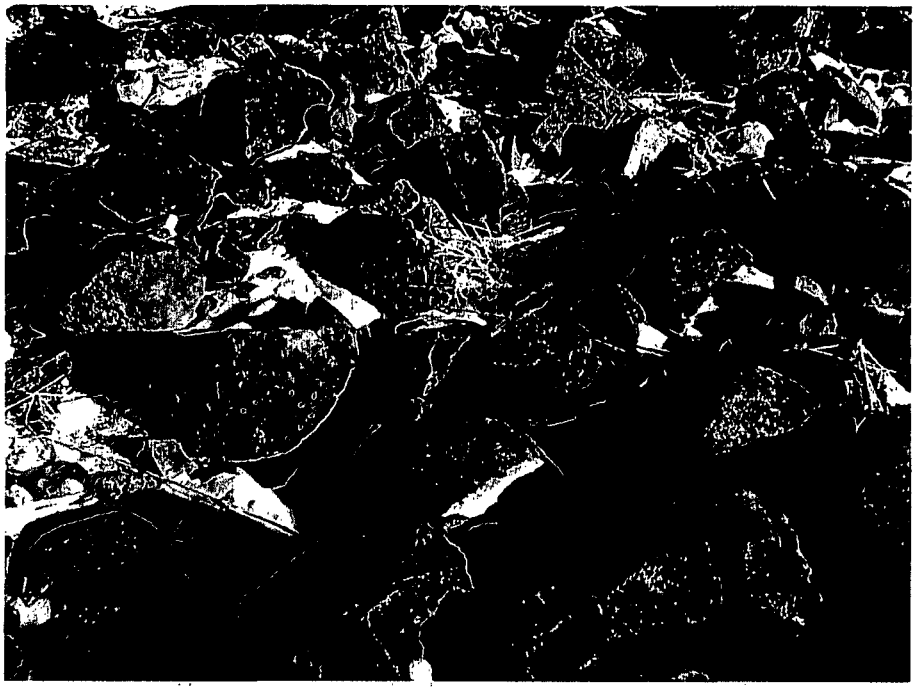


Photo 5 – Photo of TCLP Waste/Soil sample location RBS-S97 prior to high tide.

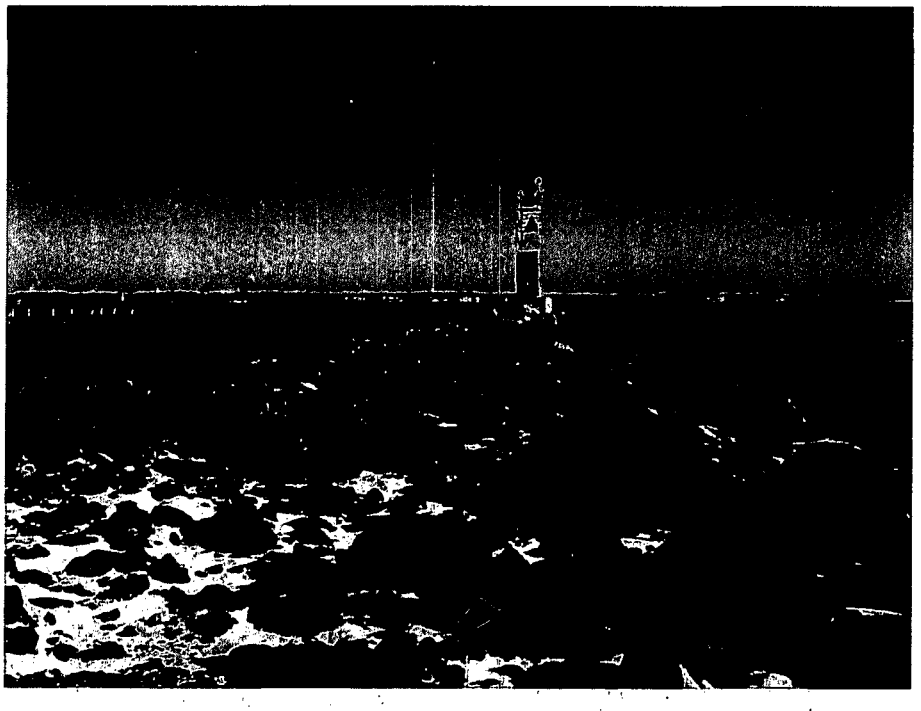


Photo 6 – Photo of TCLP Waste/Soil sample location RBS-S98 prior to high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

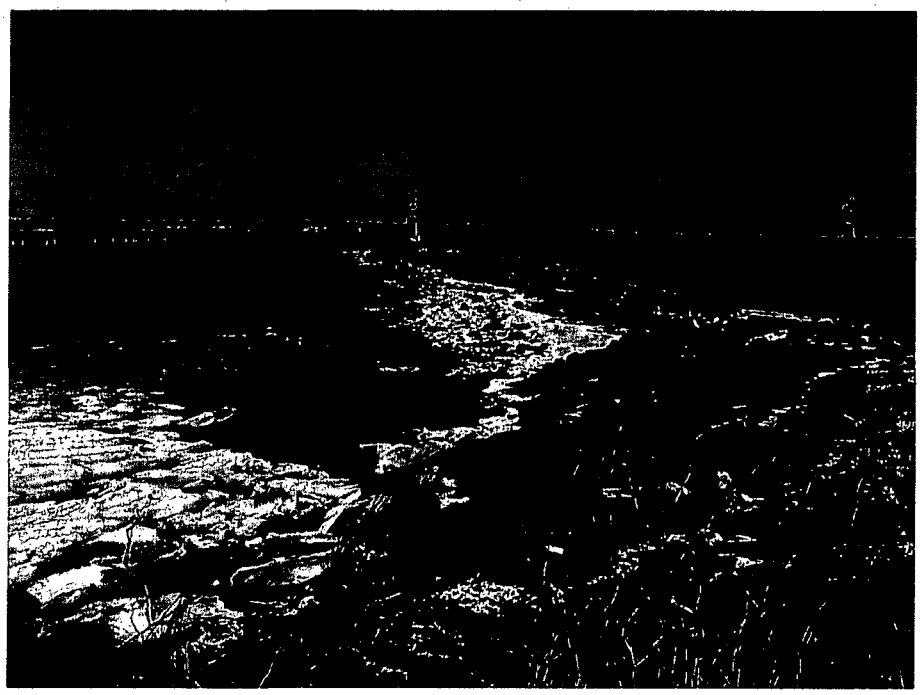


Photo 7 – Photo of Western Jetty of Cheesequake Creek Inlet; note high tide water line where ice has formed.

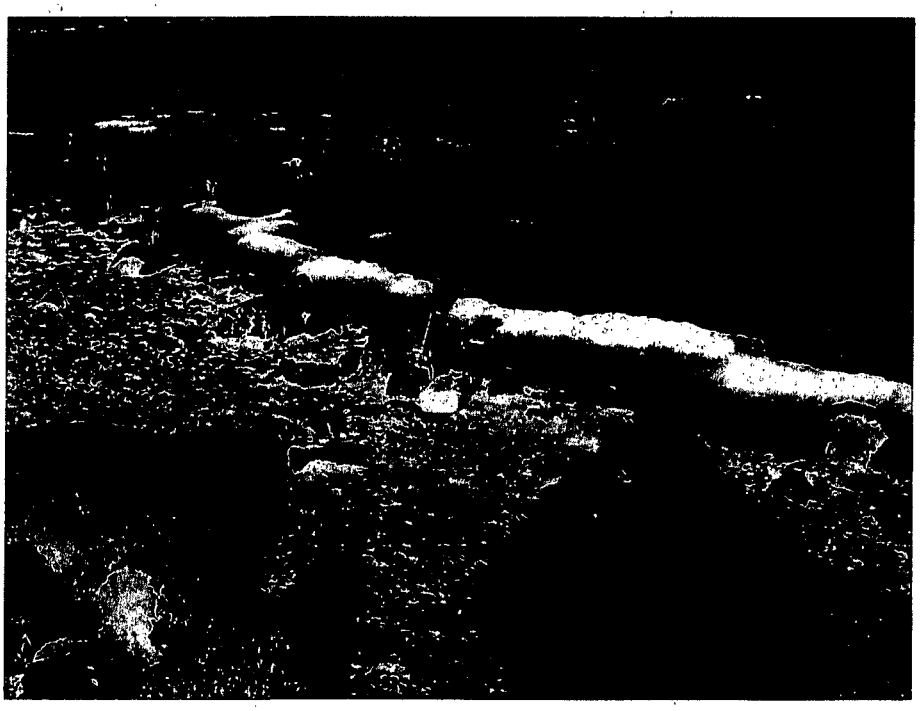


Photo 8 – Photo of TCLP Waste/Soil sample location RBS-S01A prior to high tide.

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OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

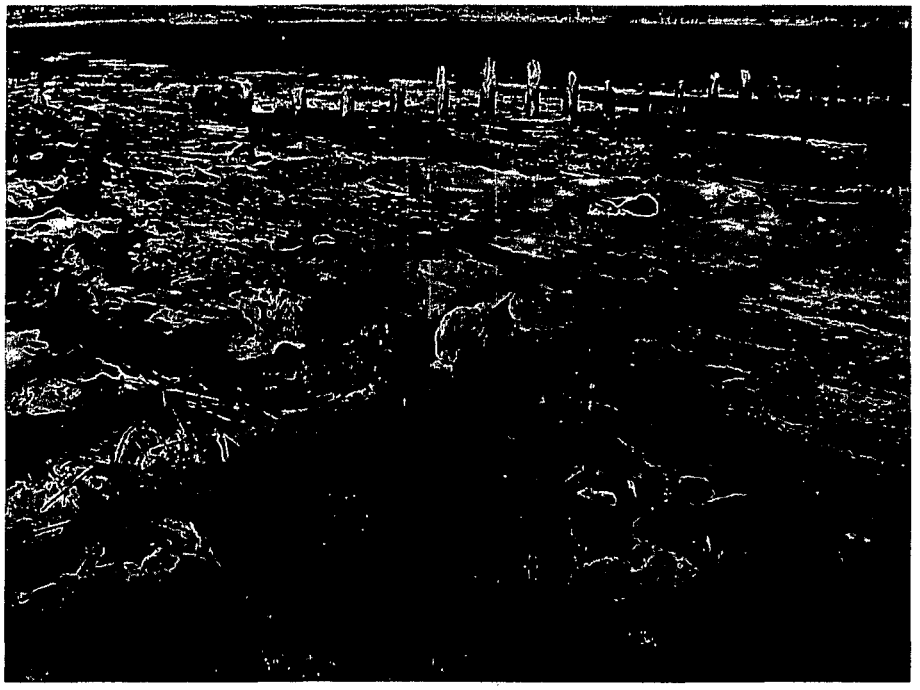

Photo 9 - Photo of TCLP Waste/Soil sample location RBS-S02A prior to high tide.

Photo 10 - Photo of TCLP Waste/Soil sample location RBS-S03A prior to high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
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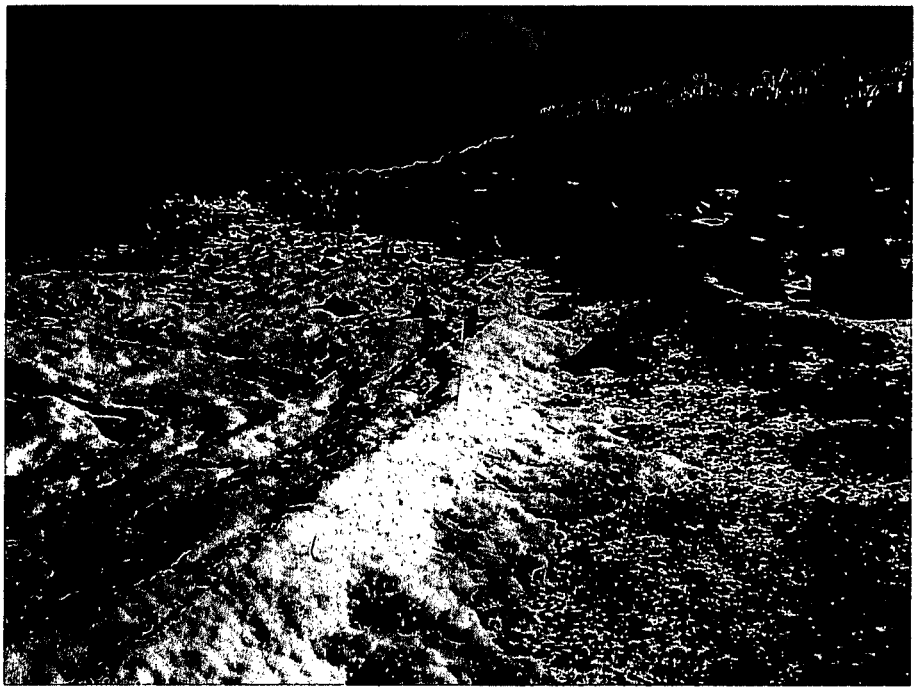

Photo 11 - Photo of TCLP Waste/Soil sample location RBS-S09A prior to high tide.

Photo 12 - Photo of TCLP Waste/Soil sample location RBS-S10A prior to high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

Photo 13 - Photo of TCLP Waste/Soil sample location RBS-S01A submerged in Raritan Bay.

Photo 14 - Photo of TCLP Waste/Soil sample location RBS-S01A submerged in Raritan Bay.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
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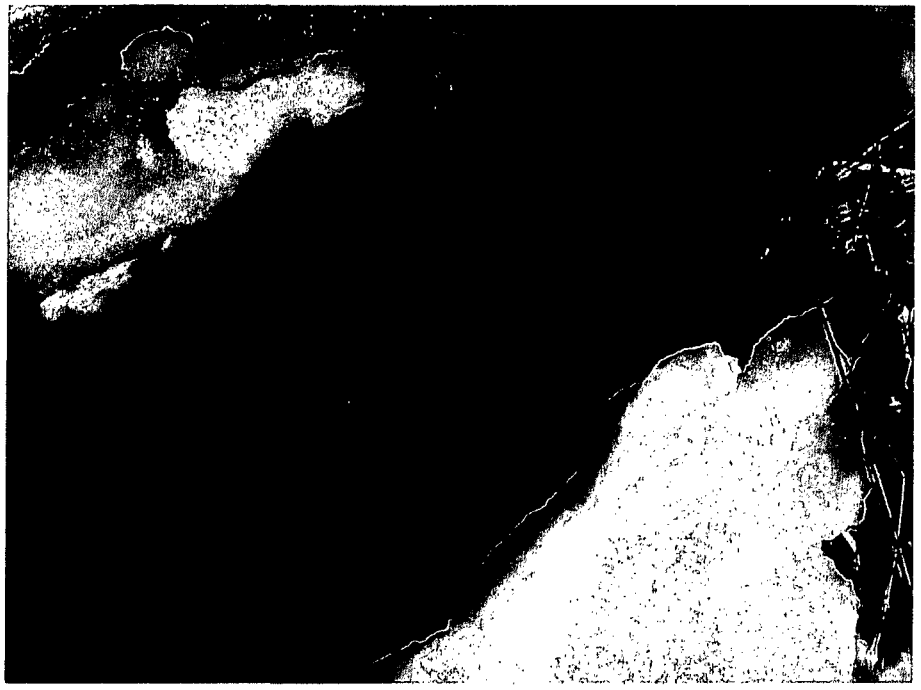

Photo 15 - Photo of TCLP Waste/Soil sample location RBS-S07A submerged in Raritan Bay at high tide.

Photo 16 - Photo of TCLP Waste/Soil sample location RBS-S059A submerged in Raritan Bay at high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

Photo 17 - Photo of TCLP Waste/Soil sample location RBS-S07A submerged in Raritan Bay at high tide.

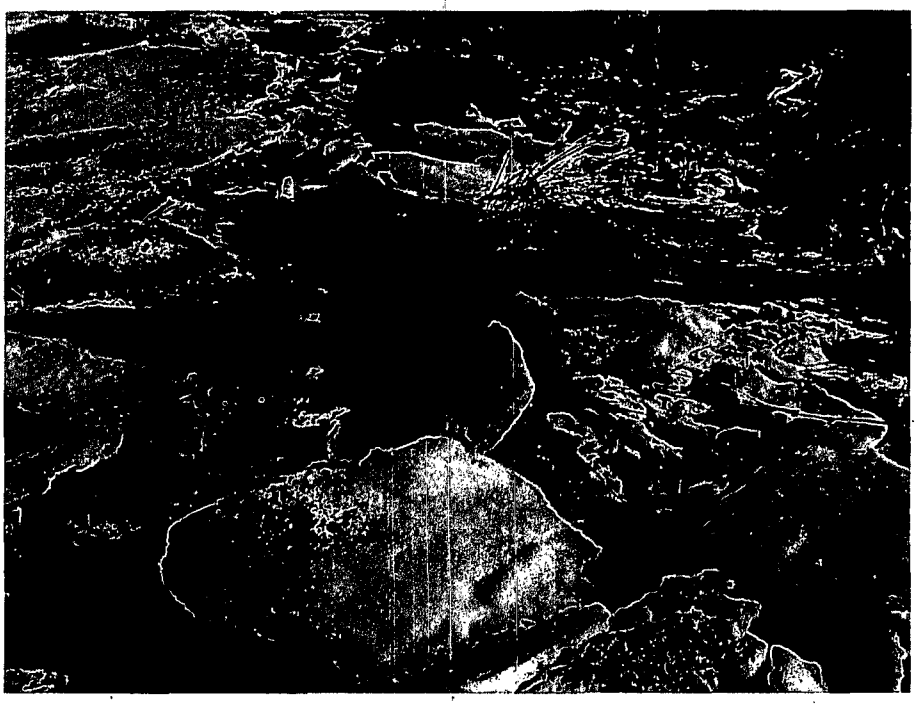

Photo 18 - Photo of TCLP Waste/Soil sample location RBS-S07A submerged in Raritan Bay at high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
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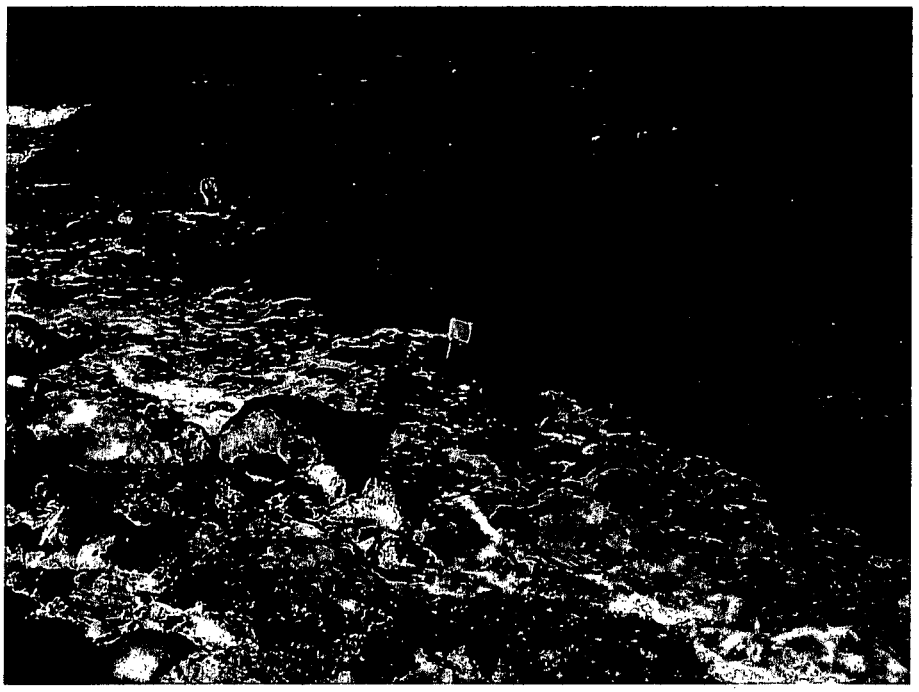

Photo 19 - Photo of TCLP Waste/Soil sample location RBS-S01A submerged in Raritan Bay at high tide.

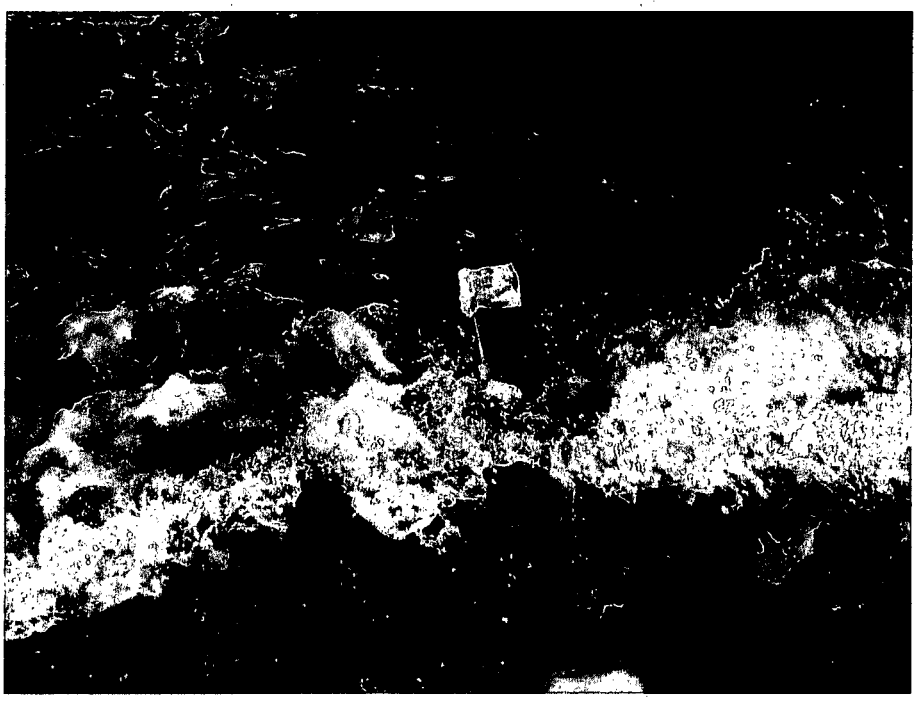

Photo 20 - Photo of TCLP Waste/Soil sample location RBS-S01A submerged in Raritan Bay at high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
PHOTO LOG
JANUARY 16, 2009

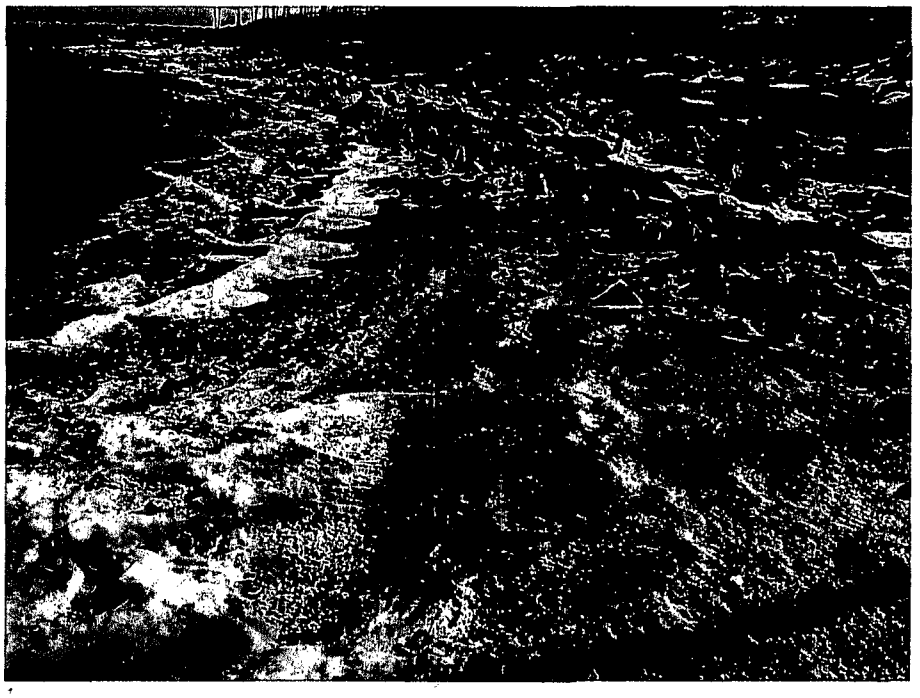

Photo 21 - Photo of TCLP Waste/Soil sample location RBS-S03A (flag in background) and interface with Raritan Bay at high tide.

Photo 22 - Photo of TCLP Waste/Soil sample location RBS-S03A (flag in background) and interface with Raritan Bay at high tide.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
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Photo 23 - Photo of TCLP Waste/Soil sample location RBS-S03A at high tide in Raritan Bay.Slag.

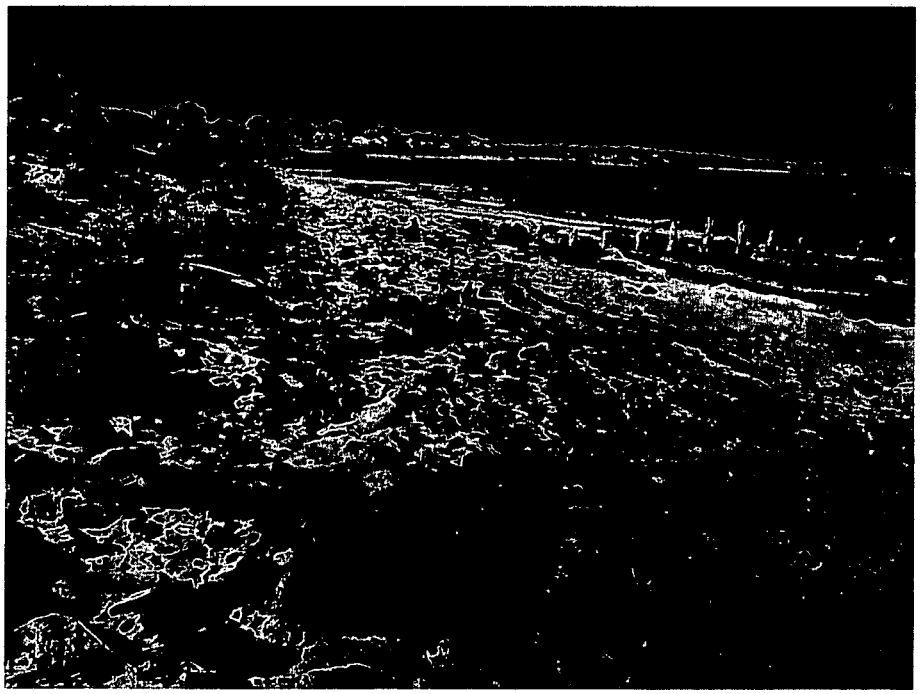

Photo 24 - Photo of TCLP Waste/Soil sample location RBS-S02A at high tide in Raritan Bay.

RARITAN BAY SLAG HRS
OLD BRIDGE AND SAYREVILLE, NEW JERSEY
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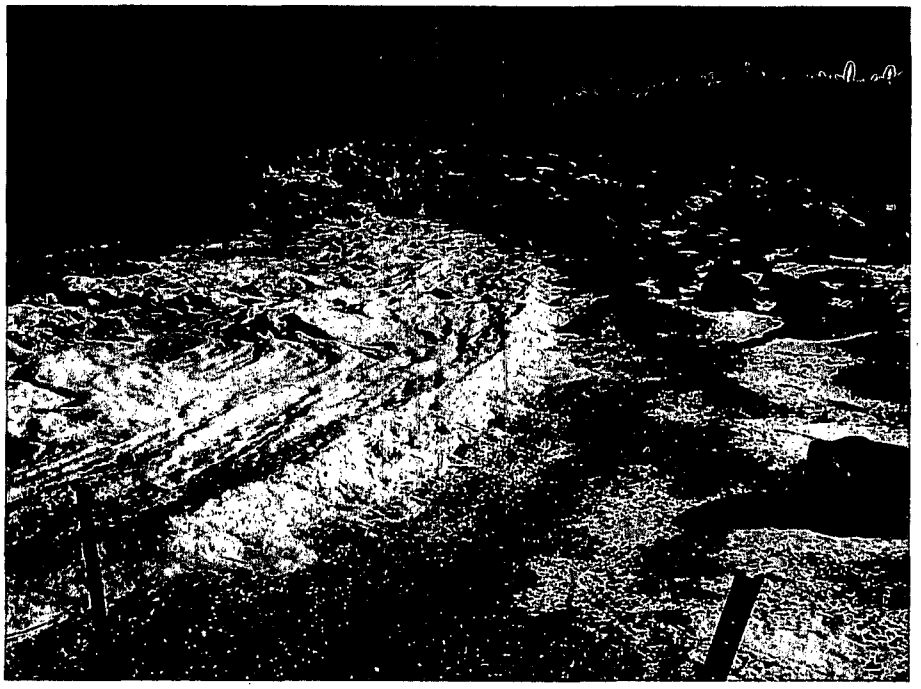

Photo 25 - Photo of TCLP Waste/Soil sample location RBS-S09A. Note ice forming at water line

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Raritan Bay Slag

"Rite in the Rain"®

ALL-WEATHER

ENVIRONMENTAL

No.-550F

RST2-02-F-0674

(30)

CONTENTS

REFERENCE | DATE

Location _____ Date 8/21/08

Project / Client Raritan Bay Slag

1000 Dan Goughan (DG) and Gerry Gilliland (GG) meet Nick Magriples (NM) at EPA in Edison to discuss site. NM provides copies of site documents and general sampling plan. Discuss number of people between SAT and RST. General sampling activities. May need to add some background samples. Collect Soil/Sand, Sediment and Surface water samples from seawall, jetty, beach areas, park, and playground. Will collect wood chip/mulch samples from playground. Check with Addy Michael about this and whether CLP can do tin analysis. ERT will do waste and biological samples at site. EPA setting up access to all locations still. DG & GG will meet NM at 1330 hrs. to conduct recon.

David R — 8/21/08

8/21/08

Raritan Bay Slag

1345 NM and Shawna Rybk (SR) arrive at Weston office. DG, GG, + Kelli Lucarino (KL) depart for site.

1410 Arrive at site. Park in eastern section near Margarets Creek. Walk east towards creek. Photo of slag.

1420 Take footbridge over creek, walk down to water. Observe slag in tidal zone.

(23)

1430 Grass in possible tidal wetland. Will identify at a later date. Photos.

1445 Go back to car. Drive to main beach area, park. Get out and walk on beach. Observe old pieces of battery casings in high tide area. Photos taken.
Discuss decontamination procedures. Will need to do more thorough decon.

8/21/08

8/21/08

Raritan Bay Slag.

1505 - Go back to car. Will go to Marina and see jetty at Cheesequake creek inlet. Jetty appears to be mostly slag. people fishing and playing on beach and in water here. Photos of area taken

1520 - All personnel depart site.

1550 - Return to office. DG will prepare sampling plan and send to NM as soon as possible.

Summary Notes -
NM proposed transects in tidal areas. Will be difficult to collect samples. Will need to know tide schedule and adjust work schedule accordingly. Access to beach areas may be difficult as well. Possibly need an all-terrain vehicle of some sort and wagon/trailer. Decon equipment for metals, needs to be more than steam

8/21/08

Date 8/21/08

Raritan Bay Slag.

cleaner. Will need at least alconox and water and nitric acid.

33

[signature] 8/21/08

Location

Date 8/22/08

Project / Client Raritan Bay Slag.

0930 - DG + KL depart office for site. H+S briefing - slip, trip, + fall. Weather - sunny 80°F. no wind.

0950 - DG + KL arrive at site - Will attempt to determine width of beach at low tide. Not low tide at this time. Will not be able to determine width of beach. Walk down to Margaret Creek. Make general site observations. Would like to get an All Terrain Vehicle - ATV / Gator type of vehicle for sampling event. Would help with speed and carrying equipment around site.

1015 - DG + KL visit playground area. Observe relatively fresh wood chips in play area. Under those are older wood chips. below that is crushed wood chips and organic material. Children playing on recreational equipment.

[signature] 8/22/08

8/22/08

Raritan Bay Slag.

1030- DG + KL go to first jetty. Observe person fishing. He is fishing for Blue fish, using bunker as bait. He does not eat what he catches, but if legal size, he will give to others on jetty or beach.

1040- DG + KL walk north up beach toward Cheesequake Creek. Observe Police Station (Old Bridge) and Middlesex County Park Commission Bldg. Workers at Park Bldg using Gator type vehicle to get around area.

1050 DG + KL observe people using beach by police station for sunbathing and one person swimming in water, photos taken.

1100 DG + KL depart site.

David R 8/22/08

9

Date 9/10/08

Raritan Bay Slag

0700- Weston Personnel meet at office Dan Gaughan (DG), Scott Snyder (SS), Julissa Morales (JM), Kelli Locorino (KL), Kristen Sharp (KS), Matt Foster (MF). Gather remaining supplies.

0715- All personnel depart office for site

0730- Arrive at Site. Nick Magriplas (NM) and Shawna Rigby (SR) are at site. Weather cool 60°F, Sunny, high 75°F, wind from E.

DG conducts Health and Safety briefing - COC are lead, copper, arsenic, antimony. Use care when drivers, slip, trip & fall hazards, flotation devices near water, sun, & sunscreen.

0800- DG conducts tour of site with JM, KS, & MF. SS + KL arrange equipment at truck. Box Truck is parked in back, parking lot.

David R 9/10/08

Location

Project / Client Raritan Bay Slag

Date 9/10/08

0830: KL calibrates PDRs, MF calibrates personal lead pumps. Seperate log for personal lead pumps.

Each field team will utilize a logbook to document sample collection, date, and time. DG will keep the main site logbook.

0845 Set up sampling teams

(SE)

0900 Begin to move to collect first samples.

0918 Begin collecting samples. JM+KS one team, KL + MF second team

0945 Continue collecting samples

1005 NM informs DG that Mark Spenger from ERT Suspects that people are collecting soft shell clams for consumption.

Dwdf SZ 9/10/08

Location

Project / Client Raritan Bay Slag

Date 9/10/08

1030- Continue collecting samples.

1100- Water too deep to collect samples will have to stop sediment samples for today and continue next week. left pin flag as a marker, in front of parking lot where box truck is parked.

1130- Plans to get lunch and collect soil samples from park and playground area. DG will walk around w/ NM, SR and Jake McPherson EPA Risk Assessor will assist in deciding soil locations. Dennis Marshall & JJ Chandry & Dennis Forster are on site as well.

1145- NM would like to collect playground samples early in morning before children arrive. Will collect tomorrow morning.

Dwdf SZ 9/10/08

Raritan Bay Slag

1200 DG, NM, SR, & Julie McPherson pick locations. Julie leaves site, Dennis, Dennis & BJ leave site. DG, NM, & SR pick locations throughout park.

1210 DG informs sample team of locations, they go to collect samples.

1245 Continue to collect samples.

1300 Collect 9 of 10 in park. RBS-S70 is too close to playground and NM would like us to collect them when no one around. (9E)

1330 Will switch to Margaret's Creek sediment and surface water and surface water at seawall and where slag and water touch.

1400 Collect samples.

1430 Continue collecting samples.

9/10/08

Raritan Bay Slag

1500 Continue collecting samples

1530 Complete sample collection Return to vehicle, Turn over samples to SS. Have done so throughout day.

1600 SS prepares samples for shipment to labs. Rest of personel pack up equipment

1630 Continue packing samples. Depart site for office. Will ship samples from there.

1700 Arrive at office. Pack all samples in ice for shipment to labs.

1730 Deliver sample coolers to FedEx. 5 total coolers shipped, 4 to CLP lab, 1 to Non CLP lab for grain size analysis.

9/10/08

Location

Date 9/10/08

Project / Client Raritan Bay Slag

4 coolers to Bonner Analytical
Airbill # 8541 0029 6945
1 cooler to Test America Burlington
Airbill # 8541 0029 6577
1 FedEx Box to EMSL for lead
Airbill # 8627 4306 2515

Summary Notes:
First Day of sampling event. Weston collected samples from sediment north of the seawall in Raritan Bay, soil samples from areas throughout the park, surface water and sediment samples from Margarets Creek, and surface water from north of seawall in Raritan Bay where slag interfaces with water. Weston collected a total of 47 samples. This includes 9 soil samples, 14 sediment samples, and 24 surface water samples. Plan for tomorrow is to collect

(37)

9/10/08

Location

Date 9/10/08

Project / Client Raritan Bay Slag

samples from playground and park and grid samples from main beach area between seawall and first jetty. Also attempt to collect sediment samples at beach and activity-based surface water samples.

Collected and shipped 13 sediment samples for grain size distribution to Test America.

Collected and shipped 3 air samples for personal lead monitoring to EMSL Analytical Airbill # 8627 4306 2526 [illegible]

9/10/08

Date 4/11/08

Raritan Bay Slag

0630- Weston personnel arrived at office. DG, SS, KL, JM, MF, KS- pack up equipment and depart for site

0700 Arrive at site, park in main parking lot at beach area. Weather 60°F going up to 75°F, cloudy in morning, will clear up as day progresses. Wind from east. H+S briefing - COC are lead, arsenic copper and antimony. Driving hazards w/ box truck and two SUVs, slip, trip, and fall hazards, steel toed boots, waders and PFDs for samples near water,

0800 DG+NM (on site prior to Weston) measure beach and determine transects. Other Weston personnel calibrate instruments and pumps. Documented in other log books.

0815 JM+KS go to collect samples from playground area and park,

David J. R 9/11/08

Location

Date 9/11/08

Project - Client Raritan Bay Slag

will collect 5 mulch samples and a duplicate from areas of older/darker worn mulch and will collect 10 soil samples from the perimeter of the playground. This is a change from the work plan. Were going to be from under the mulch, but NM observed weed barrier and decided to move locations outside playground.

DG, KL + MF will lay out grid on beach and then decon augers for use at two locations.

0830- JM + KS continue sampling park and playground.

DG, KL, + MF continue decon. will begin sample locations on beach.

All sample collection times will be recorded in field team log books.

David R 9/11/08

Location

Date 9/11/08

Project / Client Raritan Bay Slag

0845 DG + NM discuss plan for day. Will collect samples from seawall to first jetty - soil + SW, first to second jetty soil, and then complete sediment samples in front of seawall.

JM + KS complete playground and pack samples. Will assist on beach samples now.

(JE) 0900 Continue to collect soil samples from beach.

0930 Continue to collect soil samples from beach.

1000 DG + NM goto beach between first and second jetty and lay out 10 biased locations.

1010 Complete collecting samples between seawall and first jetty.

DM R 9/11/08

Location

Date 9/11/08

Project / Client Raritan Bay Slag

1015- JM + KS goto collect samples from beach between first + second jetty.

1030- DG, KL, + MF goto collect SW samples between seawall + first jetty.

1100- Complete Activity-based surface water samples. Also complete soil samples between first + second jetty.

1110 Will collect sediment samples from beach area. 3 transects out into water, 4 transects perpendicular to beach. 12 total samples
A fourth transect was added perpendicular from beach by DG. Sediment samples 81, 82 + 83, change in work plan.

1125 Begin collecting sediment samples

DM R 9/11/08

Location: Raritan Bay Slag Date: 9/11/08

1200 - Complete collecting sediment samples from between seawall and first jetty.
Break for Lunch.

1245 Return from lunch.
Set up equipment for augering locations S1 → S5 - near slag on seawall.

1330 Sampling team sets up at seawall. Will decon augers there.
NM + SR select locations for augering.

1345 Begin sampling location RBS-S01A, B, + C.

1400 Cannot auger more than 4 inches. Use scoop to collect A interval and B interval. C interval has been cancelled.

1420 Move to location RBS-S02 - same situation here. Cannot get down to depth interval. Use scoop to get A + B intervals.

Donald R 9/11/08

Location: Date: 9/11/08

Project/Client: Raritan Bay Slag

1430 - Move to location RBS-S03. Will attempt to collect samples here.

1445 - ~~NM~~ DSR Cannot get sample from 6-12 inches here. NM says to abandon the B + C intervals.
Move to location RBS-S04.

1500 - Collect RBS-S04A + S04B intervals. Cannot collect C interval

1505 - Move to location RBS-S05. NM says to not attempt C interval at this location. Will collect A interval and attempt B interval only.

1520 - NM says to abandon B + C intervals due to sub-surface obstructions.

1525 - Wash boots + equipment w/ potable water. All used augers are decontaminated, wrap in aluminum foil.

1535 - All personnel return to bait truck and main beach parking area

Donald R 9/11/08

Location _____ Date 9/11/08

Project / Client Raritan Bay Slag

1510 - DG fills out chain of custody for ERT split samples. Turns over to Shawna Rigby who will deliver to ERT at EPA bldg.

1600 DG turns ERT split samples over to SR

1610 Personnel depart site. DG & NM go to deposit neutralized wash water on slag

(H) 1630 Personel arrive at office and prepare to ship samples. SS does FORMS II Lite paperwork while others pack samples in coolers with ice for shipment.

1700 Continue to prepare samples and coolers.

1730 Deliver sample coolers to FedEx
6 total coolers shipped, 5 to CLP lab and 1 to non-CLP lab. for grain size analysis.

Daniel R 9/11/08

Location _____ Date 9/11/08

Project / Client Raritan Bay Slag

5 coolers to Bonner Analytical
Airbill # 8541 0029 6912
1 cooler to Test America Burlington
Airbill # 8541 0029 6923
1 FedEx Box to EMSL for lead
Airbill # 8627 4306 2526

DG also turned over split samples for ERT to Shawna Rigby.
5 samples delivered to ERT.

Summary Notes:

Day 2 of sampling event. Weston collected mulch/soil samples from playground and park, soil samples, sediment samples, and activity-based surface water samples from the beach area between the sea wall and the first jetty. Weston collected a total of 77 samples: including 58 soil samples, 6 surface water samples, 12 sediment samples.

Daniel R 9/11/08.

Location

Date 9/11/08

Project / Client ~~DSR~~ Raritan Bay Slag

and 1 rinsate blank.
Collected and shipped 12 sediment samples for grain size distribution to Test America.

Collected and shipped 3 air samples for personal lead monitoring to EMSL.

Plan for tomorrow is to collect samples from beach ~~beach~~ east of eastern jetty of Cheesequake Creek, and complete sediment samples north of seawall in park.

Daniel R 9/11/08

Location

Date 9/12/08

Project / Client Raritan Bay Slag

0700- Weston personnel meet at office. DG, SS, JM, KL, KS, MF
0715- All personnel depart office for RBS site.
0730- Arrive at parking location. Dead End St. near Cheesequake Creek Inlet. NM at site waiting for us.
0745- Health and Safety briefing - drowning, slip, trip + fall, PFDs for near water, possible rain today. Will collect samples from beach at Cheesequake Creek Inlet and sediment samples East from eastern inlet and south of eastern inlet.
0800- Team prepares to collect samples DG + KS lay out transects.
0830- Begin sampling beach transects.
0900- Continue sampling DG adds soil locations RBS-S88 + S89 to beach area.
0920- DG speaks with fisherman in inlet. He fishes between 2 and 4

Daniel R 9/12/08

Location _____ Date 9/12/08

Project / Client Raritan Bay Slag

times a month. Catches blue fish flukes, and striped bass. Ests what he catches on a regular basis,

KS + MF lay out transects for sediment samples at 25 + 75 ft from soil sample locations.

NM wants one additional sed sample added in along jetty area. Change in sample plan.

(EW)

0940 Collect sediment samples from beach between eastern jetty of inlet and third jetty.

1000 DG + NM ~~collect~~ lay out transect south of eastern inlet jetty, following contour of inlet.

1040 Team completes sediment samples along beach

1045 Begin samples (soil) south of eastern jetty along Cheesequake creek inlet.

1100 Complete collection of samples south of eastern jetty along Cheesequake Creek Inlet.

David R 9/12/08

Location _____ Date 9/12/08

Project / Client Raritan Bay Slag

1100- NM off site, he will return after lunch. Team prepares to collect remaining sediment samples in front of seawall.

1130- Complete preparing to collect sediment samples. Break for lunch.

1215- Return from lunch. DG, KL, JM, KS, and MF go to parking area in park and go to seawall to collect remaining sediment samples

1245- DG marks out locations on 200 ft intervals. Remainder of team collects samples at 25 ft from base of seawall and 75 ft from base of sea wall.

1300- Some locations, water too deep so collect samples closer to shore line.

1330- Jeff Lynes arrives at site to bring bubble-wrap bags and some extra bottles.

1400- Continue collecting samples from sediment in front of sea wall.

1415- Complete sediment samples from in front of sea wall

David R 9/10/08

Location

Date 9/12/08

Project / Client Raritan Bay Slag

1420 DG, KL, + NM go to collect some added soil samples from near Margaret's Creek. Remainder of team goes back to box truck to drop off samples.

Collect samples from intersection of Margaret's Creek and Raritan Bay, added in to sampling plan by NM.

(FT) 1440 Return to boxtruck, turn over samples to SS. He prepares samples for delivery to lab. Remainder of team packs equipment to return to office.

1500 Depart site and return to office.

1530 Arrive at office. Pack samples for delivery to lab.

1600 Continue to pack samples. Gather equipment for continued sampling on Monday.

9/12/08

Location

Date 9/12/08

Project / Client Raritan Bay Slag

1630 - Deliver sample coolers to FedEx
5 total coolers, 4 coolers to CLP lab and 1 cooler to non-CLP lab for grain size
4 coolers to Bonner Analytical
Airbill # 8541 0029 6901
1 cooler to Test America Burlington
Airbill # 8541 0029 6897

Summary Notes:

Day 3 of sampling event. Weston collected samples from the beach bath soil and sediment from the area east of the eastern jetty of Cheesequake Creek Inlet and the remaining sediment samples north of the seawall. Weston collected a total of 65 samples. This includes 27 soil samples and 38 sediment samples.
Collected and shipped 36 sediment samples for grain size distribution

9/12/08

Location

Date 9/12/08

Project / Client Raritan Bay Slag

to Test America.

Plan for Monday is to collect samples from and west of Cheesequake Creek inlet western jetty.

(45)

9/12/08

Location

Date 9/15/08

Project / Client Raritan Bay Slag

0730- Weston personnel meet at office, prepare for days sampling activities Depart office for site.

0800- Arrive at parking location for day west of Cheesequake Creek Inlet. NM on site.

0815- DG conducts Health & Safety briefing- Driving hazards, slip trip & fall, sampling near water, use PFDs. Hot today, drink water, wear sunscreen, Weather, hot humid 85°F, windy.

0830- Team will go collect activity based surface water samples from beach at Third Jetty and eastern inlet of Cheesequake Creek. Three locations- one near inlet jetty, then 100 east, then 100 ft east. Approx. 30-40 feet into water from current water line.

Plan for day is to collect sediment samples and soil samples from western property, west of Cheesequake Creek inlet.

9/15/08

Location

Date 9/15/08

Project / Client Raritan Bay Slag.

0910 - Sampling team completes activity-based SW samples.
NM adds two samples on sandy beach area west of western jetty & Cheesequake Creek Inlet. Will be S94 & S95
NM adds composite sample from soil on south part of jetty. Will be S96

0940 Collect sample S96, S94, S95. Collect GPS location of northern extent of slag.

(96)

1015 Go to collect auger sample from jetty. Find location and get all three depths collected 0-2, 6-12, 12-18

1030 KL & KS return to office to get ponar dredge, rope, and GPS data loggers.

1160 MF & JM collect auger sample under slag west of western jetty.

David J. R 9/15/08

Location

Date 9/15/08

Project / Client Raritan Bay Slag

Can't use auger, will collect A & B intervals using plastic scoop.

1110 - NM offsite to go find ERT team. KL & KS return with lunch.

1130 - Break for lunch

1210 - Return from lunch.
Go to collect SW sample from jetty and ~~western~~ land west of jetty.
NM chose locations.
Will also collect two surface soil samples from further out on jetty.

1245 - Collect samples from jetty and surface water samples.

1300 - KG, JM, & MF attempt to collect sediment samples from Cheesequake Creek inlet and surface water samples.

1345 - Cannot get ponar dredge far enough into channel to get sediment will attempt to get boat tomorrow for sample collection.

David J. R 9/15/08

Location: Date 9/15/08

Project / Client: Raritan Bay Slag.

1400 - DG phones Gerry Gilliland (GG) explains situation. He will arrange for someone in office to drive boat tomorrow and get a HASP revised to include work on boat.
KL + KS collect surface soil samples from jetty. NM added these locations as well. TCLP analysis and ERT split samples.

1415 Team goes to collect sediment samples from west of western jetty at low tide. Area is very mucky, high organic content, strong odor.

1440 Continue to collect sediment samples.

1515 Complete sample collection. Return to mobile command post, box truck, and deliver samples to SMO.

1530 DG + NM go to dock location for background samples. Remainder of team ~~prepare~~ DG assists SMO and packs up equipment.

David R 9/15/08

Location: Date 9/15/08

Project / Client: Raritan Bay Slag

1555 - DG receives phone call from GG saying that boat work for tomorrow is set up. HASP has been ammended. by Alanna Garrison DG + NM discuss time to meet tomorrow. DG will phone NM and inform time + place to meet.

1615 - All personnel leave site. MFT KS will deliver ERT split samples to Mark Sprenger at EPA + REAC trailers. Other personnel return to office to pack samples and prepare for tomorrows sampling activities.

1700 - Return to office. Pack samples and equipment.

1730 - Samples delivered to FedEx.
3 coolers to Bonner Analytical
Airbill # 8541 0029 6522.
1 cooler to Test America
Airbill # 8541 0029 6533

David R 9/15/08

Location

Date 9/15/08

Project / Client Raritan Bay Slag.

1- FedEx box to EMSL for lead
Airbill # 8627 4306 2537

Summary Notes:

Weston collected a total of 39 samples, This includes 11 soil samples, 18 surface water samples, 9 sediment samples and 1 Rinsate Blank.

Collected and shipped 8 sediment samples for grain size distribution to Test America.

Collected and shipped 3 air samples for personal lead monitoring to EMSL.

Weston collected 5 split samples for hand delivery to ERT.

Plan for tomorrow is to use boat to collect sediment samples from Cheesequake Creek inlet and background sediment locations.

[signature] 9/15/08

48

Location

Date 9/16/08

Project / Client Raritan Bay Slag

0730- Weston personel meet at office, prepare equipment for sample collection. Depart for site.

0800- Arrive at Police Annex station. Unload boat and all necessary equipment. Will park vehicles on western side of western jetty on Cheesequake Creek Inlet.

0830- DG holds health and safety briefing COC are lead, arsenic, capped anti-money, driving hazards, slip trip and fall, working over water, wear PFDs. No standing in boat. Ryan Brown (RB) will pilot the boat. RB, JM, + MF go on boat.

0900- Go to parking area west of creek.

0920- Begin collecting sediment samples from western side of jetty

0940- Collect Rinsate RBS-RIN03 rinsate blank from decontaminated ponar dredge, dedicated plastic scoop and beaker.

[signature] 9/16/08

Location

Date 9/16/08

Project / Client Raritan Bay Slag

1000 - Continue to collect sediment samples using boat and ponar dredge.
Move to locations in Cheesequake Creek Inlet. Not as much sediment in ~~this~~ inlet. Team is attempting to collect sediment closer to jetty and then further out in channel.

1040 Continue attempting to collect sediment samples. Attempt 15 locations so far. No sediment, only stones, shells, and vegetation.

1110 Collect third sample from inlet will attempt two more.

1130 Cannot collect samples using ponar dredge. No loose sediment in inlet only large rocks and vegetation.
Will collect samples from shoreline.

1200 Continue collecting samples from sediment in inlet.

David Z 9/16/08

Location

Date 9/16/08

Project / Client Raritan Bay Slag

1300 - Return to Police Annex Station to load boat into box truck. RB and SS will return to office to process samples and prepare shipments

1315 - Remainder of team breaks for lunch. Plan is to go collect the remaining sediment background samples after lunch.

1400 - Return from lunch. Go to park east of Margaroff Creek to collect background locations. Will lay out two transects of 25 & 75 ft from high water mark, for 200 ft. for a total of 6 samples.

1430 - Set up transects at background locations

1490 - Begin collecting soil samples

1500 - Complete sample collection, return to vehicles. Meet with NM. All samples are collected, NM has no additional locations to add. Sample activities are complete

David Z 9/16/08

Location

Date 9/16/08

Project / Client Raritan Bay Slag.

1515-All Weston personel depart site to return to office.

1545-Arrive at office. Pack samples for delivery to labs.

1615 Continue to pack samples.

1645 Deliver Sample coolers to FedEx 2 total coolers shipped, 1 cooler to CLP lab, 1 cooler to non-CLP lab. 1 cooler to Bonner Analytical Airbill # 8541 0029 6496 1 cooler to Test America Burlington Airbill # 8541 0029 6441.

50

Summary Notes:

Day 5 of sampling event. Weston collected sediment samples from ~~Ka.~~ Cheese-quake Creek inlet and background locations east of the sea wall. Weston collected a total of 12 samples. 11 sediment samples and 1 rinsate blank.

Collected 11 sediment samples for grain size distribution to Test America.

[signature] 9/16/08

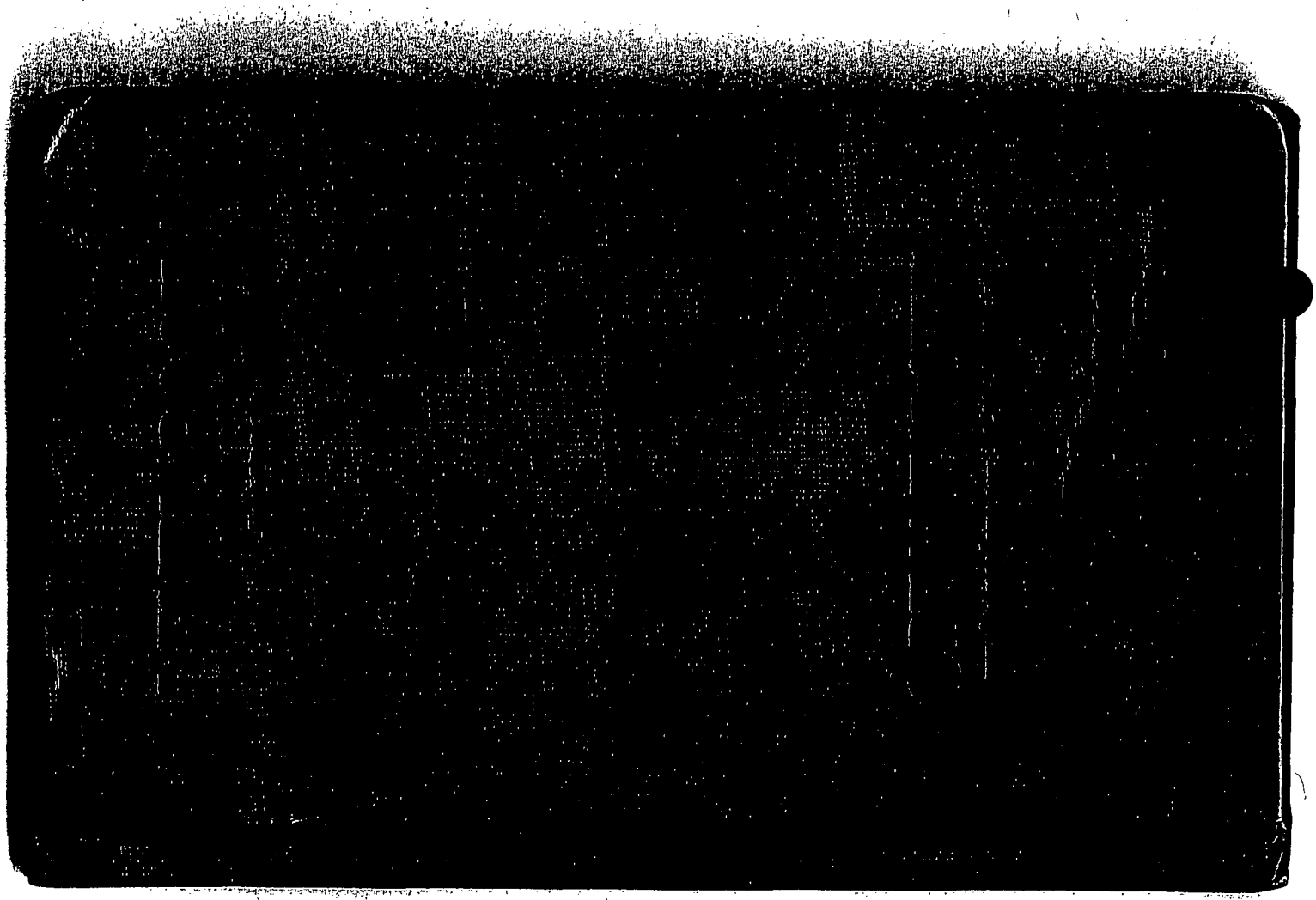
Location

Date 9/16/08.

Project / Client Raritan Bay Slag

Weston sampling event complete. Nick Magriples happy with event and all Weston activities.

[signature] 9/16/08



RARITAN BAY SLAG SITE

PERSONAL AIR MONITORING

TEAM 1

(25)

(1) Pump #	Sample ID Date P1,P2 or P3	Pre-Sampling	Post Sampling	Avg	On Time	Off Time	On Time 2	Off Time 2	Total Time	Total Volume	(2) Comments
24743	9/10/08 P3	2.534	2.700	2.62	0859	11:35	1221	1525	340	890.8L	

10 SEP 08

0920 Matt Foster (MF) and Kelli Lucarino (KL) team up

0921 MF collects sample SED-01 at the 0-2 inch interval at 25 feet on the first transect, GPS point collected

0930 Photo taken of sample location RBS-SED01

0934 Sample RBS-SED02 collected, dup of RBS-SED01. no grain size dup collected (37)

0945 MF collects sample RBS-SED03 at the 0-2 inch interval from the second transect at the 25 foot mark. GPS point collected. Photo 2 taken of MF ~~collected~~ collecting sample RBS-SED03

1002 MF collects sample RBS-SED04 at the 0-2 inch interval at the 25 foot mark of the 3rd transect. Photo 3 taken of sample location in middle of Spartina. GPS point collected.

Kelli Lucarino 9/10/08

1030 MF collects sample RBS-SED05 at the 0-2 inch interval at 25 feet on the 4th transect. GPS & photo taken

1048 MF collects sample RBS-SED06 at the 0-2 inch interval at 25 feet on the 5th transect. GPS point collected and photo of MF collecting sample at edge of Spartina taken.

1233 MF collects sample RBS-S01 in the park area at the top of the footpath leading to the beach. GPS point taken and photo taken

1240 MF collect sample RBS-S02 in the park area at the bottom of the footpath, just above slag and brick pile, leading to beach. GPS point and photo taken.

Kelli Lucarino 9/10/08

③

1303 MF collects sample RBS-S66 from edge of pathway in park area. GPS point and photo taken

1317 MF collects sample RBS-S68 from edge of path in park area at the 0-2 in interval. Photo and GPS point taken

1355 MF collects samples RBS-SW17 and RBS-SW17D from North of the Margaret's Creek Bridge. GPS point taken

1359 MF collects sample RBS-SED65 from Margaret's Creek North of Bridge. GPS point taken and photo of general area of SW and SED samples in Margaret's Creek.

1412 MF collects samples RBS-SW18 and RBS-SW18D from where the mouth of Margaret's Creek

Kevin Lucarino 9/10/08

④

meets the bay. GPS point and photo taken.

1417 MF collects sample RBS-SED66 from same area as SW samples were collected. GPS point taken.

1435 MF collects samples RBS-SW20 and RBS-SW20D ~~forki~~ from Margaret's Creek, behind slag pile area. GPS point and photo taken

1439 MF collects RBS-SED68 from same area as SW20.

1450 MF collects samples RBS-SW19 and RBS-SW19D

1500 MF collects sample RBS-SED67 from Margaret's Creek area. GPS point and photo taken

[signature] 9/10/08

(5) PUMP #	SAMPLE ID	PRE SAMPLING	POST SAMPLING	AVG	ON TIME	OFF TIME	ON TIME 2	OFF TIME 2	TOTAL TIME	VOLUME	(6) COMMENT
24743	9110&P1	2.529	2.693		0737	1214	1312	1533			
	11 SEP 08										augers dry them, and wrap them in aluminum foil. All decon procedures are in accordance with the SAQAPP and HASP.
0849	KL collects rinsate blank using decon auger, plastic beaker, and plastic scoop. Photo taken.										
0855	MF collects sample RBS-S09A										
0856	KL collects sample RBS-S10A										
0901	Photo taken of decon area and MF hand augering to a depth of 6-12 inches for sample collection of RBS-S09B.										
0905	MF collects sample RBS-S09B. from 6-12" interval										
0911	KL collects sample RBS-S10B from 6-12" interval, soil is very rocky										
0915	MF collects sample RBS-S09C from 12-18" interval										
0923	KL collects sample RBS-S10C from the 12-18" interval										
0925	MF and KL decon used										
	Kelli Jorcin 9/11/08										
						0959	MF collected sample # RBS S13 @ 0-2" (Post entry)				
						0945	KS collects sample RBS-S24				
						0950	KS collects sample RBS-S25				
						0955	KS collects sample RBS-S23				
						0958	KL collects sample RBS-S11				
						0959	~~KS~~ MF collects sample RBS-S13				
						1000	KL collects sample RBS-S12				
							KS collects sample RBS-S22				
						1004	KL collects sample RBS-S16				
						1005	KS collects sample RBS-S21				
						1008	KS collects sample RBS-S14				
						1009	KL collects sample RBS-S15				
						1010	KS collects sample RBS-S20				
						1015	KS collects sample RBS-S19				
						1020	KS collects sample RBS-S18				
						1025	KS collects sample RBS-S17.				
							Note: All above sample locations				
							Kelli Jorcin 9/11/08				

were GPS'd
1047 MF Collects samples RBS-SW09 and RBS-SW09D. Activity based SW sample. Sediment was kicked up from the bottom and collected.
1052 MF Collects samples RBS-SW10 and RBS-SW10D. Collected in same manner as previous sample
1056 MF Collects samples RBS-SW11 and RBS-SW11D. Collected in same manner as previous samples. All sample locations were GPS'd. Dan Gaughan took photos of sampling activities.
1404 MF Collects sample RBS-SD1A and a split for ERT. Sample is from the 0-2 inch interval. GPS ~~photo #~~ point collected and photo taken. Note: Unable to auger past 2" depth due to large pieces of buried slag. Photo

Kelli Fuchs 9/8/08

taken. Sample will not be collected to depth
1410 Sample RBS-SD1B collected by MF at 6" interval. Unable to get deeper interval sample.
1421 MF collects sample RBS-SD2A and a split for ERT at the 0-2" interval. GPS point collected.
1431 MF collects sample RBS-SD2B from the 6" interval.
1437 MF collects sample RBS-SD3A and a split for ERT at the 0-2" interval.
1448 EPA says to not collect any more samples at the SD3 location because depth past 2" cannot be reached.
1456 MF collects sample RBS-SD4A and a split for ERT at the 0-2 inch interval. Sample is very sandy.
1502 MF collects sample RBS-SD4B from the 6" interval. GPS

Kelli Fuchs 9/11/08

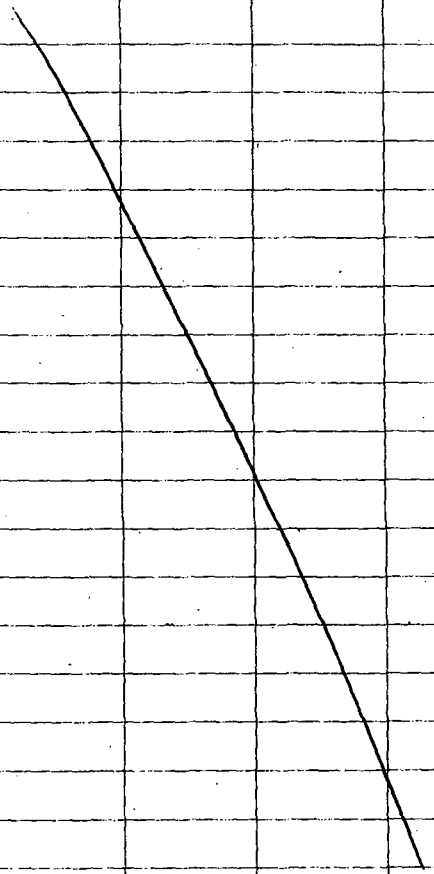
point collected.

1510 MF Collects sample RBS-S05A from the 0-2 inch interval. GPS point collected. & split for ERT

1515 MF collects sample RBS-S06A dup of RBS-S05A. No split for ERT is collected.

1518 EPA says not to collect any samples at depth due to buried slag and not being able to reach depth. Weston packs up to leave Seawall area and head back to park area.

(17)



(11) PUMP #	SAMPLE ID/ DATE	PRE SAMPLING	POST SAMPLING	AVG.	ON TIME 1	OFF TIME 1	ON TIME 2	OFF TIME 2	TOTAL TIME	TOTAL VOLUME	(12) COMMENTS.
24746 ~~9120~~	91208P1	2.478	—	—	0815	1035	1100	—	—	—	sample not used - rain ckl

12 Sept 08

0833 MF Collects RBS-S37 sample

0836 KL Collects sample RBS-S38.

0837 KS Collects sample RBS-S39.
Photo taken KS obtaining sample RBS-S39.

0841 MF Collects sample RBS-S40; KS collects RBS-S41.

(58) 0847 KS Collects sample RBS-S43.

0850 KL collects sample RBS-S42

0844 MF collects sample RBS-S44.

0852 KS Collects sample RBS-S45.
MF collects sample RBS-S46.

0856 MF collects sample RBS-S47.

0857 KL collects sample RBS-S48.

0857 KS collects sample RBS-S49.

0902 MF collects sample RBS-S50. ~~KL collects RBS-S51~~ JM

0901 ~~M~~ JM KS collects sample RBS-S51.

0906 KS collects RBS-S53.

0908 KS collects RBS-S52,

0911 MF collects sample RBS-S88.

0913 MF collects sample RBS-S89.
Photos obtained of people fishing (2).

0927 KL collects sample RBS SED 36

0935 KL collects sample RBS SED 37

0936 KS collects sample RBS SED 38

0942 KS collects sample RBS SED 40

0942 MF collects sample RBS SED 39

(13)

0948 KL collects Sample
RBS SED 43
0948 KL collects sample
~~00~~ RBS SED 41
0951 KS collects sample
RBS SED 44
0956 MF collects sample
RBS SED 45
0953 MF collects sample
RBS SED 42
0957 KS collects sample
RBS SED 46
1002 KL collects sample
RBS SED 48
1004 KS collects sample
RBS SED 49
1004 MF collects sample
RBS SED 47
1008 KL collects sample
RBS SED 50
1012 KS collects sample
RBS SED 51
1015 KS collects sample
RBS SED 52

(14)

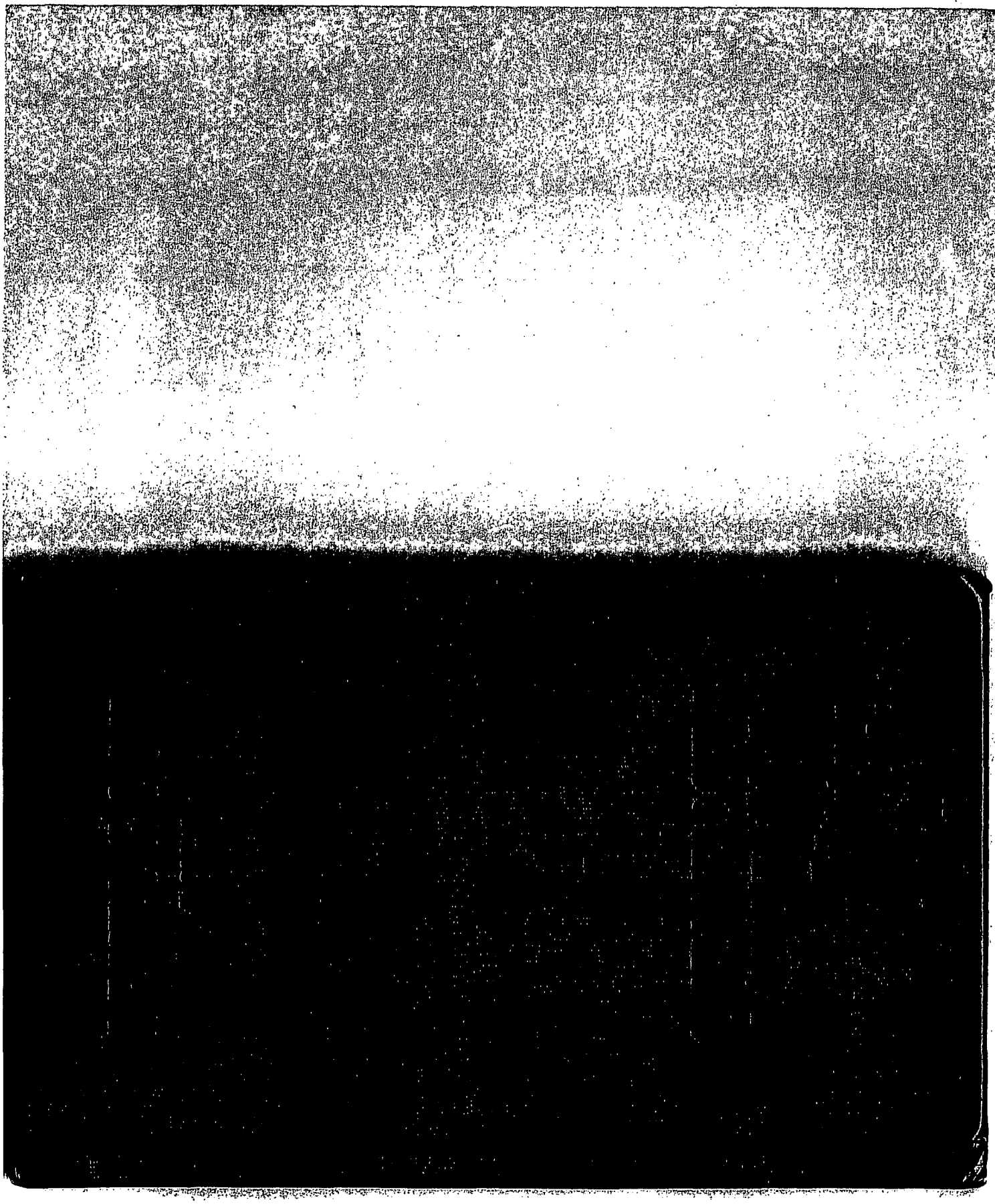
1021 KS collects sample
RBS SED 82
1021 MF collects sample
RBS SED 81
1030 MF collects sample
RBS SED 83
1040 KL collects sample
RBS SSS
1045 ME collects sample
RBS S S4
1045 MF collects sample
RBS SS7
1049 KL collects sample
RBS SS6
1051 KL collects sample
RBS S90
1054 MF collects sample
RBS SS8

(15) PUMP #	SAMPLE ID DATE/#	PRE SAMPLING	POST SAMPLING	AVG.	TIME ON 1	TIME OFF 1	TIME ON 2	TIME OFF 2	TOTAL TIME	TOTAL VOLUME	(16) COMMENT
24743	091508P1	2.569	2.627	2.598	0830	1530	–	–	7 (420)	1091.2	

9/15/08 RSTZ SHARP/Foster
0849 SAT2 Morales/Lucarino

RBS SW12 + 12D collected 15' off 3rd Jetty cheesequake inlet by MF
0856 KS 3 RBS SW13 + 13D collected 115' off 3rd Jetty by MF photo taken
0855 RBS SW14 + 14D collected 215' off 3rd Jetty by MF
0936 RBS S96 collected by KL composite of area southern part of Wester Jetty
1000 2 photos taken of area and sample surface apears to be sand sub surface is clay
1003 surface sample taken by MF on southern part of western Jetty RBS S07A
1006 6-12" depth on sample taken by KL RBS S07B
1011 RSB S07C 12-18" taken by DL + MF
1045 Rinsate RBS-RIN02 collected by JM.
1057 Sample RBS-S59A collected by MF.
1111 Sample RBS-S59B collected by MF
1130 Sample RBS-S60A collected by MF
1135 Sample RBS-SW15 and RBS-SW15D
1327 RBS S98 collected on western Jetty by KS + KL
1335 RBS S97 collected on western Jetty by KS + KL
1350 RBS SW 21D + 21 collected on western Jetty by JM
1355 RBS SW 24 + 24D collected on western Jetty by JM

(60)



RARITAN BAY SLAG SITE
PERSONAL AIR MONITORING
TEAM 2

(1) PUMP #	SAMPLE ID DATE	PRE SAMPLING	POST SAMPLING	AVG.	ON TIME	OFF TIME	ON TIME 2	OFF TIME 2	TOTAL TIME	TOTAL VOLUME	(2) COMMENTS
24746	9/10/08 P1	2.514	2.646	2.58	0857	1130	1220	1535	348	897.84	
NA	91008P3	—	—	—	0800	—	—	—	—	—	Trip Blank
24739	91108P2	2.482	2.509		0730	1214	1512	1538			
NA	91108P3	—	—	—	0820	—	—	—	—	—	TRIP BLANK
~~24743~~	~~91208P2~~	~~2.580~~	~~—~~	~~—~~	~~1147~~	~~1214~~					Sample not used - rain
NA	91208P3	—	—	—	—		—	—	—	—	
24741	091508P2	2.619	2.624	2.622	0830	—	—	—	—	—	TRIP BLANK not used
—	091508P3	—	—	—	0827	1025	1209	1527	313	820.5	
						—	—	—	—	—	TRIP BLANK

(3)

(3)

RST2 SHARP/SAT2 Morales 9/10/08

0930 RBS SED 13 collected 0-2" 75' @ sea wall photo taken - Dan GPS

1000 RBS SED 14 collected 0-2" 75' @ sea wall photo taken sampling in red muscle bed

1015 RBS SED 15 collected 0-2" 75' @ sea wall

~~1015~~ RS

1040 RBS SED 16 collected 0-2" 75' @ sea wall

1130-1200 Lunch

1228 RSB - S63 collected top of slag pile adjacent to park area photograph taken

RS

(4)

1233 RSB - S64 collected end of path photo taken Sharp homogenizing sample

1255 RSB - S65 collected front of 1st parking lot next to fence

1304 RSB - S61 collected circle area along pathway

1313 RSB - S62 collected ~~circle~~ path area under fence

(4)

1407

1412 D RSB - SW07D + RSB-SW07 collected at high tide where slag in contact with water picture taken of slag in water

1418 RSB - SW08D + RSB SW08

1423 D collected at high tide where slag in contact with water

1430 D RSB - SW01D + RSB SW01

1425 collected at end of lawrence harbor sea wall @ & east of first Jetty breach

1431 D RSB SW02D + RSB SW02

1432 collected @ end of lawrence harbor sea wall @ east of first Jetty

1440 RSB - SW03D + RSB SW03

1445 D collected @ 500' from end of sea wall east of 1st jetty

1451 ~~1440~~ RS RSB - SW04 collected @ 1000' from ~~1445~~ RS end of sea wall east of 1st jetty

1502 RSB SW04D collected @ 1000' from end of sea wall east of 1st jetty photo taken Dan in water

1508 RSB - SW05 collected @ 1500' from end of sea wall east of 1st Jetty

(5)

1513	RSB-SB-05D collected at 1500' from end of seawall east of 1st Jetty
1517	RSB-SB-06 collected at 2000' from end of seawall east of 1st Jetty
1522	RSB-SB-04D collected a 2000' from end of seawall east of 1st Jetty
1616	Departed Site back to Edison Weston
1635	Packed coolers with ice samples paperwork to FedEx
1730	End of Day
RSI2	Sharp SAT2 Morales 9/11/08
0750	RSB-S70 collected at green pole near play ground
0800	RSB-S71 collected in mulch
0805	RSB-S72 collected in mulch
0810	RSB-S77 collected around play ground
0815	RSB-S78 collected around playground

(6)

0820	RSB-S80 collected around playground
0825	RSB-S84 collected around playground
0830	RSB-S82 collected around playground
0835	RSB-S81 collected around playground
0840	RSB-S87 collected around playground
0845	RSB-S85 collected around playground
0850	RSB-S84 collected around playground
0855	RSB-S79 collected around playground
0900	RSB-S83 collected around playground
0905	RBS-S73 collected in mulch @ playground
0910	RBS-S74 collected in mulch @ playground
0915	RBS-S75 collected in mulche playground
0920	RBS S76 collected in mulch @ playgrond

1029 RBS-S27 collected on beach between Jetty 1+2
1031 RBS-S28 collected on beach between Jetty 1+2
1035 RBS-S29 collected on beach between Jetty 1+2
1039 RBS-S30 collection beach between Jetty 1+2
1045 RBS-S31 collection beach between Jetty 1+2
1045 RBS S32 collected on beach between Jetty 1+2
1049 RBS-S33 collected on ~~RBS-S34~~ beach between Jetty 1+2
1054 RBS S34 collected on beach between Jetty 1+2
1056 RBS S35 collected on beach between Jetty 1+2
1059 RBS-S36 Collected on beach between Jetty 1+2
1131 RBS-SED 28 collected on beach between Jetty 1+ Seawall
1132 RBS-SED-27 collected on
1133(GS) beach between Jetty 1 + seawall
1134 RBS SED 29

1140 RBS-SED 30 collected on beach between Jetty 1+2
1140 RBS SED 30 collected on
1141(GS) beach between Jetty 1+2
1145 RBS SED 32 collected on beach between Jetty 1+2
1146 RBS SED 34 collected on beach between Jetty 1+2
1147(GS) RBS SED 33 collected on
1149 beach between Jetty 1+2
1153 RBS SED 35 collected on beach between Jetty 1+2
1200 RBS SED 82 collected on beach between Jetty 1+2
1200(GS) RBS SED 81 collected on
1201 beach between Jetty 1+2
1208 RBS SED 83 collected on beach — xp
RST2 SHARP + Foster SAT 2 Morales Kelly Lucariello
1215 RBS SED 17 collected along seawall
1220 RBS SED 18 collected along seawall
1222 RBS SED 07 collected along seawall

1229 RSBSED 08 collected along Seawall

1235 RSBSED 19 collected along Seawall

1250 RSBSED 20 09 collected along Seawall

1305 RSBSED 11 collected along Seawall

1310 RSBSED 10 21 ~~22~~ collected ~~1315~~ along Seawall

1325 RSBSED 22 23 collected along Seawall

(17)

1330 RSBSED 12 collected along Seawall

1332 RSBSED 24 collected along Seawall

1341 RSBSED 25 collected along Seawall

1345 RSBSED 26 collected along Seawall

1350 RSBSED 87 collected along Seawall

1354 RSBSED 88 collected along Seawall

1420 DG Collects sample RBS-S92 at the bottom of the footpath leading to Margaret's Creek

1430 DG Collects sample RBS-S93 along bank of lower Margaret's Creek area

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Monday, September 15, 2008

0935 MF collected RBS S94 at ~~the North~~ West Side of Cheesequake Creek Inlet

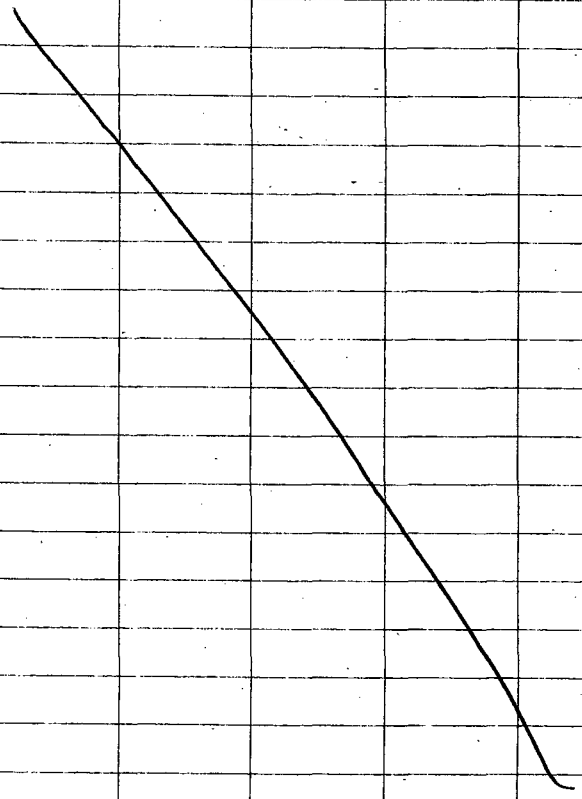
0942 MF collected RBS-S-95 at western side of Cheesequake Ct. Inlet

1213 ~~KL~~ collects sample RBS-SW16 and RBS SW16D just west of the western jetty at Cheesequake Creek inlet. GPS point collected.

1300 MF collects RBS-SW23 and SW-23D

~~1305 MF collects RBS-SW23D~~ JM

1432 RBS-SED58 collected
1435 RBS-SED59 collected
1450 RBS-SED60 collected
1455 RBS-SED61 collected
1457 RBS-SED62 dup of RBS-SED61 collected
1506 RBS-SED63 collected
1509 RBS-SED64 collected



(89)

September 16, 2008

0915 RBS-SED53 Collected by JM
0945 RBS-SED54 collected by JM.
1058 RBS-SED55 collected by JM
1240 RBS-SED90 collected by DG on eastern side of western jetty at Cheesequake Creek Inlet
1140 RBS-SED89 collected by DG.
1445 RBS-SED69 collected by MF
1450 RBS-SED70 collected by KL
1452 RBS-SED71 collected by KS
1457 RBS-SED72 collected by MF
1458 RBS-SED73 collected by ~~MF~~ JM KL
1500 RBS-SED74 collected by KS.

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REFERENCE 10

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 5 February 2009

SUBJECT: Raritan Bay Tides

Based on field observations made during field activities conducted by Weston, the Raritan Bay is tidal. Tidal predictions obtained from the NOAA website were utilized to plan for when low and high tides were going to occur at the Raritan Bay Slag site. The location selected from the NOAA website for the tide predictions was Cheesequake Creek at the Garden State Parkway, which is approximately 0.9 mile upstream of the western jetty of the Cheesequake Creek Inlet. Tide prediction corrections for this location were applied based on the reference station located at Sandy Hook, NJ. Based on field observations, the high and low tides at the western jetty of Cheesequake Creek Inlet and the Laurence Harbor seawall within a few minutes of the tide predictions for the Cheesequake Creek, Garden State Parkway. In addition, the time between high and low tides was approximately 6 hours, which is consistent with the tide predictions on the NOAA website for the Cheesequake Creek, Garden State Parkway location. Attached is the tide predications from January 1, 2009 through January 31, 2009, obtained from the NOAA website.

Signature/Date Dennis J. Foerter 2/5/09

2009 NOAA Tide Predictions: Cheesequake Creek, Garden State Parkway

ence station: Sandy Hook, Corrections Applied: Times: High 0 hr. 12 min., Low 0 hr. 13 min., Heights: High *1.09, Low *1.05)

January - Cheesequake Creek, Garden State Parkway

ate	Day	Time	Height		Time	Height		Time	Height		Time	Height		Time	Height
1/01/2009	Thu	04:34AM LST	0.5	L	10:40AM LST	4.9	H	05:05PM LST	0.1	L	11:16PM LST	4.4	H		
1/02/2009	Fri	05:14AM LST	0.6	L	11:24AM LST	4.7	H	05:41PM LST	0.1	L					
1/03/2009	Sat	12:00AM LST	4.5	H	06:04AM LST	0.7	L	12:13PM LST	4.6	H	06:25PM LST	0.2	L		
1/04/2009	Sun	12:49AM LST	4.7	H	07:14AM LST	0.8	L	01:07PM LST	4.4	H	07:23PM LST	0.2	L		
1/05/2009	Mon	01:41AM LST	4.9	H	08:33AM LST	0.6	L	02:06PM LST	4.3	H	08:31PM LST	0.2	L		
1/06/2009	Tue	02:40AM LST	5.2	H	09:42AM LST	0.4	L	03:13PM LST	4.3	H	09:37PM LST	0.0	L		
1/07/2009	Wed	03:45AM LST	5.5	H	10:44AM LST	0.0	L	04:22PM LST	4.4	H	10:38PM LST	-0.2	L		
1/08/2009	Thu	04:51AM LST	5.8	H	11:41AM LST	-0.3	L	05:28PM LST	4.7	H	11:37PM LST	-0.5	L		
1/09/2009	Fri	05:52AM LST	6.1	H	12:37PM LST	-0.6	L	06:27PM LST	5.0	H					
1/10/2009	Sat	12:35AM LST	-0.7	L	06:48AM LST	6.4	H	01:32PM LST	-0.9	L	07:22PM LST	5.2	H		
1/11/2009	Sun	01:31AM LST	-0.9	L	07:41AM LST	6.5	H	02:23PM LST	-1.2	L	08:14PM LST	5.5	H		
1/12/2009	Mon	02:25AM LST	-1.1	L	08:32AM LST	6.5	H	03:12PM LST	-1.3	L	09:07PM LST	5.6	H		
1/13/2009	Tue	03:17AM LST	-0.9	L	09:23AM LST	6.3	H	03:58PM LST	-1.2	L	10:00PM LST	5.6	H		
1/14/2009	Wed	04:07AM LST	-0.7	L	10:14AM LST	5.9	H	04:43PM LST	-0.9	L	10:53PM LST	5.5	H		
1/15/2009	Thu	04:57AM LST	-0.4	L	11:06AM LST	5.5	H	05:28PM LST	-0.6	L	11:46PM LST	5.3	H		
1/16/2009	Fri	05:49AM LST	0.0	L	11:57AM LST	5.0	H	06:15PM LST	-0.2	L					
1/17/2009	Sat	12:36AM LST	5.2	H	06:46AM LST	0.3	L	12:48PM LST	4.6	H	07:06PM LST	0.1	L		
1/18/2009	Sun	01:26AM LST	5.0	H	07:50AM LST	0.6	L	01:39PM LST	4.3	H	08:02PM LST	0.4	L		
1/19/2009	Mon	02:16AM LST	4.9	H	08:55AM LST	0.7	L	02:33PM LST	3.9	H	09:00PM LST	0.5	L		
1/20/2009	Tue	03:09AM LST	4.8	H	09:53AM LST	0.6	L	03:31PM LST	3.8	H	09:54PM LST	0.6	L		
1/21/2009	Wed	04:05AM LST	4.8	H	10:45AM LST	0.5	L	04:32PM LST	3.8	H	10:44PM LST	0.5	L		
1/22/2009	Thu	05:01AM LST	4.8	H	11:33AM LST	0.3	L	05:28PM LST	3.9	H	11:32PM LST	0.4	L		
1/23/2009	Fri	05:51AM LST	5.0	H	12:18PM LST	0.2	L	06:17PM LST	4.1	H					
1/24/2009	Sat	12:17AM LST	0.3	L	06:35AM LST	5.2	H	01:01PM LST	0.0	L	07:00PM LST	4.4	H		
1/25/2009	Sun	01:02AM LST	0.1	L	07:15AM LST	5.3	H	01:43PM LST	-0.1	L	07:39PM LST	4.5	H		
1/26/2009	Mon	01:45AM LST	0.0	L	07:52AM LST	5.5	H	02:21PM LST	-0.2	L	08:15PM LST	4.6	H		
1/27/2009	Tue	02:25AM LST	0.0	L	08:26AM LST	5.3	H	02:57PM LST	-0.3	L	08:50PM LST	4.7	H		
1/28/2009	Wed	03:03AM LST	0.0	L	09:00AM LST	5.3	H	03:31PM LST	-0.3	L	09:24PM LST	4.7	H		
1/29/2009	Thu	03:40AM LST	0.0	L	09:35AM LST	5.1	H	04:02PM LST	-0.3	L	09:59PM LST	4.8	H		
1/[illegible]/2009	Fri	04:17AM LST	0.1	L	10:13AM LST	5.0	H	04:34PM LST	-0.2	L	10:39PM LST	4.9	H		
[illegible] 2009	Sat	04:56AM LST	0.2	L	10:57AM LST	4.8	H	05:07PM LST	-0.1	L	11:24PM LST	5.0	H		

ll times are listed in Local Standard Time(LST) or, Local Daylight Time (LDT) (when applicable). All heights are in feet referenced to Mean Lower Low Water MLLW).

(2)

REFERENCE 11

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 30 January 2009

SUBJECT: Latitude and Longitude and Source Area Calculations – Raritan Bay Slag

For the Raritan Bay Slag site, the approximate centers of the two sources were plotted on the South Amboy, N.J. – N.Y. and Keyport, N.J. – N.Y. quadrangles by Michele Capriglione, a Senior Project Scientist with the WESTON office located in Edison, New Jersey. Ms. Capriglione utilized ArcView GIS software package ArcMap Version 9.3 to plot these locations. Based on these locations, the latitude/longitude coordinates reported by the ArcView GIS software are:

Source 1 – Laurence Harbor Seawall - Quadrangle: Keyport, N.J. – N.Y.

Latitude: 40° 27' 28.22" N Longitude: -74° 14' 26.07" W

Source 2 – Western Jetty of Cheseequake Creek Inlet - Quadrangle: South Amboy, N.J. – N.Y.

Latitude: 40° 27' 52.52" N Longitude: -74° 15' 28.86" W

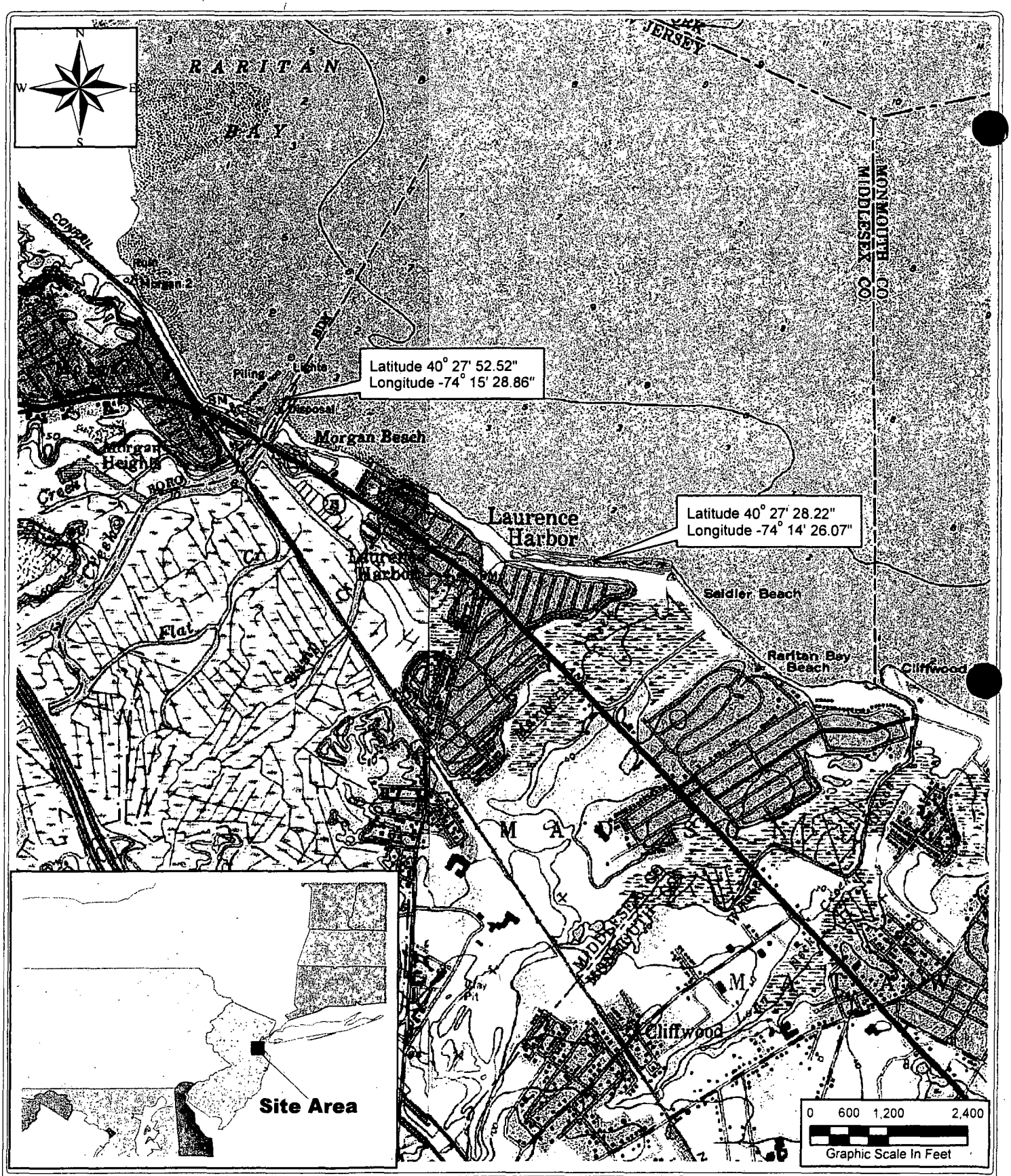
A site location map showing the location plotted to derive latitude/longitude is attached to this project note.

In addition, Ms. Capriglione utilized the ArcView GIS software package ArcMap Version 9.3 to calculate the approximate area of the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet. ArcView's feature geometry calculation tool was utilized to obtain the area of each waste source. The map used by Ms. Capriglione to determine source area calculations is located in Reference 4, Figure 2 of this HRS documentation record. Based on this evaluation, the estimated areas are as follows:

Source 1 – Laurence Harbor Seawall – **64,324 square feet**

Source 2 – Western Jetty of Cheesequake Creek Inlet – **29,690 square feet**

Signature/Date Dennis Foerter 1/30/09



LEGEND

Estimated Source Boundary Reference Point

National Geographic TOPO! U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangles: Keyport, NJ, 1977 and South Amboy, NJ, 1995.

TITLE:

Site Location Map
Raritan Bay Slag
Old Bridge Township and Sayreville, NJ

PROJECT:
Raritan Bay Slag

CLIENT NAME:
EPA

WESTON SOLUTIONS

DATE:
January 30, 2009

FIGURE #:
1

P:\SAT2\Raritan_Bay_Slag\MXD\06310_Site_Loc_Lat_Long.mxd

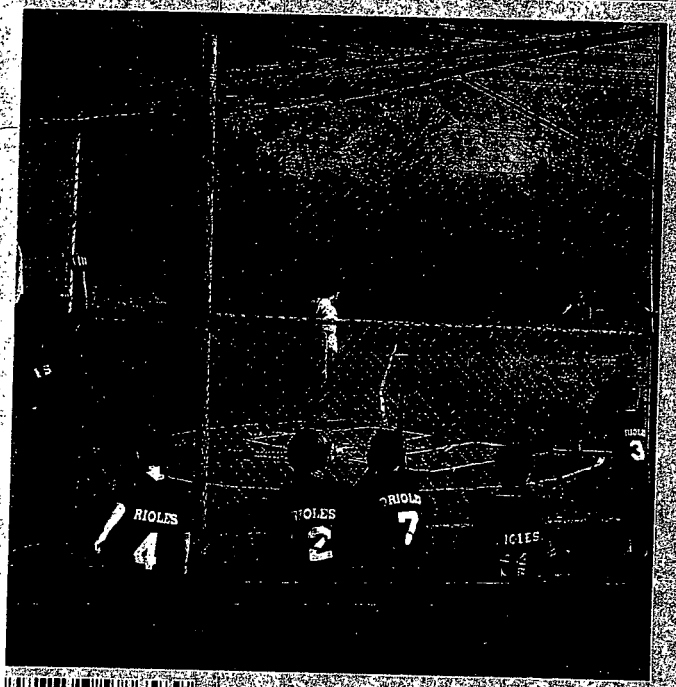
REFERENCE 12

MIDDLESEX COUNTY, NJ

Hagstrom®

Street Map
Middlesex County
New Jersey

FULLY STREET-INDEXED • U.S., STATE, INTERSTATE HIGHWAYS • NEW JERSEY TURNPIKE • GARDEN STATE PARKWAY • RR ROUTES • HOSPITALS • PARKS • GOLF COURSES • ZIP CODES • FEDERAL AND STATE LANDS



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The information shown on this map has been obtained from various authoritative sources. Nevertheless, a work of this scope may contain some inaccuracies. Any errors and omissions called to our attention will be greatly appreciated.

Size: 33" x 44"

Hagstrom

Middlesex County

- Main Highways/Limited Access
- Main Through Roads
- Unimproved Roads
- 127 Entrance and Exit
- 127 Entrance Only
- 127 Exit Only
- Garden State Parkway Interchange Symbols
- U.S. 1 / Interstate 95 / State 27 — Highway Symbols
- 514 — Statewide Secondary Highway System
- 5 — Interchange Numbers
- Passenger / Freight Only — Railroad Lines and Stations
- Parks
- Golf & Country Clubs
- Cemeteries
- H — Hospitals
- Airports
- Government Lands
- Points of Interest
- 08901 — Zip Code Numbers and Boundaries
- State Boundaries
- County Boundaries
- Municipal Boundaries

Scales (Approximate): 1:36,900 • 1¾" = 1Mile

0 2,000 4,000 1 Mile 6,000 8,000 10,000 Feet

0 1 2 3 Kilometers

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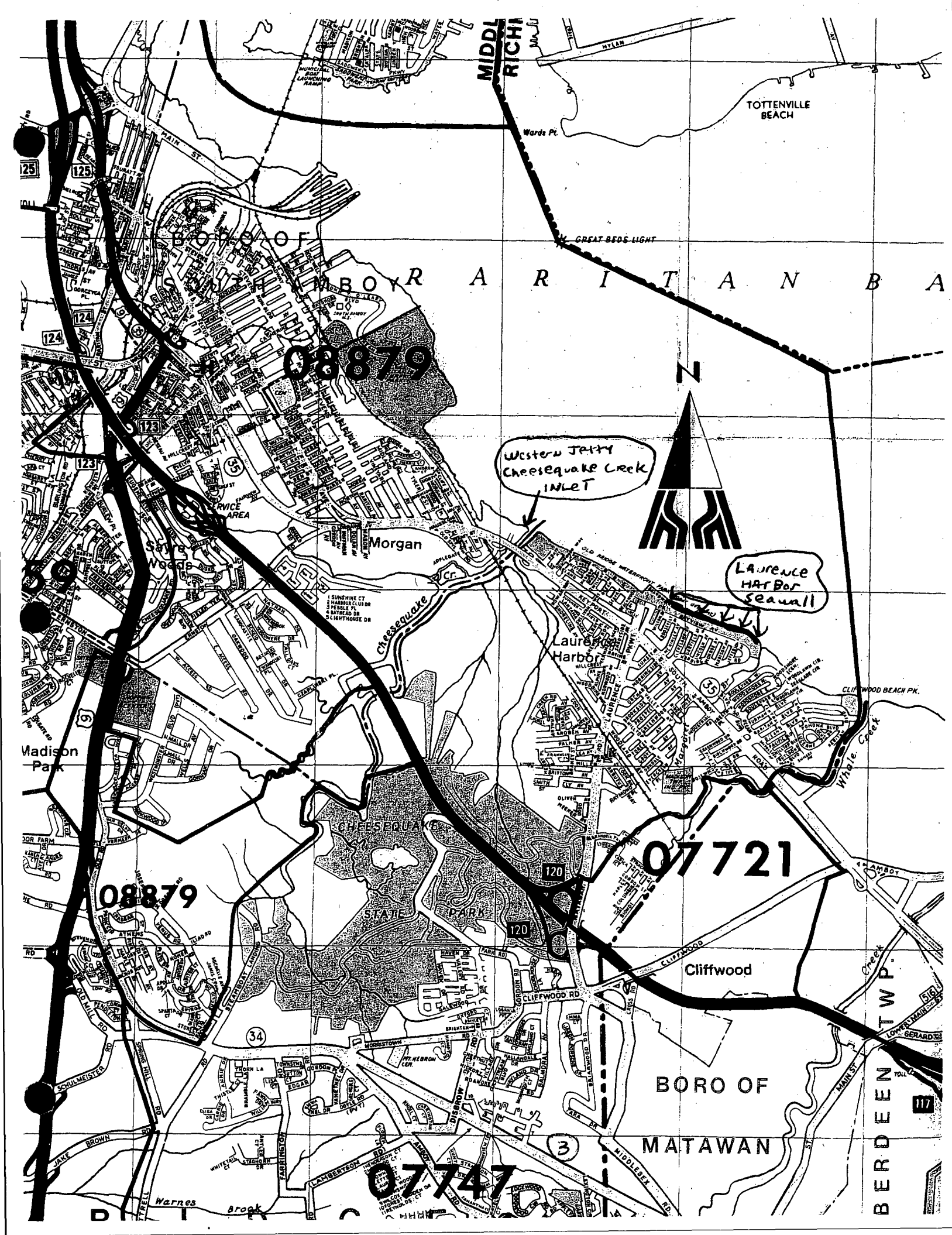
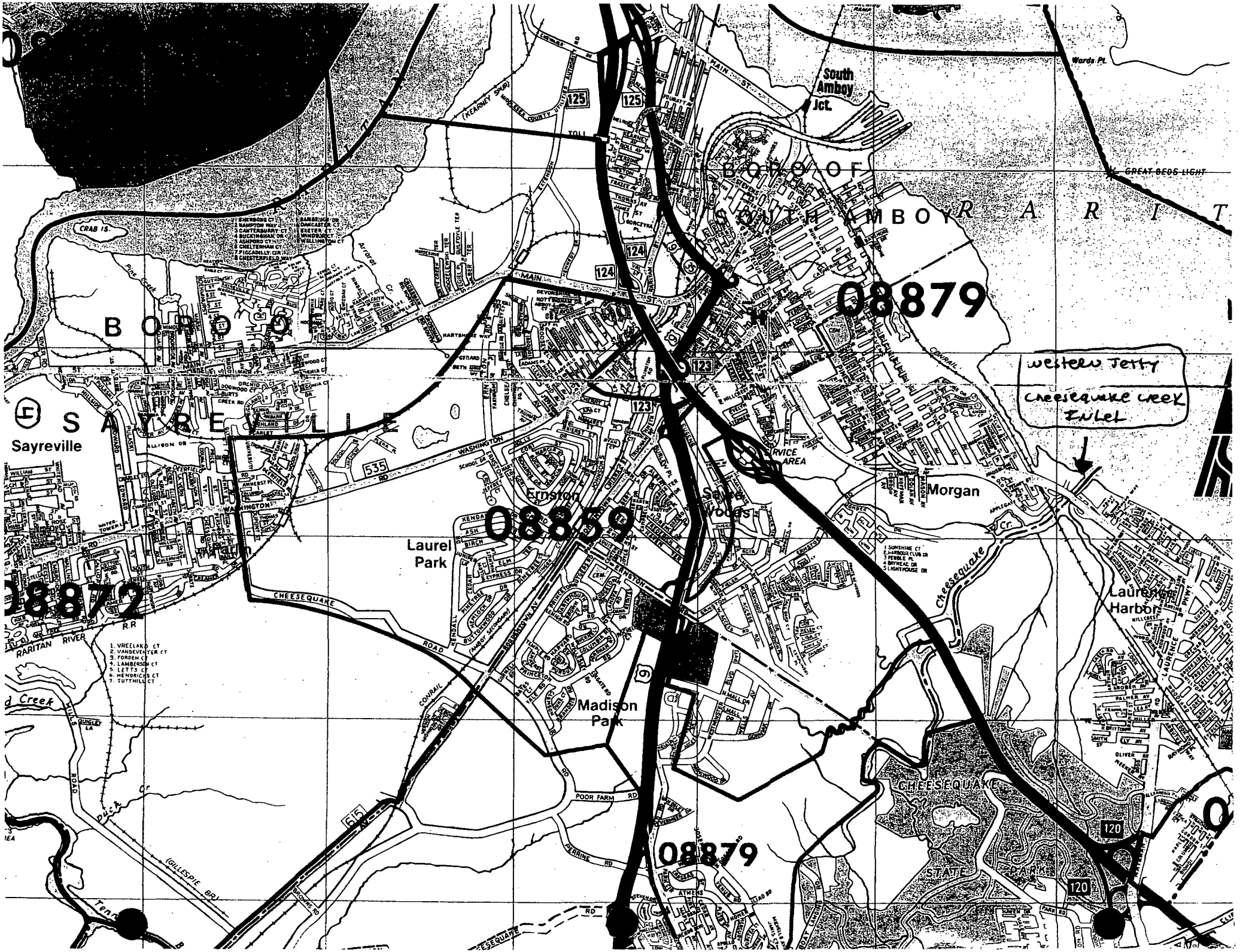
P Q R S T



TOTTENVILLE BEACH
Wards Pt.
GREAT BEDS LIGHT
BORO OF SOUTH AMBOY
R A R I T A N B A
08879
N
Western Jetty Cheesequake Creek INLET
Laurence Harbor Seawall
Morgan
Sayre Woods
Cheesequake Cr.
Laurence Harbor
CLIFFWOOD BEACH PK.
Whale Creek
Madison Park
CHEESEQUAKE STATE PARK
07721
08879
Cliffwood
BORO OF MATAWAN
BERDEEN TWP.
07747
Warnes Brook



South Amboy Jct.
BORO OF SOUTH AMBOY
R A R I T
08879
western Jetty
Cheesequake Creek Inlet
BORO OF SAYREVILLE
Sayreville
Ernston
08859
Laurel Park
Morgan
Laurence Harbor
08872
Madison Park
08879
CHEESEQUAKE STATE PARK
CHEESEQUAKE ROAD
RARITAN RIVER
Cheesequake Cr.
Wards Pt.
GREAT BEDS LIGHT
CRAB IS.
1. VREELAND CT
2. VANDEVENTER CT
3. FORDEN CT
4. LAMBERSON CT
5. LETTS CT
6. HENDRICKS CT
7. TUTTHILL CT

REFERENCE 13

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 13 October 2008

SUBJECT: National Estuary Program - New York – New Jersey Harbor

Attached to this project note are excerpts obtained from the following sources:

- General National Estuary Program Information describing the requirement for the establishment of Comprehensive Conservation and Management Plans (CCMPs) to meet the goals of Section 320 of the Clean Water Act ; accessed on http://www.epa.gov; ***(Page 2 of this project note)***
- CCMP information accessed on http://www.epa.gov, identifying the New York – New Jersey Harbor as having a CCMP under the National Estuary Program; ***(Pages 3-4 of this project note)***
- Documentation of the New York – New Jersey Harbor Estuary as part of the National Estuary Program; accessed on http://harborestuary.org ***(Page 5 of this project note)***
- Identification of the Raritan Bay as part of the core area of the New York – New Jersey Harbor Estuary; accessed on http://harborestuary.org ***(Pages 6-8 of this project note)***
- Excerpts from the Final CCMP for the New York – New Jersey Harbor Estuary Program (dated March 1996), identifying Raritan Bay as falling under the geographic scope of the CCMP; obtained from http://harborestuary.org ***(Pages 9-11 of this project note)***

The above information (accessed on October 13, 2008) documents that the Raritan Bay, in the area of the Raritan Bay Slag site, is considered a sensitive area identified in a Comprehensive Conservation and Management Plan under the National Estuary Program. It should be noted that the EPA website likes directly to the report on the New York-New Jersey Harbor found on the http://harborestuary.org website.

Signature/Date Dennis J Foerter 10/13/08

U.S. ENVIRONMENTAL PROTECTION AGENCY

National Estuary Program

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Estuaries in the National Estuary Program

National Estuary Program Home Pages

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Challenges

NEP Habitat Protection and Restoration

Invasive Species, Reefs, and Ocean Protection

Air Pollution and Water Quality

Exploring Estuaries: Students and Teachers

Estuaries are places where rivers meet the sea. Estuaries are critical to the health of coastal environments and to our enjoyment of them.

2007 marks the NEP 20th Anniversary!

EPA's National Estuary Program was established by Congress in 1987 to improve the quality of estuaries of national importance. The Clean Water Act Section 320 directs EPA to develop plans for attaining or maintaining water quality in an estuary. This includes protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife, and allows recreational activities, in and on water, requires that control of point and nonpoint sources of pollution to supplement existing controls of pollution. In several cases, more than one State is participating in a National Estuary Program. Each program establishes a Comprehensive Conservation and Management Plan to meet the goals of Section 320.

EPA's National Estuary Program is proud of its progress and has had many successes. The NEPs have succeeded because:

- they focus on the watershed,
- use science to inform decision-making,
- emphasize collaborative problem solving, and
- involve the public.

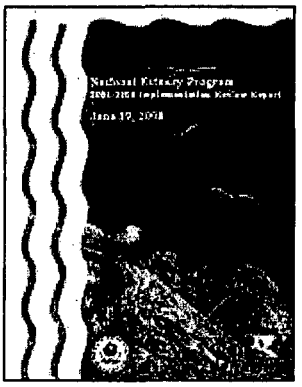
The successes of the National Estuary Program are largely a result of the programs' ability to develop long term, sustainable finance strategies.

Features

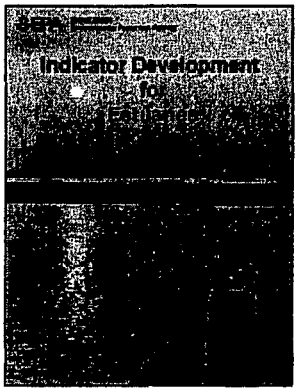
Climate Ready Estuaries

CLIMATE READY ESTUARIES EPA

NEP videos



Announcing the availability of EPA's 2004-2006 National Estuary Program (NEP) Implementation Report (PDF) (14 pp, 1MB, About PDF).



Announcing the availability of the Final "Indicators Development for Estuaries" manual. Manual presents a logical, stepwise process for developing regional-specific indicators for estuaries.

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U.S. ENVIRONMENTAL PROTECTION AGENCY

National Estuary Program

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Comprehensive Conservation and Management Plans

Each of the 28 National Estuary Programs was charged with developing and implementing a Comprehensive Conservation and Management Plan (CCMP) which establishes priorities for activities, research, and funding for the estuary. The CCMP serves as a blueprint to guide future decisions and actions and addresses a wide range of environmental protection issues including water quality, habitat, fish and wildlife, pathogens, land use, and introduced species to name a few. The CCMP is based on a scientific characterization of the estuary and is developed and approved by a broad-based coalition of stakeholders.

Select a program below to view its CCMP, note that some of these links will transport you off the EPA server. Only the CCMPs of those programs marked with an asterisk (*) are available online here. For information about the management plans of the other National Estuary Programs, contact the program directly.

You will need Adobe Acrobat Reader to view the Adobe PDF files on this page. See EPA's PDF page for more information about getting and using the free Acrobat Reader.

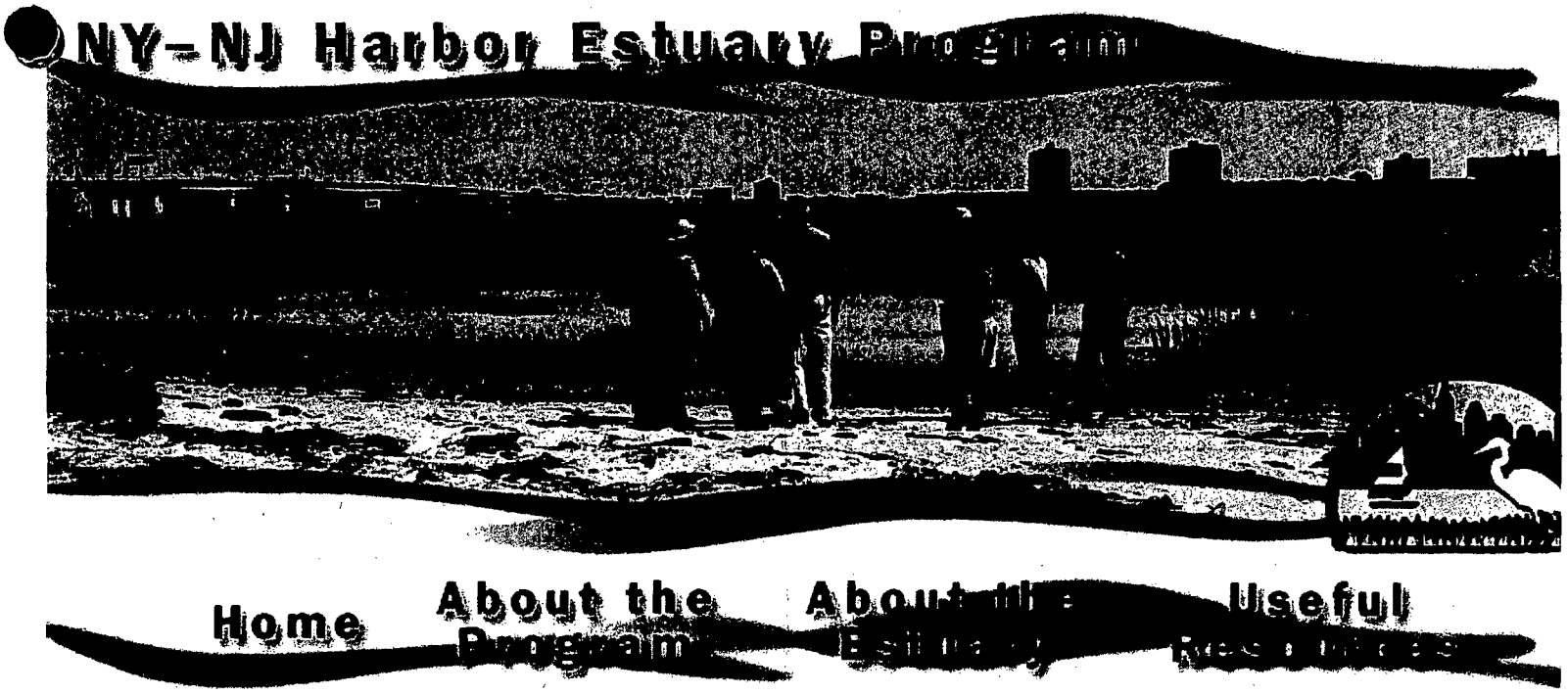
- Albemarle-Pamlico Sounds * EXIT Disclaimer
- Barataria-Terrebonne * EXIT Disclaimer
- Barnegat Bay * EXIT Disclaimer
- Buzzards Bay * EXIT Disclaimer
- Casco Bay (PDF) (51 pp, 1.9MB) * EXIT Disclaimer
- Charlotte Harbor * EXIT Disclaimer
- Coastal Bend Bays and Estuaries (PDF) (87 pp, 3.2MB) * EXIT Disclaimer
- Partnership for the Delaware Estuary EXIT Disclaimer
- Delaware Inland Bays (PDF) (173 pp, 1.4MB) * EXIT Disclaimer
- Galveston Bay EXIT Disclaimer
- Indian River Lagoon (PDF) (138 pp, 3.6MB) * EXIT Disclaimer

- Long Island Sound *
- Lower Columbia River Estuary Program * EXIT Disclaimer
- Maryland Coastal Bays EXIT Disclaimer
- Massachusetts Bays * EXIT Disclaimer
- Mobile Bay EXIT Disclaimer
  - Part 1: A Call to Action: An Overview of the Priority Environmental Issues Affecting the Mobile Bay Estuary (PDF) (45 pp, 2.5MB) EXIT Disclaimer
  - Part 2: The Path to Success: Preliminary Action Plans for Restoring and Maintaining the Mobile Bay Estuary (PDF) (92 pp, 1.9) EXIT Disclaimer
- Morrow Bay EXIT Disclaimer
- Narragansett Bay
- New Hampshire Estuaries EXIT Disclaimer
  - Comprehensive Conservation and Management Plan (PDF) (534 pp, 7.9MB) EXIT Disclaimer
  - Implementation Review EXIT Disclaimer
- New York-New Jersey Harbor * EXIT Disclaimer
- Peconic Bay EXIT Disclaimer
- Puget Sound * EXIT Disclaimer
- San Francisco Estuary * EXIT Disclaimer
- San Juan Bay, Puerto Rico EXIT Disclaimer
- Santa Monica Bay EXIT Disclaimer
- Sarasota Bay (PDF) (244 pp, 41MB) EXIT Disclaimer
- Tampa Bay
- Tillamook Bay EXIT Disclaimer

Can't find what you want? Try our A-Z Index

General Information & Resources En Español

(4)



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Regional

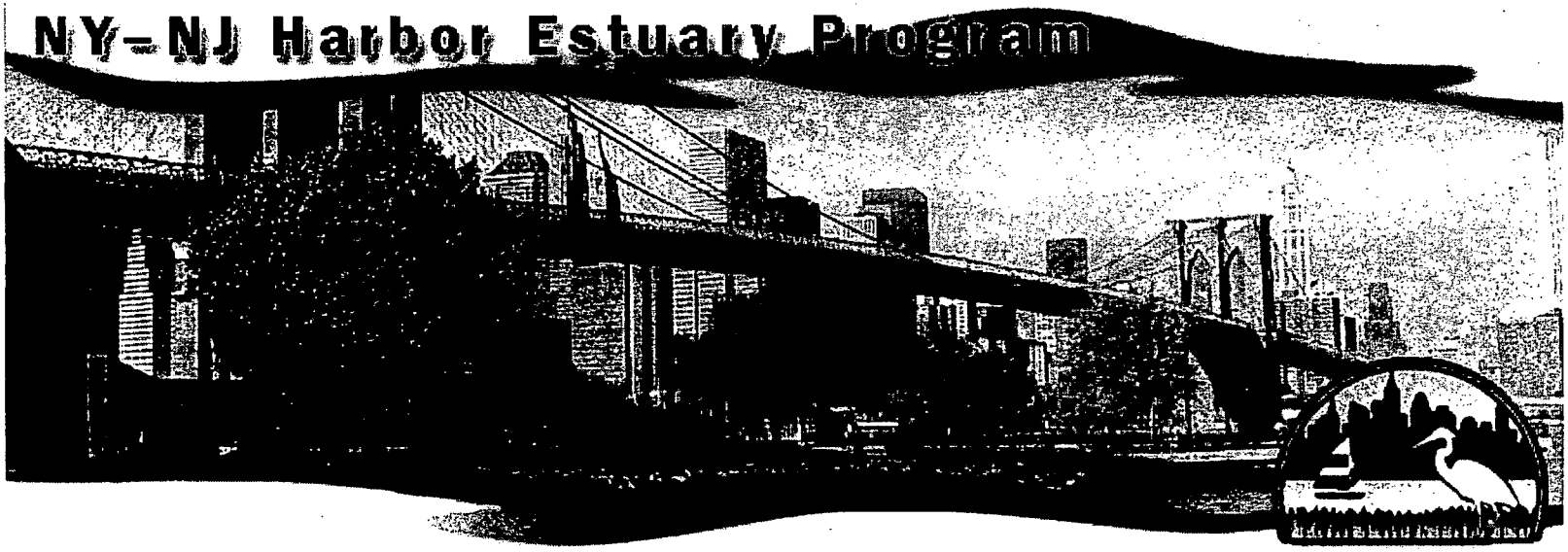
The Harbor Estuary Program (HEP) is a **National Estuary Program** authorized in 1987 by the U.S. Environmental Protection Agency. The program is a multi-year effort to develop and implement a plan to protect, conserve, and restore the estuary. Participants in the program include representatives from local, state, and federal environmental agencies, scientists, citizens, business interests, environmentalists, and others.

The primary planning document produced by the program is the **Comprehensive Conservation and Management Plan** (CCMP), completed in March of 1996 and signed by the governors of New York and New Jersey the fall of 1997.

Today, HEP is using its **Action Plan** (**Click Here**), completed in 2008, to guide its efforts and further refine its focus areas.

The New York-New Jersey Harbor Estuary was designated an "Estuary of National Significance" in 1988 by the US Environmental Protection Agency, in response to a request by the two state Governors. The HEP was convened as a partnership of federal, state, and local governments; scientists; civic and environmental advocates; the fishing community; business and labor leaders; and educators (called the Management Conference). The mission of the Conference was to develop a plan to protect and restore the Estuary. In 1987, Congress also required the preparation of a restoration plan for the New York Bight, the ocean area extending approximately 100 miles beyond Harbor waters. Because the Harbor and Bight are inextricably linked within the larger ecosystem, the two plans were joined.

(5)

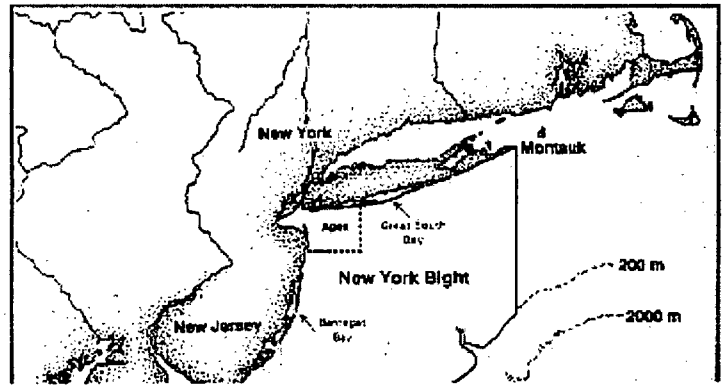


About the Estuary

About the Estuary: Home

Introduction

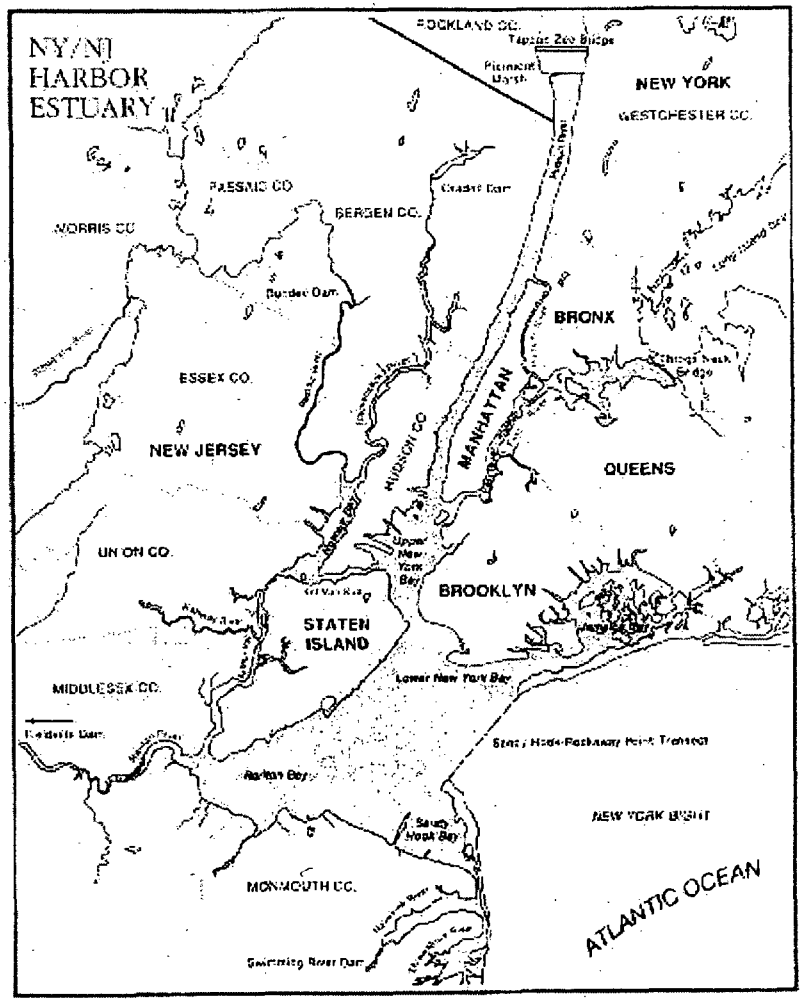
The New York-New Jersey Harbor Estuary includes the waters of New York Harbor and the tidally influenced portions of all rivers and streams that empty into the Harbor. Here are some maps to help you better visaulize our watershed:

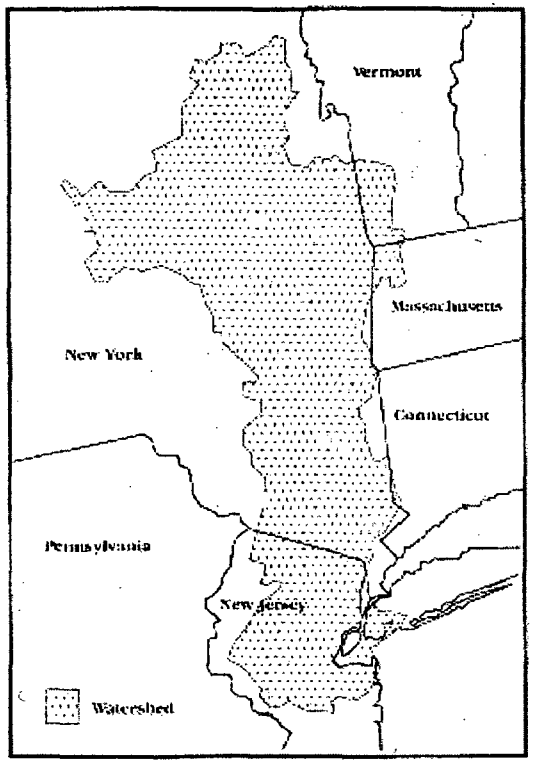


The Bight is the ocean area extending approximately 100 miles offshore from the Sandy Hook-Rockaway Point Transect to the Continental Slope. Almost 240 miles of sandy shoreline, extending from Cape May, New Jersey, to Montauk Point, Long Island, form its landward border. There are several back bays that are located behind the barrier beaches outside the core area of the Harbor. Some of the larger back bays adjacent to the Bight are the Great South Bay, Shinnecock Bay, and Moriches Bay in New York, and Barnegat Bay, Great Bay,

Great Egg Harbor, and Little Egg Harbor in New Jersey.

The shaded area in the map to the right is considered the "core area" because it is generally the most degraded. – It extends from the tidal waters of the Hudson-Raritan Estuary from Piermont Marsh in New York State to an imaginary line (the Sandy Hook-Rockaway Point Transect) connecting Sandy Hook, New Jersey, and Rockaway Point, New York, at the mouth of the Harbor. This core area includes the bi-state waters of the Hudson River, Upper and Lower Bays, Arthur Kill, Kill van Kull, and Raritan Bay. In New York, the area includes the East and Harlem Rivers and Jamaica Bay, and in New Jersey it includes the Hackensack, Passaic, Raritan, Shrewsbury, Navesink, and Rahway Rivers, and Newark and Sandy Hook Bays.





Although the focus of the HEP management plan is on the Harbor and Bight, the drainage basin or watershed of the Estuary encompasses about 16,300 square miles, *including* much of eastern New York, northern New Jersey, and small parts of western Connecticut, Massachusetts, and Vermont. The quality of the Estuary's waters is affected not only by activities occurring directly in the Harbor and Bight but also by industrial, agricultural, land use, and other individual practices throughout this larger watershed. As rainwater moves over the land in the watershed, it carries with it many potential pollutants that eventually end up in the Estuary – oil dumped down storm drains, pesticides from farms, lawn fertilizers, oil and gasoline from highway runoff, sewage from failed septic tanks, and sediment from construction projects.

(8)

New York/New Jersey Harbor Estuary Program • 290 Broadway, 24th Floor • New York, NY 10007-1866
Phone: 212-637-3816 • Fax: 212-637-3889 • E-mail: info@harborestuary.org

New York-New Jersey Harbor Estuary Program

Including the Bight Restoration Plan

Final Comprehensive Conservation and Management Plan

March 1996

(9)

THE STATE OF THE HARBOR AND BIGHT

A RESOURCE WORTHY OF PROTECTION

New York-New Jersey Harbor and the New York Bight (referred to throughout this document as the Harbor/Bight) are extraordinary in many ways -- their abundant resources, their beauty, and their many competing uses. The Harbor/Bight abounds with diverse natural resources, yet it is the heart of the most densely populated region of the nation. It provides recreational opportunities including fishing, boating, and swimming to over 20 million residents, and yet it supports a world class port for both passengers and cargo. It yields extensive commercial and recreational fisheries. It is also a repository for municipal and industrial effluents, for storm runoff from the vast metropolitan area, and for the disposal of dredged material.

It provides a livelihood for the local fishing community and citizens who work in the tourism industry. For others, the Harbor/Bight represents a great opportunity to enjoy open space, offering leisure time activities which are generally rare in an urban metropolis.

For all these reasons and more, those who work and play here should consider it a resource worthy of protection. The New York-New Jersey Harbor Estuary Program is a testimony to the fact that people care about the Harbor/Bight. Elected officials have authorized the expenditure of millions of taxpayer dollars to better understand the problems of the ecosystem. Hundreds of people have participated in the Management Conference for the past five years to develop a plan for its future. These citizens represent federal, state, and local government agencies, scientists, members of the commercial and recreational fishing community, public interest groups, environmental groups, and business and industry.

And why do people care about the Harbor/Bight? The answer is simple. Despite a legacy of environmental insults, the ecosystem is alive, and, in some areas, even teeming with marine life and valuable natural resources.

Although we can never restore this extraordinary resource to a pristine condition, we can make a difference--each of us can. The goal confirmed by participants in the Harbor/Bight Estuary Program is ***to establish and maintain a healthy and productive ecosystem with full beneficial uses.*** To achieve this goal, each individual has an opportunity and an obligation to contribute to the solutions.

ENVIRONMENTAL PROBLEMS OF THE HARBOR/BIGHT

Despite recent improvements in environmental conditions in the Harbor/Bight, significant problems remain. These problems include human use impairments such as fish consumption advisories and intermittent closures of bathing beaches, and ecosystem health and productivity impairments such as declines in fish and shellfish populations. These problems are caused, in significant part, by habitat loss and degradation, toxics, pathogens, floatables, and nutrients and organic enrichment.

ENVIRONMENTAL SETTING FOR THE HARBOR/BIGHT ESTUARY PROGRAM

What is an Estuary?

An estuary is a semi-enclosed coastal body of water which connects with the open sea. It is a transition zone where salt water from the ocean mixes with fresh water from rivers and land. The amount of fresh water flowing into the estuary varies from season to season and from year to year.

This variation, coupled with the daily rise and fall of the tides and the consequent movement of salt water up- and down-river, creates a unique environment. Estuaries are among the most productive of the Earth's systems; more than 80 percent of all fish and shellfish use estuaries as a primary habitat or as spawning or nursery grounds. Estuaries also provide feeding, nesting, breeding, and nursery areas for other diverse animal life.

What is the Harbor Estuary Program?

Congress recognized the significance of preserving and enhancing coastal environments with the establishment of the National Estuary Program in the 1987 amendments to the Clean Water Act. The purpose of the National Estuary Program is to promote the development of comprehensive management plans for estuaries of national significance threatened by pollution, development, or overuse. At the request of the Governors of New York and New Jersey, the Harbor was accepted into the program in 1988. In 1987, Congress also required USEPA to prepare a restoration plan for the Bight. Because the Harbor and Bight are linked in so many ways, USEPA and the Management Conference agreed to make the Bight Restoration Plan a product of the Harbor Estuary Program (HEP).

What is the Geographic Scope of the Program?

The New York-New Jersey Harbor Estuary encompasses the waters of New York Harbor and the tidally influenced portions of all rivers and streams which empty into the Harbor. There is a core area (defined by the shading on Figure 1) which includes the tidal waters of the Hudson-Raritan Estuary from Piermont Marsh in New York State to an imaginary line at the mouth of the Harbor which connects Sandy Hook, New Jersey and Rockaway Point, New York. This imaginary line is known as the Harbor Transect.

The core area includes the bi-state waters of the Hudson River, Upper and Lower Bay, Arthur Kill, Kill Van Kull, and Raritan Bay. In New York, it includes the East and Harlem Rivers and Jamaica Bay, and, in New Jersey, it includes the Hackensack, Passaic, Raritan, Shrewsbury, Navesink, and Rahway Rivers, and Newark and Sandy Hook Bays.

The Bight (Figure 2) is the ocean area extending approximately 100 miles offshore from the Harbor Transect to the outer limits of the Continental Shelf. Almost 240 miles of sandy shoreline, stretching from Cape May, New Jersey to Montauk Point, Long Island form its landward border. There are several back bays which are located behind the barrier beaches outside the core area of the Harbor. Some of the larger back bays adjacent to the Bight are the Great South Bay, Shinnecock Bay, and Moriches Bay in New York, and Barnegat Bay, Great Bay, Great Egg Harbor, and Little Egg Harbor in New Jersey.

What is the Value of the Harbor/Bight?

The Harbor/Bight is clearly an economic as well as an ecological asset. Billions of dollars are generated annually in the regional economy from boating, commercial and sport fishing, swimming, and beachgoing. The Port of New York and New Jersey is the largest port on the east coast of the United States and one of the largest ports in the world. Data from the Port Authority of New York and New Jersey indicate that 38 million long tons of bulk and general cargo, valued at approximately $54.7 billion, were shipped through the Port of New York and New Jersey in 1992. The regional economy also benefits from other uses of the Harbor/Bight, including ferry transportation, which is expanding, and sightseeing.

While it is fairly easy to quantify the economic value of the Harbor/Bight, there are numerous other values related to ecology and aesthetics which are much more difficult to price. What is the worth of a salt or freshwater wetland or a barrier beach as a habitat for a variety of plants and mammals, birds and reptiles -- some of which are threatened or endangered? What is the value of the personal sense of well-being that comes from an afternoon of boating or fishing?

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REFERENCE 14

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 14 October 2008

SUBJECT: Sensitive Environments

Attached is an excerpt obtained from Environmental Statutes, published by Government Institutes, Inc., 1990), which describes the requirements of Section 305(a) of the Clean Water Act ***(pages 2-5 of this project note)***. This section (33 USCA 1315) states that states are required to identify those navigable waters, the quality of which is adequate to provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allow recreational activities in and on the water. Similar verbiage in Title 33, Chapter 26, Section 1315 – State Reports on water quality, accessed on http://cyberregs.com on October 14, 2008 ***(pages 6-7 of this project note)***.

In N.J.A.C. 7:9B (Surface Water Quality Standards, last amended June 16, 2008), classifies the entire Raritan Bay as an FW2-NT/SE1 surface water ***(see attached Surface Water Quality Standards; pages 8-13 of this project note)***. These classifications indicate that designated uses include the maintenance, migration, and propagation of natural and established biota. Therefore, the Raritan Bay is considered a sensitive environment under Section 305(a) of the Clean Water Act.

Signature/Date 10/14/08

ENVIRONMENTAL STATUTES 1990 Edition

- Clean Air Act
- Clean Water Act
- Federal Insecticide, Fungicide and Rodenticide Act
- Marine Protection, Research, and Sanctuaries Act
- National Environmental Policy Act
- Noise Control Act
- Occupational Safety and Health Act
- Resource Conservation and Recovery Act
  - Hazardous and Solid Waste Amendments of 1984
- Safe Drinking Water Act
- Superfund
  - Superfund Amendments and Reauthorization Act
  - Emergency Planning and Community Right-to-Know
  - Radon Gas and Indoor Air Quality Research Act
- Toxic Substances Control Act

Government Institutes, Inc.

(2)

PUBLISHER'S NOTE

This book is designed to provide accurate and authoritative information on the subject matter. It is sold with the understanding that the publisher is not engaged in rendering legal, accounting or other professional services. If legal advice or other expert assistance is needed, the services of a competent professional should be sought. (From the Declaration of Principles adopted jointly by a committee of the American Bar Association and a committee of publishers.)

DISCLAIMER

Some of the statutes have been revised regularly with the result that there is considerable confusion as to what is officially contained in these statutes at any one time. Also, amendments are contemplated to some of these statutes, so the reader should use care in relying on what is the actual statute at any point in time.

February 1990

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Rockville, MD 20850
U.S.A.

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ISBN: 0-86587-796-3 (softcover)
ISBN: 0-86587-797-1 (hardcover)

Printed and bound in the United States of America

than 3 years after the date of the establishment of such strategy.

(2) Approval or Disapproval.—Not later than 120 days after the last day of the 2-year period referred to in paragraph (1), the Administrator shall approve or disapprove the control strategies submitted under paragraph (1) by any State.

(3) Administrator's Action.—If a State fails to submit control strategies in accordance with paragraph (1) or the Administrator does not approve the control strategies submitted by such State in accordance with paragraph (1), then, not later than 1 year after the last day of the period referred to in paragraph (2), the Administrator, in cooperation with such State and after notice and opportunity for public comment, shall implement the requirements of paragraph (1) in such State. In the implementation of such requirements, the Administrator shall, at a minimum, consider for listing under this subsection any navigable waters for which any person submits a petition to the Administrator for listing not later than 120 days after such last day.

(m) Schedule for Review of Guidelines.—

(1) Publication.—Within 12 months after the date of the enactment of the Water Quality Act of 1987, and biennially thereafter, the Administrator shall publish in the Federal Register a plan which shall—

(A) establish a schedule for the annual review and revision of promulgated effluent guidelines, in accordance with subsection (b) of this section;

(B) identify categories of sources discharging toxic or nonconventional pollutants for which guidelines under subsection (b)(2) of this section and section 306 have not previously been published; and

(C) establish a schedule for promulgation of effluent guidelines for categories identified in subparagraph (B), under which promulgation of such guidelines shall be no later than 4 years after such date of enactment for categories identified in the first published plan or 3 years after the publication of the plan for categories identified in later published plans.

(2) Public Review.—The Administrator shall provide for public review and comment on the plan prior to final publication.

WATER QUALITY INVENTORY

33 USCA 1315

Sec. 305. (a) The Administrator, in cooperation with the States and with the assistance of appropriate Federal agencies, shall prepare a report to be submitted to the Congress on or before January 1, 1974, which shall—

(1) describe the specific quality, during 1973, with appropriate supplemental descriptions as shall be required to taken into account seasonal, tidal, and other variations, of all navigable waters and the waters of the contiguous zone;

(2) include an inventory of all point sources of discharge (based on a qualitative and quantitative analysis of discharges) of pollutants, into all navigable waters and the waters of the contiguous zone; and

(3) identify specifically those navigable waters, the quality of which—

(A) is adequate to provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allow recreational activities in and on the water;

(B) can reasonably be expected to attain such level by 1977 or 1983; and

(C) can reasonably be expected to attain such level by any later date.

(b)(1) Each State shall prepare and submit to the Administrator by April 1, 1975,
and shall bring up to date by April 1, 1976, and biennially thereafter, a report which shall include—

(A) a description of the water quality of all navigable waters in such State during the preceding year, with appropriate supplemental descriptions as shall be required to take into account seasonal, tidal, and other variations, correlated with the quality of water required by the objective of this Act (as identified by the Administrator pursuant to criteria published under section 304(a) of this Act) and the water quality described in subparagraph (B) of this paragraph;

(B) an analysis of the extent to which all navigable waters of such State provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water;

(C) an analysis of the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water, have been or will be achieved by the requirements of this Act, together with recommendations as to additional action necessary to achieve such objectives and for what waters such additional action is necessary;

(D) an estimate of (i) the environmental impact, (ii) the economic and social costs necessary to achieve the objective of this Act in such State, (iii) the economic and social benefits of such achievement, and (iv) an estimate of the date of such achievement; and

(E) a description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs.

Title 33, CHAPTER 26, Section 1315 - State reports on water quality

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§1315. State reports on water quality

(a) Omitted (b)(1) Each State shall prepare and submit to the Administrator by April 1, 1975, and shall bring up to date by April 1, 1976, and biennially thereafter, a report which shall include -

(A) a description of the water quality of all navigable waters in such State during the preceding year, with appropriate supplemental descriptions as shall be required to take into account seasonal, tidal, and other variations, correlated with the quality of water required by the objective of this chapter (as identified by the Administrator pursuant to criteria published under section 1314(a) of this title) and the water quality described in subparagraph (B) of this paragraph;

(B) an analysis of the extent to which all navigable waters of such State provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water;

(C) an analysis of the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water, have been or will be achieved by the requirements of this chapter, together with recommendations as to additional action necessary to achieve such objectives and for what waters such additional action is necessary;

(D) an estimate of (i) the environmental impact, (ii) the economic and social costs necessary to achieve the objective of this chapter in such State, (iii) the economic and social benefits of such achievement, and (iv) an estimate of the date of such achievement; and

(E) a description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs.

(2) The Administrator shall transmit such State reports, together with an analysis thereof, to Congress on or before October 1, 1975, and October 1, 1976, and biennially thereafter.

SOURCE

(June 30, 1948, ch. 758, title III, Sec. 305, as added Pub. L. 92- 500, Sec. 2, Oct. 18, 1972, 86 Stat. 853; amended Pub. L. 95-217, Sec. 52, Dec. 27, 1977, 91 Stat. 1589.)

CODIFICATION

Subsec. (a) authorized the Administrator, in cooperation with the States and Federal agencies, to prepare a report describing the specific quality, during 1973, of all navigable waters and waters of the contiguous zone, including an inventory of all point sources of discharge of pollutants into these waters, and identifying those navigable waters capable of supporting fish and wildlife populations and allowing recreational activities, those which could reasonably be expected to attain this level by 1977 or 1983, and those which could attain this level sooner, and submit this report to Congress on or before Jan. 1, 1974.

AMENDMENTS (6)

1977 - Subsec. (b)(1). Pub. L. 95-217, Sec. 52(1), substituted "April 1, 1975, and shall bring up to date by April 1,

1976, and biennially thereafter" for "January 1, 1975, and shall bring up to date each year thereafter" in provisions preceding subpar. (A).

Subsec. (b)(2). Pub. L. 95-217, Sec. 52(2), substituted "on or before October 1, 1975, and October 1, 1976, and ennially thereafter" for "on or before October 1, 1975, and annually thereafter".

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(7)

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N. J. A. C. 7:9B

Surface Water Quality Standards

Statutory Authority: N.J.S.A. 58:10A-1 et seq., 58:11A-1 et seq., and 13:1D-1 et seq.

Date Last Amended: June 16, 2008 (40 N.J.R. 3630(b))

For regulatory history and effective dates, see the New Jersey Administrative Code

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"FW1" means those fresh waters, as designated in N.J.A.C. 7:9B-1.15(h) Table 6, that are to be maintained in their natural state of quality (set aside for posterity) and not subjected to any man-made wastewater discharges or increases in runoff from anthropogenic activities. These waters are set aside for posterity because of their clarity, color, scenic setting, other characteristic of aesthetic value, unique ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s).

"FW2" means the general surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands Waters.

"Groundwater" means that portion of water beneath the land surface that is within the zone of saturation (below the water table) where pore spaces are filled with water.

"Heat dissipation area" means a mixing zone, as may be designated by the Department, into which thermal effluents may be discharged for the purpose of mixing, dispersing, or dissipating such effluents without creating nuisances, hazardous conditions, or violating the provisions of this chapter, the Surface Water Quality Standards.

HUC 14" or "hydrologic unit code 14" means an area within which water drains to a particular receiving surface water body, also known as a subwatershed, which is identified by a 14 digit hydrologic unit boundary designation, delineated within New Jersey by the United States Geological Survey.

"Important species" means species that are commercially valuable (for example, within the top 10 species landed, by dollar value); recreationally valuable; threatened or endangered; critical to the organization and/or maintenance of the ecosystem; or other species necessary in the food web for the well-being of the species identified in this definition.

"Industrial water supply" means water used for processing or cooling.

"Intermittent stream" means a stream with a MA7CD10 flow of less than one-tenth (0.1) cubic foot per second.

"Lake, pond, or reservoir" means any impoundment, whether naturally occurring or created in whole or in part by the building of structures for the retention of surface water, excluding sedimentation control and stormwater retention/detention basins and ponds designed for treatment of wastewater. Lakes, ponds, and reservoirs are characterized by a long term or permanent downgradient restriction of surface water flow from the impoundment and areas of quiescent water within the body of the impoundment. Lakes, ponds, and reservoirs are frequently characterized by greater water depths within the impoundment than either the upgradient or downgradient surface water flow and by shallow water lateral edges containing emergent or submerged plant species. For regulatory purposes, the upgradient boundary of a lake, pond, impoundment, or reservoir shall be considered to be the point at which areas of greater depth and relatively quiescent water can be differentiated from the upgradient surface water input into the impoundment under average flow conditions.

medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et. seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, agricultural and construction waste or runoff or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works as defined at N.J.A.C. 7:14A-1.2. "Pollutant" includes both hazardous and nonhazardous pollutants.

"Potable surface water intake" means any structure or apparatus used to withdraw surface waters directly or indirectly that is conveyed to a potable treatment plant or is used for other potable purposes.

"Primary contact recreation" means water related recreational activities that involve significant ingestion risks and includes, but is not limited to, wading, swimming, diving, surfing, and water skiing.

"Public hearing" means a legislative type hearing before a representative or representatives of the Department providing the opportunity for public comment, but does not include cross-examination.

"Regulatory mixing zones" means areas of surface waters established pursuant to this chapter for the purpose of initial mixing, dispersion, or dissipation of wastewater effluent at or near the discharge point. Regulatory mixing zones may be established for applicable criteria.

"River mile" or "R.M." means the distance, measured in statute miles, between two locations on a stream, with the first location designated as mile zero. For example, mile zero for the Delaware River is located at the intersection of the center line of the navigation channel and a line between the Cape May Light, New Jersey, and the tip of Cape Henlopen, Delaware.

"Saline waters" means waters having salinities generally greater than 3.5 parts per thousand at mean high tide.

"SC" means the general surface water classification applied to coastal saline waters.

"SE" means the general surface water classification applied to saline waters of estuaries.

"Secondary contact recreation" means recreational activities where the probability of water ingestion is minimal and includes, but is not limited to, boating and fishing.

"Shellfish" means those mollusks commonly known as clams, oysters, or mussels.

"Shellfish waters" means waters classified as Approved, Seasonally Approved, Special Restricted, Seasonally Special Restricted or Condemned that support or possess the potential to support shellfish which are within the Coastal Area Facility Review Act (C.A.F.R.A.) zone as delineated in 1973, (excluding: 1 - The Cohansey River upstream of Brown's Run; 2 - The Maurice River upstream of Route 548; 3 - The Great Egg Harbor River upstream of Powell Creek; 4 - The Tuckahoe River upstream of Route 50; 5 - The Mullica River upstream of the

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2. Maintenance, migration and propagation of the natural and established biota indigenous to this unique ecological system;
3. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection;
4. Primary and secondary contact recreation; and
5. Any other reasonable uses.

(c) In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and
5. Any other reasonable uses.

(d) In all SE1 waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;
2. Maintenance, migration and propagation of the natural and established biota;
3. Primary and secondary contact recreation; and
4. Any other reasonable uses.

(e) In all SE2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Migration of diadromous fish;
3. Maintenance of wildlife;
4. Secondary contact recreation; and
5. Any other reasonable uses.

(f) In all SE3 waters the designated uses are:

1. Secondary contact recreation;

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i. "FW1" means those fresh waters, as designated in N.J.A.C. 7:9B-1.15(h) Table 6, and as defined at N.J.A.C. 7:9B-1.4.
ii. "FW2-TP" means FW2 trout production.
iii. "FW2-TM" means FW2 trout maintenance.
iv. "FW2-NT" means FW2 non trout.
v. "PL" means Pinelands Waters.
vi. "SE1" means saline estuarine waters whose designated uses are listed in N.J.A.C. 7:9B-1.12(d).
vii. "SE2" means saline estuarine waters whose designated uses are listed in N.J.A.C. 7:9B-1.12(e).
viii. "SE3" means saline estuarine waters whose designated uses are listed in N.J.A.C. 7:9B-1.12(f).
ix. "SC" means the general surface water classification applied to saline coastal waters.
x. FW2-NT/SE1 (or a similar designation that combines two classifications) means a waterway in which there may be a salt water/fresh water interface. The exact point of demarcation between the fresh and saline waters must be determined by salinity measurements and is that point where the salinity reaches 3.5 parts per thousand at mean high tide. The stream is classified as FW2-NT in the fresh portions (salinity less than or equal to 3.5 parts per thousand at mean high tide) and SE1 in the saline portions.

7. The following water quality designations are used in Tables 1 through 5 in (c) through (g), respectively, below:
i. "(C1)" means Category One waters;
ii. "(tp)" indicates trout production in waters which are classified as FW1. This is for information only and does not affect the water quality criteria for those waters;
iii. "(tm)" indicates trout maintenance in waters which are classified as PL or FW1. For FW1 waters this is for information only and does not affect the water quality criteria for those waters.

RAMINESSIN (HOP) BROOK (Holmdel) - Entire length, including all tributaries	FW2-TM(C1)
RARITAN BAY - Entire drainage	FW2-NT/SE1
RARITAN RIVER	
NORTH BRANCH (Also see INDIA BROOK)	
(Pleasant Valley) - Source to, but not including, Ravine Lake	FW2-TP(C1)
(Far Hills) - Ravine Lake dam to Rt. 512 bridge	FW2-TM
(Bedminister) - Rt. 512 bridge to confluence with South Branch, Raritan River	FW2-NT
SOUTH BRANCH RARITAN RIVER	
(Mt. Olive) - Source to the dam that is 390 feet upstream of the Flanders-Drakestown Road bridge and the two tributaries which originate north and east of the Budd Lake Airfield	FW2-NT(C1)
(Mt. Olive) - Dam to confluence with Turkey Brook	FW2-TM(C1)
(Middle Valley) - Confluence with Turkey Brook to Rt. 512 bridge	FW2-TP(C1)
(Califon) - Rt. 512 bridge to downstream end of Packers Island, except segment described separately, below	FW2-TM
(Ken Lockwood Gorge) - River and tributaries within Ken Lockwood Gorge Wildlife Management Area	FW2-TM(C1)
(Neshanic Sta.) - Downstream end of Packers Island to confluence with North Branch, Raritan River	FW2-NT
TRIBUTARIES, SOUTH BRANCH RARITAN RIVER	
(Long Valley) - Entire length	FW2-TP(C1)
(High Bridge) - Entire length	FW2-TM
(S. of Hoffmans) - Entire length	FW2-TP(C1)
(S. of Schooley's Mt.) - Entire length	FW2-TP(C1)
MAIN STEM RARITAN RIVER	
(Bound Brook) - From confluence of North and South Branches to Landing Lane bridge in New Brunswick and all freshwater tributaries downstream of Landing Lane bridge.	FW2-NT
(Sayreville) - Landing Lane bridge to Raritan Bay and all saline water tributaries	SE1
RINEHART BROOK (Hacklebarney) - Entire length	FW2-TP(C1)
ROCK BROOK (Montgomery) - Entire length	FW2-NT
ROCKAWAY CREEK	
NORTH BRANCH	
(Mountainville) - Source to Rt. 523 bridge	FW2-TP(C1)
(Whitehouse) - Rt. 523 bridge to confluence with South Branch	FW2-TM
SOUTH BRANCH	
(Clinton) - Headwaters to Readington Township boundary including all tributaries	FW2-TP(C1)

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REFERENCE 15

TELECON NOTE — REGION 2 SITE ASSESSMENT TEAM

To: Raritan Bay Slag File **Date:** October14, 2008 **Time:** 1400 **Page:** 1 of 1

W.O. No.: 20405.012.013.0523.00

Between: Dennis Foerter, Region 2 SAT

And: Fred Mumford, NJDEP Publicly Funded Site Remediation Element (609) 984-3074

Subject: NJDEP 2007 Soil Sampling Events at Raritan Bay Slag

Mr. Mumford is the Superfund Coordinator in the Publicly Funded Site Remediation Element of the New Jersey Department of Environmental Protection (NJDEP). He stated that the samples collected by NJDEP in May 2007 and June 2007 were collected from soil and sediment. The sample locations were biased to areas immediately adjacent to waste materials associated with the Laurence Harbor Seawall.

Mr. Mumford described the waste material associated with the Laurence Harbor seawall as consisting of various materials including large pieces of rust-colored slag. Other waste (i.e., slag) materials associated with the low-yield metallic waste from blast furnace and blast furnace rubble included finer grained "nuggets" as well as battery casing fragments of various sizes. Mr. Mumford spoke with the NJDEP sampling team and they stated that it is possible that some of the finer waste materials comprising the Laurence Harbor Seawall may have been included in the soil samples collected in May and June 2007.

Signature 10/14/08

Dennis J. Foerter

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REFERENCE 16

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 12 January 2009

SUBJECT: EPA Investigation conducted in September 2008

Interviewed Dan Gaughan of Weston Solutions, Inc. (Weston). Dan was the project manager for the soil, sediment and surface water sampling portions of EPA's sampling event conducted at the Raritan Bay Slag site in September 2008. During the interview, Dan stated the following:

- The investigation was overseen by Nick Magriples, On-Scene Coordinator for the U.S. Environmental Protection Agency (EPA).

- During the September 2008 EPA investigation, surface and subsurface soil, surface water and sediment samples were collected in the area of the Laurence Harbor seawall and the western jetty of the Cheesequake Creek Inlet. In addition to sampling activities conducted by Weston, waste samples were collected from the slag which forms portions of the Laurence Harbor seawall and the western jetty of the Cheesequake Creek Inlet. The waste samples were collected by the EPA Environmental Response Team (ERT). Analytical data for samples collected ERT during this investigation have not been received to date.

- During field activities, Dan observed that several portions of the Laurence Harbor seawall were observed to consist of slag. In addition, the top portion of the western jetty of the Cheesequake Creek Inlet was observed to consist of slag. Battery casing fragments were also noted in both areas. During field activities, Dan observed that Raritan Bay did come in contact with the slag materials in both locations during high tide.

- Dan stated that during the collection of soil samples directly from the Laurence Harbor Seawall and the western jetty of the Cheesequake Inlet, it is likely that the finer waste/slag materials comprising the Laurence Harbor Seawall and the jetty were included in the samples.

- Dan stated that there are no containment features associated with the Laurence Harbor Seawall or the western jetty of the Cheesequake Creek Inlet. Neither of these sources has a maintained engineered cover, a liner or a run-on control system and runoff management system. In addition, there were no features present to suggest that containment at each of

the sources (i.e., Laurence Harbor Seawall or western jetty of the Cheesequake Creek Inlet) is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by flood.

- The Raritan Bay in the immediate vicinity of the Laurence Harbor seawall and the western jetty of the Cheesequake Creek Inlet is used for recreational purposes. People were observed to be fishing from the Raritan Bay directly off of the Laurence Harbor seawall and the western jetty of the Cheesequake Creek Inlet. In addition, swimming activities were observed in the Raritan Bay in the beach areas of the Old Bridge Waterfront Park.

- There may be areas of the southern shoreline of Raritan Bay where the seawall consists of slag similar to materials observed on the Laurence Harbor seawall. These areas are located along the Raritan Bay's southern shoreline located west of Cheesequake Creek. EPA was unable to evaluate these areas due to access issues and the fact the NJ Transit rail lines are located along these areas.

- Maps outlining the sample locations and lead concentrations are attached to this project note. Figure 2 presents lead concentrations detected in sediment and soil samples collected in the vicinity of the western jetty of the Cheesequake Creek Inlet (i.e., Figure 2). Figure 3 presents lead concentrations detected in the vicinity of the Laurence Harbor Seawall (i.e., source 1)

Signature/Date _____ 1/12/09

WESTON SOLUTIONS SM

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REPORT DATE: January 2009	PROJECT MANAGER: D. Gaughan	CLIENT NAME: EPA
DRAWING: 06276_RBS_PB_1_of_2.mxd PATH: P:/SAT2/Raritan_Bay_Slag/MXD	CHECKED BY: D. Gaughan	
REVISION No. 0	CONTRACT No. EP-W-06-072	PROJECT NAME: Raritan Bay Slag Site
WORK ORDER No. 20401.032.010.2064	DRAWN/MODIFIED BY: J. Lynes DATE CREATED: 12/09/2008	

RBS-SED32 (0-3 in) Lead 318
RBS-SED31 (0-3 in) Lead 280
RBS-SED35 (0-3 in) Lead 304
RBS-SED34 (0-3 in) Lead 307
RBS-SED33 (0-3 in) Lead 318
RBS-SED25 (0-3 in) Lead 458 J
RBS-SED88 (0-3 in) Lead 1440 J
RBS-SED26 (0-3 in) Lead 525 J
RBS-SED87 (0-3 in) Lead 1100 J
RBS-SED82 (0-3 in) Lead 422
RBS-SED24 (0-3 in) Lead 79.4 J
RBS-SED12 (0-3 in) Lead 660
RBS-SED23 (0-3 in) Lead 90.7 J
RBS-SED21 (0-3 in) Lead 48.1
RBS-SED22 (0-3 in) Lead 53.6 J
RBS-SED81 (0-3 in) Lead 463
RBS-S83 (0-2 in) Lead 27.3 J
RBS-S73 (0-2 in) Lead 23.7 J
RBS-SED11 (0-3 in) Lead 441
RBS-S79 (0-2 in) Lead 29.5 J
RBS-S74 (0-2 in) Lead 24.8 J
RBS-SED20 (0-3 in) Lead 58.2
RBS-S84 (0-2 in) Lead 11.6 J
RBS-SED10 (0-3 in) Lead 326
RBS-S76 (0-2 in) Lead 33.7 J
RBS-S85 (0-2 in) Lead 24.7 J
RBS-SED19 (0-3 in) Lead 93.5
RBS-SED17 (0-3 in) Lead 75.7
RBS-S87 (0-2 in) Lead 12.1 J
RBS-S69 (0-2 in) Lead 28.4 J
RBS-SED18 (0-3 in) Lead 186
RBS-SED16 (0-3 in) Lead 107 J
RBS-S77 (0-2 in) Lead 34.5 J
RBS-S78 (0-2 in) Lead 32.8 J
RBS-S75 (0-2 in) Lead 8.9 J
RBS-S68 (0-2 in) Lead 31.5 J
RBS-SED09 (0-3 in) Lead 403
RBS-SED08 (0-3 in) Lead 861
RBS-SED06 (0-3 in) Lead 252 J
RBS-S70 (0-2 in) Lead 47.2 J
RBS-S71 (0-2 in) Lead 34.3 J
RBS-S72 (0-2 in) Lead 37.2 J
RBS-S81 (0-2 in) Lead 26.1 J
RBS-S82 (0-2 in) Lead 9.2 J
RBS-SED07 (0-3 in) Lead 5860
RBS-SED05 (0-3 in) Lead 135 J
RBS-S01A (0-2 in) Lead 1600 J
RBS-S01B (6-12 in) Lead 912 J
RBS-S80 (0-2 in) Lead 11.1 J
RBS-S86 (0-2 in) Lead 17.4 J
RBS-S67 (0-2 in) Lead 49.3 J
RBS-S02A (0-2 in) Lead 1040 J
RBS-S02B (6-12 in) Lead 1100 J
RBS-S03A Lead 1130
RBS-S65 (0-2 in) Lead 29.8 J
RBS-S66 (0-2 in) Lead 30.3 J

80 0 80 160
Graphic Scale In Feet

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REPORT DATE: January 2009	PROJECT MANAGER: D. Gaughan	CLIENT NAME: EPA
DRAWING: 06277_RBS_PB_2_of_2.mxd PATH: P:/SAT2/Raritan_Bay_Slag/MXD	CHECKED BY: D. Gaughan	
REVISION No. 0	CONTRACT No. EP-W-06-072	PROJECT NAME: Raritan Bay Slag Site
WORK ORDER No. 20401.032.010.2064	DRAWN/MODIFIED BY: J. Lynes DATE CREATED: 12/09/2008	

REFERENCE 17

SAMPLING TRIP REPORT

SITE NAME: Raritan Bay Slag Site
DCN No.: RST 2 – 02 – F – 0708
W.O. No.: 20401.032.010.2064
Case No.: 37836

EPA I.D. NO.: NJN000206276

SAMPLING DATES: September 10, 2008 through September 16, 2008 (excluding September 13 and 14)

1. Site Location: Refer to Figure 1

2. Sample Locations: Refer to Figure 2

3. Sample Descriptions: Refer to Table 1

4. Laboratory Receiving Samples:

Analysis	Name and Address of Laboratory
Target Analyte List (TAL) metals and dissolved metals (excluding mercury, including tin), and Toxicity Characteristic Leaching Procedure (TCLP) metals	Bonner Analytical Testing Company 2703 Oak Grove Road Hattiesburg, MS 39402
Grain-size distribution	Test America Laboratories 30 Community Drive, Suite ll South Burlington, VT 05403

5. Sample Dispatch Data:

Twelve aqueous samples for low concentration TAL metals analysis, 12 aqueous samples for low concentration dissolved TAL metals analysis, and 23 soil/sediment samples for low concentration TAL metals analysis were shipped to Bonner Analytical Testing Company (Bonner Analytical) on 9/10/2008 at 1730 hours via Federal Express Airbill No. 8541 0029 6945. Thirteen sediment samples for grain-size distribution analysis were shipped to Test America Laboratories (Test America) on 9/10/2008 at 1730 hours via Federal Express Airbill No. 8541 0029 6577.

Four aqueous samples for low concentration TAL metals analysis, three aqueous samples for low concentration dissolved TAL metal analysis, 57 soil/sediment samples for low concentration TAL metals analysis, and 13 soil samples for medium concentration TAL metals analysis (six of which also included TCLP metals analysis) were shipped to Bonner Analytical on 9/11/2008 at 1730 hours via Federal Express Airbill No. 8541 0029 6912. Twelve sediment samples for grain-size

distribution analysis were shipped to Test America on 9/11/2008 at 1730 hours via Federal Express Airbill No. 8541 0029 6923.

Sixty-five soil/sediment samples for low concentration TAL metals analysis were shipped to Bonner Analytical on 9/12/2008 at 1630 hours via Federal Express Airbill No. 8541 0029 6901. Thirty-four sediment samples for grain-size distribution analysis were shipped to Test America on 9/12/2008 at 1630 hours via Federal Express Airbill No. 8541 0029 6897.

Ten aqueous samples for low concentration TAL metals analysis, nine aqueous samples for low concentration dissolved TAL metals analysis, and 13 soil/sediment samples for low concentration TAL metals analysis, and seven soil samples for medium concentration TAL metals analysis (five of which also included TCLP metals analysis) were shipped to Bonner Analytical on 9/15/2008 at 1730 hours via Federal Express Airbill No. 8541 0029 6522. Nine sediment samples for grain-size distribution analysis were shipped to Test America on 9/15/2008 at 1730 hours via Federal Express Airbill No. 8541 0029 6533.

One aqueous sample for low concentration TAL metals analysis and 11 soil/sediment samples for low concentration TAL metals analysis were shipped to Bonner Analytical on 9/16/2008 at 1645 hours via Federal Express Airbill No. 8541 0029 6496. Eleven sediment samples for grain-size distribution analysis were shipped to Test America on 9/16/2008 at 1645 hours via Federal Express Airbill No. 8541 0029 6441.

6. On-Site Personnel:

Name	Company	Duties on Site
Dan Gaughan	WESTON	Project Manager, Site Health and Safety Officer, Sampler
Scott Snyder	WESTON	Sample Management Officer (SMO)
Kelli Lucarino	WESTON	Sampler, Global Positioning System (GPS) Data Collection
Julissa Morales	WESTON	Sampler, GPS Data Collection
Matt Foster	WESTON	Sampler
Kristen Sharp	WESTON	Sampler
Nick Magriples	EPA	EPA Oversight

7. Additional Comments:

From September 10 through September 16, 2008, Weston Solutions, Inc. (WESTON®) personnel collected surface soil, sediment, and surface water samples from the Raritan Bay Slag Site to determine the priority for further action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A total of 105 surface soil samples (including six environmental duplicate samples), 84 sediment samples (including four environmental duplicate samples), and 48 surface water samples (including four environmental duplicate samples) were collected from the site and a nearby background location.

All surface soil samples were collected at depth of 0 to 2 inches. Soil samples collected in areas adjacent to the slag were proposed to be collected at additional depth intervals of 6 to 12 inches and

12 to 18 inches. However, obstructions such as slag and rock were encountered during collection of the samples at depth. Therefore, of the 11 proposed samples at each depth, only six samples were collected from the 6 to 12 inch interval and only three samples were collected at the 12 to 18 inch interval. Surface soil samples were collected using a dedicated plastic scoop to scrape away surficial organic material (grass, leaves, etc.) and to remove the top layer of vegetation/soil/fill material. Soil samples collected at a depth of 6 to 18 inches were obtained using decontaminated, stainless-steel augers and dedicated, disposable plastic scoops: The soil sample was obtained by augering soil from the location of the previously collected 0 to 2 inch sample to the required depth below the surface. Once the soil from the appropriate depth was obtained, it was transferred into a dedicated plastic container using the dedicated plastic scoop and homogenized. The homogenized soil was then transferred into the required sample containers using the dedicated plastic scoop. All remaining soil, not used for laboratory analysis, was discarded at the sampling location.

Sediment samples were collected at a depth of 0 to 3 inches. Sediment samples were collected using a dedicated, disposable plastic scoop, allowing any excess surface water to drain from the sampling device. A petite ponar dredge was used to collect sediment samples from locations under several feet of water adjacent to the Cheesequake Creek inlet western jetty. The petite ponar dredge was decontaminated prior to each sample location. After collection, the sediment was transferred into a dedicated plastic container using the dedicated plastic scoop and homogenized. The homogenized sediment was then transferred into the required sample containers using the dedicated plastic scoop. All remaining sediment, not used for laboratory analysis, was discarded at the sampling location.

Surface water samples were collected moving in an upstream direction when appropriate, and collected prior to sediment samples if co-located. In a deviation from the Sampling and Quality Assurance Project Plan (SAQAPP), surface water sample RBS-SW17 was collected prior to and upstream of sample RBS-SW18. WESTON began collection of the samples at a location midway between the footbridge over Margaret's Creek and Raritan Bay and planned to collect an upgradient sample near the footbridge. The EPA On-Scene Coordinator directed WESTON to collect the second sample at the intersection of Margaret's Creek and Raritan Bay. Surface water samples were collected directly into the sample container by partially submerging the sample bottle and collecting the sample. Three rinsate blanks (two for plastic scoop, plastic container, and decontaminated stainless-steel augers and one for the petite ponar dredge) were collected for quality assurance/quality control (QA/QC) purposes. Surface water sample numbers containing a 'D' indicates that the samples were analyzed for Dissolved Metals.

All sample locations were recorded electronically using GPS technology. Post-processing differential correction of the GPS data was conducted in accordance with the EPA Region 2 GPS Standard Operating Procedures (SOP). The processed GPS data were then transferred to the Sample Location Map (Figure 2) using Geographic Information Systems (GIS).

All samples were collected as part of the Integrated Assessment (IA) evaluation conducted on site. Samples collected by WESTON were designated for analysis of TAL metals (including tin) (soil, sediment, and surface water), dissolved metals (surface water), and TCLP metals (select surface soil samples) through the EPA Contract Laboratory Program (CLP). Sediment samples were sent for grain size distribution analysis through a non-CLP laboratory. Inorganic Traffic Reports and non-CLP chains of custody are presented in Attachment 1.

8. Report Prepared by: Julissa Morales Date: 10/15/08
Julissa Morales

9. Report Approved by: W. S. Butterfield Date: 10/15/08
W. S. Butterfield, CHMM

TABLE 1
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVILLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-S01A	MB52W5	9/11/08	1404	Soil sample from the seawall; depth: 0-2 inches (in). Matrix spike/matrix spike duplicate (MS/MSD) for quality assurance/quality control (QA/QC) purposes.
RBS-S01B	MB52W6	9/11/08	1410	Soil sample from the seawall; depth: 6-12 in.
RBS-S02A	MB52W8	9/11/08	1421	Soil sample from the seawall; depth: 0-2 in.
RBS-S02B	MB52W9	9/11/08	1431	Soil sample from the seawall; depth: 6-12 in.
RBS-S03A	MB52X1	9/11/08	1437	Soil sample from the seawall; depth: 0-2 in.
RBS-S04A	MB52X4	9/11/08	1456	Soil sample from the seawall; depth: 0-2 in.
RBS-S04B	MB52X5	9/11/08	1502	Soil sample from the seawall; depth: 6-12 in.
RBS-S05A	MB52X7	9/11/08	1510	Soil sample from the seawall; depth: 0-2 in.
RBS-S06A	MB52Y0	9/11/08	1515	Duplicate of sample RBS-S05A for QA/QC purposes.
RBS-S07A	MB52Y1	9/15/08	1003	Soil sample from the jetty; depth: 0-2 in.
RBS-S07B	MB52Y2	9/15/08	1006	Soil sample from the jetty; depth: 6-12 in.
RBS-S07C	MB52Y3	9/15/08	1011	Soil sample from the jetty; depth: 12-18 in.
RBS-S09A	MB52Y7	9/11/08	0855	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S09B	MB52Y8	9/11/08	0905	Soil sample from the area between the seawall and the first jetty; depth: 6-12 in.
RBS-S09C	MB52Y9	9/11/08	0915	Soil sample from the area between the seawall and the first jetty; depth: 12-18 in.
RBS-S10A	MB52Z0	9/11/08	0856	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S10B	MB52Z1	9/11/08	0911	Soil sample from the area between the seawall and the first jetty; depth: 6-12 in.
RBS-S10C	MB52Z2	9/11/08	0923	Soil sample from the area between the seawall and the first jetty; depth: 12-18 in.
RBS-S11	MB52Z3	9/11/08	0958	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S12	MB52Z4	9/11/08	1000	Duplicate of sample RBS-S11 for QA/QC purposes.
RBS-S13	MB52Z5	9/11/08	0959	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S14	MB52Z6	9/11/08	1008	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S15	MB52Z7	9/11/08	1009	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S16	MB52Z8	9/11/08	1004	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S17	MB52Z9	9/11/08	1025	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S18	MB5300	9/11/08	1020	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S19	MB5301	9/11/08	1015	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S20	MB5302	9/11/08	1010	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S21	MB5303	9/11/08	1008	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-S22	MB5304	9/11/08	1000	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S23	MB5305	9/11/08	0955	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S24	MB5306	9/11/08	0945	Soil sample from the area between the seawall and the first jetty; depth: 0-2 in.
RBS-S25	MB5307	9/11/08	0950	Duplicate of sample RBS-S24 for QA/QC purposes.
RBS-S27	MB5309	9/11/08	1029	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S28	MB5310	9/11/08	1031	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S29	MB5311	9/11/08	1035	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S30	MB5312	9/11/08	1039	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S31	MB5313	9/11/08	1041	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S32	MB5314	9/11/08	1045	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S33	MB5315	9/11/08	1049	Soil sample from the area between the first jetty and the second jetty; dep 0-2 in.
RBS-S34	MB5316	9/11/08	1054	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S35	MB5317	9/11/08	1056	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S36	MB5318	9/11/08	1059	Soil sample from the area between the first jetty and the second jetty; depth: 0-2 in.
RBS-S37	MB5319	9/12/08	0833	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S38	MB5320	9/12/08	0836	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty ; depth: 0-2 in.
RBS-S39	MB5321	9/12/08	0837	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty ; depth: 0-2 in.
RBS-S40	MB5322	9/12/08	0841	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S41	MB5323	9/12/08	0841	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S42	MB5324	9/12/08	0850	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S43	MB5325	9/12/08	0847	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in. MS/MSD for QA/QC purposes.
RBS-S44	MB5326	9/12/08	0844	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S45	MB5327	9/12/08	0852	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S46	MB5328	9/12/08	0852	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-S47	MB5329	9/12/08	0856	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in
RBS-S48	MB5330	9/12/08	0857	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S49	MB5331	9/12/08	0857	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S50	MB5332	9/12/08	0902	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S51	MB5333	9/12/08	0901	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S52	MB5334	9/12/08	0908	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in. MS/MSD for QA/QC purposes.
RBS-S53	MB5335	9/12/08	0906	Duplicate of sample RBS-52 for QA/QC purposes.
RBS-S54	MB5336	9/12/08	1045	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S55	MB5337	9/12/08	1040	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S56	MB5338	9/12/08	1049	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S57	MB5339	9/12/08	1045	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S58	MB5340	9/12/08	1054	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S59A	MB5341	9/15/08	1057	Soil sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-2 in.
RBS-S59B	MB5342	9/15/08	1111	Soil sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 6-12 in.
RBS-S60A	MB5344	9/15/08	1130	Soil sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-2 in.
RBS-S61	MB5347	9/10/08	1233	Soil sample from the park area; depth: 0-2 in.
RBS-S62	MB5348	9/10/08	1240	Soil sample from the park area; depth: 0-2 in.
RBS-S63	MB5349	9/10/08	1228	Soil sample from the park area; depth: 0-2 in.
RBS-S64	MB5350	9/10/08	1233	Soil sample from the park area; depth: 0-2 in.
RBS-S65	MB5351	9/10/08	1255	Soil sample from the park area; depth: 0-2 in.
RBS-S66	MB5352	9/10/08	1303	Soil sample from the park area; depth: 0-2 in.
RBS-S67	MB5353	9/10/08	1304	Soil sample from the park area; depth: 0-2 in.
RBS-S68	MB5354	9/10/08	1317	Soil sample from the park area; depth: 0-2 in.
RBS-S69	MB5355	9/10/08	1313	Soil sample from the park area; depth: 0-2 in.
RBS-S70	MB5356	9/11/08	0750	Soil sample from the park area; depth: 0-2 in.
RBS-S71	MB5357	9/11/08	0800	Mulch/woodchip sample from the playground; depth: 0-2 in.
RBS-S72	MB5358	9/11/08	0805	Duplicate of sample RBS-71 for QA/QC purposes.
RBS-S73	MB5359	9/11/08	0905	Mulch/woodchip sample from the playground; depth: 0-2 in.
RBS-S74	MB5360	9/11/08	0910	Mulch/woodchip sample from the playground; depth: 0-2 in.
RBS-S75	MB5361	9/11/08	0915	Mulch/woodchip sample from the playground; depth: 0-2 in.
RBS-S76	MB5362	9/11/08	0920	Mulch/woodchip sample from the playground; depth: 0-2 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-S77	MB5363	9/11/08	0810	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S78	MB5364	9/11/08	0815	Duplicate of sample RBS-77 for QA/QC purposes.
RBS-S79	MB5365	9/11/08	0855	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S80	MB5366	9/11/08	0820	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S81	MB5367	9/11/08	0835	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S82	MB5368	9/11/08	0830	Soil sample from the playground; depth: 0-2 in.
RBS-S83	MB5369	9/11/08	0900	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S84	MB5370	9/11/08	0850	Soil sample from the playground; depth: 0-2 in.
RBS-S85	MB5371	9/11/08	0845	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S86	MB5372	9/11/08	0825	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S87	MB5373	9/11/08	0840	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S88	MB53M1	9/12/08	0911	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S89	MB53M2	9/12/08	0913	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S90	MB53M6	9/12/08	1051	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S92	MB53M7	9/12/08	1420	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S93	MB53M8	9/12/08	1430	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S94	MB53N2	9/15/08	0935	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S95	MB53N3	9/15/08	0942	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S96	MB53N1	9/15/08	0936	Composite soil sample from the southern portion of the western jetty of Cheesequake inlet; depth: 0-2 in.
RBS-S97	MB53N4	9/15/08	1335	Soil sample from the Cheesequake Creek inlet western jetty; depth: 0-2 in
RBS-S98	MB53N5	9/15/08	1327	Soil sample from the Cheesequake Creek inlet western jetty; depth: 0-2 in
RBS-SED01	MB5374	9/10/08	0921	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED02	MB5375	9/10/08	0934	Duplicate of sample RBS-SED01 for QA/QC purposes.
RBS-SED03	MB5376	9/10/08	0945	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED04	MB5377	9/10/08	1002	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED05	MB5378	9/10/08	1030	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED06	MB5379	9/10/08	1048	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED07	MB5380	9/12/08	1222	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED08	MB5381	9/12/08	1229	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED09	MB5382	9/12/08	1250	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED10	MB5383	9/12/08	1310	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED11	MB5384	9/12/08	1305	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED12	MB5385	9/12/08	1330	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in. MS/MSD for QA/QC purposes.
RBS-SED13	MB5386	9/10/08	0930	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED14	MB5387	9/10/08	1000	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED15	MB5388	9/10/08	1015	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED16	MB5389	9/10/08	1040	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED17	MB5390	9/12/08	1215	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED18	MB5391	9/12/08	1220	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED19	MB5392	9/12/08	1235	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED20	MB5393	9/12/08	1250	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED21	MB5394	9/12/08	1310	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED22	MB5395	9/12/08	1325	Duplicate of sample RBS-SED21 for QA/QC purposes.
RBS-SED23	MB5396	9/12/08	1225	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED24	MB5397	9/12/08	1332	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED25	MB5398	9/12/08	1341	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED26	MB5399	9/12/08	1345	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED27	MB53A0	9/11/08	1132	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED28	MB53A1	9/11/08	1131	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED29	MB53A2	9/11/08	1136	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED30	MB53A3	9/11/08	1141	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED31	MB53A4	9/11/08	1140	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED32	MB53A5	9/11/08	1145	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in. MS/MSD for QA/QC purposes.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED33	MB53A6	9/11/08	1149	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED34	MB53A7	9/11/08	1146	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED35	MB53A8	9/11/08	1153	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED36	MB53A9	9/12/08	0927	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED37	MB53B0	9/12/08	0935	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED38	MB53B1	9/12/08	0936	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED39	MB53B2	9/12/08	0942	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED40	MB53B3	9/12/08	0942	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED41	MB53B4	9/12/08	0948	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED42	MB53B5	9/12/08	0953	Duplicate of sample RBS-SED41 for QA/QC purposes.
RBS-SED43	MB53B6	9/12/08	0948	Sediment sample from the area between the third jetty and the Cheesequ[redacted] Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED44	MB53B7	9/12/08	0951	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED45	MB53B8	9/12/08	0956	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED46	MB53B9	9/12/08	0957	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED47	MB53C0	9/12/08	1004	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED48	MB53C1	9/12/08	1002	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED49	MB53C2	9/12/08	1004	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED50	MB53C3	9/12/08	1008	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED51	MB53C4	9/12/08	1012	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED52	MB53C5	9/12/08	1015	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in. MS/MSD for QA/QC purposes.
RBS-SED53	MB53C6	9/16/08	0915	Sediment sample from Cheesequake Creek inlet area on the western side of western jetty; depth: 0-3 in.
RBS-SED54	MB53C7	9/16/08	0945	Sediment sample from Cheesequake Creek inlet area on the western side of western jetty; depth: 0-3 in.
RBS-SED55	MB53C8	9/16/08	1058	Sediment sample from Cheesequake Creek inlet area on the western side of western jetty; depth: 0-3 in.
RBS-SED56	MB53C9	9/15/08	1417	Sediment sample from the area west of the Cheesequake Creek inlet, wes[redacted] of the western jetty; depth: 0-3 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED57	MB53D0	9/15/08	1420	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED58	MB53D1	9/15/08	1432	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED59	MB53D2	9/15/08	1435	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED60	MB53D3	9/15/08	1450	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED61	MB53D4	9/15/08	1455	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED62	MB53D5	9/15/08	1457	Duplicate of sample RBS-SED61 for QA/QC purposes.
RBS-SED63	MB53D6	9/15/08	1506	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED64	MB53D7	9/15/08	1509	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED65	MB53D8	9/10/08	1359	Sediment sample from Margaret's Creek north of the footbridge; depth: 0-3 in.
RBS-SED66	MB53D9	9/10/08	1417	Sediment sample from Margaret's Creek north of the footbridge; depth: 0-3 in.
RBS-SED67	MB53E0	9/10/08	1500	Sediment sample from Margaret's Creek south of the footbridge; depth: 0-3 in.
RBS-SED68	MB53E1	9/10/08	1439	Sediment sample from Margaret's Creek south of the footbridge; depth: 0-3 in.
RBS-SED69	MB53E2	9/16/08	1445	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED70	MB53E3	9/16/08	1450	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED71	MB53E4	9/16/08	1452	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED72	MB53E5	9/16/08	1457	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in. MS/MSD for QA/QC purposes.
RBS-SED73	MB53E6	9/16/08	1458	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED74	MB53E7	9/16/08	1500	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED81	MB53L8	9/11/08	1201	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED82	MB53L9	9/11/08	1200	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED83	MB53M0	9/11/08	1208	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED84	MB53M3	9/12/08	1021	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED85	MB53M4	9/12/08	1021	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED86	MB53M5	9/12/08	1030	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

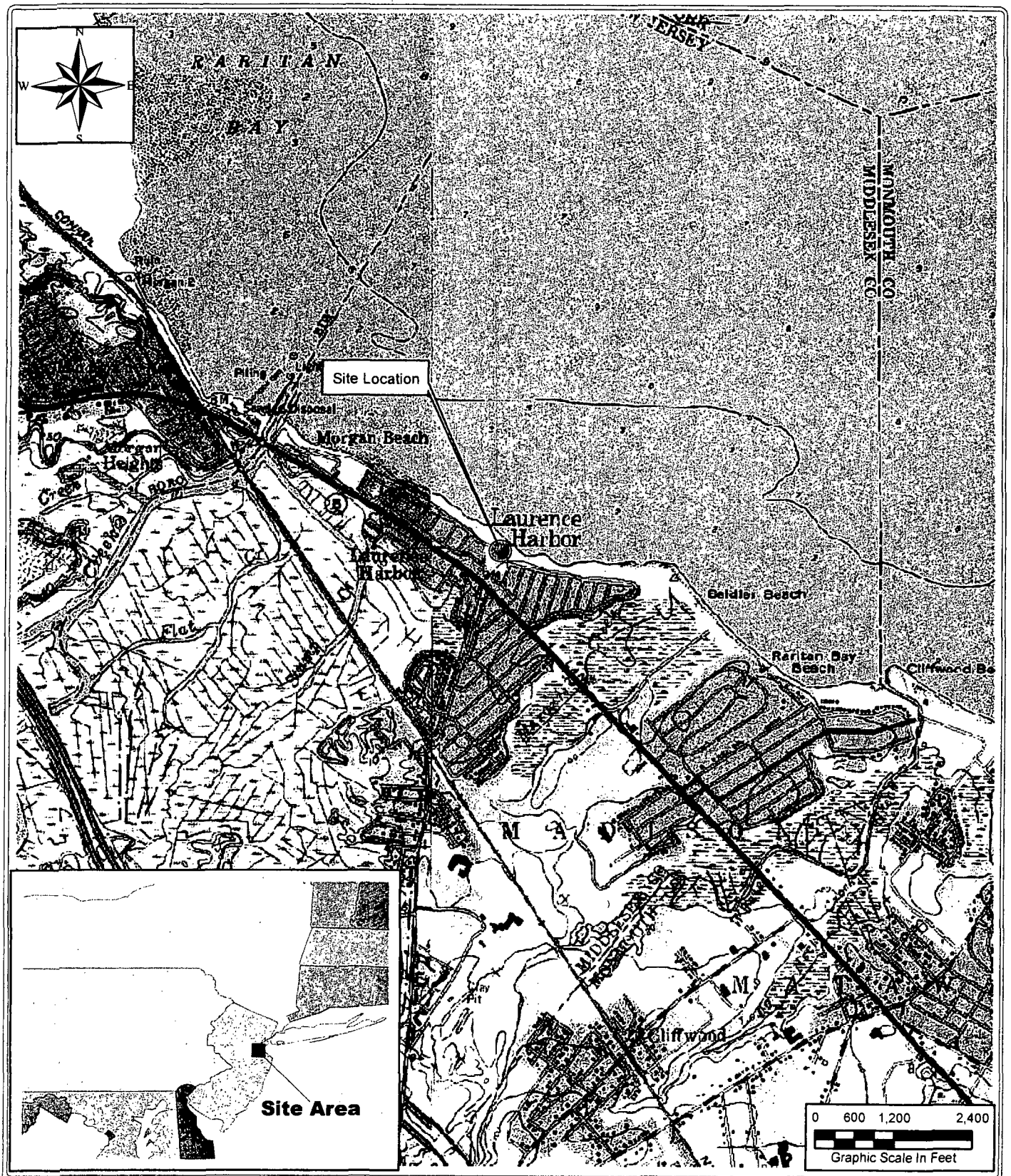
SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED87	MB53M9	9/12/08	1350	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED88	MB53N0	9/12/08	1354	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED89	MB53N7	9/16/08	1140	Sediment sample from Cheesequake Creek inlet area on the eastern side of western jetty; depth: 0-3 in.
RBS-SED90	MB53N8	9/16/08	1240	Sediment sample from Cheesequake Creek inlet area on the eastern side of western jetty; depth: 0-3 in.
RBS-SW01	MB53F4	9/10/08	1425	Surface water sample from the seawall at low tide.
RBS-SW01D	MB53F5	9/10/08	1430	Surface water sample from the seawall at low tide.
RBS-SW02	MB53F6	9/10/08	1432	Duplicate of sample RBS-SW01 for QA/QC purposes.
RBS-SW02D	MB53F7	9/10/08	1437	Duplicate of sample RBS-SW01D for QA/QC purposes.
RBS-SW03	MB53F8	9/10/08	1440	Surface water sample from the seawall at low tide.
RBS-SW03D	MB53F9	9/10/08	1445	Surface water sample from the seawall at low tide.
RBS-SW04	MB53G0	9/10/08	1457	Surface water sample from the seawall at low tide.
RBS-SW04D	MB53G1	9/10/08	1502	Surface water sample from the seawall at low tide.
RBS-SW05	MB53G2	9/10/08	1508	Surface water sample from the seawall at low tide.
RBS-SW05D	MB53G3	9/10/08	1513	Surface water sample from the seawall at low tide.
RBS-SW06	MB53G4	9/10/08	1517	Surface water sample from the seawall at low tide.
RBS-SW06D	MB53G5	9/10/08	1522	Surface water sample from the seawall at low tide. MS/MSD for QA/QC purposes.
RBS-SW07	MB53G6	9/10/08	1407	Surface water sample from the seawall at high tide.
RBS-SW07D	MB53G7	9/10/08	1412	Surface water sample from the seawall at high tide.
RBS-SW08	MB53G8	9/10/08	1418	Surface water sample from the seawall at high tide.
RBS-SW08D	MB53G9	9/10/08	1423	Surface water sample from the seawall at high tide.
RBS-SW09	MB53H0	9/11/08	1047	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW09D	MB53H1	9/11/08	1047	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW10	MB53H2	9/11/08	1052	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW10D	MB53H3	9/11/08	1052	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW11	MB53H4	9/11/08	1056	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW11D	MB53H5	9/11/08	1056	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW12	MB53H6	9/15/08	0849	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW12D	MB53H7	9/15/08	0849	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW13	MB53H8	9/15/08	0853	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW13D	MB53H9	9/15/08	0853	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SW14	MB53J0	9/15/08	0855	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW14D	MB53J1	9/15/08	0855	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW15	MB53J2	9/15/08	1135	Surface water sample from the area west of the Cheesequake Creek inlet, west of the western jetty.
RBS-SW15D	MB53J3	9/15/08	1135	Surface water sample from the area west of the Cheesequake Creek inlet, west of the western jetty.
RBS-SW16	MB53J4	9/15/08	1213	Surface water sample from the area west of the Cheesequake Creek inlet, west of the western jetty.
RBS-SW16D	MB53J5	9/15/08	1213	Surface water sample from the area west of the Cheesequake Creek inlet, west of the western jetty. MS/MSD for QA/QC purposes.
RBS-SW17	MB53J6	9/10/08	1355	Surface water sample from Margaret's Creek north of the footbridge.
RBS-SW17D	MB53J7	9/10/08	1355	Surface water sample from Margaret's Creek north of the footbridge.
RBS-SW18	MB53J8	9/10/08	1412	Surface water sample from Margaret's Creek north of the footbridge.
RBS-SW18D	MB53J9	9/10/08	1412	Surface water sample from Margaret's Creek north of the footbridge.
RBS-SW19	MB53K0	9/10/08	1450	Surface water sample from Margaret's Creek south of the footbridge.
RBS-SW19D	MB53K1	9/10/08	1450	Surface water sample from Margaret's Creek south of the footbridge.
RBS-SW20	MB53K2	9/10/08	1435	Surface water sample from Margaret's Creek south of the footbridge.
RBS-SW20D	MB53K3	9/10/08	1435	Surface water sample from Margaret's Creek south of the footbridge.
RBS-SW21	MB53K4	9/15/08	1350	Surface water sample from the Cheesequake Creek inlet area.
RBS-SW21D	MB53K5	9/15/08	1350	Surface water sample from the Cheesequake Creek inlet area.
RBS-SW22	MB53K6	9/15/08	1340	Surface water sample from the Cheesequake Creek inlet area.
RBS-SW22D	MB53K7	9/15/08	1340	Surface water sample from the Cheesequake Creek inlet area.
RBS-SW23	MB53K8	9/15/08	1300	Surface water sample from the Cheesequake Creek inlet area.
RBS-SW23D	MB53K9	9/15/08	1300	Surface water sample from the Cheesequake Creek inlet area.
RBS-SW24	MB53L0	9/15/08	1355	Duplicate of sample RBS-SW21 for QA/QC purposes.
RBS-SW24D	MB53N6	9/15/08	1355	Duplicate of sample RBS-SW21D for QA/QC purposes.
RBS-RIN01	MB53L4	9/11/08	0849	Rinsate blank (decontaminated stainless-steel auger and dedicated, disposable plastic scoop and tray) for QA/QC purposes.
RBS-RIN02	MB53L5	9/15/08	1045	Rinsate blank (decontaminated stainless-steel auger and dedicated, disposable plastic scoop and tray) for QA/QC purposes.
RBS-RIN03	MB53L6	9/16/08	0940	Rinsate blank (decontaminated stainless-steel petite ponar dredge and dedicated, disposable plastic scoop and tray) for QA/QC purposes.

Notes:
Surface water sample numbers containing a 'D' (RBS-SW01D) indicates that the samples were analyzed for Dissolved Metals.
Select soil samples were analyzed for TCLP Metals including: RBS-S01A, -S02A, -S03A, -S04A, -S05A, -S06A, -S07A, -S09A, -S10A, -S59A, -S60A, -S97, and –S98.

SITE LOCATION AND SAMPLE LOCATION MAPS



LEGEND:

Site Location

National Geographic TOPO! U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangles: Keyport, NJ, 1977 and South Amboy, NJ, 1995.

TITLE:

Site Location Map
Raritan Bay Slag
Laurence Harbor, NJ

PROJECT:

Raritan Bay Slag

CLIENT NAME:

EPA

WESTON SOLUTIONS

DATE:

August 2008

FIGURE #:

1

P:\SAT2\Raritan_Bay_Slag\MXD\105944_RBS_Site_Loc.mxd

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ATTACHMENT 1

**TRAFFIC REPORTS/CHAIN OF CUSTODY RECORDS/
FEDEX AIRBILLS**

EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 [signature] 9/10/08 1730	FedEx 9/10/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB53G2	Surface Water	L M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW05	S: 08-09-10	15:08		--
MB53G3	Surface Water/ Scott Snyder	L M/G	DTAL (14)	(HNO3) (1)	RBS-SW05D	S: 08-09-10	15:13		--
MB53G4	Surface Water	L M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW06	S: 08-09-10	15:17		--
MB53G5	Surface Water/ Scott Snyder	L M/G	DTAL (14)	(HNO3) (1)	RBS-SW06D	S: 08-09-10	15:22		--
MB53G8	Surface Water	L M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW08	S: 08-09-10	14:18		--
MB53G9	Surface Water/ Scott Snyder	L M/G	DTAL (14)	(HNO3) (1)	RBS-SW08D	S: 08-09-10	14:23		--
MB53J8	Surface Water/ Scott Snyder	L M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW18	S: 08-09-10	14:12		--
MB53J9	Surface Water/ Scott Snyder	L M/G	DTAL (14)	(HNO3) (1)	RBS-SW18D	S: 08-09-10	14:12		--
MB53K0	Surface Water/ Scott Snyder	L M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW19	S: 08-09-10	14:50		--
MB53K1	Surface Water/ Scott Snyder	L M/G	DTAL (14)	(HNO3) (1)	RBS-SW19D	S: 08-09-10	14:50		--
MB53K2	Surface Water/ Scott Snyder	L M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW20	S: 08-09-10	14:35		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB53G5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091008-0004

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 9/10/08 1730	FedEx 9/10/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53K3	Surface Water/ Scott Snyder	~~M~~/G L DBT	DTAL (14)	(HNO3) (1)	RBS-SW20D	S: 08-09-10 14:35		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB53G5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
DTAL = Dissolved Metals (aqueous), In/Sn(aq) = TAL Inorganics + Sn (aqueous)			

TR Number: 2-344931618-091008-0004

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
Weston	Dan Gaughan	9/10/08	064635
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 2**
205 Campus Dr.	732-417-5869 732-417-5801		
City Edison	**State** NJ	**Zip Code** 08837	
Site Contact Dan Gaughan	**Lab Contact** Kate Young		
Project Name and Location (State) Raritan Bay Slag	**Carrier/Waybill Number** 8541 6029 6577		
Contract/Purchase Order/Quote No. 80641364			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Ice	Grain Size w/ Hydrometer	Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt
RBS-SED01	9/10/08	0921			X								X	X		
RBS-SED03	9/10/08	0945			X								X	X		
(20) RBS-SED04	9/10/08	1002			X								X	X		
RBS-SED05	9/10/08	1030			X								X	X		
RBS-SED13	9/10/08	0930			X								X	X		
RBS-SED14	9/10/08	1000			X								X	X		
RBS-SED15	9/10/08	1015			X								X	X		
RBS-SED06	9/10/08	1048			X								X	X		
RBS-SED16	9/10/08	1040			X								X	X		
RBS-SED65	9/10/08	1359			X								X	X		
RBS-SED66	9/10/08	1417			X								X	X		
RBS-SED67	9/10/08	1500			X								X	X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	9/10/08	1730	1. Received By FedEx	9/10/08	1730
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

[redacted]

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: Weston	Project Manager: Dan Gaughan	Date: 9/10/08	Chain of Custody Number: 061636
Address: 205 Campus Dr.	Telephone Number (Area Code)/Fax Number: 732-417-5869 732-417-5861	Lab Number:	Page 2 of 2
City: Edison; State: NJ; Zip Code: 08837	Site Contact: Dan Gaughan; Lab Contact: Kirk Young		
Project Name and Location (State): Raritan Bay Slag	Carrier/Waybill Number: 8541 0029 6577		
Contract/Purchase Order/Quote No.: C0643664			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	ICE	Analysis (Attach list if more space is needed): Grain Size w/Hydrometry											Special Instructions/ Conditions of Receipt
RBS-SED68	9/10/08	1439			X									X	X											

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: [signature]	9/10/08	1730	1. Received By: Fed Ex	9/10/08	1730
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

FedEx. US Airbill
Express

FedEx Tracking Number 8541 0029 6577

1 From *Please print and press hard.*

Date 9/10/08 Sender's FedEx Account Number 396 776 623

Sender's Name Scott Snyder Phone (732) 417-5800

Company Weston Solutions, Inc.

Address 205 Campus Dr. Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

(22)

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010 2064

3 To

Recipient's Name Kirk Young Phone (302) 660-1990

Company Test America Laboratories

Recipient's Address 30 Community Drive, Ste 11 Dept./Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

Try online shipping at fedex.com

By using this Airbill you agree to the service conditions on the back of this Airbill and in the current FedEx Service Guide, including terms that limit our liability.

Questions? Go to our Web site at fedex.com
or call 1.800.GoFedEx 1.800.463.3339.

Sender's Copy

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for — FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for — FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for — FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
1	48	$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

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RETAIN THIS COPY FOR YOUR RECORDS.

FedEx® US Airbill
Express

FedEx Tracking Number 8541 0029 6945

Sender's Copy

1 From *Please print and press hard.*

Date 9/10/08 Sender's FedEx Account Number 396778 823

Sender's Name Scott Snyder Phone (732)417-5800

Company Weston Solutions, Inc.

Address 205 Campus Dr. Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010.2064

3 To

Recipient's Name Beth Whitehead Phone (601) 264-2854

(23)

Company Bonner Analytical

Recipient's Address 2703 Oak Grove Rd. Dept./Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Hattiesburg State MS ZIP 39402

Try online shipping at fedex.com

By using this Airbill you agree to the service conditions on the back of this Airbill and in the current FedEx Service Guide, including terms that limit our liability.

Questions? Go to our Web site at fedex.com
or call 1.800.GoFedEx 1.800.463.3339.

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
		$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details.

FedEx Use Only

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. *Fee applies.*
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. *Fee applies.*

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EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 [signature] 9/11/08 1730	FedEx 9/11/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB5356	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S70	S: 08-09-11 7:50		--
MB5357	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S71	S: 08-09-11 8:00		--
MB5358	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S72	S: 08-09-11 8:05		Field Duplicate
MB5359	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S73	S: 08-09-11 9:05		--
MB5360	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S74	S: 08-09-11 9:10		--
MB5361	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S75	S: 08-09-11 9:15		--
MB5362	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S76	S: 08-09-11 9:20		--
MB5363	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S77	S: 08-09-11 8:10		--
MB5364	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S78	S: 08-09-11 8:15		Field Duplicate
MB5365	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S79	S: 08-09-11 8:55		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB5365	**Additional Sampler Signature(s):** [signature]	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: **2-344931618-091108-0005**

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Send Copy to: S[illegible] Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., [illegible]ntilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1	FedEx 9/11/04 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5366	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S80	S: 08-09-11	8:20		--
MB5367	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S81	S: 08-09-11	8:35		--
MB5368	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S82	S: 08-09-11	8:30		--
MB5369	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S83	S: 08-09-11	9:00		--
MB5370	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S84	S: 08-09-11	8:50		--
MB5371	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S85	S: 08-09-11	8:45		--
MB5372	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S86	S: 08-09-11	8:25		--
MB5373	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S87	S: 08-09-11	8:40		--
MB53L4	Field QC/ Scott Snyder	M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-RIN01	S: 08-09-11	8:49		Rinsate

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB5365		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091108-0005

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EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 [signature] 9/11/08 1730	FedEx 9/11/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB52Y7	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S09A	S: 08-09-11	8:55		--
MB52Y8	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S09B	S: 08-09-11	9:05		--
MB52Y9	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S09C	S: 08-09-11	9:15		--
MB52Z0	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S10A	S: 08-09-11	8:56		--
MB52Z1	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S10B	S: 08-09-11	9:11		--
MB52Z2	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S10C	S: 08-09-11	9:23		--
MB52Z3	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S11	S: 08-09-11	9:58		--
MB52Z4	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S12	S: 08-09-11	10:00		Field Duplicate
MB52Z5	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S13	S: 08-09-11	9:59		--
MB52Z6	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S14	S: 08-09-11	10:08		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB5305	**Additional Sampler Signature(s):** [signature]	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091108-0006

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region: 2	**Date Shipped:** 08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:	**Carrier Name:** FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:	**Airbill:** 8541 0029 6912	1 9/11/08 1730	FedEx 9/11/08 1730
CERCLIS ID: NJN000206276	**Shipped to:** Bonner Analytical Testing Company, 2703 Oak Grove Rd, Hattiesburg MS 39402, (601) 264-2854	2	
Spill ID: A205		3	
Site Name/State: Raritan Bay Slag Removal/NJ		4	
Project Leader: Dan Gaughan			
Action: Integrated Assessment (IA)			
Sampling Co: WESTON - RST 2			

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB52Z7	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S15	S: 08-09-11 10:09		--
MB52Z8	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S16	S: 08-09-11 10:04		--
MB52Z9	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S17	S: 08-09-11 10:25		--
MB5300	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S18	S: 08-09-11 10:20		--
MB5301	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S19	S: 08-09-11 10:15		--
MB5302	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S20	S: 08-09-11 10:10		--
MB5303	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S21	S: 08-09-11 10:08		--
MB5304	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S22	S: 08-09-11 10:00		--
MB5305	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S23	S: 08-09-11 9:55		--
MB5306	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S24	S: 08-09-11 9:45		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB5305	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091108-0006

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EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-11
Project Code:		**Carrier Name:**	FedEx
Account Code:		**Airbill:**	8541 0029 6912
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854
Spill ID:	A205		
Site Name/State:	Raritan Bay Slag Removal/NJ		
Project Leader:	Dan Gaughan		
Action:	Integrated Assessment (IA)		
Sampling Co:	WESTON - RST 2		

Chain of Custody Record

Relinquished By	(Date / Time)	Received By	(Date / Time)
1	9/11/08 1730	FedEx	9/11/08 1730
2			
3			
4			

Sampler Signature:

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB5307	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S25	S: 08-09-11 9:50	--	(24) Field Duplicate 9/23/08

(24)

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB5305		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

In+Sn soil = TAL Inorganics + Sn (soil)

TR Number: 2-344931618-091108-0006

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 9/11/08 1730	FedEx 9/11/02 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB5309	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S27	S: 08-09-11 10:29		--
MB5310	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S28	S: 08-09-11 10:31		--
MB5311	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S29	S: 08-09-11 10:35		--
MB5312	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S30	S: 08-09-11 10:39		--
MB5313	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S31	S: 08-09-11 10:41		--
MB5314	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S32	S: 08-09-11 10:45		--
MB5315	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S33	S: 08-09-11 10:49		--
MB5316	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S34	S: 08-09-11 10:54		--
MB5317	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S35	S: 08-09-11 10:56		--
MB5318	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S36	S: 08-09-11 10:59		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091108-0007

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EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 [signature] 9/11/01 1730	FedEx 9/11/01 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53H0	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW09	S: 08-09-11 10:47		--
MB53H1	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW09D	S: 08-09-11 10:47		--
MB53H2	Surface Water	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW10	S: 08-09-11 10:52		--
MB53H3	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW10D	S: 08-09-11 10:52		--
MB53H4	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW11	S: 08-09-11 10:56		--
MB53H5	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW11D	S: 08-09-11 10:56		--

30

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091108-0007

REGION COPY

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Send Copy to: Sa[illegible]e Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 9/11/08 1730	FedEx 9/11/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB53A0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED27	S: 08-09-11	11:32		--
MB53A1	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED28	S: 08-09-11	11:31		--
MB53A2	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED29	S: 08-09-11	11:36		--
MB53A3	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED30	S: 08-09-11	11:41		--
MB53A4	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED31	S: 08-09-11	11:40		--
MB53A5	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED32	S: 08-09-11	11:45		--
MB53A6	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED33	S: 08-09-11	11:49		--
MB53A7	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED34	S: 08-09-11	11:46		--
MB53A8	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED35	S: 08-09-11	11:53		--
MB53L8	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED81	S: 08-09-11	12:01		--
MB53L9	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED82	S: 08-09-11	12:00		--

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB53A5		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

In+Sn soil = TAL Inorganics + Sn (soil)

TR Number: 2-344931618-091108-0008

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EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 9/11/08 1730	FedEx 9/11/08 1700
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53M0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED83	S: 08-09-11 12:08		–

(24)

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB53A5		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091108-0008

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-11	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6912	1 9/11/08 1730	FedEx 9/11/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB52W5	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S01A	S: 08-09-11 14:04		--
MB52W6	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S01B	S: 08-09-11 14:10		--
MB52W8	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S02A	S: 08-09-11 14:21		--
MB52W9	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S02B	S: 08-09-11 14:31		--
MB52X1	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S03A	S: 08-09-11 14:37		--
MB52X4	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S04A	S: 08-09-11 14:56		--
MB52X5	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S04B	S: 08-09-11 15:02		--
MB52X7	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (1)	RBS-S05A	S: 08-09-11 15:10		--
MB52Y0	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S06A	S: 08-09-11 15:15		Field Duplicate

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB52W5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

In+Sn soil = TAL Inorganics + Sn (soil), In/TCLP = TCLP Inorganic (soil)

TR Number: 2-344931618-091108-0009

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Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

4124 (0907)

Client	Project Manager	Date	Chain of Custody Number
Weston Solutions	Dan Gaughen	9/11/08	413283
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
205 Campus Dr.	(732) 417-5412		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
Edison / NJ / 08837	D. Gaughen		
Project Name and Location (State)	**Carrier/Waybill Number**		
Raritan Bay Slag NJ	FedEx / 8541 0029 6923		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Grain Size	Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt
RBS-SED27	9/11/08	1133			X		X						X		
RBS-SED28		1131			X		X						X		
RBS-SED29		1136			X		X						X		
RBS-SED30		1140			X		X						X		
RBS-SED31		1140			X		X						X		
RBS-SED32		1145			X		X						X		
RBS-SED33		1147			X		X						X		
RBS-SED34		1146			X		X						X		
RBS-SED35		1153			X		X						X		
RBS-SED81		1201			X		X						X		
RBS-SED82		1200			X		X						X		
RBS-SED83		1206			X		X						X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	(Scott Snyder)	9/11/08	1730	FedEx	9/11/08	1730
2.						
3.						

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

FedEx. US Airbill
Express

FedEx Tracking Number 8541 0029 6923

Sender's Copy

1 From *Please print and press hard.*

Date 9/11/06 Sender's FedEx Account Number 396774823

Sender's Name Scott Snyder Phone (732)417-5000

Company Weston Solutions, Inc.

Address 205 Campus Dr

Dept/Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference
First 24 characters will appear on invoice.

3 To

Recipient's Name Kirk Young Phone (802)660-1990

Company Test America Labs

Recipient's Address 30 Community Dr, Ste 11

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Dept/Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
		$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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or call 1.800.GoFedEx 1.800.463.3339.

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FedEx Express US Airbill

FedEx Tracking Number 8541 0029 6912

Sender's Copy

1 From *Please print and press hard.*

Date 9/11/06 Sender's FedEx Account Number 396 778 823

Sender's Name Scott Snyder Phone (732)417-5800

Company Weston Solutions Inc.

Address 205 Campus Dr.

Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

(36)

2 Your Internal Billing Reference
First 24 characters will appear on invoice.

TIL

3 To

Recipient's Name Beth Whitehead Phone (601) 264-2854

Company Bonner Analytical

Recipient's Address 2703 Oak Grove Rd.

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept./Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Hattiesburg State MS ZIP 39402

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] **SATURDAY Delivery Available ONLY for** FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] **HOLD Weekday at FedEx Location NOT Available for** FedEx First Overnight.
- [ ] **HOLD Saturday at FedEx Location Available ONLY for** FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
		$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 *NEW* Residential Delivery Signature Options *If you require a signature, check Direct or Indirect.*

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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or call 1.800.GoFedEx 1.800.463.3339.

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-12	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6901	1 9/12/08 1630	FedEx 9/12/08 1630
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5319	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S37	S: 08-09-12	8:33		--
MB5320	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S38	S: 08-09-12	8:36		--
MB5321	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S39	S: 08-09-12	8:37		--
MB5322	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S40	S: 08-09-12	8:41		--
MB5323	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S41	S: 08-09-12	8:41		--
MB5324	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S42	S: 08-09-12	8:50		--
MB5325	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S43	S: 08-09-12	8:47		--
MB5326	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S44	S: 08-09-12	8:44		--
MB5327	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S45	S: 08-09-12	8:52		--
MB5328	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S46	S: 08-09-12	8:52		--

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB5325		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

In+Sn soil = TAL Inorganics + Sn (soil)

TR Number: 2-344931618-091208-0010

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Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-12
Project Code:		**Carrier Name:**	FedEx
Account Code:		**Airbill:**	8541 0029 6901
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854
Spill ID:	A205		
Site Name/State:	Raritan Bay Slag Removal/NJ		
Project Leader:	Dan Gaughan		
Action:	Integrated Assessment (IA)		
Sampling Co:	WESTON - RST 2		

Chain of Custody Record

	Relinquished By (Date / Time)	Received By (Date / Time)
1	9/12/08 1630	FedEx 9/12/08 1630
2		
3		
4		

Sampler Signature:

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB5329	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S47	S: 08-09-12 8:56		--
MB5330	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S48	S: 08-09-12 8:57		--
MB5331	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S49	S: 08-09-12 8:57		--
MB5332	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S50	S: 08-09-12 9:02		--
MB5333	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S51	S: 08-09-12 9:01		--
MB5334	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S52	S: 08-09-12 9:08		--
MB5335	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S53	S: 08-09-12 9:06		Field Duplicate
MB53M1	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S88	S: 08-09-12 9:11		--
MB53M2	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S89	S: 08-09-12 9:13		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB5325	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

In+Sn soil = TAL Inorganics + Sn (soil)

TR Number: 2-344931618-091208-0010

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-12	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6901	1 9/12/08 1630	FedEx 9/13/08 1500
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB53A9	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED36	S: 08-09-12	9:27		--
MB53B0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED37	S: 08-09-12	9:35		--
MB53B1	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED39	S: 08-09-12	9:42		--
MB53B3	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED40	S: 08-09-12	9:42		--
MB53B4	Sediment	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED41	S: 08-09-12	9:48		--
MB53B5	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED42	S: 08-09-12	9:53		Field Duplicate
MB53B6	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED43	S: 08-09-12	9:48		--
MB53B7	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED44	S: 08-09-12	9:51		--
MB53B8	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED45	S: 08-09-12	9:56		--
MB53B9	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED46	S: 08-09-12	9:57		--
MB53C0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED47	S: 08-09-12	10:04		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB53C5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key: In+Sn soil = TAL Inorganics + Sn (soil)	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

TR Number: 2-344931618-091208-0011

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PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-12	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6901	1 9/12/08 1630	FedEx 9/12/08 1630
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company	2	
Spill ID:	A205		2703 Oak Grove Rd	3	
Site Name/State:	Raritan Bay Slag Removal/NJ		Hattiesburg MS 39402	4	
Project Leader:	Dan Gaughan		(601) 264-2854		
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53C1	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED48	S: 08-09-12 10:02		--
MB53C2	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED49	S: 08-09-12 10:04		--
MB53C3	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED50	S: 08-09-12 10:08		--
MB53C4	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED51	S: 08-09-12 10:12		--
MB53C5	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED52	S: 08-09-12 10:15		--
MB53L1	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED38	S: 08-09-12 9:36		--
MB53M3	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED84	S: 08-09-12 10:21		--
MB53M4	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED85	S: 08-09-12 10:21		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB53C5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key: In+Sn soil = TAL Inorganics + Sn (soil)	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

TR Number: 2-344931618-091208-0011

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Send Copy to: S[redacted]e Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-12	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6901	1 [signature] 9/12/08 1630	FedEx 9/12/08 1630
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5336	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S54	S: 08-09-12	10:45		--
MB5337	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S55	S: 08-09-12	10:40		--
MB5338	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S56	S: 08-09-12	10:49		--
MB5339	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S57	S: 08-09-12	10:45		--
MB5340	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S58	S: 08-09-12	10:54		--
MB5380	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED07	S: 08-09-12	12:22		--
MB5381	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED08	S: 08-09-12	12:29		--
MB5382	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED09	S: 08-09-12	12:50		--
MB5383	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED10	S: 08-09-12	13:10		--
MB5384	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED11	S: 08-09-12	13:05		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB5385	**Additional Sampler Signature(s):** [signature]	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

In+Sn soil = TAL Inorganics + Sn (soil)

TR Number: 2-344931618-091208-0012

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-12	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6901	1 9/12/08 1630	FedEx 9/12/08 1630
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company	2	
Spill ID:	A205		2703 Oak Grove Rd	3	
Site Name/State:	Raritan Bay Slag Removal/NJ		Hattiesburg MS 39402	4	
Project Leader:	Dan Gaughan		(601) 264-2854		
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB5385	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED12	S: 08-09-12 13:30		--
MB5390	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED17	S: 08-09-12 12:15		--
MB5391	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED18	S: 08-09-12 12:20		--
MB5392	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED19	S: 08-09-12 12:35		--
MB5393	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED20	S: 08-09-12 12:50		--
MB5394	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED21	S: 08-09-12 13:10		--
MB53M5	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED86	S: 08-09-12 10:30		--
MB53M6	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S90	S: 08-09-12 10:51		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB5385	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key: In+Sn soil = TAL Inorganics + Sn (soil)	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

TR Number: 2-344931618-091208-0012

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-12	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6901	1 9/12/08 1630	FedEx 9/12/08 1630
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5395	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED22	S: 08-09-12	13:25		Field Duplicate
MB5396	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED23	S: 08-09-12	12:25		--
MB5397	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED24	S: 08-09-12	13:32		--
MB5398	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED25	S: 08-09-12	13:41		--
MB5399	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED26	S: 08-09-12	13:45		--
MB53M7	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S92	S: 08-09-12	14:20		--
MB53M8	Surface Soil (0-24")	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S93	S: 08-09-12	14:30		--
MB53M9	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED87	S: 08-09-12	13:50		--
MB53N0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED88	S: 08-09-12	13:54		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091208-0013

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Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200: Fax 703/818-4602

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 .fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No 8541 0029 6597

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D Gaughen	Site Contact: D Gaughen	Date: 9/12/08	COC No:
Your Company Name here Weston Solutions	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: FedEx	1 of 3 COCs
Address 205 Campus Dr	Analysis Turnaround Time			Job No.
City/State/Zip Edison / NJ / 08837	Calendar (C) or Work Days (W) _____			
(xxx) xxx-xxxx Phone	TAT if different from Below _____			
(xxx) xxx-xxxx FAX	☐ 2 weeks			SDG No.
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS-SED36	9/12/08	0927	G	Sed	1		X	
RBS-SED37		0935					X	
RBS-SED38		0936					X	
RBS-SED39		0942					X	
(2) RBS-SED40		0942					X	
RBS-SED41		0946					X	
RBS-SED43		0945					X	
RBS-SED44		0951					X	
RBS-SED45		0956					X	
RBS-SED46		0957					X	
RBS-SED47		1004					X	
RBS-SED48		1002					X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☒

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
(Scott Snyder)	WESTON	9/12/08 1630	FedEx	—	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No 854100296597
TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughen	Site Contact: D Gaughen	Date: 9/12/08	COC No:
Your Company Name here: Weston Solutions	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: FedEx	2 of 3 COCs
Address: 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip: Edison, NJ / 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			SDG No.
(xxx) xxx-xxxx FAX	☐ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO#	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS-SED49	9/12/08	1004	G	Sed	1		X	
RBS-SED50		1004					X	
RBS-SED51		1012					X	
RBS-SED52		1015					X	
RBS-SED61		1021					X	
RBS-SED62		1021					X	
RBS-SED63		1030					X	
RBS SED 19		1235					X	
RBS SED 10		1310					X	
RBS SED 08		1229					X	
RBS SED 17		1215					X	
RBS SED 21		1310					X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

1630

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	WESTON	9/12/08	FedEx	—	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

Air bill No. 8541 0029 6897

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: D Gaughan	Date: 9/12/08	COC No:
Your Company Name here: Weston Solutions	Tel/Fax: 732 417 5800	Lab Contact:	Carrier: Fed Ex	3 of 3 COCs
Address: 205 Campus Dr	Analysis Turnaround Time			Job No.
City/State/Zip: Edison NJ 08837	Calendar (C) or Work Days (W) _____			
(xxx) xxx-xxxx Phone	TAT if different from Below _____			SDG No.
(xxx) xxx-xxxx FAX	☐ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample Grain Size	Sample Specific Notes:
RBS SED 26	9/12/08	1345	G	Sed	1	X	
RBS SED 20		1250				X	
RBS SED 23		1325				X	
RBS SED 09		1250				X	
RBSSED 12		1330				X	
RBSSED 18		1220				X	
RBSSED 24		1332				X	
RBSSED 25		1341				X	
RBSSED 11		1305				X	
RBSSED 07		1222				X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* *Poison B* ☐ *Unknown* ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:

1630

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	WESTON	9/12/08	Fed Ex	–	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

FedEx. US Airbill
Express

FedEx Tracking Number: 8541 0029 6901

Sender's Copy

1 From *Please print and press hard.*

Date 9/12/08 Sender's FedEx Account Number 396 774 823

Sender's Name Scott Snyder Phone (732) 417-5900

Company Weston Solutions, Inc.

Address 205 Campus Dr. Dept/Floor/Suite/Room

City Edison State NJ ZIP 08837

(47)

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010 2064

3 To

Recipient's Name Beth Whitehead Phone (601) 264-2454

Company Bonner Analytical

Recipient's Address 2703 Oak Grove Rd. Ste. Dept/Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Hattiesburg State MS ZIP 39402

4a Express Package Service To add SATURDAY Delivery, see Section 6. Packages up to 150 lbs. To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. Packages over 150 lbs. To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [X] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
4	236	$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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Questions? Go to our Web site at fedex.com or call 1.800.GoFedEx 1.800.463.3339.

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FedEx. US Airbill Express

FedEx Tracking Number: 8541 0029 6897

Sender's Copy

1 From *Please print and press hard.*

Date 9/12/06 Sender's FedEx Account Number: 396 778 823

Sender's Name Scott Snyder Phone (732) 417-5800

Company Weston Solutions, Inc.

Address 205 Campus Dr.

Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference
First 24 characters will appear on invoice.

8h

3 To

Recipient's Name Kirk Young Phone (802) 660-1990

Company Test America Labs

Recipient's Address 30 Community Dr. Suite

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept./Floor/Suite/Room

Address.

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. Packages up to 150 lbs. * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

*FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. Packages over 150 lbs. ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg
- [ ] Cargo Aircraft Only

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*
2	102	$ .00

*Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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or call 1.800.GoFedEx 1.800.463.3339.

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-15	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6522	1 [signature] 9/15/15 1730	FedEx 9/15/15 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB52Y1	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S07A	S: 08-09-15 10:03		--
MB52Y2	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S07B	S: 08-09-15 10:06		--
MB52Y3	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S07C	S: 08-09-15 10:11		--
MB53H6	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW12	S: 08-09-15 8:49		--
MB53H7	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW12D	S: 08-09-15 8:49		--
MB53H8	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW13	S: 08-09-15 8:53		--
MB53H9	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW13D	S: 08-09-15 8:53		--
MB53J0	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW14	S: 08-09-15 8:55		--
MB53J1	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW14D	S: 08-09-15 8:55		--
MB53L5	Field QC/ Scott Snyder	M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-RIN02	S: 08-09-15 10:45		Rinsate

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):** [signature]	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous), In/TCLP = TCLP Inorganic (soil)

TR Number: 2-344931618-091508-0014

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2
Project Code:	
Account Code:	
CERCLIS ID:	NJN000206276
Spill ID:	A205
Site Name/State:	Raritan Bay Slag Removal/NJ
Project Leader:	Dan Gaughan
Action:	Integrated Assessment (IA)
Sampling Co:	WESTON - RST 2

Date Shipped:	08-09-15
Carrier Name:	FedEx
Airbill:	8541 0029 6522
Shipped to:	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854

Chain of Custody Record

	Relinquished By (Date / Time)	Received By (Date / Time)
1	9/15/08 1730	FedEx 9/15/08 1730
2		
3		
4		

Sampler Signature:

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53N1	Surface Soil (0-24")/ Scott Snyder	L/C	In+Sn soil (14)	(Ice Only) (1)	RBS-S96	S: 08-09-15 9:36		--
MB53N2	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S94	S: 08-09-15 9:35		--
MB53N3	Surface Soil (0-24")/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S95	S: 08-09-15 9:42		--

(3)

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous), In/TCLP = TCLP Inorganic (soil)

TR Number: 2-344931618-091508-0014

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-15	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6522	1 9/15/08 1730	FedEx 9/16/08 1130
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5341	Surface Soil (0-24")/ Scott Snyder	M/G	In/TCLP (14) (3) In+Sn soil	(Ice Only) (1)	RBS-S59A	S: 08-09-15	10:57		--
MB5342	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14)	(Ice Only) (1)	RBS-S59B	S: 08-09-15	11:11		--
MB5344	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S60A	S: 08-09-15	11:30		--
MB53J2 (15)	Surface Water/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SW15	S: 08-09-15	11:35		--
MB53J3	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW15D	S: 08-09-15	11:35		--
MB53J4	Surface Water/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SW16	S: 08-09-15	12:13		--
MB53J5	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW16D	S: 08-09-15	12:13		Lab QC
MB53K8	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW23	S: 08-09-15	13:00		--
MB53K9	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW23D	S: 08-09-15	13:00		--
MB53N4	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S97	S: 08-09-15	13:35		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB53J5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous), In/TCLP = TCLP Inorganic (soil)

TR Number: 2-344931618-091508-0015

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-15
Project Code:		**Carrier Name:**	FedEx
Account Code:		**Airbill:**	8541 0029 6522
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854
Spill ID:	A205		
Site Name/State:	Raritan Bay Slag Removal/NJ		
Project Leader:	Dan Gaughan		
Action:	Integrated Assessment (IA)		
Sampling Co:	WESTON - RST 2		

Chain of Custody Record

Relinquished By	(Date / Time)	Received By	(Date / Time)
1	9/15/08 1730	FedEx	9/15/08 1730
2			
3			
4			

Sampler Signature:

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53N5	Surface Soil (0-24")/ Scott Snyder	M/G	In+Sn soil (14), In/TCLP (14)	(Ice Only) (2)	RBS-S98	S: 08-09-15 13:27		–

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:** MB53J5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous), In/TCLP = TCLP Inorganic (soil)

TR Number: 2-344931618-091508-0015

REGION COPY

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-15	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6522	1 9/15/08 1730	FedEx 9/15/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53C9	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED56	S: 08-09-15 14:17		--
MB53D0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED57	S: 08-09-15 14:20		--
MB53D1	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED58	S: 08-09-15 14:32		--
MB53D2	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED59	S: 08-09-15 14:35		--
MB53D3	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED60	S: 08-09-15 14:50		--
MB53D4	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED61	S: 08-09-15 14:55		--
MB53D5	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED62	S: 08-09-15 14:57		Field Duplicate
MB53D6	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED63	S: 08-09-15 15:06		--
MB53D7	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED64	S: 08-09-15 15:09		--
MB53K4	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW21	S: 08-09-15 13:50		--
MB53K5	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW21D	S: 08-09-15 13:50		--

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091508-0016

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Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-15	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6522	1 9/15/08 1730	FedEx 9/15/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53K6	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW22	S: 08-09-15 13:40		--
MB53K7	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW22D	S: 08-09-15 13:40		--
MB53L0	Surface Water/ Scott Snyder	L/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW24	S: 08-09-15 13:55		Field Duplicate
MB53N6	Surface Water/ Scott Snyder	L/G	DTAL (14)	(HNO3) (1)	RBS-SW24D	S: 08-09-15 13:55		Field Duplicate

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091508-0016

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Send Copy to: S[redacted]le Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No. 854100296533

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: D. Gaughan	Date: 9/15/08	COC No:
Your Company Name here WESTON	Tel/Fax:	Lab Contact:	Carrier: FedEx	1 of ____ COCs
Address 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip Edison NJ 08837	Calendar (C) or Work Days (W) ____			
(xxx) xxx-xxxx Phone 732-417-5800	TAT if different from Below ____			SDG No.
(xxx) xxx-xxxx FAX	☒ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO#	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Grain Size	Sample Specific Notes:
RBS-SED 56	9/15/08	1417	G	Sed	1	X	
RBS-SED 57		1420				X	
RBS-SED 58		1432				X	
RBS-SED 59		1435				X	
RBS-SED 60		1450				X	
RBS-SED 61		1455				X	
RBS-SED 62		1457				X	
RBS-SED 63		1506				X	
RBS-SED 64		1509				X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☒

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements & Comments:

1730

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
(Scott Snyder)	WESTON	9/15/08			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: N. Magrupelis	Site Contact:	Date: 9/15/08	COC No:
Your Company Name here: WESTON	Tel/Fax:	Lab Contact:	Carrier: Hand-Del.	____ of ____ COCs
Address	Analysis Turnaround Time			Job No.
City/State/Zip	Calendar (C) or Work Days (W) ____			
(xxx) xxx-xxxx Phone	TAT if different from Below ____			SDG No.
(xxx) xxx-xxxx FAX	☐ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site: "	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Sample Specific Notes:
RBS-SC7A	9/15/08	1003	G	S	1		
RBS-S59A		1057					
RBS-S60A		1130					
RBS-S97		1335					
(MS) RBS-S96		1327					

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Weston	9/15/08 1645		USEPA-ERT	9/15/08
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

FedEx. US Airbill
Express

FedEx Tracking Number 8541 0029 6522

Sender's Copy

1 From Please print and press hard.

Date 9/15/08 Sender's FedEx Account Number 396775 6823

Sender's Name Scott Snyder Phone (732) 417-5800

Company Weston Solutions, Inc.

Address 205 Campus Dr. Dept/Floor/Suite/Room

City Edison State NJ ZIP 08837

(LS)

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010.2064

3 To

Recipient's Name Beth Whitehead Phone (601) 264-2454

Company Bonner Analytical

Recipient's Address 2703 Oak Grove Rd Dept/Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Hattiesburg State MS ZIP 39402

4a Express Package Service To add SATURDAY Delivery, see Section 6. Packages up to 150 lbs.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. Packages over 150 lbs.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

** Declared value limit $500.

5 Packaging

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Includes FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages: 3 Total Weight: 185 Total Declared Value†: $ .00

† Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [X] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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Questions? Go to our Web site at fedex.com or call 1.800.GoFedEx 1.800.463.3339.

RETAIN THIS COPY FOR YOUR RECORDS.

FedEx. US Airbill
Express

FedEx Tracking Number 8541 0029 6533

Sender's Copy

1 From *Please print and press hard.*

Date 9/15/06 Sender's FedEx Account Number 396778823

Sender's Name Scott Snyder Phone 732 417-5800

Company Weston Solutions, Inc.

Address 205 Campus Dr.

Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

(85)

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010.2064

3 To

Recipient's Name Kirk Young Phone (802) 660-1990

Company Test America Labs

Recipient's Address 30 Community Dr Ste 11

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept./Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.*

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.*

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Includes FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [X] Dry Ice — Dry Ice, 9, UN 1845 ____ kg
- [ ] Cargo Aircraft Only

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No.: Exp. Date

Total Packages	Total Weight	Total Declared Value†
1	56	$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [X] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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Questions? Go to our Web site at fedex.com or call 1.800.GoFedEx 1.800.463.3339.

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:

R

Region:	2	**Date Shipped:**	08-09-16	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6496	1 9/16/16 1645	FedEx 9/16/16 1645
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB53C6	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED53	S: 08-09-16	9:15		--
MB53C7	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED54	S: 08-09-16	9:45		--
MB53C8	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED55	S: 08-09-16	10:58		--
MB53E2	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED69	S: 08-09-16	14:45		--
MB53E3	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED70	S: 08-09-16	14:50		--
MB53E4	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED71	S: 08-09-16	14:52		--
MB53E5	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED72	S: 08-09-16	14:57		--
MB53E6	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED73	S: 08-09-16	14:58		--
MB53E7	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED74	S: 08-09-16	15:00		--
MB53L6	Field QC/ Scott Snyder	M/G	In/Sn(aq) (14)	(HNO3) (1)	RBS-RIN03	S: 08-09-16	9:40		Rinsate
MB53N7	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED89	S: 08-09-16	11:40		--

Shipment for Case Complete? Y	**Sample(s) to be used for laboratory QC:** MB53E5	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091608-0017

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-16	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6496	1 9/16/16 1645	FedEx 9/16/16 1645
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53N8	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED90	S: 08-09-16 12:40		--

60

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB53E5		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

In+Sn soil = TAL Inorganics + Sn (soil), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091608-0017

REGION COPY

PR provides pre[illegible]ary results. Requests for preliminary results will increase analytical costs.

Send Copy to: S[illegible]ple Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

2000 W. Inte[illegible]hal Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No. 854100329 6441

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughen	Site Contact: D. Gaughen	Date: 9/16/08	COC No:
Your Company Name here: WESTON	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: FedEx	1 of ____ COCs
Address: 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip: Edison, NJ 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			SDG No.
(xxx) xxx-xxxx FAX	☒ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO#	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample (Grain Size)	Sample Specific Notes:
RBS-SED 53	9/16/08	0915	G	Sed	1	X	
RBS-SED 54		0945				X	
RBS-SED 55		1056				X	
RBS-SED 89		1140				X	
(9) RBS-SED 90		1240				X	
RBS-SED 70		1450				X	
RBS-SED 71		1452				X	
RBS-SED 69		1445				X	
RBS-SED 72		1457				X	
RBS-SED 73		1458				X	
RBS-SED 74		1500				X	
						X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☒

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

1645

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
(Susan Snyder)	WESTON	9/16/08	FedEx	—	9/16/08 1645
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

FedEx. US Airbill
Express

FedEx Tracking Number 8541 0029 6441

Sender's Copy

1 From *Please print and press hard.*

Date 9/16/05 Sender's FedEx Account Number 3967796823

Sender's Name Scott Snyder Phone (732)417-5600

Company Weston Solutions, Inc.

Address 205 Campus Dr.

Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010.2064

3 To

Recipient's Name Kirkhoury Phone (802)660-1990

(79)

Company Test America Labs

Recipient's Address 30 Community Dr., Ste 11

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept/Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. Packages up to 150 lbs. * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. Packages over 150 lbs. ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
1	39	$ • .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. FedEx Use Only

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

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Questions? Go to our Web site at fedex.com
or call 1.800.GoFedEx 1.800.463.3339.

FedEx. US Airbill
Express

FedEx Tracking Number 8541 0029 6496

Sender's Copy

1 From *Please print and press hard.*

Date 9/16/05 Sender's FedEx Account Number 396776823

Sender's Name Scott Snyder Phone (732)417-5600

Company Weston Solutions, Inc.

Address 205 Campus Dr.

Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference First 24 characters will appear on invoice. 20401.035.010.2064

3 To

Recipient's Name Beth Whitehead Phone (601) 264-2854

Company Bonner Analytical

Recipient's Address 2703 Oak Grove Rd

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Dept./Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Hattiesburg State MS ZIP 39402

(3)

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. / Credit Card No.: Exp. Date:

Total Packages	Total Weight	Total Declared Value†	
1	58	$ .00	FedEx Use Only

†Our liability is limited to $100 unless you declare a higher value. See back for details.

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 7/10/08 1730	FedEx 9/10/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB5347	Surface Soil (0-24")/ Scott Snyder	L ~~M~~/G DJ7	In+Sn soil (14)	(Ice Only) (1)	RBS-S61	S: 08-09-10 12:33		--
MB5348	Surface Soil (0-24")/ Scott Snyder	L ~~M~~/G DJ7	In+Sn soil (14)	(Ice Only) (1)	RBS-S62	S: 08-09-10 12:40		--
MB5349	Surface Soil (0-24")/ Scott Snyder	L ~~M~~/G DJ7	In+Sn soil (14)	(Ice Only) (1)	RBS-S63	S: 08-09-10 12:28		--
MB5350	Surface Soil (0-24")/ Scott Snyder	L ~~M~~/G DJ7	In+Sn soil (14)	(Ice Only) (1)	RBS-S64	S: 08-09-10 12:33		--
MB5374	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED01	S: 08-09-10 9:21		--
MB5375	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED02	S: 08-09-10 9:34		Field Duplicate
MB5376	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED03	S: 08-09-10 9:45		--
MB5377	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED04	S: 08-09-10 10:02		--
MB5378	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED05	S: 08-09-10 10:30		--
MB5379	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED06	S: 08-09-10 10:48		--

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB5375		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091008-0001

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

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EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 9/10/10 1730	FedEx 9/10/10 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5386	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED13	S: 08-09-10	9:30		--
MB5387	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED14	S: 08-09-10	10:00		--
MB5388	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED15	S: 08-09-10	10:15		--
MB5389	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED16	S: 08-09-10	10:40		--

59

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MB5375		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091008-0001

REGION COPY

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F2V5.[redacted]

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 9/10/08 1730	FedEx 9/10/08 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MB5351	Surface Soil (0-24")/ Scott Snyder	L/~~M~~/G DX7	In+Sn soil (14)	(Ice Only) (1)	RBS-S65	S: 08-09-10	12:55		--
MB5352	Surface Soil (0-24")/ Scott Snyder	L/~~M~~/G DX7	In+Sn soil (14)	(Ice Only) (1)	RBS-S66	S: 08-09-10	13:03		--
MB5353	Surface Soil (0-24")/ Scott Snyder	L/~~M~~/G DJG	In+Sn soil (14)	(Ice Only) (1)	RBS-S67	S: 08-09-10	13:04		--
MB5354	Surface Soil (0-24")/ Scott Snyder	L/~~M~~/G DX7	In+Sn soil (14)	(Ice Only) (1)	RBS-S68	S: 08-09-10	13:17		--
MB5355	Surface Soil (0-24")/ Scott Snyder	L/~~M~~/G DX7	In+Sn soil (14)	(Ice Only) (1)	RBS-S69	S: 08-09-10	13:13		--
MB53D8	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED65	S: 08-09-10	13:59		--
MB53D9	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED66	S: 08-09-10	14:17		--
MB53E0	Sediment/ Scott Snyder	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED67	S: 08-09-10	15:00		--
MB53E1	Sediment	L/G	In+Sn soil (14)	(Ice Only) (1)	RBS-SED68	S: 08-09-10	14:39		--

99

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
In+Sn soil = TAL Inorganics + Sn (soil)			

TR Number: 2-344931618-091008-0002

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836 **R**
DAS No:

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 [signature] 9/10/09 1730	FedEx 9/11/09 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53F4	Surface Water/ Scott Snyder	L M/G DJ7	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW01	S: 08-09-10 14:25		--
MB53F5	Surface Water/ Scott Snyder	L M/G DJ7	DTAL (14)	(HNO3) (1)	RBS-SW01D	S: 08-09-10 14:30		--
MB53F6	Surface Water/ Scott Snyder	L M/G DJ7	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW02	S: 08-09-10 14:32		Field Duplicate
MB53F7	Surface Water	L M/G DJ7	DTAL (14)	(HNO3) (1)	RBS-SW02D	S: 08-09-10 14:37		Field Duplicate
MB53F8	Surface Water/ Scott Snyder	L M/G DJ7	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW03	S: 08-09-10 14:40		--
MB53F9	Surface Water/ Scott Snyder	L M/G DJ7	DTAL (14)	(HNO3) (1)	RBS-SW03D	S: 08-09-10 14:45		--
MB53G0	Surface Water/ Scott Snyder	L M/G DJ7	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW04	S: 08-09-10 14:57		--
MB53G1	Surface Water/ Scott Snyder	L M/G DJ7	DTAL (14)	(HNO3) (1)	RBS-SW04D	S: 08-09-10 15:02		--
MB53G6	Surface Water/ Scott Snyder	L M/G DJ7	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW07	S: 08-09-10 14:07		--
MB53G7	Surface Water/ Scott Snyder	L M/G DJ7	DTAL (14)	(HNO3) (1)	RBS-SW07D	S: 08-09-10 14:12		--
MB53J6	Surface Water	L M/G DJ7	In/Sn(aq) (14)	(HNO3) (1)	RBS-SW17	S: 08-09-10 13:55		--

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Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?**

DTAL = Dissolved Metals (aqueous), In/Sn(aq) = TAL Inorganics + Sn (aqueous)

TR Number: 2-344931618-091008-0003

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F2V5.1 [redacted]

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 37836
DAS No:
R

Region:	2	**Date Shipped:**	08-09-10	**Chain of Custody Record**	**Sampler Signature:**
Project Code:		**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:		**Airbill:**	8541 0029 6945	1 9/10/09 1730	FedEx 9/10/10 1730
CERCLIS ID:	NJN000206276	**Shipped to:**	Bonner Analytical Testing Company 2703 Oak Grove Rd Hattiesburg MS 39402 (601) 264-2854	2	
Spill ID:	A205			3	
Site Name/State:	Raritan Bay Slag Removal/NJ			4	
Project Leader:	Dan Gaughan				
Action:	Integrated Assessment (IA)				
Sampling Co:	WESTON - RST 2				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MB53J7	Surface Water	~~M~~/G L DSL	DTAL (14)	(HNO3) (1)	RBS-SW17D	S: 08-09-10 13:55		--

89

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
DTAL = Dissolved Metals (aqueous), In/Sn(aq) = TAL Inorganics + Sn (aqueous)			

TR Number: 2-344931618-091008-0003

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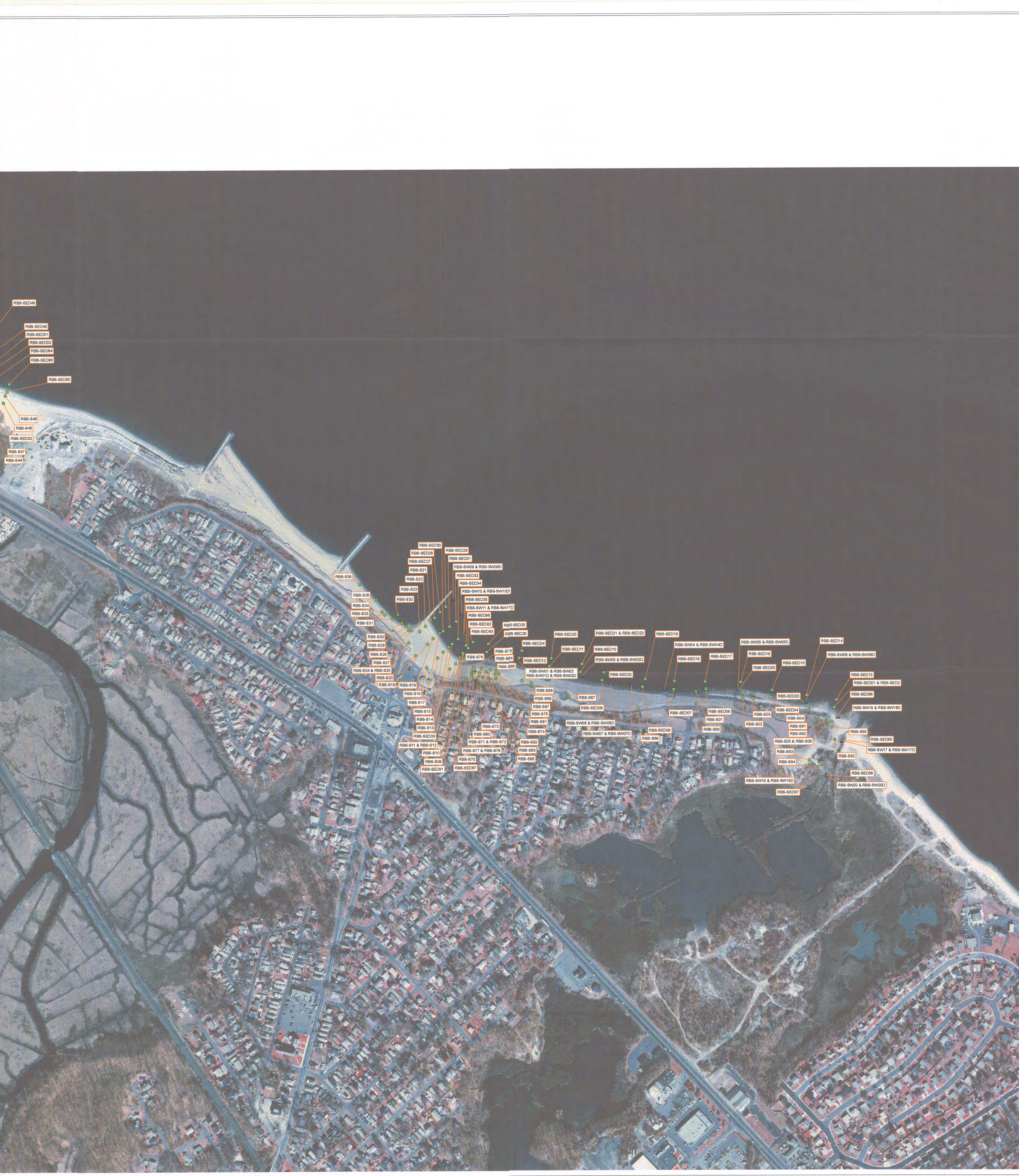

WESTON SOLUTIONS SM

Weston Solutions, Inc.

205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

REPORT DATE: September 2008	PROJECT MANAGER: D. Gaughan	CLIENT NAME: EPA
DRAWING: 06025_RBS_Sample_Loc.mxd PATH: P:/SAT2/Raritan_Bay_Slag/MXD	CHECKED BY: D. Gaughan	
REVISION No. 0	CONTRACT No. EP-W-06-072	PROJECT NAME: Raritan Bay Slag Site
WORK ORDER No. 20401.032.010.2064	DRAWN/MODIFIED BY: J. Lynes DATE CREATED: 09/22/2008	

REFERENCE 18

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

ROC #5

DATE: 10/2/2008

SUBJECT: CLP Data Package for Quality Assurance Review

FROM: Hazardous Waste Support Section (HWSS)/RSCC

TO: HWSS ESAT-TOPO

TDF# 09-0100

09-0136

Attached is the following INORGANIC Data Package to be reviewed for Quality Assurance

SITE: Raritan Bay Slag **CASE #: 37836**

SDG#: MB52W5, MB5341 **SAMPLER: W-SAT**

PROJ. CODE: RS SITE SPILL #: A205	**#SAMPLES**	**MATRIX**
LAB: BONNER OPERABLE UNIT: 00	**13**	**Soil**
TURN-AROUND-TIME: 14 day		
CERCLIS ID # : NJN000206276	**FRACTION: Metals (MA #1454.1)**	

Contaminant(s) of Concern (If known)

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	**Date/Time**	**Signature**	**Date/Time**
[signature]	10/10/08 1:35 pm	[signature]	10/10/08 1:35 pm
[signature]	10/10/08	C-Stanca	10/10/08
C-Stanca	10/29/08	Dorine Christine Allin	10/29/08
Dorine Christine Allin	10/29/08 9:05 am	[signature]	10/29/08 9:05 am
[signature]	10/29/08 10:10 AM	Hanif Sheikh	10/29/08 10:10 PM
Hanif Sheikh	10/30/08 10:11 AM	[signature]	10/30/08 10:11 AM
[signature]	10/30/08 2:25 pm	C-Stanca	10/30/ 2:25 pm
C. Stanca	10/30/08 3:05 pm	[signature]	10/30/08 3:05 pm

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5341

Matrix: (Soil/Water) WATER Lab Sample ID: 0809209-05

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	227			P
7440-39-3	Barium	200 ~~184~~	J		P
7440-43-9	Cadmium	62.4			P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	930000		~~D~~	P
7439-97-6	Mercury	0.20 ~~0.051~~	J		CV
7782-49-2	Selenium	8.6	J		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5341

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5341

Matrix: (Soil/Water) WATER Lab Sample ID: 0809209-01

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	7.6	J		P
7440-39-3	Barium	200 ~~172~~	~~J~~ U		P
7440-43-9	Cadmium	5.0 ~~1.2~~	~~J~~ U		P
7440-47-3	Chromium	2.8	J		P
7439-92-1	Lead	10300			P
7439-97-6	Mercury	0.20 ~~0.049~~	~~J~~ U		CV
7782-49-2	Selenium	3.6 ~~35.0~~	~~U~~ J		P
7440-22-4	Silver	10.0	U		P

CS 10/22/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5344

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5341

Matrix: (Soil/Water) WATER Lab Sample ID: 0809209-02

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	416			P
7440-39-3	Barium	204 ~~161~~	~~J~~ U		P
7440-43-9	Cadmium	11.8			P
7440-47-3	Chromium	1.6 ~~10.0~~	~~U~~ J		P
7439-92-1	Lead	723000		D	P
7439-97-6	Mercury	0.20 ~~0.084~~	~~J~~ U		CV
7782-49-2	Selenium	6.4	J		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5341

Matrix: (Soil/Water) WATER Lab Sample ID: 0809209-03

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	564			P
7440-39-3	Barium	20.0 ~~122~~	~~J~~		P
7440-43-9	Cadmium	416			P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	561000		~~D~~	P
7439-97-6	Mercury	0.2 ~~0.074~~	~~J~~		CV
7782-49-2	Selenium	5.7	J		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5341

Matrix: (Soil/Water) WATER Lab Sample ID: 0809209-04

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	167			P
7440-39-3	Barium	200 ~~64.1~~	~~J~~		P
7440-43-9	Cadmium	202			P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	1230000		~~D~~	P
7439-97-6	Mercury	0.20 ~~0.066~~	~~J~~		CV
7782-49-2	Selenium	10.4	J		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52W5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-01

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	21.6			P
7440-39-3	Barium	200 ~~188~~	~~J~~ U		P
7440-43-9	Cadmium	5.0 ~~1.6~~	~~J~~ U		P
7440-47-3	Chromium	0.78 ~~10.0~~	~~U~~		P
7439-92-1	Lead	31500		~~D~~	P
7439-97-6	Mercury	0.20 ~~0.17~~	~~J~~ U		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~ U		P
7440-22-4	Silver	10.0	U		P

CK 10/29/08

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

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USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52W8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-02

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	13.3			P
7440-39-3	Barium	209			P
7440-43-9	Cadmium	5.0 ~~0.50~~	~~J~~ U		P
7440-47-3	Chromium	3.4	J		P
7439-92-1	Lead	11100			P
7439-97-6	Mercury	0.20 ~~0.095~~	~~J~~ U		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~ U		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-03

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	24.5			P
7440-39-3	Barium	200 ~~183~~	~~J~~ U		P
7440-43-9	Cadmium	5.0 ~~2.2~~	~~J~~ U		P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	28700		~~D~~	P
7439-97-6	Mercury	0.20 ~~0.13~~	~~J~~ U		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~ U		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-04

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	10.0	U		P
7440-39-3	Barium	20.0 ~~184~~	~~U~~ J		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	62.6			P
7439-97-6	Mercury	0.20 ~~0.13~~	~~U~~ J		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~ J		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-05

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	10.0	U		P
7440-39-3	Barium	226			P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	2330		J	P
7439-97-6	Mercury	0.20 ~~0.14~~	~~U~~		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-06

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	10.0	U		P
7440-39-3	Barium	200 ~~199~~	~~U~~		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	0.92 ~~10.0~~	~~U~~ J		P
7439-92-1	Lead	932		J	P
7439-97-6	Mercury	0.20 ~~0.15~~	~~U~~		CV
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U		P

CS 12/22/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-08

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	7.8	J		P
7440-39-3	Barium	221			P
7440-43-9	Cadmium	5.0 ~~0.24~~	~~J~~ U		P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	451			P
7439-97-6	Mercury	0.20 ~~0.20~~	~~U~~ U		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~ U		P
7440-22-4	Silver	10.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

Matrix: (Soil/Water) WATER Lab Sample ID: 0809168-07

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	4.8	J		P
7440-39-3	Barium	397			P
7440-43-9	Cadmium	5.0 ~~1.2~~	~~J~~ U		P
7440-47-3	Chromium	10.0	U		P
7439-92-1	Lead	5850			P
7439-97-6	Mercury	0.20 ~~0.17~~	~~J~~ U		CV
7782-49-2	Selenium	35.0 ~~35.0~~	~~U~~ U		P
7440-22-4	Silver	1.0 ~~10.0~~	~~U~~		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Inorganic Data Review Narrative

Case# 37836	Site: RARITAN BAY SLAG	Soil: 13
SDG# MB52W5, MB5341	Lab: BONNER	Water: 0
Sampling Team: W-SAT	Reviewer: C. STANCA	Other: 0

A.2.1 Data Validation Flags:

The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:

The CLP laboratory applies a contractual qualifier on all Form I=S and the QC Form when a QC analysis is outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their meanings are as follows:

N: This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E: This qualifier indicates the presence of interference, and is applied when the ICP serial dilution is outside the control limits.

*: This qualifier indicates the lack of precision, and is applied on Form I=S and Form VI when the Lab Duplicate analysis is outside the control limits.

U: This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit (MDL). A non-detected result of an analyte is indicated by the Contract Required Quantitation Limit (CRQL) of that analyte suffixed with "U".

J: This is also a concentration qualifier that laboratory applies to a positive result below the CRQL.

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

(15)

A.2.3.1 **Data Case Description:**

This case consists of thirteen (13) soil samples collected at the Raritan Bay Slag site between 9/11/08 and 9/15/08 for TAL Metals and mercury analysis according to the USEPA CLP SOW No. ILM05.4. Matrix spike, laboratory duplicate and serial dilution analyses were performed on samples MB52W5 and MB52Y1. Sample MB52Y0 was the field duplicate of sample MB52X7.

As per EPA Technical Direction Form (TDF) only the following criteria were reviewed by the data validator: Holding Time, CRQL Standard, Matrix Spike, ICS, Laboratory Duplicate, Field Duplicate, ICP Serial Dilution, Percent Solids, and Field Blank. The qualifiers applied on Form Is and CADRE EXCEL spreadsheets are based on ESAT data review of the above mentioned criteria and the attached CADRE Reports.

A.2.3.2 **CSF Audit**: No problems.

A.2.3.3 **Technical Review**:

SDG MB52W5 (TCLP SOIL, ICP-AES MA 1454.1)

ICB/CCB

The Calibration Blanks values were ≥MDL but ≤CRQL for Ba, Cd, and Hg. (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Ba -> MB52W5, MB52X1, MB52X4, MB52Y0

Cd -> MB52W5, MB52W8, MB52X1, MB52Y7, MB52Z0

Hg -> MB52W5, MB52W8, MB52X1, MB52X4, MB52X7, MB52Y0, MB52Y7, MB52Z0

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Ba, Hg, and Se. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U". Ba and Hg results were previously qualified; no action was taken for these two analytes.

"U" -> Se -> MB52W5, MB52W8, MB52X1, MB52X4, MB52X7, MB52Y7, MB52Z0

FIELD DUPLICATE

The RPD between sample (MB52X7) and duplicate (MB52Y0) results was ≥ 35% but less than 120% for Pb when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J".

"J" -> Pb -> MB52X7, MB52Y0

SDG MB5341 (TCLP SOIL, ICP-AES MA 1454.1)

ICB/CCB

The Calibration Blanks values were ≥MDL but ≤CRQL for Ba and Cd. (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Ba -> MB52Y1, MB5341, MB5344, MB53N4, MB53N5

Cd -> MB5341

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Ba and Hg. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U". Ba results were previously qualified; no action was taken for this analyte.

"U" -> Hg -> MB52Y1, MB5341, MB5344, MB53N4, MB53N5

A.2.3.4 Contract-Problem/Non-Compliance:

1. All Form Is: Lab code was missing or was incorrect.
2. All Form 4s: The Final Found Solution AB results were incorrect; they did not match the raw data.

Re-submittals were requested from the laboratory and were received on 10/27/08. Several re-submitted Form Is had the selenium, chromium, and silver results qualified "U" although the values were between MDL and CRQL, or greater than the CRQL. The above mentioned "U" qualifiers were changed by the reviewer to "J" for detects less than the CRQL or no qualifier for detects greater than the CRQL.

HWSS Reviewer: _____ Date: 10/29/
Signature

Contractor Reviewer: Constantine Stamus Date: 10/28/08
Signature

Verified by: _____ Date: _____
Signature

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COVER PAGE

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5341

SOW No.: ILM05.4

EPA SAMPLE NO.	Lab Sample ID:
MB52Y1	0809209-05
MB52Y1D	0809209-05DUP
MB52Y1S	0809209-05MS
MB5341	0809209-01
MB5344	0809209-02
MB53N4	0809209-03
MB53N5	0809209-04

		ICP-AES	ICP-MS
Were ICP-AES and ICP interelement corrections applied?	(Yes/No)	Yes	Yes
Were ICP-AES and ICP background corrections applied?	(Yes/No)	Yes	Yes
If yes, were raw data generated before application of background corrections?	(Yes/No)	No	No

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette (or via an alternate means of electronic transmission, if approved in advance designee, as verified by the following signature.

Signature: _____ Name: Chris Bonner

Date: _____ Title: President

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SEP 30 2008
HAZ. WASTE SUPPORT SI

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB5341
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 16, 2008, we received 5 water samples in 2 coolers under FedEx master airbill number 8541 0029 6522. Custody seals were present and intact. Cooler temps were determined to be 5°C and 6°C. Samples were received in good condition except for the following discrepancies:

1. No QC was listed on the TR/COC for SDGs MB52Y1 and MB5341. We would like to use MB52Y1 as QC for both. Please advise if this is acceptable.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

2. No sample tags were included in this shipment. Please advise.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/23/2008 @ 1648 hrs. MB5344, N4, N5, Y1, Y1D, and Y1S were over the linear range for Pb; the samples were reanalyzed at appropriate dilutions.

Mercury
The analytical run began 9/19/2008 @ 1354 hrs. The calibration curve failed; the instrument was recalibrated and S1 was not used in the calibration. MB5241, 41D, 41S, 44, N4 and N5 formed a white precipitate after the addition of sulfuric acid; the samples were digested and analyzed normally per CMB.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809209-05 EPA Sample # MB52Y1

Date & Time 9/23/2008@1818

Metals: 226.88 µg/L * 1 (Dilution Factor) = 227 ug/L
(Analyte As)

Date & Time 9/19/2008@1431

Hg: 0.0513 µg/L * 1 (Dilution Factor) = 0.051 ug/L

Authorized by

Daniel Antrim
Document Control Officer

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SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB5341

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: $ 345.00 **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 14541

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB52Y1	7)	13)	19)
2) MB5341	8)	14)	20)
3) MB5344	9)	15)	21)
4) MB53N4	10)	16)	22)
5) MB53N5	11)	17)	23)
6) 09-16-08	12)	18)	24) 9-16-08

MB52Y1
First Sample in SDG

MB53N5
Last Sample in SDG

09/16/2008
First Sample Receipt Date

09/16/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-16-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 1:12 PM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDGs MB52Y1 and MB5341. The laboratory would like to perform laboratory QC on sample MB52Y1 for both SDGs.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

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From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Tuesday, September 16, 2008 2:18 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | case 37836 | Sample Receipt

Kristin:

Today we received 20 soil samples and 19 water samples in 3 coolers under FedEx master airbill number 8541 0029 6522. Custody seals were present and intact. Cooler temps were determined to be 5°C, 5.5°C, and 6°C. Samples were received in good condition except for the following discrepancies:

1. No QC was listed on the TR/COC for SDGs MB52Y1 and MB5341. We would like to use MB52Y1 as QC for both. Please advise if this is acceptable.

2. No sample tags were included in this shipment. Please advise.

22

Thanks,

Beth Whitehead
Bonner Analytical

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COVER PAGE

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W5

SOW No.: ILM05.4

EPA SAMPLE NO.	Lab Sample ID:
MB52W5	0809168-01
MB52W5D	0809168-01DUP
MB52W5S	0809168-01MS
MB52W8	0809168-02
MB52X1	0809168-03
MB52X4	0809168-04
MB52X7	0809168-05
MB52Y0	0809168-06
MB52Y7	0809168-08
MB52Z0	0809168-07

		ICP-AES	ICP-MS
Were ICP-AES and ICP interelement corrections applied?	(Yes/No)	Yes	Yes
Were ICP-AES and ICP background corrections applied?	(Yes/No)	Yes	Yes
If yes, were raw data generated before application of background corrections?	(Yes/No)	No	No

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette (or via an alternate means of electronic transmission, if approved in advance designee, as verified by the following signature.

Signature: _____ Name: Chris Bonner

Date: _____ Title: President

Bonner Analytical Testing Company

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SEP 26 2008
HAZ. WASTE SUPPORT SEC

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB52W5
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 12, 2008, we received 8 water samples in 2 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 5.5°C and 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/22/2008 @ 1556 hrs. MB52W5, duplicate, spike and X1 were over the range for Pb; the samples were reanalyzed for Pb.

Mercury
No Discrepancies

CSF
No Discrepancies

Sample Equation:

Lab ID 080916 8-01 EPA Sample # MB52W5

Date & Time 9/22/2008@1647

Metals: 21.57 µg/L * 1 (Dilution Factor) = 21.6 µg/L
(Analyte As)

Date & Time 9/22/2008@1411

Hg: 0.1705 µg/L * 1 (Dilution Factor) = 0.17 µg/L

Authorized by _____
Daniel Antrim
Document Control Officer

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SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB52W5

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: $ 552.00 **SDG Turnaround:** 14 TAT

Modified Analysis (if applicable):

Modification Reference No.: 1454.1

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB52W5	7) MB52Y7	13)	19)
2) MB52W8	8) MB52Z0	14)	20)
3) MB52X1	9)	15)	21)
4) MB52X4	10)	16)	22)
5) MB52X7	11)	17)	23)
6) MB52Y0	12) 9-12-08	18)	~~24)~~ 9-12-08

MB52W5	MB52Z0
First Sample in SDG	**Last Sample in SDG**
09/12/2008	09/12/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

[signature] **Signature**

9-12-08 **Date**

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Monday, September 15, 2008 8:02 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Non-sampler issues | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. **The Resolution will be applied to all samples received for this Case**.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

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From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Saturday, September 13, 2008 2:23 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 12, 2008, we received 7 water samples and 70 soil samples in 5 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 4.5° C, 5°C, 5.5°C, 6°C, and 6.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

Thanks,

Beth Whitehead
Bonner Analytical

(27)

Request for Quote (RFQ) for Modified Analysis

Date: September 5, 2008

Subject: Modification Reference Number: 1454.1
Title: TCLP for Metals and Mercury
Sample Matrix: Soil
Fraction Affected: Metals and Mercury
Statement of Work: ILM05.4

Purpose:

The Contractor Laboratory is requested to perform the following modified analyses under the Organic Statement of Work (SOW) ILM05.4, based on the additional specifications listed below. Unless specifically modified by this modification, all analyses, Quality Control (QC), and reporting requirements specified in SOW ILM05.4 remain unchanged and in full force and effect. The number of samples requested in this modification is not guaranteed.

Please note that accepting a modified analysis request is voluntary, and that the Laboratory is not required to accept the modified analysis. There will be no adverse effect to the Laboratory for not accepting the modified analysis request. However, once the Laboratory accepts the request for modified analysis, it shall perform the analysis in accordance with this modification and as specified in SOW ILM05.4.

The Laboratory is requested to review the modification described herein, determine whether or not it shall accept the requested modified analyses, and complete the attached response form. The Laboratory shall provide comments in response to the required changes in the designated area, in order to ensure that the modified analysis can be completed in accordance with the specifications described herein.

Notice to Contractors: Acceptance of Modified Analysis samples will not count against the monthly capacity.

Modification to the SOW Specifications:

The contract Laboratory shall extract soil samples for Metals and Mercury by Method SW-846 1311 [Toxicity Characteristic Leaching Procedure (TCLP)], as indicated on the Traffic Report/Chain of Custody Record.

The Laboratory shall digest TCLP extracts by preparation methods HW1 or MW1 and analyze for Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver by ICP-AES.

- The Laboratory shall prepare TCLP extracts by preparation methods CW1 [method CV], or analyze by method AV, and analyze for Mercury by CVAA.
- The Laboratory shall perform Matrix Spike at SOW specified levels.
- The Laboratory shall analyze the TCLP extraction blank as preparation blank (PBW).
- The Laboratory shall report TCLP results as aqueous samples.
- The Laboratory shall provide raw data [laboratory bench sheets, logs, notebook pages] for the TCLP procedure. This includes the initial determination of percent solids, determination of extraction fluid, amount of liquid (if any) separated from solid phase, mass of solid material, volume of extraction fluid used.

Reporting Requirements:

Hardcopy and electronic data reporting are required as specified per SOW ILM05.4. All hardcopy and electronic data shall be adjusted to incorporate modified specifications. This includes attaching a copy of the requirements for modified analysis to the SDG Narrative. If specific problems occur with incorporation of the modified analysis into the hardcopy and/or electronic deliverable, the Laboratory shall contact the DASS Manager within the Sample Management Office (SMO) at (703) 818-4233 or via email at CCSSUPPORT@fedcsc.com for resolution.

All samples and/or fractions assigned to an SDG shall be analyzed under the same Modified Analysis requirements as established in this memorandum. The Laboratory shall not include data from multiple Modified Analyses in one SDG.

The Laboratory shall include the Modification Reference Number 1454.1 on each hardcopy data form under the "NRAS No:" header appearing on each form as well as the "NRAS No." field on the Record type 21 of the electronic deliverable (if diskette deliverable is required). The Laboratory shall also document the Modification Reference Number and Solicitation Number on the SDG Coversheet.

Clarifications/Revisions to the RFQ for Modified Analysis:

Laboratory Name:
Laboratory Comments:

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REFERENCE 19

Parks and Recreation

Parks

Parks
Golf Courses
Fees
Rules and Regulations
Permits / Passes / Reservations
Playing the Park
Organized Sports
Concerts
Ice Rink
Roller Skating Rink
Middlesex County Conservation Corps

Old Bridge Waterfront Park

Location: Bayview Avenue, Old Bridge

Acreage: 52 Acres

Facilities (Under Construction):
- 1.3 miles of walk/bikeway along Raritan Bay from Cheesequake Creek to Margaret's Creek
- Park Center/Concession Area
- Fishing Piers
- 1 Playground
- Performance Gazebo
- Nature Study Area
- Observation Areas

Projected Completion Date:
- Summer 2002
- A Phase II is now being designed for the waterfront area south of Margaret's Creek to the Monmouth County border

Key Feature: Raritan Bay Views

DIRECTIONS: (To Main Parking area: additional access at Laurence Harbor)

Parkway South

- Take Exit 129 for Route 9 South (Route 9/Route 35 merge at base of the Edison Bridge and then divide -- at that point stay on Route 35 South)
- Make a quick right turn base of Morgan drawbridge
- Follow jug handle under Route 35
- Make a slight right towards Park
- Park in on left hand side

Parkway North

- Take exit 120 (Laurence Harbor)
- Make a left at the stop sign
- Follow to Route 35
- Make a left and follow to bridge
- Make a right into park before bridge

Route 9 South

- Follow directions for Route 9 from Parkway South (above)

Route 9 North

- Take Route 35 South (South Amboy/Parlin)
- Follow directions for Route 9 South at Route 35 South (above)

Route 1

- Take Route 287 South to Route 9 South
- Follow directions for Parkway South at Route 9 South (above)

New Jersey Turnpike

- Take exit 11 (Woodbridge)
- Follow signs for Parkway South & Route 9 South
- Take Route 9 South
- Follow directions for Parkway South at Route 9 South (above)

Route 287 South

- Take Route 9 South
- Follow directions for Parkway South at Route 9 South (above)

County Home Department Home

REFERENCE 20

Electronic Code of Federal Regulations
e-CFR™

e-CFR Data is current as of December 3, 2008

Title 40: Protection of Environment

Browse Previous | Browse Next

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

Section Contents

Subpart A—General

261.1 Purpose and scope.
261.2 Definition of solid waste.
261.3 Definition of hazardous waste.
261.4 Exclusions.
261.5 Special requirements for hazardous waste generated by conditionally exempt small quantity generators.
261.6 Requirements for recyclable materials.
261.7 Residues of hazardous waste in empty containers.
261.8 PCB wastes regulated under Toxic Substance Control Act.
261.9 Requirements for Universal Waste.

Subpart B—Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Waste

261.10 Criteria for identifying the characteristics of hazardous waste.
261.11 Criteria for listing hazardous waste.

Subpart C—Characteristics of Hazardous Waste

261.20 General.
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Subpart D—Lists of Hazardous Wastes

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261.32 Hazardous wastes from specific sources.
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261.35 Deletion of certain hazardous waste codes following equipment cleaning and replacement.

Subpart E—Exclusions/Exemptions

261.38 Comparable/Syngas Fuel Exclusion.
261.39 Conditional Exclusion for Used, Broken Cathode Ray Tubes (CRTs) and

(1)

Subpart C—Characteristics of Hazardous Waste

top

§ 261.20 General.

top

(a) A solid waste, as defined in §261.2, which is not excluded from regulation as a hazardous waste under §261.4(b), is a hazardous waste if it exhibits any of the characteristics identified in this subpart.

Comment: §262.11 of this chapter sets forth the generator's responsibility to determine whether his waste exhibits one or more of the characteristics identified in this subpart]

(b) A hazardous waste which is identified by a characteristic in this subpart is assigned every EPA Hazardous Waste Number that is applicable as set forth in this subpart. This number must be used in complying with the notification requirements of section 3010 of the Act and all applicable recordkeeping and reporting requirements under parts 262 through 265, 268, and 270 of this chapter.

(c) For purposes of this subpart, the Administrator will consider a sample obtained using any of the applicable sampling methods specified in appendix I to be a representative sample within the meaning of part 260 of this chapter.

Comment: Since the appendix I sampling methods are not being formally adopted by the Administrator, a person who desires to employ an alternative sampling method is not required to demonstrate the equivalency of his method under the procedures set forth in §§260.20 and 260.21.]

[45 FR 33119, May 19, 1980, as amended at 51 FR 40636, Nov. 7, 1986; 55 FR 22684, June 1, 1990; 56 FR 3876, Jan. 31, 1991]

261.21 Characteristic of ignitability.

top

(a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

(1) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has a flash point less than 60 °C (140 °F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D 93–79 or D 93–80 (incorporated by reference, see 260.11), or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D 3278–78 (incorporated by reference, see §260.11).

(2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

(3) It is an ignitable compressed gas.

(i) The term "compressed gas" shall designate any material or mixture having in the container an absolute pressure exceeding 40 p.s.i. at 70 °F or, regardless of the pressure at 70 °F, having an absolute pressure exceeding 104 p.s.i. at 130 °F; or any liquid flammable material having a vapor pressure exceeding 40 p.s.i. absolute at 100 °F as determined by ASTM Test D–323.

(ii) A compressed gas shall be characterized as ignitable if any one of the following occurs:

(A) Either a mixture of 13 percent or less (by volume) with air forms a flammable mixture or the flammable range with air is wider than 12 percent regardless of the lower limit. These limits shall be determined at atmospheric temperature and pressure. The method of sampling and test procedure shall

e acceptable to the Bureau of Explosives and approved by the director, Pipeline and Hazardous Materials Technology, U.S. Department of Transportation (see Note 2).

B) Using the Bureau of Explosives' Flame Projection Apparatus (see Note 1), the flame projects more 18 inches beyond the ignition source with valve opened fully, or, the flame flashes back and burns valve with any degree of valve opening.

C) Using the Bureau of Explosives' Open Drum Apparatus (see Note 1), there is any significant ropagation of flame away from the ignition source.

D) Using the Bureau of Explosives' Closed Drum Apparatus (see Note 1), there is any explosion of the apor-air mixture in the drum.

4) It is an oxidizer. An oxidizer for the purpose of this subchapter is a substance such as a chlorate, ermanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of rganic matter (see Note 4).

) An organic compound containing the bivalent -O-O- structure and which may be considered a erivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by rganic radicals must be classed as an organic peroxide unless:

A) The material meets the definition of a Class A explosive or a Class B explosive, as defined in 261.23(a)(8), in which case it must be classed as an explosive,

B) The material is forbidden to be offered for transportation according to 49 CFR 172.101 and 49 CFR 73.21,

C) It is determined that the predominant hazard of the material containing an organic peroxide is other han that of an organic peroxide, or

D) According to data on file with the Pipeline and Hazardous Materials Safety Administration in the U.S. rtment of Transportation (see Note 3), it has been determined that the material does not present a d in transportation.

) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of)001.

lote 1: A description of the Bureau of Explosives' Flame Projection Apparatus, Open Drum pparatus, Closed Drum Apparatus, and method of tests may be procured from the Bureau of xplosives.

lote 2: As part of a U.S. Department of Transportation (DOT) reorganization, the Office of lazardous Materials Technology (OHMT), which was the office listed in the 1980 publication f 49 CFR 173.300 for the purposes of approving sampling and test procedures for a ammable gas, ceased operations on February 20, 2005. OHMT programs have moved to the ipeline and Hazardous Materials Safety Administration (PHMSA) in the DOT.

lote 3: As part of a U.S. Department of Transportation (DOT) reorganization, the Research nd Special Programs Administration (RSPA), which was the office listed in the 1980 ublication of 49 CFR 173.151a for the purposes of determining that a material does not resent a hazard in transport, ceased operations on February 20, 2005. RSPA programs have noved to the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the DOT.

lote 4: The DOT regulatory definition of an oxidizer was contained in §173.151 of 49 CFR, nd the definition of an organic peroxide was contained in paragraph 173.151a. An organic eroxide is a type of oxidizer.

5 FR 33119, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 55 FR 22684, June 1, 1990; 70 561, June 14, 2005; 71 FR 40259, July 14, 2006]

261.22 Characteristic of corrosivity.

(3) (4)

top

a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW–846, as incorporated by reference in §260.11 of this chapter.

2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 °C (130 °F) as determined by Method 1110A in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW–846, and as incorporated by reference in §260.11 of this chapter.

b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

[45 FR 33119, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 55 FR 22684, June 1, 1990; 58 FR 46049, Aug. 31, 1993; 70 FR 34561, June 14, 2005]

§ 261.23 Characteristic of reactivity.

top

a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has *any* of the following properties:

1) It is normally unstable and readily undergoes violent change without detonating.

2) It reacts violently with water.

3) It forms potentially explosive mixtures with water.

4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

8) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.88.

c) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.

[45 FR 33119, May 19, 1980, as amended at 55 FR 22684, June 1, 1990]

261.24 Toxicity characteristic.

top

a) A solid waste (except manufactured gas plant waste) exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, test Method 1311 in "Test Methods for Evaluating Solid

(4) (5)

Waste, Physical/Chemical Methods," EPA Publication SW–846, as incorporated by reference in §260.11 of this chapter, the extract from a representative sample of the waste contains any of the contaminants listed in table 1 at the concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in Method 1311, is considered to be the extract for the purpose of this section.

(b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table 1 which corresponds to the toxic contaminant causing it to be hazardous.

Table 1 —Maximum Concentration of Contaminants for the Toxicity Characteristic

EPA HW No.[1]	Contaminant	CAS No.[2]	Regulatory Level (mg/L)
D004	Arsenic	7440–38–2	5.0
D005	Barium	7440–39–3	100.0
D018	Benzene	71–43–2	0.5
D006	Cadmium	7440–43–9	1.0
D019	Carbon tetrachloride	56–23–5	0.5
D020	Chlordane	57–74–9	0.03
D021	Chlorobenzene	108–90–7	100.0
D022	Chloroform	67–66–3	6.0
D007	Chromium	7440–47–3	5.0
[illegible]23	o-Cresol	95–48–7	[4]200.0
D024	m-Cresol	108–39–4	[4]200.0
D025	p-Cresol	106–44–5	[4]200.0
D026	Cresol		[4]200.0
D016	2,4-D	94–75–7	10.0
D027	1,4-Dichlorobenzene	106–46–7	7.5
D028	1,2-Dichloroethane	107–06–2	0.5
D029	1,1-Dichloroethylene	75–35–4	0.7
D030	2,4-Dinitrotoluene	121–14–2	[3]0.13
D012	Endrin	72–20–8	0.02
D031	Heptachlor (and its epoxide)	76–44–8	0.008
D032	Hexachlorobenzene	118–74–1	[3]0.13
D033	Hexachlorobutadiene	87–68–3	0.5
D034	Hexachloroethane	67–72–1	3.0
D008	Lead	7439–92–1	5.0
D013	Lindane	58–89–9	0.4
[illegible]09	Mercury	7439–97–6	0.2
D014	Methoxychlor	72–43–5	10.0

5 6

D035	Methyl ethyl ketone	78–93–3	200.0
D036	Nitrobenzene	98–95–3	2.0
D037	Pentrachlorophenol	87–86–5	100.0
D038	Pyridine	110–86–1	[3]5.0
D010	Selenium	7782–49–2	1.0
D011	Silver	7440–22–4	5.0
D039	Tetrachloroethylene	127–18–4	0.7
D015	Toxaphene	8001–35–2	0.5
D040	Trichloroethylene	79–01–6	0.5
D041	2,4,5-Trichlorophenol	95–95–4	400.0
D042	2,4,6-Trichlorophenol	88–06–2	2.0
D017	2,4,5-TP (Silvex)	93–72–1	1.0
D043	Vinyl chloride	75–01–4	0.2

Hazardous waste number.

Chemical abstracts service number.

Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.

[55 FR 11862, Mar. 29, 1990, as amended at 55 FR 22684, June 1, 1990; 55 FR 26987, June 29, 1990; 58 FR 46049, Aug. 31, 1993; 67 FR 11254, Mar. 13, 2002; 71 FR 40259, July 14, 2006]

6

REFERENCE 21

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 5 February 2009

SUBJECT: Sample Quantitation Limits – Raritan Bay Slag Site

Contacted Yunru Yang, who is certified in U.S. EPA Contract Laboratory Program (CLP) data validation, to discuss calculation of sample quantitation limits (SQL) for the background and observed release samples used in scoring the observed releases of lead from sources associated with the Raritan Bay Slag site. Ms. Yang informed me that the following formula can be utilized to determine SQLs for inorganic analytes, based on 100 milliliters of final volume and 1 gram of wet weight in samples, as specified in ILM05.4:

{(C x F) / (% solids / 100)}

where: C = CRQL (1 mg/kg for lead)
F = dilution factor

Attached to this project note are:

- Sample trip report excerpts showing the sediment sample numbers correlating to the CLP sample numbers (Ref. 17 of this HRS documentation record)
- Form 12's (i.e., preparation logs) which shows the weights and volumes for all sediment samples, documenting weights of 1 gram and volumes of 100 mL for all sediment samples.
- Form 13's (i.e., analysis run logs) for sediment samples collected, which shows the dilution weights for all sediment samples collected.
- Excerpts from the EPA CLP Statement of Work for Inorganic Analysis, Multi-media, Multi-Concentration ILM05.4, showing the CRQLs for lead in soil. Also included is the summary of changes from ILM05.3 to ILM05.4.

Based on this information sample quantitation limits were calculated on the above formula and are listed in the attached table.

Signature/Date Dennis J Foerter 2/5/09

Sample No.	CRQL* (mg/kg)	% Solids**	Dilution Factor	Lead SQL
RBS-SED01	1	81.2	1	1.23
RBS-SED02	1	80.5	1	1.24
RBS-SED13	1	80.4	1	1.24
RBS-SED84	1	81.2	1	1.23
RBS-SED85	1	85.1	1	1.18
RBS-SED04	1	74.4	1	1.34
RBS-SED05	1	74.0	1	1.35
RBS-SED06	1	75.4	1	1.33
RBS-SED07	1	90.0	3	3.33
RBS-SED16	1	77.6	1	1.29
RBS-SED17	1	70.6	1	1.42
RBS-SED18	1	62.6	1	1.60
RBS-SED08	1	77.3	1	1.29
RBS-SED19	1	66.8	1	1.50
RBS-SED09	1	81.6	1	1.23
RBS-SED20	1	65.7	1	1.52
RBS-SED10	1	80.7	1	1.24
RBS-SED11	1	70.8	1	1.41
RBS-SED21	1	76.4	1	1.31
RBS-SED22	1	77.5	1	1.29
RBS-SED23	1	69.9	1	1.43
RBS-SED12	1	83.0	1	1.20
RBS-SED24	1	72.6	1	1.38
RBS-SED26	1	71.9	1	1.39
RBS-SED25	1	85.3	1	1.17
RBS-SED81	1	79.0	1	1.27
RBS-SED82	1	71.7	1	1.39
RBS-SED83	1	76.4	1	1.31
RBS-SED87	1	77.3	1	1.29
RBS-SED88	1	71.5	1	1.40
RBS-SED33	1	84.7	1	1.18
RBS-SED34	1	68.9	1	1.45
RBS-SED35	1	68.6	1	1.46
RBS-SED30	1	86.5	1	1.16
RBS-SED31	1	68.8	1	1.45
RBS-SED32	1	69.8	1	1.43
RBS-SED27	1	80.9	1	1.24
RBS-SED28	1	72.7	1	1.38
RBS-SED29	1	77.0	1	1.30
RBS-SED86	1	81.2	1	1.23

Sample No.	CRQL* (mg/kg)	% Solids**	Dilution Factor	Lead SQL
RBS-SED52	1	86.7	1	1.15
RBS-SED63	1	73.8	1	1.36
RBS-SED64	1	73.0	1	1.37
RBS-SED56	1	10.4	1	9.62
RBS-SED57	1	52.0	1	1.92
RBS-SED58	1	60.1	1	1.66
RBS-SED59	1	46.9	1	2.13
RBS-SED60	1	57.1	1	1.75

Notes:

* - Obtained from EPA CLP Statement of Work for Inorganic Analysis, Multi-media, Multi-Concentration ILM05.4

** - % solids obtained from the CLP Form 1 for the samples located in References 22, 23, 24, and 25 of this HRS documentation Record

CRQL – Contract Required Quantitation Limit

SQL – Sample quantitation Limit

mg/kg – milligrams per kilogram

USEPA CONTRACT LABORATORY PROGRAM

STATEMENT OF WORK

FOR

INORGANIC ANALYSIS

Multi-Media, Multi-Concentration

ILM05.3
March 2004

1.0 INORGANIC TARGET ANALYTE LIST AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQLs)

Analyte	CAS Number	ICP-AES CRQL for Water[1,2,3,4] (µg/L)	ICP-AES CRQL for Soil[1,2,3,4,5] (mg/kg)	ICP-MS CRQL for Water[1,2,4] (µg/L)
Aluminum	7429-90-5	200	20	--
Antimony	7440-36-0	60	6	2
Arsenic	7440-38-2	10	1	1
Barium	7440-39-3	200	20	10
Beryllium	7440-41-7	5	0.5	1
Cadmium	7440-43-9	5	0.5	1
Calcium	7440-70-2	5000	500	--
Chromium	7440-47-3	10	1	2
Cobalt	7440-48-4	50	5	1
Copper	7440-50-8	25	2.5	2
Iron	7439-89-6	100	10	--
Lead	7439-92-1	10	1	1
Magnesium	7439-95-4	5000	500	--
Manganese	7439-96-5	15	1.5	1
Mercury	7439-97-6	0.2	0.1	--
Nickel	7440-02-0	40	4	1
Potassium	7440-09-7	5000	500	--
Selenium	7782-49-2	35	3.5	5
Silver	7440-22-4	10	1	1
Sodium	7440-23-5	5000	500	--
Thallium	7440-28-0	25	2.5	1
Vanadium	7440-62-2	50	5	1
Zinc	7440-66-6	60	6	2
Cyanide	57-12-5	10	2.5	--

[1]The CRQLs are the minimum levels of quantitation acceptable under the contract Statement of Work (SOW).

[2]Subject to the restrictions specified in Exhibit D, any analytical method specified in ILM05.3 Exhibit D may be utilized as long as the documented Method Detection Limits (MDLs) are less than one-half the CRQLs.

[3]Mercury is analyzed by cold vapor atomic absorption. Cyanide is analyzed by colorimetry/spectrophotometry.

[4]Changes to the Inorganic Target Analyte List (TAL) (e.g., adding an additional analyte) or CRQLs may be requested under the modified analysis clause in the contract.

[5]The CRQLs for soil are based on 100% solids and on the exact weights and volumes specified in Exhibit D. Samples with less than 100% solids may have CRQLs greater than those listed in the table above.

ILM05.3 to ILM05.4
Summary of Changes

The ILM05.3 SOW document has been revised to ILM05.4 as identified in the Exhibit section(s) (and any other applicable sections within the ILM05.3 SOW) shown below. All changes identified in this document should be adhered to in conjunction with the ILM05.3 SOW as stipulated below.

Exhibit Section(s)	Revisions
Global	All references to "ILM05.3" are changed to "ILM05.4".
Exhibit A: Section 4.2.3.1	The reporting requirement has been modified as follows: The Contractor shall be responsible for completing and submitting analysis data sheets and computer-readable data on diskette or compact disc (CD) (or via an alternate means of electronic transmission approved in advance by USEPA) in a format specified in this SOW and within the time specified in Exhibit B, Section 1.1.
Exhibit B: Section 2.7	The Data in Computer-Readable Format has been modified as follows: The Contractor shall provide a computer-readable copy for all samples in the SDG, as specified in Exhibit H and delivered as specified in Exhibit B, Section 1.1. Computer-readable data deliverables shall be submitted on DOS/Windows formatted 3.5-inch high-density 1.44 MB diskette(s), compact disc (CD), or via an alternate means of electronic transmission, if approved in advance by USEPA.
Exhibit B: Section 2.7.1	Add the following to the end of the section: The CD shall be packaged and shipped in such a manner that the CD cannot be bent or folded and will not be exposed to extreme heat/cold. The CD shall be included in the same shipment as the hardcopy data, and, at a minimum, be enclosed in a CD mailer.
Exhibit C: Section 1.0	The ICP-MS CRQL in water (µg/L) for vanadium has been modified from 1 to 5.
Exhibit D: Introduction: Section 1.6.2	The temperature range for the oven has been modified to 105°C (± 5°C).

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-S77	MB5363	9/11/08	0810	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S78	MB5364	9/11/08	0815	Duplicate of sample RBS-77 for QA/QC purposes.
RBS-S79	MB5365	9/11/08	0855	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S80	MB5366	9/11/08	0820	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S81	MB5367	9/11/08	0835	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S82	MB5368	9/11/08	0830	Soil sample from the playground; depth: 0-2 in.
RBS-S83	MB5369	9/11/08	0900	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S84	MB5370	9/11/08	0850	Soil sample from the playground; depth: 0-2 in.
RBS-S85	MB5371	9/11/08	0845	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S86	MB5372	9/11/08	0825	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S87	MB5373	9/11/08	0840	Soil sample from the area around the playground; depth: 0-2 in.
RBS-S88	MB53M1	9/12/08	0911	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S89	MB53M2	9/12/08	0913	Soil sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-2 in.
RBS-S90	MB53M6	9/12/08	1051	Soil sample from the area along the Cheesequake Creek inlet, south of the eastern jetty; depth: 0-2 in.
RBS-S92	MB53M7	9/12/08	1420	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S93	MB53M8	9/12/08	1430	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S94	MB53N2	9/15/08	0935	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S95	MB53N3	9/15/08	0942	Soil sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-2 in.
RBS-S96	MB53N1	9/15/08	0936	Composite soil sample from the southern portion of the western jetty of Cheesequake inlet; depth: 0-2 in.
RBS-S97	MB53N4	9/15/08	1335	Soil sample from the Cheesequake Creek inlet western jetty; depth: 0-2 in
RBS-S98	MB53N5	9/15/08	1327	Soil sample from the Cheesequake Creek inlet western jetty; depth: 0-2 in
RBS-SED01	MB5374	9/10/08	0921	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED02	MB5375	9/10/08	0934	Duplicate of sample RBS-SED01 for QA/QC purposes.
RBS-SED03	MB5376	9/10/08	0945	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED04	MB5377	9/10/08	1002	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED05	MB5378	9/10/08	1030	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED06	MB5379	9/10/08	1048	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED07	MB5380	9/12/08	1222	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED08	MB5381	9/12/08	1229	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED09	MB5382	9/12/08	1250	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED10	MB5383	9/12/08	1310	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED11	MB5384	9/12/08	1305	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED12	MB5385	9/12/08	1330	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in. MS/MSD for QA/QC purposes.
RBS-SED13	MB5386	9/10/08	0930	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED14	MB5387	9/10/08	1000	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED15	MB5388	9/10/08	1015	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED16	MB5389	9/10/08	1040	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED17	MB5390	9/12/08	1215	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED18	MB5391	9/12/08	1220	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED19	MB5392	9/12/08	1235	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED20	MB5393	9/12/08	1250	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED21	MB5394	9/12/08	1310	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED22	MB5395	9/12/08	1325	Duplicate of sample RBS-SED21 for QA/QC purposes.
RBS-SED23	MB5396	9/12/08	1225	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED24	MB5397	9/12/08	1332	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED25	MB5398	9/12/08	1341	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED26	MB5399	9/12/08	1345	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED27	MB53A0	9/11/08	1132	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED28	MB53A1	9/11/08	1131	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED29	MB53A2	9/11/08	1136	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED30	MB53A3	9/11/08	1141	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED31	MB53A4	9/11/08	1140	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED32	MB53A5	9/11/08	1145	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in. MS/MSD for QA/QC purposes.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED33	MB53A6	9/11/08	1149	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED34	MB53A7	9/11/08	1146	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED35	MB53A8	9/11/08	1153	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED36	MB53A9	9/12/08	0927	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED37	MB53B0	9/12/08	0935	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED38	MB53B1	9/12/08	0936	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED39	MB53B2	9/12/08	0942	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED40	MB53B3	9/12/08	0942	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED41	MB53B4	9/12/08	0948	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED42	MB53B5	9/12/08	0953	Duplicate of sample RBS-SED41 for QA/QC purposes.
RBS-SED43	MB53B6	9/12/08	0948	Sediment sample from the area between the third jetty and the Cheesequal Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED44	MB53B7	9/12/08	0951	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED45	MB53B8	9/12/08	0956	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED46	MB53B9	9/12/08	0957	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED47	MB53C0	9/12/08	1004	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED48	MB53C1	9/12/08	1002	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED49	MB53C2	9/12/08	1004	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED50	MB53C3	9/12/08	1008	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED51	MB53C4	9/12/08	1012	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED52	MB53C5	9/12/08	1015	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in. MS/MSD for QA/QC purposes.
RBS-SED53	MB53C6	9/16/08	0915	Sediment sample from Cheesequake Creek inlet area on the western side of western jetty; depth: 0-3 in.
RBS-SED54	MB53C7	9/16/08	0945	Sediment sample from Cheesequake Creek inlet area on the western side of western jetty; depth: 0-3 in.
RBS-SED55	MB53C8	9/16/08	1058	Sediment sample from Cheesequake Creek inlet area on the western side of western jetty; depth: 0-3 in.
RBS-SED56	MB53C9	9/15/08	1417	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED57	MB53D0	9/15/08	1420	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED58	MB53D1	9/15/08	1432	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED59	MB53D2	9/15/08	1435	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED60	MB53D3	9/15/08	1450	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED61	MB53D4	9/15/08	1455	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED62	MB53D5	9/15/08	1457	Duplicate of sample RBS-SED61 for QA/QC purposes.
RBS-SED63	MB53D6	9/15/08	1506	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED64	MB53D7	9/15/08	1509	Sediment sample from the area west of the Cheesequake Creek inlet, west of the western jetty; depth: 0-3 in.
RBS-SED65	MB53D8	9/10/08	1359	Sediment sample from Margaret's Creek north of the footbridge; depth: 0-3 in.
RBS-SED66	MB53D9	9/10/08	1417	Sediment sample from Margaret's Creek north of the footbridge; depth: 0-3 in.
RBS-SED67	MB53E0	9/10/08	1500	Sediment sample from Margaret's Creek south of the footbridge; depth: [illegible] in.
RBS-SED68	MB53E1	9/10/08	1439	Sediment sample from Margaret's Creek south of the footbridge; depth: 0-3 in.
RBS-SED69	MB53E2	9/16/08	1445	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED70	MB53E3	9/16/08	1450	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED71	MB53E4	9/16/08	1452	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED72	MB53E5	9/16/08	1457	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in. MS/MSD for QA/QC purposes.
RBS-SED73	MB53E6	9/16/08	1458	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED74	MB53E7	9/16/08	1500	Background sediment sample from an area suspected not to be influenced by past site activities; depth: 0-3 in.
RBS-SED81	MB53L8	9/11/08	1201	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED82	MB53L9	9/11/08	1200	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED83	MB53M0	9/11/08	1208	Sediment sample from the area between the western end of the seawall and the first jetty; depth: 0-3 in.
RBS-SED84	MB53M3	9/12/08	1021	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED85	MB53M4	9/12/08	1021	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.
RBS-SED86	MB53M5	9/12/08	1030	Sediment sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty; depth: 0-3 in.

TABLE 1 (continued)
SAMPLE DESCRIPTIONS
RARITAN BAY SLAG SITE
OLD BRIDGE AND SAYREVLLE, NEW JERSEY

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
RBS-SED87	MB53M9	9/12/08	1350	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED88	MB53N0	9/12/08	1354	Sediment sample from the area between Margaret's Creek and the western end of the seawall; depth: 0-3 in.
RBS-SED89	MB53N7	9/16/08	1140	Sediment sample from Cheesequake Creek inlet area on the eastern side of western jetty; depth: 0-3 in.
RBS-SED90	MB53N8	9/16/08	1240	Sediment sample from Cheesequake Creek inlet area on the eastern side of western jetty; depth: 0-3 in.
RBS-SW01	MB53F4	9/10/08	1425	Surface water sample from the seawall at low tide.
RBS-SW01D	MB53F5	9/10/08	1430	Surface water sample from the seawall at low tide.
RBS-SW02	MB53F6	9/10/08	1432	Duplicate of sample RBS-SW01 for QA/QC purposes.
RBS-SW02D	MB53F7	9/10/08	1437	Duplicate of sample RBS-SW01D for QA/QC purposes.
RBS-SW03	MB53F8	9/10/08	1440	Surface water sample from the seawall at low tide.
RBS-SW03D	MB53F9	9/10/08	1445	Surface water sample from the seawall at low tide.
RBS-SW04	MB53G0	9/10/08	1457	Surface water sample from the seawall at low tide.
RBS-SW04D	MB53G1	9/10/08	1502	Surface water sample from the seawall at low tide.
RBS-SW05	MB53G2	9/10/08	1508	Surface water sample from the seawall at low tide.
RBS-SW05D	MB53G3	9/10/08	1513	Surface water sample from the seawall at low tide.
RBS-SW06	MB53G4	9/10/08	1517	Surface water sample from the seawall at low tide.
RBS-SW06D	MB53G5	9/10/08	1522	Surface water sample from the seawall at low tide. MS/MSD for QA/QC purposes.
RBS-SW07	MB53G6	9/10/08	1407	Surface water sample from the seawall at high tide.
RBS-SW07D	MB53G7	9/10/08	1412	Surface water sample from the seawall at high tide.
RBS-SW08	MB53G8	9/10/08	1418	Surface water sample from the seawall at high tide.
RBS-SW08D	MB53G9	9/10/08	1423	Surface water sample from the seawall at high tide.
RBS-SW09	MB53H0	9/11/08	1047	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW09D	MB53H1	9/11/08	1047	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW10	MB53H2	9/11/08	1052	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW10D	MB53H3	9/11/08	1052	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW11	MB53H4	9/11/08	1056	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW11D	MB53H5	9/11/08	1056	Activity-based surface water sample from the area between the western end of the seawall and the first jetty.
RBS-SW12	MB53H6	9/15/08	0849	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW12D	MB53H7	9/15/08	0849	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW13	MB53H8	9/15/08	0853	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.
RBS-SW13D	MB53H9	9/15/08	0853	Activity-based surface water sample from the area between the third jetty and the Cheesequake Creek inlet eastern jetty.

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB5319

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/22/08	1.00	100
MB5319	09/22/08	1.00	100
MB5320	09/22/08	1.00	100
MB5321	09/22/08	1.00	100
MB5322	09/22/08	1.00	100
MB5323	09/22/08	1.00	100
MB5324	09/22/08	1.00	100
MB5325	09/22/08	1.00	100
MB5325D	09/22/08	1.00	100
MB5325S	09/22/08	1.00	100
MB5326	09/22/08	1.00	100
MB5327	09/22/08	1.00	100
MB5328	09/22/08	1.00	100
MB5329	09/22/08	1.00	100
MB5330	09/22/08	1.00	100
MB5331	09/22/08	1.00	100
MB5332	09/22/08	1.00	100
MB5333	09/22/08	1.00	100
MB5334	09/22/08	1.00	100
MB5335	09/22/08	1.00	100
MB53M1	09/22/08	1.00	100
MB53M2	09/22/08	1.00	100
PBS01	09/22/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5319

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/25/2008 End Date: 9/25/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	18:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	18:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	18:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	18:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	18:36											X									X						
ICV01	1	18:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	18:43	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	18:47	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	18:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	18:54	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	18:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	19:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	19:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	19:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5325	1	19:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5325S	1	19:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5319	1	19:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5320	1	19:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5321	1	19:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5322	1	19:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5323	1	19:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5324	1	19:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	19:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	19:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5325D	1	19:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5325L	5	19:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5326	1	19:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5327	1	20:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5328	1	20:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5329	1	20:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5330	1	20:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	20:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	20:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	20:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	20:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	20:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

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13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5319

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/25/2008 End Date: 9/25/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
MB5331	1	20:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5332	1	20:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5333	1	20:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5334	1	20:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5335	1	20:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M1	1	20:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M2	1	20:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5325A	1	21:00		X										X							X							
CCV04	1	21:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB04	1	21:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI03	1	21:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA03	1	21:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB03	1	21:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV05	1	21:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB05	1	21:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5319

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/25/2008 End Date: 9/25/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
S0	1	18:21											X														
S	1	18:25											X														
S	1	18:29											X														
S	1	18:32											X														
S	1	18:36																									
ICB01	1	18:43											X														
CRI01	1	18:47											X														
ICSA01	1	18:51											X														
ICSAB01	1	18:54											X														
CCV01	1	18:58											X														
CCB01	1	19:02											X														
PBS01	1	19:05											X														
LCSS01	1	19:09											X														
MB5325	1	19:13											X														
MB5325S	1	19:16											X														
MB5319	1	19:20											X														
MB5320	1	19:24											X														
MB5321	1	19:27											X														
MB5322	1	19:31											X														
MB5323	1	19:35											X														
MB5324	1	19:38											X														
CCV02	1	19:42											X														
CCB02	1	19:46											X														
MB5325D	1	19:50											X														
MB5325L	5	19:53											X														
MB5326	1	19:57											X														
MB5327	1	20:01											X														
MB5328	1	20:04											X														
MB5329	1	20:08											X														
MB5330	1	20:12											X														
CRI02	1	20:15											X														
ICSA02	1	20:19											X														
ICSAB02	1	20:23											X														
CCV03	1	20:27											X														
CCB03	1	20:30											X														

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5319

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/25/2008 End Date: 9/25/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
MB5331	1	20:34											X														
MB5332	1	20:38											X														
MB5333	1	20:41											X														
MB5334	1	20:45											X														
MB5335	1	20:49											X														
MB53M1	1	20:52											X														
MB53M2	1	20:56											X														
MB5325A	1	21:00																									
CCV04	1	21:04											X														
CCB04	1	21:07											X														
CRI03	1	21:11											X														
ICSA03	1	21:15											X														
ICSAB03	1	21:18											X														
CCV05	1	21:22											X														
CCB05	1	21:26											X														

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12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB5336

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/19/08	1.00	100
MB5336	09/19/08	1.00	100
MB5337	09/19/08	1.00	100
MB5338	09/19/08	1.00	100
MB5339	09/19/08	1.00	100
MB5340	09/19/08	1.00	100
MB5380	09/19/08	1.00	100
MB5381	09/19/08	1.00	100
MB5382	09/19/08	1.00	100
MB5383	09/19/08	1.00	100
MB5384	09/19/08	1.00	100
MB5385	09/19/08	1.00	100
MB5385D	09/19/08	1.00	100
MB5385S	09/19/08	1.00	100
MB5390	09/19/08	1.00	100
MB5391	09/19/08	1.00	100
MB5392	09/19/08	1.00	100
MB5393	09/19/08	1.00	100
MB5394	09/19/08	1.00	100
MB53M5	09/19/08	1.00	100
MB53M6	09/19/08	1.00	100
PBS01	09/19/08	1.00	100

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13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5336

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
S0	1	12:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	12:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	12:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	12:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	12:35											X									X							
ICV01	1	12:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICB01	1	12:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI01	1	12:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA01	1	12:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB01	1	12:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV01	1	12:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB01	1	13:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
PBS01	1	13:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LCSS01	1	13:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5336	1	13:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5337	1	13:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5338	1	13:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5339	1	13:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5340	1	13:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5380	1	13:30	X	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB5381	1	13:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5382	1	13:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV02	1	13:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB02	1	13:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5383	1	13:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5384	1	13:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5385	1	13:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5385S	1	13:59	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
MB5385D	1	14:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5385L	5	14:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5390	1	14:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI02	1	14:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA02	1	14:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB02	1	14:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV03	1	14:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB03	1	14:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

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13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5336

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	9:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:38											X									X						
ICV01	1	9:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	9:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	9:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	9:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	9:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	10:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	10:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5391	1	10:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5392	1	10:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5393	1	10:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5394	1	10:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M5	1	10:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M6	1	10:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5385A	1	10:29		X	X							X				X				X			X	X	X			
MB5385S	3	10:33												X														
MB5380	3	10:37											X	X														
ZZZZZZ	1	10:45																										
CCV02	1	10:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	10:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	10:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	11:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	11:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	11:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	11:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5336

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	12:20												X													
S	1	12:24												X													
S	1	12:27												X													
S	1	12:31												X													
S	1	12:35																									
ICB01	1	12:42												X													
CRI01	1	12:46												X													
ICSA01	1	12:50												X													
ICSAB01	1	12:53												X													
CCV01	1	12:57												X													
CCB01	1	13:01												X													
PBS01	1	13:04												X													
LCSS01	1	13:08												X													
MB5336	1	13:12												X													
MB5337	1	13:15												X													
MB5338	1	13:19												X													
MB5339	1	13:23												X													
MB5340	1	13:26												X													
MB5380	1	13:30												X													
MB5381	1	13:34												X													
MB5382	1	13:37												X													
CCV02	1	13:41												X													
CCB02	1	13:45												X													
MB5383	1	13:48												X													
MB5384	1	13:52												X													
MB5385	1	13:56												X													
MB5385S	1	13:59												X													
MB5385D	1	14:03												X													
MB5385L	5	14:14												X													
MB5390	1	14:18												X													
CRI02	1	14:22												X													
ICSA02	1	14:25												X													
ICSAB02	1	14:29												X													
CCV03	1	14:33												X													
CCB03	1	14:36												X													

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5336

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	9:23												X													
S	1	9:26												X													
S	1	9:30												X													
S	1	9:34												X													
S	1	9:38																									
ICB01	1	9:45												X													
CRI01	1	9:49												X													
ICSA01	1	9:52												X													
ICSAB01	1	9:56												X													
CCV01	1	10:00												X													
CCB01	1	10:04												X													
MB5391	1	10:07												X													
MB5392	1	10:11												X													
MB5393	1	10:15												X													
MB5394	1	10:18												X													
MB53M5	1	10:22												X													
MB53M6	1	10:26												X													
MB5385A	1	10:29																									
MB5385S	3	10:33																									
MB5380	3	10:37																									
ZZZZZZ	1																										
CCV02	1	10:49												X													
CCB02	1	10:53												X													
CRI02	1	10:57												X													
ICSA02	1	11:01												X													
ICSAB02	1	11:04												X													
CCV03	1	11:08												X													
CCB03	1	11:12												X													

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB53A9

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/24/08	1.00	100
MB53A9	09/24/08	1.00	100
MB53B0	09/24/08	1.00	100
MB53B1	09/24/08	1.00	100
MB53B2	09/24/08	1.00	100
MB53B3	09/24/08	1.00	100
MB53B4	09/24/08	1.00	100
MB53B5	09/24/08	1.00	100
MB53B6	09/24/08	1.00	100
MB53B7	09/24/08	1.00	100
MB53B8	09/24/08	1.00	100
MB53B9	09/24/08	1.00	100
MB53C0	09/24/08	1.00	100
MB53C1	09/24/08	1.00	100
MB53C2	09/24/08	1.00	100
MB53C3	09/24/08	1.00	100
MB53C4	09/24/08	1.00	100
MB53C5	09/24/08	1.00	100
MB53C5D	09/24/08	1.00	100
MB53C5S	09/24/08	1.00	100
MB53M3	09/24/08	1.00	100
MB53M4	09/24/08	1.00	100
PBS01	09/24/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A9

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	10:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	10:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:10											X									X						
ICV01	1	11:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	11:17	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	11:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	11:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	11:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	11:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	11:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	11:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	11:43	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C5	1	11:47	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C5S	1	11:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A9	1	11:54	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B0	1	11:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B1	1	12:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B3	1	12:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B4	1	12:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B5	1	12:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B6	1	12:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	12:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	12:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B7	1	12:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B8	1	12:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53B9	1	12:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C0	1	12:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C1	1	12:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C2	1	12:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C3	1	12:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	12:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	12:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	13:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	13:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A9

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
CCB03	1	13:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53C4	1	13:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53C5D	1	13:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53C5L	5	13:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53C5A	1	13:23		X																	X								
MB53B2	1	13:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53M3	1	13:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53M4	1	13:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI03	1	13:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA03	1	13:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB03	1	13:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV04	1	13:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB04	1	13:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A9

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	10:55												X													
S	1	10:59												X													
S	1	11:03												X													
S	1	11:06												X													
S	1	11:10																									
ICB01	1	11:17												X													
CRI01	1	11:21												X													
ICSA01	1	11:25												X													
ICSAB01	1	11:29												X													
CCV01	1	11:32												X													
CCB01	1	11:36												X													
PBS01	1	11:40												X													
LCSS01	1	11:43												X													
MB53C5	1	11:47												X													
MB53C5S	1	11:51												X													
MB53A9	1	11:54												X													
MB53B0	1	11:58												X													
MB53B1	1	12:01												X													
MB53B3	1	12:05												X													
MB53B4	1	12:09												X													
MB53B5	1	12:13												X													
MB53B6	1	12:16												X													
CCV02	1	12:20												X													
CCB02	1	12:23												X													
MB53B7	1	12:27												X													
MB53B8	1	12:31												X													
MB53B9	1	12:35												X													
MB53C0	1	12:38												X													
MB53C1	1	12:42												X													
MB53C2	1	12:46												X													
MB53C3	1	12:49												X													
CRI02	1	12:53												X													
ICSA02	1	12:57												X													
ICSAB02	1	13:00												X													
CCV03	1	13:04												X													

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 / NRAS No.: SDG No.: MB53A9

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
CCB03	1	13:08												X													
MB53C4	1	13:12												X													
MB53C5D	1	13:15												X													
MB53C5L	5	13:19												X													
MB53C5A	1	13:23																									
MB53B2	1	13:26												X													
MB53M3	1	13:30												X													
MB53M4	1	13:34												X													
CRI03	1	13:37												X													
ICSA03	1	13:41												X													
ICSAB03	1	13:45												X													
CCV04	1	13:49												X													
CCB04	1	13:52												X													

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB52Y1

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/22/08	1.00	100
MB52Y1	09/22/08	1.00	100
MB52Y1D	09/22/08	1.00	100
MB52Y1S	09/22/08	1.00	100
MB52Y2	09/22/08	1.00	100
MB52Y3	09/22/08	1.00	100
MB5341	09/22/08	1.00	100
MB5342	09/22/08	1.00	100
MB5344	09/22/08	1.00	100
MB53C9	09/22/08	1.00	100
MB53D0	09/22/08	1.00	100
MB53D1	09/22/08	1.00	100
MB53D2	09/22/08	1.00	100
MB53D3	09/22/08	1.00	100
MB53D4	09/22/08	1.00	100
MB53D5	09/22/08	1.00	100
MB53D6	09/22/08	1.00	100
MB53D7	09/22/08	1.00	100
MB53N1	09/22/08	1.00	100
MB53N2	09/22/08	1.00	100
MB53N3	09/22/08	1.00	100
MB53N4	09/22/08	1.00	100
MB53N5	09/22/08	1.00	100
PBS01	09/22/08	1.00	100

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USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y1

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
S0	1	3:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:50											X									X							
ICV01	1	3:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICB01	1	3:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI01	1	4:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA01	1	4:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB01	1	4:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV01	1	4:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB01	1	4:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
PBS01	1	4:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LCSS01	1	4:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB52Y1	1	4:27	X	X		X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB52Y1S	1	4:31	X	X		X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB52Y1D	1	4:34	X	X		X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB52Y1L	5	4:38	X	X		X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB52Y2	1	4:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB52Y3	1	4:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53N1	1	4:49	X			X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB53N2	1	4:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV02	1	4:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB02	1	5:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53N3	1	5:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53C9	1	5:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53D0	1	5:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53D1	1	5:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53D2	1	5:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53D3	1	5:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI02	1	5:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI03	1	5:30																											
ICSA02	1	5:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB02	1	5:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV03	1	5:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB03	1	5:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y1

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	15:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	15:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	16:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	16:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	16:10											X									X						
ICV01	1	16:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	16:17	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	16:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	16:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	16:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	16:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	16:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Y1	30	16:49												X														
ZZZZZZ	1	16:52																										
MB53N1	30	16:56												X														
ZZZZZZ	1	17:00																										
MB52Y1	3	17:05			X								X															
MB52Y1D	3	17:08			X								X															
MB52Y1S	1	17:12			X								X															
MB52Y1L	15	17:16			X								X															
MB53D4	1	17:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53D5	1	17:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	17:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	17:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53D6	1	17:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53D7	1	17:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5341	1	17:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5342	1	17:45	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
MB5344	1	17:49	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
MB5344	10	17:52												X														
CRI02	1	17:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI03	1	18:00																										
ICSA02	1	18:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	18:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	18:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	18:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y1

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
MB53N4	1	18:19	X		X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB53N5	1	18:23	X	X		X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X				
MB52Y1A	1	18:27						X								X				X	X		X						
MB53N1	3	18:30		X	X								X																
MB53N4	3	18:34		X									X																
MB53N5	4	18:38			X								X																
MB5342	10	18:42												X															
MB53N4	100	18:45												X															
MB53N5	60	18:49												X															
MB52Y1S	40	18:53												X															
CCV04	1	18:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB04	1	19:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB52Y1D	30	19:04												X															
MB52Y1L	150	19:08												X															
CRI04	1	19:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI05	1	19:15																											
ICSA03	1	19:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB03	1	19:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV05	1	19:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB05	1	19:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

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13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y1

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																							
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR								
S0	1	3:35												X												
S	1	3:39												X												
S	1	3:42												X												
S	1	3:46												X												
S	1	3:50																								
ICB01	1	3:57												X												
CRI01	1	4:01												X												
ICSA01	1	4:04												X												
ICSAB01	1	4:08												X												
CCV01	1	4:12												X												
CCB01	1	4:15												X												
PBS01	1	4:19												X												
LCSS01	1	4:23	X				X					X		X	X	X		X								
MB52Y1	1	4:27												X												
MB52Y1S	1	4:31	X			X	X					X		X	X	X		X								
MB52Y1D	1	4:34												X												
MB52Y1L	5	4:38												X												
MB52Y2	1	4:42												X												
MB52Y3	1	4:46												X												
MB53N1	1	4:49																								
MB53N2	1	4:53												X												
CCV02	1	4:57												X												
CCB02	1	5:01												X												
MB53N3	1	5:04												X												
MB53C9	1	5:08												X												
MB53D0	1	5:12												X												
MB53D1	1	5:15												X												
MB53D2	1	5:19												X												
MB53D3	1	5:23												X												
CRI02	1	5:26												X												
CRI03	1	5:30																								
ICSA02	1	5:34												X												
ICSAB02	1	5:38												X												
CCV03	1	5:41												X												
CCB03	1	5:45												X												

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13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y1

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																									
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
S0	1	15:55												X														
S	1	15:59												X														
S	1	16:03												X														
S	1	16:06												X														
S	1	16:10																										
ICB01	1	16:17												X														
CRI01	1	16:21												X														
ICSA01	1	16:25												X														
ICSAB01	1	16:29												X														
CCV01	1	16:32												X														
CCB01	1	16:36												X														
MB52Y1	30	16:49																										
ZZZZZZ	1	16:52																										
MB53N1	30	16:56																										
ZZZZZZ	1	17:00																										
MB52Y1	3	17:05																										
MB52Y1D	3	17:08																										
MB52Y1S	1	17:12																										
MB52Y1L	15	17:16																										
MB53D4	1	17:19												X														
MB53D5	1	17:23												X														
CCV02	1	17:27												X														
CCB02	1	17:30												X														
MB53D6	1	17:34												X														
MB53D7	1	17:38												X														
MB5341	1	17:41												X														
MB5342	1	17:45												X														
MB5344	1	17:49												X														
MB5344	10	17:52																										
CRI02	1	17:56												X														
CRI03	1	18:00																										
ICSA02	1	18:04												X														
ICSAB02	1	18:07												X														
CCV03	1	18:11												X														
CCB03	1	18:15												X														

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13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y1

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/26/2008 End Date: 9/26/2008

EPA Sample NO.	D/F	Time	Analytes																							
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR								
MB53N4	1	18:19																								
MB53N5	1	18:23																								
MB52Y1A	1	18:27																								
MB53N1	3	18:30												X												
MB53N4	3	18:34												X												
MB53N5	4	18:38												X												
MB5342	10	18:42																								
MB53N4	100	18:45																								
MB53N5	60	18:49																								
MB52Y1S	40	18:53																								
CCV04	1	18:56												X												
CCB04	1	19:00												X												
MB52Y1D	30	19:04																								
MB52Y1L	150	19:08																								
CRI04	1	19:11												X												
CRI05	1	19:15																								
ICSA03	1	19:19												X												
ICSAB03	1	19:23												X												
CCV05	1	19:26												X												
CCB05	1	19:30												X												

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12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB53C6

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/22/08	1.00	100
MB53C6	09/22/08	1.00	100
MB53C7	09/22/08	1.00	100
MB53C8	09/22/08	1.00	100
MB53E2	09/22/08	1.00	100
MB53E3	09/22/08	1.00	100
MB53E4	09/22/08	1.00	100
MB53E5	09/22/08	1.00	100
MB53E5D	09/22/08	1.00	100
MB53E5S	09/22/08	1.00	100
MB53E6	09/22/08	1.00	100
MB53E7	09/22/08	1.00	100
MB53N7	09/22/08	1.00	100
MB53N8	09/22/08	1.00	100
PBS01	09/22/08	1.00	100

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13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53C6

Instrument: ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/27/2008 End Date: 9/28/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	14:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	14:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	14:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	14:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	14:56											X									X						
ICV01	1	15:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	15:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	15:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	15:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	15:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	15:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	15:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	15:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	15:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C6	1	15:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C7	1	15:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ZZZZZZ	1	15:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53C8	1	15:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E2	1	15:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E3	1	15:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E5	1	15:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E5S	1	16:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	16:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	16:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E4	1	16:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E5D	1	16:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E5L	5	16:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E5A	1	16:23			X									X														
MB53E6	1	16:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53E7	1	16:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	16:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI03	1	16:38																										
ICSA02	1	16:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	16:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	16:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	16:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53C6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/27/2008 End Date: 9/28/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	18:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	19:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	19:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	19:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	19:12											X									X						
ICV01	1	19:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	19:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	19:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	19:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	19:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	19:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	19:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53N7	1	19:43	X			X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X			
MB53N8	1	19:47	X		X	X	X	X	X	X		X			X	X			X	X	X	X	X	X	X			
MB53N7	4	19:51		X	X								X															
MB53N8	3	19:55		X							X		X					X										
MB53N8	20	19:58												X														
MB53N7	40	20:02												X														
CRI02	1	20:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI03	1	20:10																										
ICSA02	1	20:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	20:17	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	20:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	20:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53C6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/27/2008 End Date: 9/28/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	14:41												X													
S	1	14:45												X													
S	1	14:49												X													
S	1	14:52												X													
S	1	14:56																									
ICB01	1	15:04												X													
CRI01	1	15:08												X													
ICSA01	1	15:11												X													
ICSAB01	1	15:15												X													
CCV01	1	15:19												X													
CCB01	1	15:23												X													
PBS01	1	15:26												X													
LCSS01	1	15:30												X													
MB53C6	1	15:34												X													
MB53C7	1	15:38												X													
ZZZZZZ	1	15:41												X													
MB53C8	1	15:45												X													
MB53E2	1	15:49												X													
MB53E3	1	15:53												X													
MB53E5	1	15:56												X													
MB53E5S	1	16:00												X													
CCV02	1	16:04												X													
CCB02	1	16:08												X													
MB53E4	1	16:11												X													
MB53E5D	1	16:15												X													
MB53E5L	5	16:19												X													
MB53E5A	1	16:23																									
MB53E6	1	16:27												X													
MB53E7	1	16:30												X													
CRI02	1	16:34												X													
CRI03	1	16:38																									
ICSA02	1	16:42												X													
ICSAB02	1	16:46												X													
CCV03	1	16:49												X													
CCB03	1	16:53												X													

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53C6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/27/2008 End Date: 9/28/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	18:57												X													
S	1	19:01												X													
S	1	19:05												X													
S	1	19:09												X													
S	1	19:12																									
ICB01	1	19:20												X													
CRI01	1	19:24												X													
ICSA01	1	19:28												X													
ICSAB01	1	19:31												X													
CCV01	1	19:35												X													
CCB01	1	19:39												X													
MB53N7	1	19:43																									
MB53N8	1	19:47																									
MB53N7	4	19:51												X													
MB53N8	3	19:55												X													
MB53N8	20	19:58																									
MB53N7	40	20:02																									
CRI02	1	20:06												X													
CRI03	1	20:10																									
ICSA02	1	20:14												X													
ICSAB02	1	20:17												X													
CCV02	1	20:21												X													
CCB02	1	20:25												X													

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB5347

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/18/08	1.00	100
MB5347	09/18/08	1.00	100
MB5348	09/18/08	1.00	100
MB5349	09/18/08	1.00	100
MB5350	09/18/08	1.00	100
MB5374	09/18/08	1.00	100
MB5375	09/18/08	1.00	100
MB5375D	09/18/08	1.00	100
MB5375S	09/18/08	1.00	100
MB5376	09/18/08	1.00	100
MB5377	09/18/08	1.00	100
MB5378	09/18/08	1.00	100
MB5379	09/18/08	1.00	100
MB5386	09/18/08	1.00	100
MB5387	09/18/08	1.00	100
MB5388	09/18/08	1.00	100
MB5389	09/18/08	1.00	100
PBS01	09/18/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5347

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
S0	1	3:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	3:57											X									X							
ICV01	1	4:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICB01	1	4:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI01	1	4:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA01	1	4:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB01	1	4:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV01	1	4:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB01	1	4:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
PBS01	1	4:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LCSS01	1	4:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5347	1	4:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5348	1	4:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5349	1	4:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5350	1	4:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5374	1	4:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5375	1	4:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5375S	1	4:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5375D	1	5:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV02	1	5:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB02	1	5:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5375L	5	5:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5376	1	5:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5377	1	5:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5378	1	5:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5379	1	5:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5386	1	5:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5388	1	5:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI02	1	5:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA02	1	5:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB02	1	5:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV03	1	5:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB03	1	5:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5347

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
MB5387	1	5:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5389	1	5:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5375A	1	6:02												X															
ZZZZZZ	1	6:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ZZZZZZ	1	6:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ZZZZZZ	1	6:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI03	1	6:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA03	1	6:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB03	1	6:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV04	1	6:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB04	1	6:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5347

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	3:42												X													
S	1	3:46												X													
S	1	3:50												X													
S	1	3:53												X													
S	1	3:57																									
ICB01	1	4:04												X													
CRI01	1	4:08												X													
ICSA01	1	4:12												X													
ICSAB01	1	4:16												X													
CCV01	1	4:19												X													
CCB01	1	4:23												X													
PBS01	1	4:27												X													
LCSS01	1	4:30												X													
MB5347	1	4:34												X													
MB5348	1	4:38												X													
MB5349	1	4:41												X													
MB5350	1	4:45												X													
MB5374	1	4:49												X													
MB5375	1	4:52												X													
MB5375S	1	4:56												X													
MB5375D	1	5:00												X													
CCV02	1	5:03												X													
CCB02	1	5:07												X													
MB5375L	5	5:11												X													
MB5376	1	5:15												X													
MB5377	1	5:18												X													
MB5378	1	5:22												X													
MB5379	1	5:26												X													
MB5386	1	5:29												X													
MB5388	1	5:33												X													
CRI02	1	5:37												X													
ICSA02	1	5:40												X													
ICSAB02	1	5:44												X													
CCV03	1	5:48												X													
CCB03	1	5:51												X													

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5347

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																							
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR								
MB5387	1	5:55												X												
MB5389	1	5:59												X												
MB5375A	1	6:02																								
ZZZZZZ	1	6:06												X												
ZZZZZZ	1	6:10												X												
ZZZZZZ	1	6:14												X												
CRI03	1	6:18												X												
ICSA03	1	6:21												X												
ICSAB03	1	6:25												X												
CCV04	1	6:29												X												
CCB04	1	6:32												X												

LL3

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB5351

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/19/08	1.00	100
MB5351	09/19/08	1.00	100
MB5351D	09/19/08	1.00	100
MB5351S	09/19/08	1.00	100
MB5352	09/19/08	1.00	100
MB5353	09/19/08	1.00	100
MB5354	09/19/08	1.00	100
MB5355	09/19/08	1.00	100
MB53D8	09/19/08	1.00	100
MB53D9	09/19/08	1.00	100
MB53E0	09/19/08	1.00	100
MB53E1	09/19/08	1.00	100
PBS01	09/19/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5351

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
S0	1	21:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	21:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	21:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	21:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
S	1	21:43											X									X							
ICV01	1	21:47	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICB01	1	21:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI01	1	21:54	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA01	1	21:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB01	1	22:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV01	1	22:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB01	1	22:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
PBS01	1	22:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LCSS01	1	22:17	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5351	1	22:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5351S	1	22:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5351D	1	22:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5351L	5	22:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5352	1	22:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5353	1	22:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5354	1	22:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5355	1	22:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV02	1	22:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB02	1	22:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53D8	1	22:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53D9	1	23:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53E0	1	23:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB53E1	1	23:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5351A	1	23:12		X												X				X	X								
CRI02	1	23:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA02	1	23:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB02	1	23:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV03	1	23:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB03	1	23:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5351

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																									
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
S0	1	21:28												X														
S	1	21:32												X														
S	1	21:36												X														
S	1	21:40												X														
S	1	21:43																										
ICB01	1	21:51												X														
CRI01	1	21:54												X														
ICSA01	1	21:58												X														
ICSAB01	1	22:02												X														
CCV01	1	22:05												X														
CCB01	1	22:09												X														
PBS01	1	22:13												X														
LCSS01	1	22:17												X														
MB5351	1	22:20												X														
MB5351S	1	22:24												X														
MB5351D	1	22:28												X														
MB5351L	5	22:31												X														
MB5352	1	22:35												X														
MB5353	1	22:39												X														
MB5354	1	22:42												X														
MB5355	1	22:46												X														
CCV02	1	22:50												X														
CCB02	1	22:53												X														
MB53D8	1	22:57												X														
MB53D9	1	23:01												X														
MB53E0	1	23:05												X														
MB53E1	1	23:08												X														
MB5351A	1	23:12												X														
CRI02	1	23:16												X														
ICSA02	1	23:19												X														
ICSAB02	1	23:23												X														
CCV03	1	23:27												X														
CCB03	1	23:30												X														

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB5356

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/19/08	1.00	100
MB5356	09/19/08	1.00	100
MB5357	09/19/08	1.00	100
MB5358	09/19/08	1.00	100
MB5359	09/19/08	1.00	100
MB5360	09/19/08	1.00	100
MB5361	09/19/08	1.00	100
MB5362	09/19/08	1.00	100
MB5363	09/19/08	1.00	100
MB5364	09/19/08	1.00	100
MB5365	09/19/08	1.00	100
MB5365D	09/19/08	1.00	100
MB5365S	09/19/08	1.00	100
MB5366	09/19/08	1.00	100
MB5367	09/19/08	1.00	100
MB5368	09/19/08	1.00	100
MB5369	09/19/08	1.00	100
MB5370	09/19/08	1.00	100
MB5371	09/19/08	1.00	100
MB5372	09/19/08	1.00	100
MB5373	09/19/08	1.00	100
PBS01	09/19/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5356

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	17:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	17:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	17:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	17:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	17:59											X									X						
ICV01	1	18:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	18:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	18:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	18:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	18:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	18:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	18:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	18:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	18:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5356	1	18:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5357	1	18:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5358	1	18:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5359	1	18:47	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5360	1	18:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5361	1	18:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5362	1	18:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5363	1	19:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	19:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	19:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5364	1	19:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5365	1	19:17	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5365S	1	19:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5365A	1	19:24		X																X								
MB5365D	1	19:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5365L	5	19:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5366	1	19:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	19:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	19:43	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	19:47	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	19:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	19:54	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5356

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
MB5367	1	19:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5368	1	20:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5369	1	20:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5370	1	20:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5371	1	20:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5372	1	20:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5373	1	20:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI03	1	20:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA03	1	20:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB03	1	20:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV04	1	20:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB04	1	20:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5356

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	9:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	9:38											X									X						
ICV01	1	9:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	9:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	9:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	9:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	9:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	10:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	10:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ZZZZZZ	1	10:07																										
ZZZZZZ	1	10:11																										
ZZZZZZ	1	10:15																										
ZZZZZZ	1	10:18																										
ZZZZZZ	1	10:22																										
ZZZZZZ	1	10:26																										
ZZZZZZ	1	10:29																										
ZZZZZZ	3	10:33																										
ZZZZZZ	3	10:37																										
MB5365A	1	10:45														X												
CCV02	1	10:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	10:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	10:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	11:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	11:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	11:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	11:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5356

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																									
			B	AU	LI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR											
S0	1	17:44											X															
S	1	17:48											X															
S	1	17:52											X															
S	1	17:55											X															
S	1	17:59																										
ICB01	1	18:06											X															
CRI01	1	18:10											X															
ICSA01	1	18:14											X															
ICSAB01	1	18:18											X															
CCV01	1	18:21											X															
CCB01	1	18:25											X															
PBS01	1	18:29											X															
LCSS01	1	18:32											X															
MB5356	1	18:36											X															
MB5357	1	18:40											X															
MB5358	1	18:44											X															
MB5359	1	18:47											X															
MB5360	1	18:51											X															
MB5361	1	18:55											X															
MB5362	1	18:59											X															
MB5363	1	19:02											X															
CCV02	1	19:06											X															
CCB02	1	19:10											X															
MB5364	1	19:13											X															
MB5365	1	19:17											X															
MB5365S	1	19:21											X															
MB5365A	1	19:24																										
MB5365D	1	19:28											X															
MB5365L	5	19:32											X															
MB5366	1	19:35											X															
CRI02	1	19:39											X															
ICSA02	1	19:43											X															
ICSAB02	1	19:47											X															
CCV03	1	19:50											X															
CCB03	1	19:54											X															

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5356

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/22/2008

EPA Sample NO.	D/F	Time	Analytes																							
			B	AU	LI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
MB5367	1	19:58											X													
MB5368	1	20:01											X													
MB5369	1	20:05											X													
MB5370	1	20:09											X													
MB5371	1	20:13											X													
MB5372	1	20:16											X													
MB5373	1	20:20											X													
CRI03	1	20:24											X													
ICSA03	1	20:27											X													
ICSAB03	1	20:31											X													
CCV04	1	20:35											X													
CCB04	1	20:38											X													

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB5395

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/19/08	1.00	100
MB5395	09/19/08	1.00	100
MB5395D	09/19/08	1.00	100
MB5395S	09/19/08	1.00	100
MB5396	09/19/08	1.00	100
MB5397	09/19/08	1.00	100
MB5398	09/19/08	1.00	100
MB5399	09/19/08	1.00	100
MB53M7	09/19/08	1.00	100
MB53M8	09/19/08	1.00	100
MB53M9	09/19/08	1.00	100
MB53N0	09/19/08	1.00	100
PBS01	09/19/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5395

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/21/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	15:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	15:43	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	15:47	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	15:50	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	15:54											X									X						
ICV01	1	15:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	16:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	16:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	16:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	16:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	16:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	16:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	16:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	16:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5395	1	16:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5395S	1	16:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5395D	1	16:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5395A	1	16:42		X																								
MB5395L	5	16:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5396	1	16:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5397	1	16:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5398	1	16:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	17:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	17:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5399	1	17:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M7	1	17:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M8	1	17:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53M9	1	17:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53N0	1	17:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	17:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	17:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	17:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	17:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	17:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB5395

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/21/2008 End Date: 9/21/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	15:39												X													
S	1	15:43												X													
S	1	15:47												X													
S	1	15:50												X													
S	1	15:54																									
ICB01	1	16:01												X													
CRI01	1	16:05												X													
ICSA01	1	16:09												X													
ICSAB01	1	16:12												X													
CCV01	1	16:16												X													
CCB01	1	16:20												X													
PBS01	1	16:23												X													
LCSS01	1	16:27												X													
MB5395	1	16:31												X													
MB5395S	1	16:34												X													
MB5395D	1	16:38												X													
MB5395A	1	16:42																									
MB5395L	5	16:45												X													
MB5396	1	16:49												X													
MB5397	1	16:53												X													
MB5398	1	16:56												X													
CCV02	1	17:00												X													
CCB02	1	17:04												X													
MB5399	1	17:08												X													
MB53M7	1	17:11												X													
MB53M8	1	17:15												X													
MB53M9	1	17:19												X													
MB53N0	1	17:22												X													
CRI02	1	17:26												X													
ICSA02	1	17:30												X													
ICSAB02	1	17:33												X													
CCV03	1	17:37												X													
CCB03	1	17:41												X													

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB53A0

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/19/08	1.00	100
MB53A0	09/19/08	1.00	100
MB53A1	09/19/08	1.00	100
MB53A2	09/19/08	1.00	100
MB53A3	09/19/08	1.00	100
MB53A4	09/19/08	1.00	100
MB53A5	09/19/08	1.00	100
MB53A5D	09/19/08	1.00	100
MB53A5S	09/19/08	1.00	100
MB53A6	09/19/08	1.00	100
MB53A7	09/19/08	1.00	100
MB53A8	09/19/08	1.00	100
MB53L8	09/19/08	1.00	100
MB53L9	09/19/08	1.00	100
MB53M0	09/19/08	1.00	100
PBS01	09/19/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A0

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/20/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	23:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	23:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	23:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	23:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	23:49											X									X						
ICV01	1	23:53	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	23:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	0:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	0:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	0:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	0:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	0:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	0:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	0:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A0	1	0:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A1	1	0:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A2	1	0:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A3	1	0:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A4	1	0:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A5	1	0:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A5S	1	0:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A5D	1	0:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	0:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	0:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A5L	5	1:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A6	1	1:07	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
MB53A7	1	1:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A8	1	1:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53L8	1	1:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53L9	1	1:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	1:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	1:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	1:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	1:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	1:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53A5A	1	1:44		X	X															X								

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A0

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/20/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
MB53A6	2	1:47											X															
MB53M0	1	1:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI03	1	1:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA03	1	1:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB03	1	2:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV04	1	2:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB04	1	2:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A0

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/20/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
S0	1	23:34												X													
S	1	23:38												X													
S	1	23:42												X													
S	1	23:45												X													
S	1	23:49																									
ICB01	1	23:56												X													
CRI01	1	0:00												X													
ICSA01	1	0:04												X													
ICSAB01	1	0:08												X													
CCV01	1	0:11												X													
CCB01	1	0:15												X													
PBS01	1	0:19												X													
LCSS01	1	0:22												X													
MB53A0	1	0:26												X													
MB53A1	1	0:30												X													
MB53A2	1	0:33												X													
MB53A3	1	0:37												X													
MB53A4	1	0:41												X													
MB53A5	1	0:44												X													
MB53A5S	1	0:48												X													
MB53A5D	1	0:52												X													
CCV02	1	0:55												X													
CCB02	1	0:59												X													
MB53A5L	5	1:03												X													
MB53A6	1	1:07												X													
MB53A7	1	1:10												X													
MB53A8	1	1:14												X													
MB53L8	1	1:18												X													
MB53L9	1	1:21												X													
CRI02	1	1:25												X													
ICSA02	1	1:29												X													
ICSAB02	1	1:33												X													
CCV03	1	1:36												X													
CCB03	1	1:40												X													
MB53A5A	1	1:44																									

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB53A0

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/19/2008 End Date: 9/20/2008

EPA Sample NO.	D/F	Time	Analytes																									
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
MB53A6	2	1:47																										
MB53M0	1	1:51												X														
CRI03	1	1:55												X														
ICSA03	1	1:58												X														
ICSAB03	1	2:02												X														
CCV04	1	2:06												X														
CCB04	1	2:09												X														

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB52W6

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/18/08	1.00	100
MB52W5	09/18/08	1.00	100
MB52W5D	09/18/08	1.00	100
MB52W5S	09/18/08	1.00	100
MB52W6	09/18/08	1.00	100
MB52W8	09/18/08	1.00	100
MB52W9	09/18/08	1.00	100
MB52X1	09/18/08	1.00	100
MB52X4	09/18/08	1.00	100
MB52X5	09/18/08	1.00	100
MB52Y0	09/18/08	1.00	100
MB5307	09/18/08	1.00	100
MB5309	09/18/08	1.00	100
MB5310	09/18/08	1.00	100
MB5311	09/18/08	1.00	100
MB5312	09/18/08	1.00	100
MB5314	09/18/08	1.00	100
MB5315	09/18/08	1.00	100
MB5316	09/18/08	1.00	100
MB5317	09/18/08	1.00	100
MB5318	09/18/08	1.00	100
MB5319	09/18/08	1.00	100
MB5320	09/18/08	1.00	100
PBS01	09/18/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52W6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/18/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	20:58	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	21:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	21:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	21:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	21:12											X									X						
ICV01	1	21:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	21:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	21:24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	21:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	21:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	21:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	21:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ZZZZZZ	1	21:42																										
ZZZZZZ	1	21:48																										
LCSS01	1	22:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	22:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52W5	1	22:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52W5S	1	22:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52W5D	1	22:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52W6	1	22:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ZZZZZZ	1	22:34																										
MB52W8	1	22:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	22:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	22:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52W9	1	22:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52X1	1	22:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52X4	1	22:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52X5	1	22:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52X7	1	23:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB53Y0	1	23:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5307	1	23:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	23:14	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	23:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	23:22	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	23:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	23:29	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52W6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/18/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																										
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN			
MB5309	1	23:33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5310	1	23:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5311	1	23:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5312	1	23:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5313	1	23:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5314	1	23:51	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5315	1	23:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5316	1	23:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5317	1	0:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB5318	1	0:06	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV04	1	0:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB04	1	0:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MB52W5A	1	0:17		X	X											X				X					X				
MB52W5L	5	0:21	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI03	1	0:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA03	1	0:28	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB03	1	0:32	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV03	1	0:36	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB03	1	0:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52W6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/18/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																									
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
S0	1	20:58												X														
S	1	21:01												X														
S	1	21:05												X														
S	1	21:09												X														
S	1	21:12																										
ICV01	1	21:16												X														
ICB01	1	21:20												X														
CRI01	1	21:24												X														
ICSA01	1	21:27												X														
ICSAB01	1	21:31												X														
CCV01	1	21:35												X														
CCB01	1	21:38												X														
ZZZZZZ	1	21:42																										
ZZZZZZ	1	21:48																										
LCSS01	1	22:07												X														
PBS01	1	22:11												X														
MB52W5	1	22:15												X														
MB52W5S	1	22:18												X														
MB52W5D	1	22:22												X														
MB52W6	1	22:30												X														
ZZZZZZ	1	22:34																										
MB52W8	1	22:37												X														
CCV02	1	22:41												X														
CCB02	1	22:45												X														
MB52W9	1	22:48												X														
MB52X1	1	22:52												X														
MB52X4	1	22:56												X														
MB52X5	1	22:59												X														
MB52X7	1	23:03												X														
MB53Y0	1	23:07												X														
MB5307	1	23:11												X														
CRI02	1	23:14												X														
ICSA02	1	23:18												X														
ICSAB02	1	23:22												X														
CCV03	1	23:25												X														
CCB03	1	23:29												X														

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52W6

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/18/2008 End Date: 9/19/2008

EPA Sample NO.	D/F	Time	Analytes																								
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR									
MB5309	1	23:33												X													
MB5310	1	23:37												X													
MB5311	1	23:40												X													
MB5312	1	23:44												X													
MB5313	1	23:48												X													
MB5314	1	23:51												X													
MB5315	1	23:55												X													
MB5316	1	23:59												X													
MB5317	1	0:02												X													
MB5318	1	0:06												X													
CCV04	1	0:10												X													
CCB04	1	0:13												X													
MB52W5A	1	0:17																									
MB52W5L	5	0:21												X													
CRI03	1	0:25												X													
ICSA03	1	0:28												X													
ICSAB03	1	0:32												X													
CCV03	1	0:36												X													
CCB03	1	0:39												X													

USEPA - CLP

12-IN
PREPARATION LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG MB52Y7

Preparation HS1

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS01	09/22/08	1.00	100
MB52Y7	09/22/08	1.00	100
MB52Y8	09/22/08	1.00	100
MB52Y9	09/22/08	1.00	100
MB52Z0	09/22/08	1.00	100
MB52Z1	09/22/08	1.00	100
MB52Z2	09/22/08	1.00	100
MB52Z3	09/22/08	1.00	100
MB52Z4	09/22/08	1.00	100
MB52Z5	09/22/08	1.00	100
MB52Z6	09/22/08	1.00	100
MB52Z7	09/22/08	1.00	100
MB52Z8	09/22/08	1.00	100
MB52Z9	09/22/08	1.00	100
MB5300	09/22/08	1.00	100
MB5301	09/22/08	1.00	100
MB5302	09/22/08	1.00	100
MB5303	09/22/08	1.00	100
MB5304	09/22/08	1.00	100
MB5305	09/22/08	1.00	100
MB5305D	09/22/08	1.00	100
MB5305S	09/22/08	1.00	100
MB5306	09/22/08	1.00	100
PBS01	09/22/08	1.00	100

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y7

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/23/2008 End Date: 9/23/2008

EPA Sample NO.	D/F	Time	Analytes																								
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
S0	1	11:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:42	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:46	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1	11:53											X									X						
ICV01	1	11:57	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB01	1	12:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI01	1	12:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA01	1	12:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB01	1	12:12	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV01	1	12:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB01	1	12:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS01	1	12:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSS01	1	12:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Y7	1	12:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Y8	1	12:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Y9	1	12:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z0	1	12:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z1	1	12:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z2	1	12:48	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z3	1	12:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z4	1	12:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV02	1	12:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB02	1	13:03	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z5	1	13:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z6	1	13:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z7	1	13:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z8	1	13:23	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Z9	1	13:26	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5300	1	13:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI02	1	13:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI03	1	13:37	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA02	1	13:41	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB02	1	13:45	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV03	1	13:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB03	1	13:52	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-IN
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y7

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/23/2008 End Date: 9/23/2008

EPA Sample NO.	D/F	Time	Analytes																									
			AL	SB	AS	BA	BE	CD	CA	CO	CR	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	ZN	V	CN		
MB5301	1	13:56	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5302	1	14:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5303	1	14:04	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5304	1	14:07	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5305	1	14:11	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5305S	1	14:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5305P	L5	14:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5305A	1	14:24		X																	X							
MB5305L	D1	14:27	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB5306	1	14:31	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV04	1	14:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB04	1	14:38	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MB52Y9	3	14:46											X															
MB52Y8	3	14:50											X															
MB52Y9	10	14:54												X														
MB52Y8	10	14:58												X														
CRI04	1	15:01	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI05	1	15:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA03	1	15:09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB03	1	15:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV05	1	15:16	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB05	1	15:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y7

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/23/2008 End Date: 9/23/2008

EPA Sample NO.	D/F	Time	Analytes																							
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR								
S0	1	11:38												X												
S	1	11:42												X												
S	1	11:46												X												
S	1	11:49												X												
S	1	11:53																								
ICB01	1	12:00												X												
CRI01	1	12:04												X												
ICSA01	1	12:08												X												
ICSAB01	1	12:12												X												
CCV01	1	12:16												X												
CCB01	1	12:19												X												
PBS01	1	12:23												X												
LCSS01	1	12:27												X												
MB52Y7	1	12:30												X												
MB52Y8	1	12:34												X												
MB52Y9	1	12:38												X												
MB52Z0	1	12:41												X												
MB52Z1	1	12:45												X												
MB52Z2	1	12:48												X												
MB52Z3	1	12:52												X												
MB52Z4	1	12:56												X												
CCV02	1	12:59												X												
CCB02	1	13:03												X												
MB52Z5	1	13:07												X												
MB52Z6	1	13:11												X												
MB52Z7	1	13:19												X												
MB52Z8	1	13:23												X												
MB52Z9	1	13:26												X												
MB5300	1	13:30												X												
CRI02	1	13:34												X												
CRI03	1	13:37												X												
ICSA02	1	13:41												X												
ICSAB02	1	13:45												X												
CCV03	1	13:49												X												
CCB03	1	13:52												X												

USEPA - CLP

13-INB
ANALYSIS RUN LOG

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: SDG No.: MB52Y7

Instrument ICAPP 6500 Analysis Method: ILM05.4 - ICP-AES Flex

Start Date: 9/23/2008 End Date: 9/23/2008

EPA Sample NO.	D/F	Time	Analytes																									
			B	AU	LI	BI	MO	OS	PD	P	PT	SI	S	SN	SR	TI	U	ZR										
MB5301	1	13:56												X														
MB5302	1	14:00												X														
MB5303	1	14:04												X														
MB5304	1	14:07												X														
MB5305	1	14:11												X														
MB5305S	1	14:15												X														
MB5305D	1	14:18												X														
MB5305A	1	14:24																										
MB5305I	1	14:27												X														
MB5306	1	14:31												X														
CCV04	1	14:35												X														
CCB04	1	14:38												X														
MB52Y9	3	14:46																										
MB52Y8	3	14:50																										
MB52Y9	10	14:54																										
MB52Y8	10	14:58																										
CRI04	1	15:01												X														
CRI05	1	15:05												X														
ICSA03	1	15:09												X														
ICSAB03	1	15:13												X														
CCV05	1	15:16												X														
CCB05	1	15:20												X														

REFERENCE 22

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

ROC #1

TDF# 09-0045

EXT. 09-0139

DATE: 9/26/2008
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: Hazardous Waste Support Section (HWSS)/RSCC
TO: HWSS ESAT-TOPO

Attached is the following INORGANIC Data Package to be reviewed for Quality Assurance

SITE: Raritan Bay Slag **CASE #: 37836**

SDG#: MB5347, MB5351, MB5356, MB5395 **SAMPLER: W-SAT**

PROJ. CODE: RS SITE SPILL #: A205	**#SAMPLES**	**MATRIX**
LAB: BONNER OPERABLE UNIT: 00	**50**	**Soil**
TURN-AROUND-TIME: 14 day		

CERCLIS ID # : NJN000206276 **FRACTION: Metals (MA #1630.0)**

Contaminant(s) of Concern (If known)

REGION II RSCC DATA TRANSFER LOG

Relinquished By		**Received By**	
Signature	**Date/Time**	**Signature**	**Date/Time**
Robert Otto	10/1/08 1:43 pm	Dorine Christine Allin	10/1/08 1:43 pm
Dorine Christine Allin	10/2/08	C. Hanna	10/2/08
C. Hanna	11/3/08 9:25 am	Robert Otto	11/3/08 9:25 am
Robert Otto	11/3/08 3:50 pm	Hanif Shaikh	11/3/08 3:50 pm
Hanif Shaikh	11/3/08 3:52 pm	R. J. Shelley	11/3/08 3:52 pm
R. J. Shelley	11/3/08 4:25pm	Hanif Shaikh	11/3/08 4:25 pm

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5347

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-01

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 88.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3760		~~N~~ J	P
7440-36-0	Antimony	6.8 ~~2.8~~	~~J~~ U		P
7440-38-2	Arsenic	34.8			P
7440-39-3	Barium	46.7		J	P
7440-41-7	Beryllium	0.56 ~~0.21~~	~~J~~ U		P
7440-43-9	Cadmium	0.56 ~~0.19~~	~~J~~ U		P
7440-70-2	Calcium	589			P
7440-47-3	Chromium	8.3			P
7440-48-4	Cobalt	5.6 ~~1.3~~	~~J~~ U		P
7440-50-8	Copper	131		J	P
7439-89-6	Iron	13300		~~+~~	P
7439-92-1	Lead	97.8		~~N~~ J	P
7439-95-4	Magnesium	247	J		P
7439-96-5	Manganese	22.1			P
7440-02-0	Nickel	8.1			P
7440-09-7	Potassium	412	J		P
7782-49-2	Selenium	4.0 ~~1.1~~	~~J~~ U		P
7440-22-4	Silver	1.1	J		P
7440-23-5	Sodium	564 ~~126~~	~~J~~ U		P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	11.3 ~~8.3~~	~~J~~ U		P
7440-62-2	Vanadium	41.7			P
7440-66-6	Zinc	20.8			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5348

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-02

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 85.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3410		~~N~~ J	P
7440-36-0	Antimony	7.0 ~~2.5~~	~~J~~ U		P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	23.4 ~~12.2~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.58 ~~0.098~~	~~J~~ U		P
7440-43-9	Cadmium	0.58 ~~0.098~~	~~J~~ U		P
7440-70-2	Calcium	2350			P
7440-47-3	Chromium	37.3			P
7440-48-4	Cobalt	5.8 ~~2.4~~	~~J~~ U		P
7440-50-8	Copper	61.1		J	P
7439-89-6	Iron	15800		~~J~~	P
7439-92-1	Lead	62.9		~~N~~ J	P
7439-95-4	Magnesium	1570			P
7439-96-5	Manganese	82.8			P
7440-02-0	Nickel	5.4			P
7440-09-7	Potassium	352	J		P
7782-49-2	Selenium	4.1 ~~0.74~~	~~J~~ U		P
7440-22-4	Silver	0.15	J		P
7440-23-5	Sodium	58J ~~110~~	~~J~~ U		P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.7 ~~4.9~~	~~J~~ U		P
7440-62-2	Vanadium	25.4			P
7440-66-6	Zinc	50.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5349

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-03

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 89.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2120		~~N~~ J	P
7440-36-0	Antimony	120			P
7440-38-2	Arsenic	48.3			P
7440-39-3	Barium	70.9		J	P
7440-41-7	Beryllium	0.56 ~~0.11~~	~~J~~ U		P
7440-43-9	Cadmium	1.7			P
7440-70-2	Calcium	561 ~~147~~	~~J~~ U		P
7440-47-3	Chromium	9.4			P
7440-48-4	Cobalt	5.6 ~~1.5~~	~~J~~ U		P
7440-50-8	Copper	186		J	P
7439-89-6	Iron	14700		~~J~~	P
7439-92-1	Lead	10200		~~N~~ J	P
7439-95-4	Magnesium	176	J		P
7439-96-5	Manganese	52.5			P
7440-02-0	Nickel	14.8			P
7440-09-7	Potassium	458	J		P
7782-49-2	Selenium	3.9 ~~1.0~~	~~J~~ U		P
7440-22-4	Silver	0.46	J		P
7440-23-5	Sodium	561 ~~154~~	~~J~~ U		P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	313			P
7440-62-2	Vanadium	19.0			P
7440-66-6	Zinc	63.2			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5350

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-04

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 90.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1030		~~N~~ J	P
7440-36-0	Antimony	41.0			P
7440-38-2	Arsenic	17.6			P
7440-39-3	Barium	22.1 ~~9.3~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.55 ~~0.042~~	~~J~~ U		P
7440-43-9	Cadmium	0.5J ~~0.14~~	~~J~~ U		P
7440-70-2	Calcium	554 ~~56.3~~	~~J~~ U		P
7440-47-3	Chromium	4.9			P
7440-48-4	Cobalt	5.5 ~~0.30~~	~~J~~ U		P
7440-50-8	Copper	16.7		J	P
7439-89-6	Iron	6580		~~N~~	P
7439-92-1	Lead	824		~~N~~ J	P
7439-95-4	Magnesium	76.9	J		P
7439-96-5	Manganese	11.1			P
7440-02-0	Nickel	4.4 ~~1.0~~	~~J~~ U		P
7440-09-7	Potassium	228	J		P
7782-49-2	Selenium	3.9 ~~0.54~~	~~J~~ U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	554 ~~11.2~~	~~J~~ U		P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	28.1			P
7440-62-2	Vanadium	8.0			P
7440-66-6	Zinc	10.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5374

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-05

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 81.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	607		~~N~~ J	P
7440-36-0	Antimony	7.4 ~~0.33~~	~~J~~ U		P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	24.6 ~~1.3~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.62 ~~0.092~~	~~J~~ U		P
7440-43-9	Cadmium	0.62 ~~0.056~~	~~J~~ U		P
7440-70-2	Calcium	616 ~~165~~	~~J~~ U		P
7440-47-3	Chromium	5.9		J	P
7440-48-4	Cobalt	6.2 ~~0.31~~	~~J~~ U		P
7440-50-8	Copper	2.1	~~J~~	J	P
7439-89-6	Iron	9420		~~+~~ J	P
7439-92-1	Lead	9.2		~~N~~ J	P
7439-95-4	Magnesium	271	J		P
7439-96-5	Manganese	16.7			P
7440-02-0	Nickel	4.3 ~~0.74~~	~~J~~ U		P
7440-09-7	Potassium	129	J		P
7782-49-2	Selenium	4.3 ~~0.66~~	~~J~~ U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	1320			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.3 ~~1.5~~	~~J~~ U		P
7440-62-2	Vanadium	11.0			P
7440-66-6	Zinc	16.4			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5375

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-06

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 80.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	318		~~N~~ J	P
7440-36-0	Antimony	7.5	U		P
7440-38-2	Arsenic	1.3			P
7440-39-3	Barium	24.8 ~~1.1~~	~~U~~	J	P
7440-41-7	Beryllium	0.62 ~~0.035~~	~~J~~ U		P
7440-43-9	Cadmium	0.62 ~~0.049~~	~~J~~ U		P
7440-70-2	Calcium	621 ~~287~~	~~J~~ U		P
7440-47-3	Chromium	2.1		J	P
7440-48-4	Cobalt	6.2 ~~0.17~~	~~J~~ U		P
7440-50-8	Copper	1.4	~~J~~	J	P
7439-89-6	Iron	3180		~~J~~ J	P
7439-92-1	Lead	7.3		~~N~~ J	P
7439-95-4	Magnesium	224	J		P
7439-96-5	Manganese	~~6.1~~		R	P
7440-02-0	Nickel	5.0 ~~0.33~~	~~J~~ U		P
7440-09-7	Potassium	117	J		P
7782-49-2	Selenium	4.3	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	1250			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.4 ~~1.7~~	~~J~~ U		P
7440-62-2	Vanadium	6.2 ~~4.2~~	~~J~~ U		P
7440-66-6	Zinc	9.2			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5376

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-07

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 78.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1380		~~N~~ J	P
7440-36-0	Antimony	7.7 ~~1.0~~	~~J~~ U		P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	25.6 ~~3.8~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.64 ~~0.10~~	~~J~~ U		P
7440-43-9	Cadmium	0.64	U		P
7440-70-2	Calcium	639 ~~323~~	~~J~~ U		P
7440-47-3	Chromium	11.4			P
7440-48-4	Cobalt	6.4 ~~0.66~~	~~J~~ U		P
7440-50-8	Copper	7.5		J	P
7439-89-6	Iron	12100		~~J~~	P
7439-92-1	Lead	37.6		~~N~~ J	P
7439-95-4	Magnesium	639 ~~490~~	~~J~~ U		P
7439-96-5	Manganese	60.8			P
7440-02-0	Nickel	5.1 ~~1.5~~	~~J~~ U		P
7440-09-7	Potassium	262	J		P
7782-49-2	Selenium	4.5 ~~0.76~~	~~J~~ U		P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	1620			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.3 ~~4.5~~	~~J~~ U		P
7440-62-2	Vanadium	15.8			P
7440-66-6	Zinc	22.0			P

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5377

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-08

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 74.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1020		~~N~~ J	P
7440-36-0	Antimony	8.1 ~~1.7~~	~~J~~ U		P
7440-38-2	Arsenic	4.2			P
7440-39-3	Barium	26.9 ~~2.9~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.67 ~~0.13~~	~~J~~ U		P
7440-43-9	Cadmium	0.67 ~~0.11~~	~~J~~ U		P
7440-70-2	Calcium	1700			P
7440-47-3	Chromium	6.3			P
7440-48-4	Cobalt	6.7 ~~0.74~~	~~J~~ U		P
7440-50-8	Copper	7.4		J	P
7439-89-6	Iron	10500		~~N~~	P
7439-92-1	Lead	60.9		~~N~~ J	P
7439-95-4	Magnesium	532 ~~523~~	~~J~~ U		P
7439-96-5	Manganese	41.3			P
7440-02-0	Nickel	5.4 ~~1.5~~	~~J~~ U		P
7440-09-7	Potassium	262	J		P
7782-49-2	Selenium	4.7 ~~0.79~~	~~J~~ U		P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	2050			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	13.4 ~~3.3~~	~~J~~ U		P
7440-62-2	Vanadium	16.9			P
7440-66-6	Zinc	30.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5378

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-09

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 74.0

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2350		~~N~~ J	P
7440-36-0	Antimony	8.1 ~~3.8~~	~~J~~ U		P
7440-38-2	Arsenic	10.5			P
7440-39-3	Barium	22.2 ~~6.7~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.69 ~~0.40~~	~~J~~ U		P
7440-43-9	Cadmium	0.68 ~~0.32~~	~~J~~ U		P
7440-70-2	Calcium	676 ~~514~~	~~J~~ U		P
7440-47-3	Chromium	15.9			P
7440-48-4	Cobalt	2.0 ~~2.1~~	~~J~~ U		P
7440-50-8	Copper	15.1		J	P
7439-89-6	Iron	23000		~~J~~	P
7439-92-1	Lead	135		~~N~~ J	P
7439-95-4	Magnesium	716			P
7439-96-5	Manganese	56.0			P
7440-02-0	Nickel	5.4 ~~4.2~~	~~J~~ U		P
7440-09-7	Potassium	429	J		P
7782-49-2	Selenium	4.7 ~~1.0~~	~~J~~ U		P
7440-22-4	Silver	0.17	J		P
7440-23-5	Sodium	1850			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	13.J ~~5.2~~	~~J~~ U		P
7440-62-2	Vanadium	77.8			P
7440-66-6	Zinc	65.8			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5379

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-10

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 75.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2500		~~N~~ J	P
7440-36-0	Antimony	8.0 ~~6.8~~	~~J~~ U		P
7440-38-2	Arsenic	11.5			P
7440-39-3	Barium	26.5 ~~6.6~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.66 ~~0.41~~	~~J~~ U		P
7440-43-9	Cadmium	0.66 ~~0.20~~	~~J~~ U		P
7440-70-2	Calcium	3800			P
7440-47-3	Chromium	20.6			P
7440-48-4	Cobalt	6.6 ~~2.2~~	~~J~~ U		P
7440-50-8	Copper	22.9		J	P
7439-89-6	Iron	28500		~~*~~	P
7439-92-1	Lead	252		~~N~~ J	P
7439-95-4	Magnesium	907			P
7439-96-5	Manganese	87.3			P
7440-02-0	Nickel	5.3 ~~4.8~~	~~J~~ U		P
7440-09-7	Potassium	472	J		P
7782-49-2	Selenium	4.6 ~~1.1~~	~~J~~ U		P
7440-22-4	Silver	0.43	J		P
7440-23-5	Sodium	2390			P
7440-28-0	Thallium	3.3	U		P
7440-31-5	Tin	13.2 ~~10.1~~	~~J~~ U		P
7440-62-2	Vanadium	33.1			P
7440-66-6	Zinc	75.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5386

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-11

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 80.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	509		~~N~~ J	P
7440-36-0	Antimony	7.5 ~~1.6~~	~~J~~ U		P
7440-38-2	Arsenic	2.9			P
7440-39-3	Barium	24.9 ~~1.3~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.62 ~~0.062~~	~~J~~ U		P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	622 ~~93.4~~	~~J~~ U		P
7440-47-3	Chromium	4.0			P
7440-48-4	Cobalt	6.2 ~~0.28~~	~~J~~ U		P
7440-50-8	Copper	2.3 ~~J~~		J	P
7439-89-6	Iron	6990		~~J~~	P
7439-92-1	Lead	11.5		~~N~~ J	P
7439-95-4	Magnesium	622 ~~173~~	~~J~~ U		P
7439-96-5	Manganese	12.9			P
7440-02-0	Nickel	5.0 ~~0.65~~	~~J~~ U		P
7440-09-7	Potassium	102	J		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	753			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.4 ~~2.8~~	~~J~~ U		P
7440-62-2	Vanadium	9.3			P
7440-66-6	Zinc	15.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5387

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-12

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 78.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1210		~~N~~ J	P
7440-36-0	Antimony	7.7 ~~0.76~~	~~J~~ U		P
7440-38-2	Arsenic	3.5			P
7440-39-3	Barium	25.6 ~~2.9~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.64 ~~0.15~~	~~J~~ U		P
7440-43-9	Cadmium	0.64 ~~0.094~~	~~J~~ U		P
7440-70-2	Calcium	639 ~~191~~	~~J~~ U		P
7440-47-3	Chromium	20.5			P
7440-48-4	Cobalt	6.4 ~~0.52~~	~~J~~ U		P
7440-50-8	Copper	5.8		J	P
7439-89-6	Iron	14200			P
7439-92-1	Lead	22.6		~~N~~ J	P
7439-95-4	Magnesium	639 ~~395~~	~~J~~ U		P
7439-96-5	Manganese	70.8			P
7440-02-0	Nickel	5.1 ~~1.0~~	~~J~~ U		P
7440-09-7	Potassium	213	J		P
7782-49-2	Selenium	4.5 ~~0.72~~	~~J~~ U		P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	1500			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.8 ~~3.2~~	~~J~~ U		P
7440-62-2	Vanadium	15.1			P
7440-66-6	Zinc	25.1			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5388

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-13

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 74.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1320		~~N~~ J	P
7440-36-0	Antimony	8.0 ~~1.0~~	~~J~~ J		P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	26.8 ~~5.0~~	~~J~~ J	J	P
7440-41-7	Beryllium	0.67 ~~0.14~~	~~J~~ J		P
7440-43-9	Cadmium	0.67 ~~0.28~~	~~J~~ J		P
7440-70-2	Calcium	765			P
7440-47-3	Chromium	6.9			P
7440-48-4	Cobalt	6.7 ~~0.95~~	~~J~~ J		P
7440-50-8	Copper	8.0		J	P
7439-89-6	Iron	13000		~~+~~	P
7439-92-1	Lead	36.2		~~N~~ J	P
7439-95-4	Magnesium	670 ~~572~~	~~J~~ J		P
7439-96-5	Manganese	31.6			P
7440-02-0	Nickel	5.4 ~~2.0~~	~~J~~ J		P
7440-09-7	Potassium	343	J		P
7782-49-2	Selenium	4.7 ~~0.67~~	~~J~~ J		P
7440-22-4	Silver	0.17	J		P
7440-23-5	Sodium	2040			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	13.4 ~~2.8~~	~~J~~ J		P
7440-62-2	Vanadium	17.8			P
7440-66-6	Zinc	39.2			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: /

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5389

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5347

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809146-14

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 77.6

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1770		~~N~~ J	P
7440-36-0	Antimony	7.7 ~~5.9~~	~~J~~ U		P
7440-38-2	Arsenic	8.6			P
7440-39-3	Barium	25.4 ~~22.1~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.64 ~~0.30~~	~~J~~ U		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	1290			P
7440-47-3	Chromium	13.7			P
7440-48-4	Cobalt	6.6 ~~1.8~~	~~J~~ U		P
7440-50-8	Copper	18.4		J	P
7439-89-6	Iron	23300		—	P
7439-92-1	Lead	107		~~N~~ J	P
7439-95-4	Magnesium	671			P
7439-96-5	Manganese	34.4			P
7440-02-0	Nickel	5.2 ~~5.2~~	~~J~~ U		P
7440-09-7	Potassium	296	J		P
7782-49-2	Selenium	4.5 ~~1.3~~	~~J~~ U		P
7440-22-4	Silver	0.19	J		P
7440-23-5	Sodium	2200			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.7 ~~4.8~~	~~J~~ U		P
7440-62-2	Vanadium	33.3			P
7440-66-6	Zinc	71.7			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

RECEIVED
SEP 2 5 2008
HAZ. WASTE SUPPORT SEC.

SDG NARRATIVE:

SDG Number: MB5347
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 11, 2008, we received 14 soil samples under FedEx master airbill number 8541 0029 6945. Custody seals were not present, but coolers do not appear to have been tampered with in any way. Cooler temp was determined to be 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were included in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

2. The TR/COC states that soil samples should be analyzed for TM plus Sn; however, SUPRS states that soil samples should be analyzed for TM plus Sn under MA 1630.0. Please advise how to proceed.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, perform the analyses as indicated on the Scheduling Notification Form, and proceed with the analysis of the samples. The resolution will be applied to all TR/COCs received for this Case that list an incorrect analysis.

Metals
The analytical run began 9/19/2008 @ 1542 hrs. The matrix spike failed for Pb; a post spike was analyzed at twice the indigenous level for Pb.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809146-01 EPA Sample # MB5347

Date & Time 9/19/2008 @

Metals: 195.87 µg/L * (0.100 L) / (1.00 g) * 100 % / 88.6% * 1000 g / 1 kg * 1 mg / 1000 µg = 22.1 mg/kg
(Analyte Mn)

Authorized by _____
Daniel Antrim
Document Control Officer

(16)

RECEIVED
SEP 25 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB5347

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 TAT

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB5347	7) MB5376	13) MB5388	19)
2) MB5348	8) MB5377	14) MB5389	20)
3) MB5349	9) MB5378	15)	21)
4) MB5350	10) MB5379	16)	22)
5) MB5374	11) MB5386	17)	23)
6) MB5375	12) MB5387	18) 9-11-08	24) 9-11-08

MB5347
First Sample in SDG

MB5389
Last Sample in SDG

09/11/2008
First Sample Receipt Date

09/11/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-11-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Friday, September 12, 2008 11:23 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDGs MB5351 and MB53F4. The laboratory would like to perform laboratory QC on sample MB5351 for SDG MB5351 and sample MB53F4 for SDG MB53F4.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

-Discrepancies with tags, jars, and/or TR/COC-
Issue 3: The TR/COC lists the analysis as TM plus Sn or DM plus Sn; however, per scheduling the analysis should be TM plus Sn under MA 1630.0 and DM plus Sn under MA 1630.0.
Resolution 3: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, perform the analyses as indicated on the Scheduling Notification Form, and proceed with the analysis of the samples. The resolution will be applied to all TR/COCs received for this Case that list an incorrect analysis.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Beth Whitehead [mailto:bwhitehead@batco.com]
Sent: Friday, September 12, 2008 12:17 PM
To: Von Moll, Kristin
Subject: RE: Region 2 | Case 37836 | Sample Receipt

Kristin:

I am faxing the TR/COCs right now.

(18)

Thanks,

Beth Whitehead
Bonner Analytical

-----Original Message-----
From: Von Moll, Kristin [mailto:kvonmoll@fedcsc.com]
Sent: Friday, September 12, 2008 10:07 AM
To: Bethany Whitehead
Cc: Chris Bonner
Subject: RE: Region 2 | Case 37836 | Sample Receipt

Hi Beth,

Can you please send me a copy of the TR/COC(s)? If you fax it please let me know when it is faxed.

Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Friday, September 12, 2008 10:53 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 11, 2008, we received 23 soil samples and 24 water samples in 4 coolers under FedEx master airbill number 8541 0029 6945. Custody seals were not present, but coolers do not appear to have been tampered with in any way. Cooler temps were determined to be 5.5°C or 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were included in this shipment. Please advise.

2. No QC is listed on the TR/COC for SDG MB5351. We would like to use MB5351 as QC. Please advise if this is acceptable.

3. No QC is listed on the TR/COC for SDG MB53F4. We would like to use MB53F4 as QC. Please advise if this is acceptable.

4. The TR/COC states that soil samples should be analyzed for TM plus Sn; however, SUPRS states that soil samples should be analyzed for TM plus Sn under MA 1630.0. Please advise how to proceed.

5. The TR/COC states that some water samples should be analyzed for TM and others for TM plus Sn; however, SUPRS states that water samples should be analyzed for TM plus Sn under MA 1630.0. Please advise how to proceed.

(19)

Thanks,

Beth Whitehead
Bonner Analytical

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5351

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-01

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 90.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7060		~~E~~ J	P
7440-36-0	Antimony	6.7	U	~~N~~ J	P
7440-38-2	Arsenic	4.5			P
7440-39-3	Barium	25.3		~~E~~ J	P
7440-41-7	Beryllium	0.43	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.33	~~J~~	~~N~~	P
7440-70-2	Calcium	1500		~~E~~	P
7440-47-3	Chromium	11.1		~~E~~	P
7440-48-4	Cobalt	3.1	~~J~~	~~E~~	P
7440-50-8	Copper	22.3		~~E~~	P
7439-89-6	Iron	13300		~~E~~	P
7439-92-1	Lead	29.8		~~E~~	P
7439-95-4	Magnesium	2040		~~E~~	P
7439-96-5	Manganese	166		~~E~~	P
7440-02-0	Nickel	12.6		~~E~~	P
7440-09-7	Potassium	879		~~E~~	P
7782-49-2	Selenium	0.81	~~J~~	~~N~~	P
7440-22-4	Silver	1.1	U	~~N~~ U	P
7440-23-5	Sodium	816		~~E~~ J	P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	~~1.3~~ 11.1	~~J~~ U	~~N~~ J	P
7440-62-2	Vanadium	22.1		~~E~~ J	P
7440-66-6	Zinc	37.9		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5352

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-02

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 85.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3890		~~E~~ J	P
7440-36-0	Antimony	7.1	U	~~N~~ J	P
7440-38-2	Arsenic	3.8			P
7440-39-3	Barium	18.7	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.052	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.020	~~J~~	~~N~~	P
7440-70-2	Calcium	3860		~~E~~	P
7440-47-3	Chromium	10		~~E~~	P
7440-48-4	Cobalt	1.3	~~J~~	~~E~~	P
7440-50-8	Copper	12.0		~~E~~	P
7439-89-6	Iron	11300		~~E~~	P
7439-92-1	Lead	30.3		~~E~~	P
7439-95-4	Magnesium	933		~~E~~	P
7439-96-5	Manganese	58.2		~~E~~	P
7440-02-0	Nickel	3.5	~~J~~	~~E~~	P
7440-09-7	Potassium	491	~~J~~	~~E~~	P
7782-49-2	Selenium	0.93	~~J~~	~~N~~	P
7440-22-4	Silver	0.16	~~J~~	~~N~~ V	P
7440-23-5	Sodium	58.2 ~~98.1~~	~~J~~ V	~~E~~ J	P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.2 ~~1.9~~	~~J~~ V	~~N~~ J	P
7440-62-2	Vanadium	18.4		~~E~~ J	P
7440-66-6	Zinc	29.0		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5353

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-03

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 78.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5770		~~E~~ J	P
7440-36-0	Antimony	0.42	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	2.9			P
7440-39-3	Barium	43.9		~~E~~ J	P
7440-41-7	Beryllium	0.050	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.19	~~J~~	~~N~~	P
7440-70-2	Calcium	6490		~~E~~	P
7440-47-3	Chromium	16.4		~~E~~	P
7440-48-4	Cobalt	2.5	~~J~~	~~E~~	P
7440-50-8	Copper	29.8		~~E~~	P
7439-89-6	Iron	9520		~~E~~	P
7439-92-1	Lead	49.3		~~E~~	P
7439-95-4	Magnesium	1740		~~E~~	P
7439-96-5	Manganese	162		~~E~~	P
7440-02-0	Nickel	9.0		~~E~~	P
7440-09-7	Potassium	707		~~E~~	P
7782-49-2	Selenium	0.87	~~J~~	~~N~~	P
7440-22-4	Silver	0.67	~~U~~	~~N~~ U	P
7440-23-5	Sodium	63.5 ~~113~~	~~J~~ U	~~E~~ J	P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.7 ~~3.8~~	~~J~~ U	~~N~~ J	P
7440-62-2	Vanadium	20.1		~~E~~ J	P
7440-66-6	Zinc	60.3		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5354

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-04

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 95.1

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4900		~~E~~ J	P
7440-36-0	Antimony	0.36	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	7.2			P
7440-39-3	Barium	26.3		~~E~~ J	P
7440-41-7	Beryllium	0.29	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.53	U	~~N~~	P
7440-70-2	Calcium	879		~~E~~	P
7440-47-3	Chromium	19.2		~~E~~	P
7440-48-4	Cobalt	1.9	~~J~~	~~E~~	P
7440-50-8	Copper	14.0		~~E~~	P
7439-89-6	Iron	19600		~~E~~	P
7439-92-1	Lead	31.5		~~E~~	P
7439-95-4	Magnesium	904		~~E~~	P
7439-96-5	Manganese	52.1		~~E~~	P
7440-02-0	Nickel	5.0		~~E~~	P
7440-09-7	Potassium	822		~~E~~	P
7782-49-2	Selenium	0.95	~~J~~	~~N~~	P
7440-22-4	Silver	1.1	U	~~N~~ V	P
7440-23-5	Sodium	526 ~~115~~	J U	~~E~~ J	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~1.8~~	J U	~~N~~ J	P
7440-62-2	Vanadium	28.4		~~E~~ J	P
7440-66-6	Zinc	25.6		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5355

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-05

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 81.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5160		~~E~~ J	P
7440-36-0	Antimony	7.4	U	~~N~~ J	P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	28.3		~~E~~	P
7440-41-7	Beryllium	0.30	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.62	U	~~N~~	P
7440-70-2	Calcium	1310		~~E~~	P
7440-47-3	Chromium	15.5		~~E~~	P
7440-48-4	Cobalt	2.9	~~J~~	~~E~~	P
7440-50-8	Copper	13.9		~~E~~	P
7439-89-6	Iron	17500		~~E~~	P
7439-92-1	Lead	28.4		~~E~~	P
7439-95-4	Magnesium	1120		~~E~~	P
7439-96-5	Manganese	78.4		~~E~~	P
7440-02-0	Nickel	6.1		~~E~~	P
7440-09-7	Potassium	862		~~E~~	P
7782-49-2	Selenium	0.93	~~J~~	~~N~~	P
7440-22-4	Silver	1.2	U	~~N~~ ✓	P
7440-23-5	Sodium	617 ~~161~~	~~J~~ ✓	~~E~~ J	P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.3 ~~2.1~~	~~J~~ ✓	~~N~~ J	P
7440-62-2	Vanadium	28.3		E J	P
7440-66-6	Zinc	35.1		E J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-06

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 78.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	731		~~E~~ J	P
7440-36-0	Antimony	0.63	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	2.8			P
7440-39-3	Barium	1.4	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.036	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.64	U	~~N~~	P
7440-70-2	Calcium	636 ~~173~~	~~J~~ U	~~E~~	P
7440-47-3	Chromium	4.4		~~E~~	P
7440-48-4	Cobalt	0.16	~~J~~	~~E~~	P
7440-50-8	Copper	3.7		~~E~~	P
7439-89-6	Iron	9460		~~E~~	P
7439-92-1	Lead	23.8		~~E~~	P
7439-95-4	Magnesium	260	~~J~~	~~E~~	P
7439-96-5	Manganese	21.5		~~E~~	P
7440-02-0	Nickel	0.67	~~J~~	~~E~~	P
7440-09-7	Potassium	132	~~J~~	~~E~~	P
7782-49-2	Selenium	0.70	~~J~~	~~N~~	P
7440-22-4	Silver	0.24	~~J~~	~~N~~	P
7440-23-5	Sodium	636 ~~144~~	~~J~~ U	~~E~~ J	P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.7 ~~2.0~~	~~J~~ U	~~N~~ J	P
7440-62-2	Vanadium	13.0		~~E~~ J	P
7440-66-6	Zinc	24.3		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-07

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 82.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2390		~~E~~ J	P
7440-36-0	Antimony	1.8	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	13.8			P
7440-39-3	Barium	5.6	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.34	~~J~~	~~E~~	P
7440-43-9	Cadmium	0.61	U	~~N~~	P
7440-70-2	Calcium	639		~~E~~	P
7440-47-3	Chromium	21.0		~~E~~	P
7440-48-4	Cobalt	1.5	~~J~~	~~E~~	P
7440-50-8	Copper	13.9		~~E~~	P
7439-89-6	Iron	51300		~~E~~	P
7439-92-1	Lead	23.8		~~E~~	P
7439-95-4	Magnesium	480	~~J~~	~~E~~	P
7439-96-5	Manganese	172		~~E~~	P
7440-02-0	Nickel	3.8	~~U~~	~~E~~	P
7440-09-7	Potassium	389	~~U~~	~~E~~	P
7782-49-2	Selenium	0.98	~~U~~	~~N~~	P
7440-22-4	Silver	0.20	~~J~~	~~N~~ V	P
7440-23-5	Sodium	607 ~~189~~	~~J~~ U	~~E~~ J	P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	12.1 ~~2.5~~	~~J~~ U	~~N~~ J	P
7440-62-2	Vanadium	45.3		~~E~~ J	P
7440-66-6	Zinc	58.3		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-08

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 44.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12400		~~E~~ J	P
7440-36-0	Antimony	2.1	~~J~~	~~N~~	P
7440-38-2	Arsenic	16.1			P
7440-39-3	Barium	36.2	~~J~~	~~E~~	P
7440-41-7	Beryllium	0.61	~~J~~	~~E~~	P
7440-43-9	Cadmium	1.1	U	~~N~~	P
7440-70-2	Calcium	1120 ~~861~~	~~J~~ V	~~E~~	P
7440-47-3	Chromium	34.6		~~E~~	P
7440-48-4	Cobalt	2.0	~~J~~	~~E~~	P
7440-50-8	Copper	53.8		~~E~~	P
7439-89-6	Iron	34600		~~E~~	P
7439-92-1	Lead	279		~~E~~	P
7439-95-4	Magnesium	1690		~~E~~	P
7439-96-5	Manganese	42.3		~~E~~	P
7440-02-0	Nickel	6.4	~~J~~	~~E~~	P
7440-09-7	Potassium	1460		~~E~~	P
7782-49-2	Selenium	2.2	~~J~~	~~N~~	P
7440-22-4	Silver	0.27	~~J~~	~~N~~	P
7440-23-5	Sodium	3530		~~E~~	P
7440-28-0	Thallium	5.6	U		P
7440-31-5	Tin	22.4 ~~9.4~~	~~J~~ V	~~N~~	P
7440-62-2	Vanadium	56.3		~~E~~ V	P
7440-66-6	Zinc	43.7		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5351

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809147-09

Level: (low/med) LOW Date Received: 09/11/2008

% Solids 46.5

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3780		~~E~~ J	P
7440-36-0	Antimony	0.72	~~J~~	~~N~~	P
7440-38-2	Arsenic	6.9			P
7440-39-3	Barium	14.0	~~J~~	~~E~~	P
7440-41-7	Beryllium	0.19	~~J~~	~~E~~	P
7440-43-9	Cadmium	1.1	U	~~N~~	P
7440-70-2	Calcium	1080 ~~950~~	~~J~~ U	~~E~~	P
7440-47-3	Chromium	15.3		~~E~~	P
7440-48-4	Cobalt	2.0	~~J~~	~~E~~	P
7440-50-8	Copper	62.7		~~E~~	P
7439-89-6	Iron	12400		~~E~~	P
7439-92-1	Lead	79.4		~~E~~	P
7439-95-4	Magnesium	1220		~~E~~	P
7439-96-5	Manganese	87.1		~~E~~	P
7440-02-0	Nickel	26.3		~~E~~	P
7440-09-7	Potassium	690	~~J~~	~~E~~	P
7782-49-2	Selenium	1.2	~~J~~	~~N~~	P
7440-22-4	Silver	0.61	~~J~~	~~N~~	P
7440-23-5	Sodium	1080 ~~998~~	~~J~~ U	~~E~~	P
7440-28-0	Thallium	5.4	U		P
7440-31-5	Tin	21.5 ~~5.4~~	~~J~~ U	~~N~~	P
7440-62-2	Vanadium	21.3		~~E~~ V	P
7440-66-6	Zinc	45.6		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

RECEIVED
SEP 25 2008
HAZ. WASTE SUPPORT SEC.

SDG NARRATIVE:

SDG Number: MB5351
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 11, 2008, we received 9 soil samples under FedEx master airbill number 8541 0029 6945. Custody seals were not present, but coolers do not appear to have been tampered with in any way. Cooler temp was determined to be 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were included in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

2. No QC is listed on the TR/COC for SDG MB5351. We would like to use MB5351 as QC. Please advise if this is acceptable.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

3. The TR/COC states that soil samples should be analyzed for TM plus Sn; however, SUPRS states that soil samples should be analyzed for TM plus Sn under MA 1630.0. Please advise how to proceed.
Resolution 3: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, perform the analyses as indicated on the Scheduling Notification Form, and proceed with the analysis of the samples. The resolution will be applied to all TR/COCs received for this Case that list an incorrect analysis.

Metals
The analytical run began 9/19/2008 @ 2128 hrs. The serial dilution was made improperly; the serial dilution was remade and parent, duplicate, matrix spike and serial dilution were reanalyzed. The reanalysis of the serial dilution had the same results as the initial analysis; the original data was reported. The matrix spike failed for Ag, Sb, Se, Sn and Mn; a post spike was analyzed at twice the indigenous level for Mn and at twice the CRQL for Ag, Sb, Se and Sn.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809147-01 EPA Sample # MB5351

Date & Time 9/19/2008 @ 2220

Metals: 6350 µg/L * (0.100 L) / (1.00 g) * 100 % / 90 % * 1000 g / 1 kg * 1 mg / 1000 µg = 7060 mg/Kg

(Analyte Al)

Authorized by _____
Daniel Antrim
Document Control Officer

RECEIVED
SEP 25 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB5351

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 TAT

Modified Analysis (if applicable):

Modification Reference No.: 1630, D

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB5351	7) MB53D9	13)	19)
2) MB5352	8) MB53E0	14)	20)
3) MB5353	9) MB53E1	15)	21)
4) MB5354	10)	16)	22)
5) MB5355	11)	17)	23)
6) MB53D8	12) 9-11-08	18)	24) 9-11-08

MB5351	MB53E1
First Sample in SDG	**Last Sample in SDG**
09/11/2008	09/11/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature **Date** 9-11-08

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Friday, September 12, 2008 11:23 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDGs MB5351 and MB53F4. The laboratory would like to perform laboratory QC on sample MB5351 for SDG MB5351 and sample MB53F4 for SDG MB53F4.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

-Discrepancies with tags, jars, and/or TR/COC-
Issue 3: The TR/COC lists the analysis as TM plus Sn or DM plus Sn; however, per scheduling the analysis should be TM plus Sn under MA 1630.0 and DM plus Sn under MA 1630.0.
Resolution 3: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, perform the analyses as indicated on the Scheduling Notification Form, and proceed with the analysis of the samples. The resolution will be applied to all TR/COCs received for this Case that list an incorrect analysis.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

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From: Beth Whitehead [mailto:bwhitehead@batco.com]
Sent: Friday, September 12, 2008 12:17 PM
To: Von Moll, Kristin
Subject: RE: Region 2 | Case 37836 | Sample Receipt

Kristin:

I am faxing the TR/COCs right now.

Thanks,

Beth Whitehead
Bonner Analytical

-----Original Message-----
From: Von Moll, Kristin [mailto:kvonmoll@fedcsc.com]
Sent: Friday, September 12, 2008 10:07 AM
To: Bethany Whitehead
Cc: Chris Bonner
Subject: RE: Region 2 | Case 37836 | Sample Receipt

Hi Beth,

Can you please send me a copy of the TR/COC(s)? If you fax it please let me know when it is faxed.

Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Friday, September 12, 2008 10:53 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 11, 2008, we received 23 soil samples and 24 water samples in 4 coolers under FedEx master airbill number 8541 0029 6945. Custody seals were not present, but coolers do not appear to have been tampered with in any way. Cooler temps were determined to be 5.5°C or 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were included in this shipment. Please advise.

2. No QC is listed on the TR/COC for SDG MB5351. We would like to use MB5351 as QC. Please advise if this is acceptable.

3. No QC is listed on the TR/COC for SDG MB53F4. We would like to use MB53F4 as QC. Please advise if this is acceptable.

4. The TR/COC states that soil samples should be analyzed for TM plus Sn; however, SUPRS states that soil samples should be analyzed for TM plus Sn under MA 1630.0. Please advise how to proceed.

5. The TR/COC states that some water samples should be analyzed for TM and others for TM plus Sn; however, SUPRS states that water samples should be analyzed for TM plus Sn under MA 1630.0. Please advise how to proceed.

Thanks,

Beth Whitehead
Bonner Analytical

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5356

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-01

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 90.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	890			P
7440-36-0	Antimony	6.7 ~~0.67~~	~~JV~~	~~N~~ J	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	22.2 ~~5.6~~	~~JV~~		P
7440-41-7	Beryllium	0.55 ~~0.042~~	~~JV~~		P
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	555 ~~286~~	~~JV~~		P
7440-47-3	Chromium	3.6			P
7440-48-4	Cobalt	5.5 ~~0.22~~	~~JV~~		P
7440-50-8	Copper	3.9			P
7439-89-6	Iron	4050			P
7439-92-1	Lead	47.2		~~E~~ J	P
7439-95-4	Magnesium	118	J		P
7439-96-5	Manganese	12.4		~~N~~ J	P
7440-02-0	Nickel	0.64	J		P
7440-09-7	Potassium	179	J		P
7782-49-2	Selenium	0.52 ~~3.9~~	~~UJ~~	~~N~~ J	P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	8.8	J		P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	11.1 ~~7.6~~	~~JV~~		P
7440-62-2	Vanadium	6.8			P
7440-66-6	Zinc	8.3		~~E~~ J	P

CS 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5357

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-02

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 27.9

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	930		J	P
7440-36-0	Antimony	21.5	U	~~N~~	P
7440-38-2	Arsenic	0.84 ~~3.6~~	~~U~~ J		P
7440-39-3	Barium	71.7 ~~67.7~~	~~J~~ J		P
7440-41-7	Beryllium	1.8	U		P
7440-43-9	Cadmium	1.8 ~~1.0~~	~~U~~ J		P
7440-70-2	Calcium	9890			P
7440-47-3	Chromium	5.0			P
7440-48-4	Cobalt	17.9 ~~0.71~~	~~J~~ J		P
7440-50-8	Copper	16.1			P
7439-89-6	Iron	3260			P
7439-92-1	Lead	34.3		~~E~~	P
7439-95-4	Magnesium	888	~~J~~		P
7439-96-5	Manganese	319		~~N~~	P
7440-02-0	Nickel	2.9	~~J~~		P
7440-09-7	Potassium	513	~~J~~		P
7782-49-2	Selenium	1.4 ~~12.5~~	~~U~~ J	~~N~~	P
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	124	~~J~~		P
7440-28-0	Thallium	9.0	U		P
7440-31-5	Tin	35.8 ~~5.0~~	~~J~~ J		P
7440-62-2	Vanadium	17.9 ~~4.9~~	~~J~~ J	J	P
7440-66-6	Zinc	64.4		~~E~~ J	P

cs 1-12-10

cs 10/21/09

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5358

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-03

Level: (low/med) LOW Date Received: 09/12/2008

% Solids (27.2)

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1130		J	P
7440-36-0	Antimony	22.1	U	~~N~~	P
7440-38-2	Arsenic	1.3 ~~3.7~~	~~UJ~~		P
7440-39-3	Barium	73.5 ~~70.3~~	~~J~~ U		P
7440-41-7	Beryllium	1.8 ~~0.057~~	~~J~~ U		P
7440-43-9	Cadmium	1.8 ~~1.0~~	~~J~~ U		P
7440-70-2	Calcium	10600			P
7440-47-3	Chromium	5.7			P
7440-48-4	Cobalt	18.4 ~~0.79~~	~~J~~ U		P
7440-50-8	Copper	15.7			P
7439-89-6	Iron	4310			P
7439-92-1	Lead	37.2		~~B~~	P
7439-95-4	Magnesium	807	~~J~~		P
7439-96-5	Manganese	357		~~N~~	P
7440-02-0	Nickel	2.9	~~J~~		P
7440-09-7	Potassium	542	~~J~~		P
7782-49-2	Selenium	1.9 ~~12.9~~	~~U~~ J	~~N~~	P
7440-22-4	Silver	3.7 ~~0.37~~ ~~3.7~~	~~U~~ J	V	P
7440-23-5	Sodium	117	~~J~~		P
7440-28-0	Thallium	9.2	U		P
7440-31-5	Tin	36.8 ~~4.3~~	~~J~~ U		P
7440-62-2	Vanadium	18.4 ~~5.6~~	~~J~~ U	V	P
7440-66-6	Zinc	69.3		~~B~~ J	P

cj 10/31/08

cs
cs 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5359

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-04

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 22.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	863		J	P
7440-36-0	Antimony	26.9	U	~~N~~	P
7440-38-2	Arsenic	1.5 ~~4.5~~	~~U~~ J		P
7440-39-3	Barium	89.7 ~~60.1~~	~~J~~ J		P
7440-41-7	Beryllium	2.2	U		P
7440-43-9	Cadmium	2.2 ~~0.46~~	~~J~~ J		P
7440-70-2	Calcium	8530			P
7440-47-3	Chromium	5.5			P
7440-48-4	Cobalt	22.4 ~~0.71~~	~~J~~ J		P
7440-50-8	Copper	16.5			P
7439-89-6	Iron	3100			P
7439-92-1	Lead	23.7		~~E~~	P
7439-95-4	Magnesium	683	~~J~~		P
7439-96-5	Manganese	361		~~N~~	P
7440-02-0	Nickel	1.9	~~J~~		P
7440-09-7	Potassium	532	~~J~~		P
7782-49-2	Selenium	1.6 ~~5.7~~	~~U~~ J	~~N~~	P
7440-22-4	Silver	4.5 ~~0.65~~ 4.5	~~U~~ J J		P
7440-23-5	Sodium	111	~~J~~		P
7440-28-0	Thallium	11.2	U		P
7440-31-5	Tin	44.8 ~~5.3~~	~~U~~ J		P
7440-62-2	Vanadium	22.4 ~~3.9~~	~~J~~ J	J	P
7440-66-6	Zinc	56.5		~~E~~ J	P

CS 10/31/08

CS 10/31/08

CS

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5360

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-05

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 19.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1740		J	P
7440-36-0	Antimony	30.5	U	~~N~~	P
7440-38-2	Arsenic	5.1	U		P
7440-39-3	Barium	102 ~~75.2~~	~~J~~ J		P
7440-41-7	Beryllium	2.5	U		P
7440-43-9	Cadmium	2.5 ~~0.51~~	~~J~~ J		P
7440-70-2	Calcium	8370			P
7440-47-3	Chromium	5.1 ~~4.8~~	~~J~~ J		P
7440-48-4	Cobalt	25.4 ~~0.63~~	~~J~~ J		P
7440-50-8	Copper	13.8			P
7439-89-6	Iron	3630			P
7439-92-1	Lead	24.8		~~B~~	P
7439-95-4	Magnesium	718	~~J~~		P
7439-96-5	Manganese	196		~~N~~	P
7440-02-0	Nickel	2.1	~~J~~		P
7440-09-7	Potassium	535	~~J~~		P
7782-49-2	Selenium	2.1 ~~17.8~~	~~U~~ J	~~N~~	P
7440-22-4	Silver	5.1 ~~0.64~~ ~~5.1~~	~~U~~ J J		P
7440-23-5	Sodium	129	~~J~~		P
7440-28-0	Thallium	12.7	U		P
7440-31-5	Tin	50.8 ~~5.3~~	~~J~~ J		P
7440-62-2	Vanadium	25.4 ~~6.6~~	~~J~~ J	J	P
7440-66-6	Zinc	50.2		~~B~~ J	P

cs 10/31/08
cs

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5361

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-06

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 87.7

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	378		J	P
7440-36-0	Antimony	21.7	U	~~N~~	P
7440-38-2	Arsenic	3.6	U		P
7440-39-3	Barium	72.2 ~~49.6~~	~~J~~ V		P
7440-41-7	Beryllium	1.8	U		P
7440-43-9	Cadmium	1.8 ~~0.29~~	~~J~~ V		P
7440-70-2	Calcium	10900			P
7440-47-3	Chromium	3.6 ~~1.5~~ ~~3.6~~	~~UJ~~ U		P
7440-48-4	Cobalt	18.1 ~~0.46~~	~~J~~ V		P
7440-50-8	Copper	9.0	~~J~~		P
7439-89-6	Iron	2600			P
7439-92-1	Lead	8.9		~~E~~	P
7439-95-4	Magnesium	557	~~J~~		P
7439-96-5	Manganese	319		~~N~~	P
7440-02-0	Nickel	1.2	~~J~~		P
7440-09-7	Potassium	475	~~J~~		P
7782-49-2	Selenium	1.5 ~~12.6~~	~~UJ~~	~~N~~	P
7440-22-4	Silver	3.6 ~~0.49~~ ~~3.6~~	~~UJ~~ U		P
7440-23-5	Sodium	100	~~J~~		P
7440-28-0	Thallium	9.0	U		P
7440-31-5	Tin	36.1 ~~4.7~~	~~J~~ V		P
7440-62-2	Vanadium	18.1 ~~1.6~~	~~J~~ V	V	P
7440-66-6	Zinc	126		~~E~~ J	P

cs 10/31/08

cs 10/31/08

cs

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5362

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-07

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 25.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	760		J	P
7440-36-0	Antimony	23.6	U	~~N~~	P
7440-38-2	Arsenic	3.9	U		P
7440-39-3	Barium	78.7 ~~66.3~~	~~J~~ J		P
7440-41-7	Beryllium	2.0	U		P
7440-43-9	Cadmium	2.4			P
7440-70-2	Calcium	9570			P
7440-47-3	Chromium	3.9 ~~3.9~~	~~J~~ J		P
7440-48-4	Cobalt	19.7 ~~0.51~~	~~J~~ J		P
7440-50-8	Copper	14.5			P
7439-89-6	Iron	2290			P
7439-92-1	Lead	33.7		~~E~~	P
7439-95-4	Magnesium	729	~~J~~		P
7439-96-5	Manganese	358		~~N~~	P
7440-02-0	Nickel	2.3	~~J~~		P
7440-09-7	Potassium	505	~~J~~		P
7782-49-2	Selenium	2.1 ~~13.8~~	~~U~~ J	~~N~~	P
7440-22-4	Silver	3.9	U		P
7440-23-5	Sodium	129	~~J~~		P
7440-28-0	Thallium	9.8	U		P
7440-31-5	Tin	39.4 ~~4.9~~	~~J~~ J		P
7440-62-2	Vanadium	19.2 ~~3.9~~	~~J~~ J	J	P
7440-66-6	Zinc	59.3		~~E~~ J	P

S 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
J MB5363

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-08

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 84.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2800			P
7440-36-0	Antimony	7.1 ~~0.49~~ 7.1	~~UJ~~ V	~~N~~ J	P
7440-38-2	Arsenic	5.3			P
7440-39-3	Barium	23.8 ~~13.2~~	~~J~~ V		P
7440-41-7	Beryllium	0.59 ~~0.14~~	~~J~~ V		P
7440-43-9	Cadmium	0.59 ~~0.060~~	~~J~~ V		P
7440-70-2	Calcium	634			P
7440-47-3	Chromium	12.5			P
7440-48-4	Cobalt	5.9 ~~0.91~~	~~J~~ V		P
7440-50-8	Copper	10.1			P
7439-89-6	Iron	14500		J	P
7439-92-1	Lead	34.5		~~E~~ J	P
7439-95-4	Magnesium	405	J		P
7439-96-5	Manganese	43.6		~~N~~ J	P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	425	J		P
7782-49-2	Selenium	0.71 ~~4.2~~	~~UJ~~	~~N~~ J	P
7440-22-4	Silver	1.2 ~~0.23~~	~~J~~ V		P
7440-23-5	Sodium	17.5	J		P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	11.9 ~~1.6~~	~~J~~ V		P
7440-62-2	Vanadium	19.0			P
7440-66-6	Zinc	19.9		~~E~~ J	P

CS 10/31/08

CS 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5364

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-09

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 83.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2690			P
7440-36-0	Antimony	7.2 ~~0.43~~ 7.2	~~UJ~~ V	~~N~~ J	P
7440-38-2	Arsenic	4.5			P
7440-39-3	Barium	24.0 ~~13.8~~	~~J~~ V		P
7440-41-7	Beryllium	0.60 ~~0.12~~	~~J~~ V		P
7440-43-9	Cadmium	0.60 ~~0.047~~	~~J~~ V		P
7440-70-2	Calcium	708			P
7440-47-3	Chromium	8.8			P
7440-48-4	Cobalt	6.0 ~~0.89~~	J V		P
7440-50-8	Copper	10.3			P
7439-89-6	Iron	9660		J	P
7439-92-1	Lead	32.8		~~E~~ J	P
7439-95-4	Magnesium	398	J		P
7439-96-5	Manganese	45.2		~~N~~ J	P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	400	J		P
7782-49-2	Selenium	0.77	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2 ~~0.22~~ 1.2	~~UJ~~ V		P
7440-23-5	Sodium	21.4	J		P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	12.0 ~~1.7~~	J V		P
7440-62-2	Vanadium	16.6			P
7440-66-6	Zinc	19.5		~~E~~ J	P

CS 10/31/08

CS 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5365

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-10

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 72.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6070			P
7440-36-0	Antimony	8.3	U	~~N~~ J	P
7440-38-2	Arsenic	8.7			P
7440-39-3	Barium	38.7			P
7440-41-7	Beryllium	0.69 ~~0.26~~	~~J~~ U		P
7440-43-9	Cadmium	0.69 ~~0.12~~	~~J~~ U		P
7440-70-2	Calcium	1910			P
7440-47-3	Chromium	17.0			P
7440-48-4	Cobalt	5.9 ~~2.7~~	~~J~~ U		P
7440-50-8	Copper	18.3			P
7439-89-6	Iron	14400			P
7439-92-1	Lead	29.5		~~E~~ J	P
7439-95-4	Magnesium	1340			P
7439-96-5	Manganese	211		~~N~~ J	P
7440-02-0	Nickel	5.9			P
7440-09-7	Potassium	707			P
7782-49-2	Selenium	1.1	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.4 ~~0.22 1.4~~	~~U J~~ U		P
7440-23-5	Sodium	44.9	J		P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	13.8 ~~2.2~~	~~J~~ U		P
7440-62-2	Vanadium	24.5			P
7440-66-6	Zinc	49.7		~~E~~ J	P

CS 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5366

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-11

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 89.2

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4720			P
7440-36-0	Antimony	6.7 ~~1.0~~	~~U~~ J	~~N~~ J	P
7440-38-2	Arsenic	8.7			P
7440-39-3	Barium	22.4 ~~15.8~~	~~U~~ J		P
7440-41-7	Beryllium	0.63			P
7440-43-9	Cadmium	0.56 ~~0.062~~	~~U~~ J		P
7440-70-2	Calcium	478	J		P
7440-47-3	Chromium	22.1			P
7440-48-4	Cobalt	6.7			P
7440-50-8	Copper	4.6			P
7439-89-6	Iron	28400			P
7439-92-1	Lead	11.1		~~E~~ J	P
7439-95-4	Magnesium	540	J		P
7439-96-5	Manganese	206		~~N~~ J	P
7440-02-0	Nickel	2.8	J		P
7440-09-7	Potassium	941			P
7782-49-2	Selenium	1.2	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.1 ~~0.21~~ 1.1	~~U~~ J		P
7440-23-5	Sodium	22.0	J		P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	11.2 ~~1.4~~	~~U~~ J		P
7440-62-2	Vanadium	32.2			P
7440-66-6	Zinc	27.2		~~E~~ J	P

CS 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5367

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-12

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 70.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6980			P	
7440-36-0	Antimony	~~8.5 0.48 8.5~~	~~U~~ J	~~N~~ J	P	cs 10/31/08
7440-38-2	Arsenic	11.4			P	
7440-39-3	Barium	30.3			P	
7440-41-7	Beryllium	0.71 ~~0.39~~	~~U~~ J		P	
7440-43-9	Cadmium	0.71 ~~0.087~~	~~U~~ J		P	
7440-70-2	Calcium	1900			P	
7440-47-3	Chromium	22.5			P	
7440-48-4	Cobalt	7.1 ~~2.8~~	~~U~~ J		P	
7440-50-8	Copper	23.1			P	
7439-89-6	Iron	20600			P	
7439-92-1	Lead	26.1		~~E~~ J	P	
7439-95-4	Magnesium	1270			P	
7439-96-5	Manganese	96.5		~~N~~ J	P	
7440-02-0	Nickel	8.2			P	
7440-09-7	Potassium	1240			P	
7782-49-2	Selenium	1.2	~~J~~	~~N~~ J	P	
7440-22-4	Silver	1.4 ~~0.21 1.4~~	~~U~~ J	U	P	cs 10/31/08
7440-23-5	Sodium	53.9	J		P	
7440-28-0	Thallium	3.6	U		P	
7440-31-5	Tin	14.2 ~~4.8~~	~~U~~ J		P	
7440-62-2	Vanadium	44.8			P	
7440-66-6	Zinc	102		~~E~~ J	P	

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5368

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-13

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 86.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5290			P
7440-36-0	Antimony	7.0 ~~0.95~~	~~JU~~	~~N~~ J	P
7440-38-2	Arsenic	9.5			P
7440-39-3	Barium	23.2 ~~16.0~~	~~JU~~		P
7440-41-7	Beryllium	0.93			P
7440-43-9	Cadmium	0.60 ~~0.14~~	~~JU~~		P
7440-70-2	Calcium	770			P
7440-47-3	Chromium	53.8			P
7440-48-4	Cobalt	11.3			P
7440-50-8	Copper	7.2			P
7439-89-6	Iron	43700			P
7439-92-1	Lead	9.2		~~E~~ J	P
7439-95-4	Magnesium	540	J		P
7439-96-5	Manganese	231		~~N~~ J	P
7440-02-0	Nickel	4.1	J		P
7440-09-7	Potassium	805			P
7782-49-2	Selenium	1.2	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2 ~~0.35~~	~~JU~~		P
7440-23-5	Sodium	23.1	J		P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.6 ~~1.3~~	~~JU~~		P
7440-62-2	Vanadium	48.4			P
7440-66-6	Zinc	42.2		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5369

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-14

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 80.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7040			P
7440-36-0	Antimony	7.5 ~~0.36 7.5~~	~~UJ~~ U	~~N~~ J	P
7440-38-2	Arsenic	6.5			P
7440-39-3	Barium	32.4			P
7440-41-7	Beryllium	0.62 ~~0.35~~	~~UJ~~ U		P
7440-43-9	Cadmium	0.62 ~~0.085~~	~~UJ~~ U		P
7440-70-2	Calcium	1690			P
7440-47-3	Chromium	19.3			P
7440-48-4	Cobalt	6.2 ~~3.0~~	~~UJ~~ U		P
7440-50-8	Copper	19.1			P
7439-89-6	Iron	16300			P
7439-92-1	Lead	27.3		~~E~~ J	P
7439-95-4	Magnesium	1260			P
7439-96-5	Manganese	147		~~N~~ J	P
7440-02-0	Nickel	7.1			P
7440-09-7	Potassium	842			P
7782-49-2	Selenium	1.1	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2 ~~0.72 1.2~~	~~UJ~~ U		P
7440-23-5	Sodium	48.8	J		P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.4 ~~2.6~~	~~UJ~~ U		P
7440-62-2	Vanadium	25.8			P
7440-66-6	Zinc	71.8		~~E~~ J	P

cs 10/31/08

cs 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5370

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-15

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 81.0

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6660			P
7440-36-0	Antimony	7.4	U	~~N~~ J	P
7440-38-2	Arsenic	9.1			P
7440-39-3	Barium	24.7 ~~22.5~~	~~J~~ J		P
7440-41-7	Beryllium	0.62 ~~0.27~~	~~J~~ J		P
7440-43-9	Cadmium	0.62 ~~0.059~~	~~J~~ J		P
7440-70-2	Calcium	1140			P
7440-47-3	Chromium	22.5			P
7440-48-4	Cobalt	6.2 ~~1.8~~	~~J~~ J		P
7440-50-8	Copper	9.1			P
7439-89-6	Iron	17100			P
7439-92-1	Lead	11.6		~~E~~ J	P
7439-95-4	Magnesium	615	J		P
7439-96-5	Manganese	117		~~N~~ J	P
7440-02-0	Nickel	3.7	J		P
7440-09-7	Potassium	699			P
7782-49-2	Selenium	1.1	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2 ~~0.24~~	~~J~~ J		P
7440-23-5	Sodium	26.3	J		P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.3 ~~1.7~~	~~J~~ J		P
7440-62-2	Vanadium	27.3			P
7440-66-6	Zinc	26.4		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5371

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-16

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 68.0

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4860			P
7440-36-0	Antimony	~~8.8~~ ~~0.67~~ ~~8.8~~	~~UJ~~	~~N~~ J	P
7440-38-2	Arsenic	144			P
7440-39-3	Barium	64.3			P
7440-41-7	Beryllium	0.74 ~~0.21~~	~~J~~		P
7440-43-9	Cadmium	0.74 ~~0.38~~	~~J~~		P
7440-70-2	Calcium	3150			P
7440-47-3	Chromium	19.1			P
7440-48-4	Cobalt	7.4 ~~4.5~~	~~J~~		P
7440-50-8	Copper	23.2			P
7439-89-6	Iron	25500			P
7439-92-1	Lead	24.7		~~E~~ J	P
7439-95-4	Magnesium	1210			P
7439-96-5	Manganese	940		~~N~~ J	P
7440-02-0	Nickel	5.4	J		P
7440-09-7	Potassium	750			P
7782-49-2	Selenium	1.8	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.5 ~~0.51~~	~~J~~		P
7440-23-5	Sodium	41.3	J		P
7440-28-0	Thallium	3.7	U		P
7440-31-5	Tin	14.7 ~~1.9~~	~~J~~		P
7440-62-2	Vanadium	24.8			P
7440-66-6	Zinc	62.5		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5372

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-17

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 91.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7730			P
7440-36-0	Antimony	6.6	U	~~N~~ J	P
7440-38-2	Arsenic	5.0			P
7440-39-3	Barium	49.6			P
7440-41-7	Beryllium	0.67			P
7440-43-9	Cadmium	0.55 ~~0.11~~	~~J~~ U		P
7440-70-2	Calcium	1050			P
7440-47-3	Chromium	12.8			P
7440-48-4	Cobalt	5.5 ~~5.0~~	~~J~~ U		P
7440-50-8	Copper	9.3			P
7439-89-6	Iron	18200			P
7439-92-1	Lead	17.4		~~E~~ J	P
7439-95-4	Magnesium	1220			P
7439-96-5	Manganese	380		~~N~~ J	P
7440-02-0	Nickel	8.0			P
7440-09-7	Potassium	761			P
7782-49-2	Selenium	1.1	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.1 ~~0.29~~	~~J~~ U		P
7440-23-5	Sodium	57.6	J		P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.9 ~~1.3~~	~~J~~ U		P
7440-62-2	Vanadium	27.9			P
7440-66-6	Zinc	40.1		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5373

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5356

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809162-18

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 83.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8070			P
7440-36-0	Antimony	7.2 ~~3.30~~ 7.2	~~U~~ J	~~N~~ J	P
7440-38-2	Arsenic	7.8			P
7440-39-3	Barium	24.0 ~~22.1~~	~~J~~		P
7440-41-7	Beryllium	0.60 ~~0.28~~	~~J~~		P
7440-43-9	Cadmium	0.60 ~~0.029~~	~~J~~		P
7440-70-2	Calcium	930			P
7440-47-3	Chromium	19.9			P
7440-48-4	Cobalt	6.0 ~~2.1~~	~~J~~		P
7440-50-8	Copper	8.8			P
7439-89-6	Iron	19400			P
7439-92-1	Lead	12.1		~~E~~ J	P
7439-95-4	Magnesium	789			P
7439-96-5	Manganese	77.0		~~N~~ J	P
7440-02-0	Nickel	3.8	J		P
7440-09-7	Potassium	810			P
7782-49-2	Selenium	1.0	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2 ~~0.29~~	~~J~~		P
7440-23-5	Sodium	28.6	J		P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	12.0 ~~1.2~~	~~J~~		P
7440-62-2	Vanadium	31.9			P
7440-66-6	Zinc	23.3		~~E~~ J	P

CS 10/31/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

RECEIVED
SEP 2 6 2008
HAZ. WASTE SUPPORT SEC.

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB5356
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 12, 2008, we received 18 soil samples under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temp was determined to be 5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/21/1744 hrs. The matrix spike failed for Sb, Se and Mn; a post spike was analyzed at twice the CRQL for Sb and Se and at twice the indigenous level for Mn.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809162-01 EPA Sample # MB5356

Date & Time 9/21/2008 1836

Metals: 8017 µg/L * (0.100 L) * 100 % * 1000 g * 1 mg = 890 mg/Kg
(Analyte Al) (1.00 g) 90.1 % 1 kg 1000 µg

Authorized by _____
Daniel Antrim
Document Control Officer

11

RECEIVED
SEP 26 2008
HAZ. WASTE SUPPORT SEC

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB5356

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB5356	7) MB5362	13) MB5368	19)
2) MB5357	8) MB5363	14) MB5369	20)
3) MB5358	9) MB5364	15) MB5370	21)
4) MB5359	10) MB5365	16) MB5371	22)
5) MB5360	11) MB5366	17) MB5372	23)
6) MB5361	12) MB5367	18) MB5373	24) 9-12-08

MB5356
First Sample in SDG

MB5373
Last Sample in SDG

09/12/2008
First Sample Receipt Date

09/12/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-12-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Monday, September 15, 2008 8:02 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Non-sampler issues | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. **The Resolution will be applied to all samples received for this Case**.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Saturday, September 13, 2008 2:23 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 12, 2008, we received 7 water samples and 70 soil samples in 5 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 4.5° C, 5°C, 5.5°C, 6°C, and 6.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

Thanks,

Beth Whitehead
Bonner Analytical

(56)

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5395

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-01

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 77.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1080			P
7440-36-0	Antimony	7.7 ~~1.1~~	~~J~~ U	~~N~~ J	P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	25.9 ~~5.2~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.67 ~~0.12~~	~~J~~ U		P
7440-43-9	Cadmium	0.67 ~~0.080~~	~~J~~ U		P
7440-70-2	Calcium	5500		~~+~~ J	P
7440-47-3	Chromium	6.4			P
7440-48-4	Cobalt	6.5 ~~0.73~~	~~J~~ U		P
7440-50-8	Copper	8.4			P
7439-89-6	Iron	6070			P
7439-92-1	Lead	53.6		~~*E~~ J	P
7439-95-4	Magnesium	495	J		P
7439-96-5	Manganese	18.7			P
7440-02-0	Nickel	5.2 ~~1.4~~	~~J~~ U		P
7440-09-7	Potassium	258	J		P
7782-49-2	Selenium	0.58	J		P
7440-22-4	Silver	0.32	J		P
7440-23-5	Sodium	1960			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.9 ~~3.5~~	~~J~~ U		P
7440-62-2	Vanadium	12.0			P
7440-66-6	Zinc	34.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5396

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-02

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 69.9

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1180			P
7440-36-0	Antimony	8.6 ~~1.9~~	~~J~~ U	~~N~~ J	P
7440-38-2	Arsenic	3.1			P
7440-39-3	Barium	28.6 ~~4.1~~	~~J~~ U	~~B~~ J	P
7440-41-7	Beryllium	0.72 ~~0.12~~	~~J~~ U		P
7440-43-9	Cadmium	0.72 ~~0.062~~	~~J~~ U		P
7440-70-2	Calcium	2730		~~*~~ J	P
7440-47-3	Chromium	5.5			P
7440-48-4	Cobalt	7.2 ~~0.67~~	~~J~~ U		P
7440-50-8	Copper	9.6			P
7439-89-6	Iron	5870			P
7439-92-1	Lead	90.7		~~*~~ E J	P
7439-95-4	Magnesium	617	J		P
7439-96-5	Manganese	17.2			P
7440-02-0	Nickel	5.7 ~~1.9~~	~~J~~ U		P
7440-09-7	Potassium	309	J		P
7782-49-2	Selenium	0.59	J		P
7440-22-4	Silver	0.22	J		P
7440-23-5	Sodium	3020			P
7440-28-0	Thallium	3.6	U		P
7440-31-5	Tin	14.3 ~~5.3~~	~~J~~ U		P
7440-62-2	Vanadium	10.9			P
7440-66-6	Zinc	30.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5397

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-03

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 72.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1060			P
7440-36-0	Antimony	8.3 ~~1.8~~	~~J~~ U	~~N~~ J	P
7440-38-2	Arsenic	2.9			P
7440-39-3	Barium	27.5 ~~4.5~~	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.69 ~~0.13~~	~~J~~ U		P
7440-43-9	Cadmium	0.64 ~~0.083~~	~~J~~ U		P
7440-70-2	Calcium	6140		~~*~~ J	P
7440-47-3	Chromium	6.0			P
7440-48-4	Cobalt	6.9 ~~0.73~~	~~J~~ U		P
7440-50-8	Copper	9.7			P
7439-89-6	Iron	5780			P
7439-92-1	Lead	79.4		~~*E~~ J	P
7439-95-4	Magnesium	462	J		P
7439-96-5	Manganese	14.6			P
7440-02-0	Nickel	5.5 ~~1.5~~	~~J~~ U		P
7440-09-7	Potassium	253	J		P
7782-49-2	Selenium	0.54	J		P
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	2300			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	12 ~~5.8~~	~~J~~ U		P
7440-62-2	Vanadium	10.7			P
7440-66-6	Zinc	32.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5398

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-04

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 85.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	941			P
7440-36-0	Antimony	13.9		~~N~~ J	P
7440-38-2	Arsenic	6.6			P
7440-39-3	Barium	23.4 ~~5.4~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.59 ~~0.11~~	~~J~~ U		P
7440-43-9	Cadmium	0.59 ~~0.096~~	~~J~~ U		P
7440-70-2	Calcium	586 ~~323~~	~~J~~ U	~~[illegible]~~ J	P
7440-47-3	Chromium	4.5			P
7440-48-4	Cobalt	5.9 ~~0.60~~	~~J~~ U		P
7440-50-8	Copper	21.2			P
7439-89-6	Iron	5950			P
7439-92-1	Lead	458		~~E~~ J	P
7439-95-4	Magnesium	505	J		P
7439-96-5	Manganese	15.5			P
7440-02-0	Nickel	4.7 ~~1.8~~	~~J~~ U		P
7440-09-7	Potassium	250	J		P
7782-49-2	Selenium	0.65	J		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	2430			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	22.5			P
7440-62-2	Vanadium	9.4			P
7440-66-6	Zinc	29.1			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5399

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-05

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 71.9

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1020			P
7440-36-0	Antimony	20.5		~~N~~ J	P
7440-38-2	Arsenic	15.7			P
7440-39-3	Barium	27.8 ~~9.7~~	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.32 ~~0.15~~	~~J~~		P
7440-43-9	Cadmium	0.70 ~~0.10~~	~~J~~		P
7440-70-2	Calcium	1110		~~E~~ J	P
7440-47-3	Chromium	6.3			P
7440-48-4	Cobalt	7.0 ~~0.95~~	~~J~~		P
7440-50-8	Copper	25.4			P
7439-89-6	Iron	9500			P
7439-92-1	Lead	525		~~E~~ J	P
7439-95-4	Magnesium	591	J		P
7439-96-5	Manganese	89.5			P
7440-02-0	Nickel	5.6 ~~3.0~~	~~J~~		P
7440-09-7	Potassium	257	J		P
7782-49-2	Selenium	0.69	J		P
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	2480			P
7440-28-0	Thallium	3.5	U		P
7440-31-5	Tin	23.7			P
7440-62-2	Vanadium	14.3			P
7440-66-6	Zinc	39.4			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-06

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	479			P
7440-36-0	Antimony	7.9		~~N~~ J	P
7440-38-2	Arsenic	6.1			P
7440-39-3	Barium	20.1 ~~2.4~~	~~J~~	~~B~~ J	P
7440-41-7	Beryllium	0.50 ~~0.071~~	~~J~~		P
7440-43-9	Cadmium	0.50 ~~0.010~~	~~J~~		P
7440-70-2	Calcium	50 ~~57.7~~	~~J~~	~~*~~ J	P
7440-47-3	Chromium	5.3			P
7440-48-4	Cobalt	5.0 ~~0.45~~	~~J~~		P
7440-50-8	Copper	4.9			P
7439-89-6	Iron	7930			P
7439-92-1	Lead	50.4		~~E~~ J	P
7439-95-4	Magnesium	77.0	J		P
7439-96-5	Manganese	28.0			P
7440-02-0	Nickel	4.0 ~~1.2~~	~~J~~		P
7440-09-7	Potassium	49.0	J		P
7782-49-2	Selenium	0.61	J		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	6.2	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~6.6~~	~~J~~		P
7440-62-2	Vanadium	10			P
7440-66-6	Zinc	19.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-07

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 86.9

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	187			P
7440-36-0	Antimony	6.9	U	~~N~~ J	P
7440-38-2	Arsenic	0.76	J		P
7440-39-3	Barium	23.0 ~~0.89~~	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.54 ~~0.010~~	~~U~~		P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	721 ~~66.5~~	~~J~~	~~+~~ J	P
7440-47-3	Chromium	2.1			P
7440-48-4	Cobalt	5.0 ~~0.17~~	~~J~~		P
7440-50-8	Copper	1.3	J		P
7439-89-6	Iron	2280			P
7439-92-1	Lead	11.4		~~+~~ ~~E~~ J	P
7439-95-4	Magnesium	53.5	J		P
7439-96-5	Manganese	41.3			P
7440-02-0	Nickel	4.6 ~~0.19~~	~~J~~		P
7440-09-7	Potassium	31.8	J		P
7782-49-2	Selenium	0.46	J		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	74.0	J		P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.5 ~~1.3~~	~~J~~		P
7440-62-2	Vanadium	5.0 ~~3.5~~	~~J~~		P
7440-66-6	Zinc	6.9 ~~6.5~~	~~J~~		P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-08

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 77.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	736			P
7440-36-0	Antimony	33.2		~~N~~ J	P
7440-38-2	Arsenic	22.5			P
7440-39-3	Barium	25.9 ~~8.1~~ ~~J~~ U		~~B~~ J	P
7440-41-7	Beryllium	0.65 ~~0.11~~ ~~J~~ U			P
7440-43-9	Cadmium	0.65 ~~0.21~~ ~~J~~ U			P
7440-70-2	Calcium	901		~~*~~ J	P
7440-47-3	Chromium	6.7			P
7440-48-4	Cobalt	6.5 ~~0.93~~ ~~J~~ U			P
7440-50-8	Copper	37.3			P
7439-89-6	Iron	12700			P
7439-92-1	Lead	1100		~~*B~~ J	P
7439-95-4	Magnesium	395	J		P
7439-96-5	Manganese	51.6			P
7440-02-0	Nickel	12.2			P
7440-09-7	Potassium	162	J		P
7782-49-2	Selenium	0.89	J		P
7440-22-4	Silver	0.23	J		P
7440-23-5	Sodium	2050			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	45.4			P
7440-62-2	Vanadium	15.9			P
7440-66-6	Zinc	41.1			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5395

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809182-09

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 71.5

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	792			P
7440-36-0	Antimony	28.0		~~N~~ J	P
7440-38-2	Arsenic	19.2			P
7440-39-3	Barium	28.0 ~~6.6~~ JV		~~B~~ J	P
7440-41-7	Beryllium	0.20 ~~0.11~~ JV			P
7440-43-9	Cadmium	2.0			P
7440-70-2	Calcium	699 ~~349~~ JV		~~*~~ J	P
7440-47-3	Chromium	5.8			P
7440-48-4	Cobalt	7.0 ~~1.1~~ JV			P
7440-50-8	Copper	117			P
7439-89-6	Iron	6810			P
7439-92-1	Lead	1440		~~*~~ B J	P
7439-95-4	Magnesium	422	J		P
7439-96-5	Manganese	13.7			P
7440-02-0	Nickel	5.6 ~~3.5~~ JV			P
7440-09-7	Potassium	184	J		P
7782-49-2	Selenium	0.64	J		P
7440-22-4	Silver	0.14	J		P
7440-23-5	Sodium	1770			P
7440-28-0	Thallium	3.5	U		P
7440-31-5	Tin	42.1			P
7440-62-2	Vanadium	9.5			P
7440-66-6	Zinc	53.2			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB5395
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 13, 2008, we received 9 soil samples under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temp was determined to be 4.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

2. There is no QC listed on the TR/COC for SDG MB5395. We would like to use MB5395 as QC. Please advise if this is acceptable
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

Metals
The analytical run began 9/21/2008 @ 1539 hrs. The matrix spike failed for Sb; a post spike was analyzed at twice the CRQL for Sb.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809182-01 EPA Sample # MB5395

Date & Time 9/21/2008 @ 1631

Metals: 8377.2 µg/L (0.100 L) 100 % 1000 g 1 mg
(Analyte Al) * * * * = 1080 mg/kg
(1.00 g) 77.5 % 1 kg 1000 µg

Authorized by: _____
Daniel Antrim
Document Control Officer

SAMPLE DELIVERY GROUP (SDG)
COVER SHEET

SDG Number: MB5395

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: _____ **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB5395	7) MB53M8	13)	19)
2) MB5396	8) MB53M9	14)	20)
3) MB5397	9) MB53N0	15)	21)
4) MB5398	10)	16)	22)
5) MB5399	11)	17)	23)
6) MB53M7	12) 9-13-08	18)	24) 9-13-08

MB5395
First Sample in SDG

MB53N0
Last Sample in SDG

09/13/2008
First Sample Receipt Date

09/13/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

_____
Signature

9-13-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 9:57 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDG MB5395. The laboratory would like to perform laboratory QC on sample MB5395.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Monday, September 15, 2008 6:55 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 13, 2008, we received 65 soil samples in 4 coolers under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temps were determined to be 3.5°C, 4.5°C, and 5.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
2. There is no QC listed on the TR/COC for SDG MB5395. We would like to use MB5395 as QC. Please advise if this is acceptable.

(68)

Thanks,

Beth Whitehead
Bonner Analytical

69

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Inorganic Data Review Narrative

Case# 37836	Site: RARITAN BAY SLAG	Soil: 50
SDG# MB5347, MB5351, MB5356, MB5395	Lab: BONNER	Water: 0
Sampling Team: W-SAT	Reviewer: C. STANCA	Other: 0

A.2.1 Data Validation Flags:

The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:

The CLP laboratory applies a contractual qualifier on all Form I=S and the QC Form when a QC analysis is outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their meanings are as follows:

N: This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E: This qualifier indicates the presence of interference, and is applied when the ICP serial dilution is outside the control limits.

*: This qualifier indicates the lack of precision, and is applied on Form I=S and Form VI when the Lab Duplicate analysis is outside the control limits.

U: This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit (MDL). A non-detected result of an analyte is indicated by the Contract Required Quantitation Limit (CRQL) of that analyte suffixed with "U".

J: This is also a concentration qualifier that laboratory applies to a positive result below the CRQL.

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

A.2.3.1 **Data Case Description:**

This case consists of fifty (50) soil samples collected at the Raritan Bay Slag site between 9/10/08 and 9/12/08 for TAL Metals and Tin analysis according to the USEPA CLP SOW No. ILM05.4. Matrix spike, laboratory duplicate and serial dilution analyses were performed on samples MB5375, MB5351, MB5365, and MB5395. Samples MB5374/MB5375, MB5357/MB5358, MB5363/MB5364, and MB5394/MB5395 were the field duplicate pairs for this sampling event. Sample MB5394 belongs to SDG MB5336 and it is not present in this package. Sample MB53L4 was identified as field blank. This sample belongs to SDG MB53H0 and is also not present in this package.

As per EPA Technical Direction Form (TDF) only the following criteria were reviewed by the data validator: Holding Time, CRQL Standard, Matrix Spike, ICS, Laboratory Duplicate, Field Duplicate, ICP Serial Dilution, Percent Solids, and Field Blank. The qualifiers applied on Form Is and CADRE EXCEL spreadsheets are based on ESAT data review of the above mentioned criteria and the attached CADRE Reports.

A.2.3.2 **CSF Audit**: No problems.

A.2.3.3 **Technical Review**:

SDG MB5347 (SOIL ICP-MS, MA 1630.0)

ICB/CCB

The Calibration Blanks values were ≥MDL but ≤CRQL for Sb, Ba, Be, Cd, Ca, Co, Mg, Ni, Na, Se, and V . (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sb -> MB5347, MB5348, MB5374, MB5376 - MB5379, MB5386 - MB5389
Be -> MB5347 - MB5350, MB5374 - MB5379, MB5386 - MB5389
Cd -> MB5347, MB5348, MB5350, MB5374, MB5375, MB5377 - MB5379, MB5387, MB5388
Co -> MB5347 - MB5350, MB5374 - MB5379, MB5386 - MB5389
Se -> MB5347 - MB5350, MB5374, MB5376 - MB5379, MB5387 - MB5389
Ba -> MB5348, MB5350, MB5374 - MB5379, MB5386 - MB5389
Ca -> MB5349, MB5350, MB5374 - MB5376, MB5378, MB5386, MB5387
Mg -> MB5376, MB5377, MB5386 - MB5388
Ni -> MB5350, MB5374 - MB5379, MB5386, MB5387 - MB5389
Na -> MB5347 - MB5350
V -> MB5375

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB5347, MB5348, MB5374 - MB5379, MB5386 - MB5389

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Al (%R = 139) and Pb (%R = 178). All associated detects have been considered estimated and qualified "J".

"J" -> Al, Pb -> MB5347 - MB5350, MB5374 - MB5379, MB5386 - MB5389

FIELD DUPLICATE

The RPD between sample (MB5374) and duplicate (MB5375) results was ≥ 35% but less than 120% for Al and Fe when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J".

"J" -> Al*, Fe -> MB5374, MB5375

The absolute difference between sample (MB5374)and duplicate (MB5375) results was greater than 2X CRQL for Cr and greater than 4X CRQL for Mn when sample and/or duplicate results were less than 5 X CRQL. All associated Cr results ≤5XCRQL have been considered estimated and flagged "J". All associated Mn results ≤5XCRQL were rejected.

"J" -> Cr -> MB5374, MB5375

"R" -> Mn -> MB5375

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba and Cu were less than the lower control limit. All associated results and all associated positive results have been considered estimated and flagged "J".

"J" -> Ba, Cu -> MB5347 - MB5350, MB5374 - MB5379, MB5386 - MB5389

SDG MB5351 (SOIL ICP-AES, MA1630.0)

ICB/CCB

The Calibration Blanks values were ≥MDL but ≤CRQL for Ca and Na. (Only

analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Ca -> MB53D8, MB53E0, MB53E1

Na -> MB5352 - MB5355, MB53D8, MB53D9, MB53E1

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB5351 - MB5355, MB53D8, MB53D9, MB53E0, MB53E1

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Sb (%R = 21), Cd (%R = 75), Se (%R = 64), Ag (%R = 69), and Sn (%R = 70). All associated sample results have been considered estimated and qualified "J".

"J" -> Sb, Cd, Se, Ag, Sn -> MB5351 - MB5355, MB53D8, MB53D9, MB53E0, MB53E1

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba was less than the lower control limit. All associated results and all associated positive results have been considered estimated and flagged "J".

"J" -> Ba -> MB5351 - MB5355, MB53D8, MB53D9, MB53E0, MB53E1

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 when the initial concentration was equal to or greater than 50 X MDL for most analytes. All associated sample results greater than MDL have been considered estimated and flagged "J".

"J" -> Al, Ba*, Be, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Na, V, Zn -> MB5351 - MB5355, MB53D8, MB53D9, MB53E0, MB53E1

PERCENT SOLIDS

The percent solids were less than 50 for samples MB53E0 and MB53E1. All sample results not previously qualified have been considered estimated and flagged "J".

"J" -> All results not previously qualified -> MB53E0, MB53E1

SDG MB5356 (SOIL ICP-AES, MA 1630.0)

ICB/CCB

The Calibration Blanks values were ≥MDL but ≤CRQL for Sb, Ba, Be, Cd, Ca, Cr, Co, Ag, and V. (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sb -> MB5356, MB5363, MB5364, MB5366 - MB5369, MB5371, MB5373

Be -> MB5356, MB5358, MB5363 - MB5365, MB5367, MB5369, MB5370, MB5371, MB5373

Ag -> MB5358 - MB5361, MB5363 - MB5373

Ba -> MB5356 - MB5364, MB5366, MB5368, MB5370, MB5373

Cd -> MB5357 - MB5361, MB5363 - MB5373

Ca -> MB5356

Cr -> MB5360 - MB5362

Co -> MB5356 - MB5365, MB5367, MB5369 - MB5373

V -> MB5357 - MB5362

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB5356 - MB5373

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Sb (%R = 22), Mn (%R = 71, and Se (%R = 68). All associated sample results have been considered estimated and qualified "J".

"J" -> Sb, Mn, Se -> MB5356 - MB5373

FIELD DUPLICATE

The RPD between sample (MB5363) and duplicate (MB5364) results was ≥ 35% but less than 120% for Fe when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J".

"J" -> Fe -> MB5363, MB5364

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba was less than the lower control limit. All associated results and all associated positive results have been considered estimated and flagged "J".

"J" -> Ba -> MB5356 - MB5373

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 when the initial concentration was equal to or greater than 50 X MDL for Pb (%D = 19) and Zn (%D = 12). All associated sample results greater than MDL have been considered estimated and flagged "J".

"J" -> Pb, Zn -> MB5356 - MB5373

FIELD BLANK

The Fe (1190 ug/l) and Mn (24.3 ug/l) results in field blank MB53L4 was greater than the CRQL indicating sample contamination due to poor decontamination procedures. Detects between the Field Blank value and 10 X Field Blank value have been estimated and flagged "J". The field blank belongs to SDG MB53H0 and is not present in this package.

"J" -> Mn* -> MB5356

PERCENT SOLIDS

The percent solids were less than 50 for six samples. All sample results not previously qualified have been considered estimated and flagged "J".

"J" -> All results not previously qualified -> MB5357 - MB5362

SDG MB5395 (SOIL ICP-AES, MA 1630.0)

ICB/CCB

The Calibration Blanks values were ≥MDL but ≤CRQL for Sb, Ba, Be, Cd, Ca, Co, Ni, Zn, and V. (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sb -> MB5395 - MB5397
Be -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0
Ca -> MB5398, MB53M7, MB53M8, MB53N0
Ba -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0
Cd -> MB5395 - MB5399, MB53M7, MB53M9
Co -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0

Ni -> MB5395 - MB5399, MB53M7, MB53M8, MB53N0

V -> MB53M8

Zn -> MB53M8

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB5395 - MB5397, MB53M7, MB53M8

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Sb (%R = 67). All associated sample results have been considered estimated and qualified "J".

"J" -> Sb -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0

LABORATORY DUPLICATE

The RPD between sample and duplicate results was ≥ 35% but less than 120% for Ca and Pb when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J".

"J" -> Ca, Pb -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0

FIELD DUPLICATE

The RPD between sample (MB5394) and duplicate (MB5395) results was ≥ 35% but less than 120% for Ca when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J". Sample MB5394 belongs to SDG MB5336 and it is not present in this package.

"J" -> Ca* -> MB5395

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba was less than the lower control limit. All associated results and all associated positive results have been considered estimated and flagged "J".

"J" -> Ba -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 when the initial concentration was equal to or greater than 50 X MDL for Ba (%D = 16) and Pb (%D = 11). All associated sample results greater than MDL have been considered estimated and flagged "J".

"J" -> Ba*, Pb* -> MB5395 - MB5399, MB53M7 - MB53M9, MB53N0

*** already qualified**

A.2.3.4 **Contract-Problem/Non-Compliance:**

All SDGs:

1. All Form Is: Lab code was missing or was incorrect. Some analytes were not qualified "J" although the results were detects with values below CRQL.
2. All Form 9s: CRQLs were incorrect for Method Preparation NP1.
3. All Form 7s: Almost all Found values were outside the acceptable limits. The provided limits both lower and higher, were incorrect.
4. All Form 4: The Final Found Solution AB results were incorrect; they did not match the raw data.

SDGs MB5347 & MB5395:

Tin was missing from form 5A.

SDG MB5395:

Form 6 - The %D for Ba was incorrect.

Corrected forms were requested from the laboratory and were submitted on 10/09/08 and 10/24/08. Several re-submitted Form Is had the Sb, As, Cr, Se and Ag results qualified "U" although the values were between MDL and CRQL. The above mentioned "U" qualifiers were changed by the reviewer to "J.

HWSS Reviewer: _____ Date: 11/3/08
Signature

Contractor Reviewer: Constantin Stanca Date: 11/3/08
Signature

Verified by: _____ Date: _____
Signature

REFERENCE 23

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

ROC #3

DATE: 9/29/2008
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: Hazardous Waste Support Section (HWSS)/RSCC
TO: HWSS ESAT-TOPO

TDF# 09-004
Ext. 09-0138

Attached is the following INORGANIC Data Package to be reviewed for Quality Assurance

SITE: Raritan Bay Slag **CASE #: 37836**

SDG#: MB5319, MB5336, MB53A9 **SAMPLER: W-SAT**

PROJ. CODE: RS SITE SPILL #: A205	**#SAMPLES**	**MATRIX**
LAB: BONNER OPERABLE UNIT: 00	**56**	**Soil**
TURN-AROUND-TIME: 14 day		

CERCLIS ID # : NJN000206276 **FRACTION: Metals (MA #1630.0)**

Contaminant(s) of Concern (If known)

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	**Date/Time**	**Signature**	**Date/Time**
Robert [illegible]	10/1/08 1:42 pm	Doris Christie Allen	10/1/08 1:42 pm
Doris Christie Allen	10/7/08	C. Stanco	10/7/08
C Stanco	10/30/08 10:07 am	Robert [illegible]	10/30/08 10:07 am
Robert [illegible]	10/30/08 10:15	Hanif Sheikh	10/30/08 10:15 Ag
Hanif Sheikh	10/30/08 2:11 PM	Robert [illegible]	10/30/08 2:11
[illegible]			
Hanif Sheikh	10/30/08 3:53 P	R. J. Shelley	3:53 pm
R. J. Shelley	10/30/08 4:30 pm	Hanif Sheikh	10/30/08 4:30 PM

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5319

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-01

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 98.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	956		~~N~~ J	P
7440-36-0	Antimony	~~2.2~~	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	9.2			P
7440-39-3	Barium	~~2.9~~	~~J~~	J	P
7440-41-7	Beryllium	~~0.29~~	~~J~~		P
7440-43-9	Cadmium	0.056	J		P
7440-70-2	Calcium	187	J		P
7440-47-3	Chromium	14.5			P
7440-48-4	Cobalt	~~0.87~~	~~J~~		P
7440-50-8	Copper	15.0			P
7439-89-6	Iron	15800			P
7439-92-1	Lead	50.6		~~N~~ E J	P
7439-95-4	Magnesium	148	J		P
7439-96-5	Manganese	25.9			P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	139	J		P
7782-49-2	Selenium	0.73	J		P
7440-22-4	Silver	~~1.0~~	~~U~~	M	P
7440-23-5	Sodium	11.[illegible]	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	~~3.5~~	~~J~~		P
7440-62-2	Vanadium	22.1			P
7440-66-6	Zinc	17.1		J	P

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5320

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-02

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.0

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	960		~~N~~ J	P
7440-36-0	Antimony	6.1 ~~0.70~~	~~J~~ U	~~N~~ J	P
7440-38-2	Arsenic	3.5			P
7440-39-3	Barium	20.2 ~~1.9~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.57 ~~0.25~~	~~J~~ U		P
7440-43-9	Cadmium	0.51 ~~0.025~~	~~J~~ U		P
7440-70-2	Calcium	60.1	J		P
7440-47-3	Chromium	12.9			P
7440-48-4	Cobalt	5.1 ~~0.46~~	~~J~~ U		P
7440-50-8	Copper	4.4			P
7439-89-6	Iron	15000			P
7439-92-1	Lead	28.3		~~N E~~ J	P
7439-95-4	Magnesium	120	J		P
7439-96-5	Manganese	19.0			P
7440-02-0	Nickel	1.3	J		P
7440-09-7	Potassium	128	J		P
7782-49-2	Selenium	3.5 ~~0.80~~	~~J~~ U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	6.9	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~1.6~~	~~J~~ U		P
7440-62-2	Vanadium	21.0			P
7440-66-6	Zinc	16.5		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5321

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-03

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	571		~~N~~ J	P
7440-36-0	Antimony	6.0 ~~0.58~~	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	20.1 ~~3.0~~	~~J~~	J	P
7440-41-7	Beryllium	~~0.50~~ ~~0.097~~	~~J~~		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	40.9	J		P
7440-47-3	Chromium	7.0			P
7440-48-4	Cobalt	5.0 ~~0.27~~	~~J~~		P
7440-50-8	Copper	1.8	J		P
7439-89-6	Iron	9240			P
7439-92-1	Lead	13.6		~~N~~ E J	P
7439-95-4	Magnesium	72.1	J		P
7439-96-5	Manganese	10.2			P
7440-02-0	Nickel	0.59	J		P
7440-09-7	Potassium	107	J		P
7782-49-2	Selenium	3.5 ~~0.75~~	~~J~~		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	6.4	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~7.5~~	~~J~~		P
7440-62-2	Vanadium	15.4			P
7440-66-6	Zinc	7.8		E J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5322

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-04

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	645		~~N~~ J	P
7440-36-0	Antimony	6.0	U	~~N~~ J	P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	20.1 ~~9.9~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.50 ~~0.090~~	~~J~~ U		P
7440-43-9	Cadmium	0.50 ~~0.0098~~	~~J~~ U		P
7440-70-2	Calcium	209	J		P
7440-47-3	Chromium	4.9			P
7440-48-4	Cobalt	5.0 ~~0.50~~	~~J~~ U		P
7440-50-8	Copper	1.9	J		P
7439-89-6	Iron	7150			P
7439-92-1	Lead	29.1		~~N~~ E J	P
7439-95-4	Magnesium	205	J		P
7439-96-5	Manganese	23.7			P
7440-02-0	Nickel	0.98	J		P
7440-09-7	Potassium	192	J		P
7782-49-2	Selenium	3.5 ~~0.69~~	~~J~~ U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	35.6	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~3.2~~	~~J~~ U		P
7440-62-2	Vanadium	10.6			P
7440-66-6	Zinc	11.7		E J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5323

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-05

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.6

Concentration Units (**ug/L** or **mg/kg** dry weight): ~~mg/Kg~~

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	780		~~N~~ J	P
7440-36-0	Antimony	6.0 ~~1.4~~	~~J~~ U	~~N~~ J	P
7440-38-2	Arsenic	3.6			P
7440-39-3	Barium	20.0 ~~8.1~~	~~J~~ L	J	P
7440-41-7	Beryllium	0.50 ~~0.21~~	~~J~~ U		P
7440-43-9	Cadmium	0.50 ~~0.016~~	~~J~~ U		P
7440-70-2	Calcium	197	J		P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	5.0 ~~0.48~~	~~J~~ U		P
7440-50-8	Copper	4.1			P
7439-89-6	Iron	12700			P
7439-92-1	Lead	55.3		~~N E~~ J	P
7439-95-4	Magnesium	152	J		P
7439-96-5	Manganese	21.8			P
7440-02-0	Nickel	1.4	J		P
7440-09-7	Potassium	133	J		P
7782-49-2	Selenium	3.5 ~~0.73~~	~~J~~ U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	16.5	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.0 ~~2.7~~	~~J~~ U		P
7440-62-2	Vanadium	18.1			P
7440-66-6	Zinc	15.4		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5324

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-06

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 98.5

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1110		~~N~~ J	P
7440-36-0	Antimony	6.1 ~~1.5~~	~~J~~	~~N~~ J	P
7440-38-2	Arsenic	3.6			P
7440-39-3	Barium	20.3 ~~18.5~~	~~J~~	J	P
7440-41-7	Beryllium	0.51 ~~0.48~~	~~J~~		P
7440-43-9	Cadmium	0.51 ~~0.053~~	~~J~~		P
7440-70-2	Calcium	468	J		P
7440-47-3	Chromium	9.8			P
7440-48-4	Cobalt	5.1 ~~0.62~~	~~J~~		P
7440-50-8	Copper	7.3			P
7439-89-6	Iron	16200			P
7439-92-1	Lead	94.1		~~N E~~ J	P
7439-95-4	Magnesium	213	J		P
7439-96-5	Manganese	32.0			P
7440-02-0	Nickel	2.0	J		P
7440-09-7	Potassium	126	J		P
7782-49-2	Selenium	3.6 ~~0.70~~	~~J~~		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	29.6	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.2 ~~5.6~~	~~J~~		P
7440-62-2	Vanadium	15.4			P
7440-66-6	Zinc	31.3		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5325

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-07

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 98.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	929		~~N~~ J	P
7440-36-0	Antimony	6.1	U	~~N~~ J	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	20.3 ~~2.3~~	~~J~~	J	P
7440-41-7	Beryllium	0.51 ~~0.16~~	~~J~~		P
7440-43-9	Cadmium	0.51 ~~0.0093~~	~~J~~		P
7440-70-2	Calcium	610			P
7440-47-3	Chromium	5.4			P
7440-48-4	Cobalt	5.1 ~~0.86~~	~~J~~		P
7440-50-8	Copper	2.2	J		P
7439-89-6	Iron	7420			P
7439-92-1	Lead	12.9		~~N~~ E J	P
7439-95-4	Magnesium	410	J		P
7439-96-5	Manganese	26.0			P
7440-02-0	Nickel	1.9	J		P
7440-09-7	Potassium	347	J		P
7782-49-2	Selenium	3.6	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	18.8	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.2 ~~1.4~~	~~J~~		P
7440-62-2	Vanadium	9.5			P
7440-66-6	Zinc	10.5		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5326

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-08

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.6

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1030		~~N~~ J	P
7440-36-0	Antimony	6.0	U	~~N~~ J	P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	20.0 ~~3.2~~	~~J~~	J	P
7440-41-7	Beryllium	0.50 ~~0.11~~	~~J~~		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	687			P
7440-47-3	Chromium	7.5			P
7440-48-4	Cobalt	5.0 ~~1.0~~	~~J~~		P
7440-50-8	Copper	0.91	J		P
7439-89-6	Iron	6030			P
7439-92-1	Lead	3.8		~~N~~ E J	P
7439-95-4	Magnesium	493	J		P
7439-96-5	Manganese	26.5			P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	476	J		P
7782-49-2	Selenium	0.63	J		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	25.4	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.0 ~~1.1~~	~~J~~		P
7440-62-2	Vanadium	8.7			P
7440-66-6	Zinc	8.0		E J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5327

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-09

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 97.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1270		~~N~~ J	P
7440-36-0	Antimony	6.2	U	~~N~~ J	P
7440-38-2	Arsenic	4.2			P
7440-39-3	Barium	20.6 ~~2.6~~	~~J~~	J	P
7440-41-7	Beryllium	0.51 ~~0.13~~	~~J~~		P
7440-43-9	Cadmium	0.51	U		P
7440-70-2	Calcium	740			P
7440-47-3	Chromium	7.0			P
7440-48-4	Cobalt	5.1 ~~1.2~~	~~J~~		P
7440-50-8	Copper	1.1	J		P
7439-89-6	Iron	6730			P
7439-92-1	Lead	4.9		~~N E~~ J	P
7439-95-4	Magnesium	641			P
7439-96-5	Manganese	30.2			P
7440-02-0	Nickel	2.6	J		P
7440-09-7	Potassium	646			P
7782-49-2	Selenium	3.6	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	23.3	J		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.3 ~~1.2~~	~~J~~		P
7440-62-2	Vanadium	9.1			P
7440-66-6	Zinc	9.5		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5328

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-10

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 91.7

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	993		~~N~~ J	P
7440-36-0	Antimony	6.5	U	~~N~~ J	P
7440-38-2	Arsenic	2.2			P
7440-39-3	Barium	21.8 ~~1.7~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.55 ~~0.15~~	~~J~~ U		P
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	376	J		P
7440-47-3	Chromium	6.0			P
7440-48-4	Cobalt	5.5 ~~1.1~~	~~J~~ U		P
7440-50-8	Copper	0.70	J		P
7439-89-6	Iron	6750			P
7439-92-1	Lead	2.2		~~N~~ E J	P
7439-95-4	Magnesium	527	J		P
7439-96-5	Manganese	52.5			P
7440-02-0	Nickel	2.6	J		P
7440-09-7	Potassium	376	J		P
7782-49-2	Selenium	0.74	J		P
7440-22-4	Silver	1.1	U	~~N~~ J	P
7440-23-5	Sodium	667			P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.9 ~~1.3~~	~~J~~ U		P
7440-62-2	Vanadium	8.2			P
7440-66-6	Zinc	9.6		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5329

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-11

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 91.9

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1020		~~N~~ J	P
7440-36-0	Antimony	6.5	U	~~N~~ J	P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	21.8 ~~1.5~~	~~J~~	J	P
7440-41-7	Beryllium	0.54 ~~0.11~~	~~J~~		P
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	1450			P
7440-47-3	Chromium	3.7			P
7440-48-4	Cobalt	5.4 ~~1.0~~	~~J~~		P
7440-50-8	Copper	0.79	J		P
7439-89-6	Iron	6550			P
7439-92-1	Lead	1.7		~~N~~ E J	P
7439-95-4	Magnesium	499	J		P
7439-96-5	Manganese	41.8			P
7440-02-0	Nickel	2.6	J		P
7440-09-7	Potassium	267	J		P
7782-49-2	Selenium	3.8	U		P
7440-22-4	Silver	1.1	U	~~N~~ J	P
7440-23-5	Sodium	539	J		P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.9 ~~1.2~~	~~J~~		P
7440-62-2	Vanadium	6.3			P
7440-66-6	Zinc	7.6		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5330

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-12

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 94.6

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1050		~~N~~ J	P
7440-36-0	Antimony	6.3	U	~~N~~ J	P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	21.1 ~~3.7~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.53 ~~0.13~~	~~U~~ U		P
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	2060			P
7440-47-3	Chromium	4.0			P
7440-48-4	Cobalt	5.3 ~~1.3~~	~~J~~ U		P
7440-50-8	Copper	1.5	J		P
7439-89-6	Iron	8320			P
7439-92-1	Lead	2.0		~~N~~ E J	P
7439-95-4	Magnesium	582			P
7439-96-5	Manganese	49.0			P
7440-02-0	Nickel	2.6	J		P
7440-09-7	Potassium	283	J		P
7782-49-2	Selenium	3.7	U		P
7440-22-4	Silver	0.26	~~J~~	~~N~~ J	P
7440-23-5	Sodium	486	J		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.6 ~~1.2~~	~~J~~ U		P
7440-62-2	Vanadium	10.6			P
7440-66-6	Zinc	9.0		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5331

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-13

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 96.4

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1090		~~N~~ J	P
7440-36-0	Antimony	6.2	U	~~N~~ J	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	20.7 ~~2.3~~	~~J~~ J	J	P
7440-41-7	Beryllium	0.52 ~~0.10~~	~~J~~ J		P
7440-43-9	Cadmium	0.52 0.045	J		P
7440-70-2	Calcium	6810			P
7440-47-3	Chromium	3.5			P
7440-48-4	Cobalt	5.2 ~~1.0~~	~~J~~ J		P
7440-50-8	Copper	1.1	J		P
7439-89-6	Iron	6650			P
7439-92-1	Lead	2.0		~~N E~~ J	P
7439-95-4	Magnesium	621			P
7439-96-5	Manganese	43.4			P
7440-02-0	Nickel	1.8	J		P
7440-09-7	Potassium	330	J		P
7782-49-2	Selenium	3.6	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	380	J		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.4 ~~1.2~~	~~J~~ J		P
7440-62-2	Vanadium	6.7			P
7440-66-6	Zinc	9.0		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5332

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-14

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 96.7

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1120		~~N~~ J	P
7440-36-0	Antimony	6.2	U	~~N~~ J	P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	20.7 ~~1.8~~	~~U~~	J	P
7440-41-7	Beryllium	0.52 ~~0.11~~	~~U~~ J		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	6350			P
7440-47-3	Chromium	6.2			P
7440-48-4	Cobalt	5.2 ~~1.1~~	~~U~~ J		P
7440-50-8	Copper	2.6			P
7439-89-6	Iron	11900			P
7439-92-1	Lead	2.2		~~N E~~ J	P
7439-95-4	Magnesium	579			P
7439-96-5	Manganese	44.1			P
7440-02-0	Nickel	1.6	J		P
7440-09-7	Potassium	140	J		P
7782-49-2	Selenium	3.6 ~~0.74~~	~~U~~ J		P
7440-22-4	Silver	0.18 ~~1.0~~	~~U~~ J	~~N~~ J	P
7440-23-5	Sodium	336	J		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.3 ~~1.2~~	~~U~~ J		P
7440-62-2	Vanadium	16.4			P
7440-66-6	Zinc	9.8		~~E~~ J	P

as 10/29/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5333

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-15

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1570		~~N~~ J	P
7440-36-0	Antimony	6.1	U	~~N~~ J	P
7440-38-2	Arsenic	2.0			P
7440-39-3	Barium	20.2 ~~6.8~~	~~U~~	J	P
7440-41-7	Beryllium	0.50 ~~0.12~~	~~U~~		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	3260			P
7440-47-3	Chromium	5.4			P
7440-48-4	Cobalt	5.0 ~~1.3~~	~~U~~ J		P
7440-50-8	Copper	2.0	J		P
7439-89-6	Iron	8210			P
7439-92-1	Lead	11.6		~~N E~~ J	P
7439-95-4	Magnesium	795			P
7439-96-5	Manganese	42.6			P
7440-02-0	Nickel	3.0	J		P
7440-09-7	Potassium	567			P
7782-49-2	Selenium	3.5	U		P
7440-22-4	Silver	0.19 ~~1.0~~	~~U~~ J	~~N~~ J	P
7440-23-5	Sodium	312	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~3.1~~	~~J~~		P
7440-62-2	Vanadium	10.2			P
7440-66-6	Zinc	14.4		~~E~~ J	P

ok 10/29/08

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5334

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-16

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1200		~~N~~ J	P
7440-36-0	Antimony	6.0	U	~~N~~ J	P
7440-38-2	Arsenic	4.1			P
7440-39-3	Barium	20.1 ~~2.6~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.50 ~~0.23~~	~~J~~ U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	4250			P
7440-47-3	Chromium	6.6			P
7440-48-4	Cobalt	5.0 ~~1.2~~	~~J~~ U		P
7440-50-8	Copper	2.0	J		P
7439-89-6	Iron	18400		J	P
7439-92-1	Lead	3.8		~~N E~~ J	P
7439-95-4	Magnesium	682			P
7439-96-5	Manganese	54.7			P
7440-02-0	Nickel	2.4	J		P
7440-09-7	Potassium	216	J		P
7782-49-2	Selenium	3.5 ~~0.86~~	~~J~~ U		P
7440-22-4	Silver	0.19	~~J~~	~~N~~ J	P
7440-23-5	Sodium	82.8	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~1.2~~	~~J~~ U		P
7440-62-2	Vanadium	19.7		J	P
7440-66-6	Zinc	12.5		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5335

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-17

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 99.2

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	845		~~N~~ J	P
7440-36-0	Antimony	6.0	U	~~N~~ J	P
7440-38-2	Arsenic	2.5			P
7440-39-3	Barium	20.2 ~~2.0~~	~~J~~	J	P
7440-41-7	Beryllium	0.50 ~~0.11~~	~~J~~		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	~~1990~~		R	P
7440-47-3	Chromium	5.6			P
7440-48-4	Cobalt	5.0 ~~0.86~~	~~J~~		P
7440-50-8	Copper	0.99	J		P
7439-89-6	Iron	6840		J	P
7439-92-1	Lead	3.2		~~N~~ E J	P
7439-95-4	Magnesium	469	J		P
7439-96-5	Manganese	40.4			P
7440-02-0	Nickel	1.8	J		P
7440-09-7	Potassium	231	J		P
7782-49-2	Selenium	3.5 ~~0.64~~	~~J~~		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	44.9	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.1 ~~1.2~~	~~J~~		P
7440-62-2	Vanadium	7.4		J	P
7440-66-6	Zinc	8.5		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-18

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 97.2

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	743		~~N~~ J	P
7440-36-0	Antimony	6.2	U	~~N~~ J	P
7440-38-2	Arsenic	3.7			P
7440-39-3	Barium	20.6 ~~1.4~~	~~J~~ J	J	P
7440-41-7	Beryllium	0.51 ~~0.10~~	~~J~~ J		P
7440-43-9	Cadmium	0.51	U		P
7440-70-2	Calcium	402	J		P
7440-47-3	Chromium	4.3			P
7440-48-4	Cobalt	5.1 ~~0.83~~	~~J~~ J		P
7440-50-8	Copper	1.6	J		P
7439-89-6	Iron	10400			P
7439-92-1	Lead	3.5		~~N E~~ J	P
7439-95-4	Magnesium	276	J		P
7439-96-5	Manganese	28.4			P
7440-02-0	Nickel	0.99	J		P
7440-09-7	Potassium	179	J		P
7782-49-2	Selenium	3.6 ~~0.71~~	~~J~~ J		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	22.5	J		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.3 ~~1.2~~	~~J~~ J		P
7440-62-2	Vanadium	14.3			P
7440-66-6	Zinc	7.7		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: FINE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5319

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809180-19

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 98.5

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1060		~~N~~ J	P
7440-36-0	Antimony	6.1	U	~~N~~ J	P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	20.3 ~~7.6~~	~~J~~	J	P
7440-41-7	Beryllium	0.51 ~~0.098~~	~~J~~		P
7440-43-9	Cadmium	0.51	U		P
7440-70-2	Calcium	675			P
7440-47-3	Chromium	4.8			P
7440-48-4	Cobalt	5.1 ~~1.3~~	~~J~~		P
7440-50-8	Copper	1.2	J		P
7439-89-6	Iron	8920			P
7439-92-1	Lead	16.0		~~N E~~ J	P
7439-95-4	Magnesium	561			P
7439-96-5	Manganese	68.7			P
7440-02-0	Nickel	2.2	J		P
7440-09-7	Potassium	293	J		P
7782-49-2	Selenium	3.6 ~~0.70~~	~~J~~		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	231	J		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.2 ~~2.6~~	~~J~~		P
7440-62-2	Vanadium	9.4			P
7440-66-6	Zinc	12.1		~~E~~ J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

RECEIVED
SEP 29 2008
HAZ. WASTE SUPPORT SE

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB5319
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 13, 2008, we received 19 soil samples under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temp was determined to be 3.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/25/2008 @ 1821 hrs. The matrix spike failed for Sb, Pb and Ag; a post spike was analyzed at twice the CRQL for Sb and Ag and at twice the indigenous level for Pb.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809180-10 EPA Sample # MB5328

Date & Time 9/25/2008 @ 2094

Metals: 9108 µg/L * (0.100 L) / (1.00 g) * 100 % / 91.7 % * 1000 g / 1 kg * 1 mg / 1000 µg = 993 mg/Kg
(Analyte Al)

Authorized by _____
Daniel Antrim
Document Control Officer

12

RECEIVED
SEP 29 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB5319

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 16301

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB5319	**7)** MB5325	**13)** MB5331	**19)** MB53M2
2) MB5320	**8)** MB5326	**14)** MB5332	**20)**
3) MB5321	**9)** MB5327	**15)** MB5333	**21)**
4) MB5322	**10)** MB5328	**16)** MB5334	**22)**
5) MB5323	**11)** MB5329	**17)** MB5335	**23)**
6) MB5324	**12)** MB5330	**18)** MB53M1	**24)** 9-13-08

MB5319
First Sample in SDG

MB53M2
Last Sample in SDG

09/13/2008
First Sample Receipt Date

09/13/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE·Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-13-08
Date

22

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 9:57 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDG MB5395. The laboratory would like to perform laboratory QC on sample MB5395.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Monday, September 15, 2008 6:55 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 13, 2008, we received 65 soil samples in 4 coolers under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temps were determined to be 3.5°C, 4.5°C, and 5.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

2. There is no QC listed on the TR/COC for SDG MB5395. We would like to use MB5395 as QC. Please advise if this is acceptable.

(23)

Thanks,

Beth Whitehead
Bonner Analytical

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5336

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-01

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 85.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~998~~		~~* N~~ R	P
7440-36-0	Antimony	7.0	U	~~* N E~~	P
7440-38-2	Arsenic	~~1.8~~		~~N E~~ R	P
7440-39-3	Barium	1.6	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.5 J ~~0.067~~	~~J~~ U		P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	6210		~~*~~ J	P
7440-47-3	Chromium	13.2		~~*~~	P
7440-48-4	Cobalt	1.2	J		P
7440-50-8	Copper	~~1.0~~	~~J~~	~~* N~~ R	P
7439-89-6	Iron	4320		~~*~~	P
7439-92-1	Lead	1.8			P
7439-95-4	Magnesium	563	J		P
7439-96-5	Manganese	~~45.9~~		~~* N~~ R	P
7440-02-0	Nickel	4.4	J		P
7440-09-7	Potassium	208	J		P
7782-49-2	Selenium	4.1	U	~~N~~ J	P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	1080		~~E~~ J	P
7440-28-0	Thallium	2.9	U	~~N~~ J	P
7440-31-5	Tin	11.7 ~~1.1~~	~~J~~ U	~~* E~~ J	P
7440-62-2	Vanadium	5.9 ~~4.1~~	~~J~~ U	~~N~~ J	P
7440-66-6	Zinc	7.7		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5337

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-02

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 95.6

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~846~~		~~* N~~ R	P
7440-36-0	Antimony	6.3	U	~~* N E~~	P
7440-38-2	Arsenic	~~3.0~~		~~* N E~~ R	P
7440-39-3	Barium	1.1	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.52 ~~0.14~~	~~J~~ U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	3300		~~*~~ J	P
7440-47-3	Chromium	6.1		~~*~~	P
7440-48-4	Cobalt	1.2	J		P
7440-50-8	Copper	~~1.4~~	~~J~~	~~* N~~ R	P
7439-89-6	Iron	10400		~~*~~	P
7439-92-1	Lead	2.9			P
7439-95-4	Magnesium	431	J		P
7439-96-5	Manganese	~~64.6~~		~~* N~~ R	P
7440-02-0	Nickel	1.9	J		P
7440-09-7	Potassium	153	J		P
7782-49-2	Selenium	0.58	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	426	~~J~~	~~E~~ J	P
7440-28-0	Thallium	2.6	U	~~N~~ J	P
7440-31-5	Tin	10 J ~~0.95~~	~~J~~ U	~~* E~~ J	P
7440-62-2	Vanadium	11.1		~~N~~ J	P
7440-66-6	Zinc	10.3		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5338

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-03

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 94.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~855~~		~~*~~ ~~N~~ R	P
7440-36-0	Antimony	6.3	U	~~*~~ ~~N~~ ~~E~~	P
7440-38-2	Arsenic	~~5.4~~		~~*~~ ~~N~~ ~~E~~ R	P
7440-39-3	Barium	1.6	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.53 ~~0.14~~	~~J~~ U		P
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	7460		~~*~~ J	P
7440-47-3	Chromium	4.4		~~*~~	P
7440-48-4	Cobalt	1.2	J		P
7440-50-8	Copper	~~2.0~~	~~J~~	~~*~~ ~~N~~ R	P
7439-89-6	Iron	11900		~~*~~	P
7439-92-1	Lead	3.2			P
7439-95-4	Magnesium	484	J		P
7439-96-5	Manganese	~~63.9~~		~~*~~ ~~N~~ R	P
7440-02-0	Nickel	2.3	J		P
7440-09-7	Potassium	183	J		P
7782-49-2	Selenium	0.54	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	459	~~J~~	~~E~~ J	P
7440-28-0	Thallium	2.6	U	~~N~~ J	P
7440-31-5	Tin	10.6 ~~1.2~~	~~J~~ U	~~*~~ ~~E~~ J	P
7440-62-2	Vanadium	11.8		~~N~~ J	P
7440-66-6	Zinc	11.0		~~N~~ ~~E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5339

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-04

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 95.7

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~897~~		~~N~~ R	P
7440-36-0	Antimony	6.3	U	~~N~~ E	P
7440-38-2	Arsenic	~~2.5~~		N E R	P
7440-39-3	Barium	1.9	~~J~~	E J	P
7440-41-7	Beryllium	0.52 ~~0.074~~	~~J~~ U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	368	~~J~~	~~J~~ J	P
7440-47-3	Chromium	6.2		~~J~~	P
7440-48-4	Cobalt	0.97	J		P
7440-50-8	Copper	~~1.3~~	~~J~~	~~N~~ R	P
7439-89-6	Iron	6080		~~J~~	P
7439-92-1	Lead	3.6			P
7439-95-4	Magnesium	504	J		P
7439-96-5	Manganese	~~51.2~~		~~N~~ R	P
7440-02-0	Nickel	1.8	J		P
7440-09-7	Potassium	363	J		P
7782-49-2	Selenium	3.7	U	~~N~~ J	P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	388	~~J~~	~~E~~ J	P
7440-28-0	Thallium	2.6	U	~~N~~ J	P
7440-31-5	Tin	10.4 ~~1.6~~	~~J~~ U	~~E~~ J	P
7440-62-2	Vanadium	7.5		~~N~~ J	P
7440-66-6	Zinc	9.3		N E J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5340

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-05

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 88.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~850~~		~~* N~~ R	P
7440-36-0	Antimony	6.8	U	~~* N E~~	P
7440-38-2	Arsenic	~~2.2~~		~~* N E~~ R	P
7440-39-3	Barium	0.91	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.56 ~~0.14~~	~~J~~ U		P
7440-43-9	Cadmium	0.56	U		P
7440-70-2	Calcium	1080		~~*~~ J	P
7440-47-3	Chromium	12.5		~~*~~	P
7440-48-4	Cobalt	1.1	J		P
7440-50-8	Copper	~~1.4~~	~~J~~	~~* N~~ R	P
7439-89-6	Iron	9510		~~*~~	P
7439-92-1	Lead	4.4			P
7439-95-4	Magnesium	445	J		P
7439-96-5	Manganese	~~37.8~~		~~* N~~ R	P
7440-02-0	Nickel	2.7	J		P
7440-09-7	Potassium	192	J		P
7782-49-2	Selenium	0.41	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	818		~~E~~ J	P
7440-28-0	Thallium	2.8	U	~~N~~ J	P
7440-31-5	Tin	11.3 ~~1.1~~	~~J~~ U	~~* E~~ J	P
7440-62-2	Vanadium	11.7		~~N~~ J	P
7440-66-6	Zinc	15.0		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5380

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-06

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 90.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~3930~~		~~N~~ J	P
7440-36-0	Antimony	~~2.32~~		~~N E~~ J	P
7440-38-2	Arsenic	~~1.57~~		~~N E~~ K	P
7440-39-3	Barium	42.4		~~E~~ J	P
7440-41-7	Beryllium	0.76			P
7440-43-9	Cadmium	0.96			P
7440-70-2	Calcium	1010		~~J~~	P
7440-47-3	Chromium	57.0		~~J~~	P
7440-48-4	Cobalt	3.7	J		P
7440-50-8	Copper	~~2.48~~		~~N~~ J	P
7439-89-6	Iron	96100		~~D~~	P
7439-92-1	Lead	5860		~~D~~	P
7439-95-4	Magnesium	991			P
7439-96-5	Manganese	~~1.74~~		~~N~~ J	P
7440-02-0	Nickel	18.4			P
7440-09-7	Potassium	259	J		P
7782-49-2	Selenium	1.1	~~J~~	~~N~~ J	P
7440-22-4	Silver	0.24	J		P
7440-23-5	Sodium	1070		~~E~~ J	P
7440-28-0	Thallium	2.8	U	~~N~~ J	P
7440-31-5	Tin	127		~~E~~ J	P
7440-62-2	Vanadium	71.0		~~N~~ J	P
7440-66-6	Zinc	242		~~N E~~ J	P

Color Before: BROWM Clarity Before: - Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5381

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-07

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 77.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~681~~		~~N~~ R	P
7440-36-0	Antimony	~~20.9~~		~~N E~~ R	P
7440-38-2	Arsenic	~~22.7~~		~~N E~~ R	P
7440-39-3	Barium	18.3	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.6J ~~0.086~~	~~J~~ U		P
7440-43-9	Cadmium	0.21	J		P
7440-70-2	Calcium	2810		~~J~~ J	P
7440-47-3	Chromium	7.1		~~J~~	P
7440-48-4	Cobalt	0.72	J		P
7440-50-8	Copper	~~24.0~~		~~N~~ R	P
7439-89-6	Iron	10400		~~J~~	P
7439-92-1	Lead	861			P
7439-95-4	Magnesium	455	J		P
7439-96-5	Manganese	~~48.5~~		~~N~~ R	P
7440-02-0	Nickel	3.0	J		P
7440-09-7	Potassium	172	J		P
7782-49-2	Selenium	0.60	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	2270		~~E~~ J	P
7440-28-0	Thallium	3.2	U	~~N~~ J	P
7440-31-5	Tin	38.6		~~E~~ J	P
7440-62-2	Vanadium	11.7		~~N~~ J	P
7440-66-6	Zinc	46.3		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5382

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-08

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 81.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1010~~		~~N~~ R	P
7440-36-0	Antimony	~~15.1~~		~~N~~ E R	P
7440-38-2	Arsenic	~~17.1~~		~~N~~ E R	P
7440-39-3	Barium	2.1	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.61 / ~~0.20~~	~~J~~ U		P
7440-43-9	Cadmium	0.093	J		P
7440-70-2	Calcium	484	~~J~~	~~*~~ J	P
7440-47-3	Chromium	17.3		~~*~~	P
7440-48-4	Cobalt	0.97	J		P
7440-50-8	Copper	~~31.1~~		~~*~~ N R	P
7439-89-6	Iron	19500		~~*~~	P
7439-92-1	Lead	403			P
7439-95-4	Magnesium	453	J		P
7439-96-5	Manganese	~~65.9~~		~~*~~ N R	P
7440-02-0	Nickel	2.7	J		P
7440-09-7	Potassium	150	J		P
7782-49-2	Selenium	0.85	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	1500		~~E~~ J	P
7440-28-0	Thallium	3.1	U	~~N~~ J	P
7440-31-5	Tin	14.5		~~*~~ E J	P
7440-62-2	Vanadium	26.8		~~N~~ J	P
7440-66-6	Zinc	47.0		~~N~~ E J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5383

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-09

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 80.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1070~~		~~*~~ ~~N~~ R	P
7440-36-0	Antimony	~~7.6~~		~~*~~ ~~N~~ ~~E~~ R	P
7440-38-2	Arsenic	~~9.5~~		~~*~~ ~~N~~ ~~E~~ R	P
7440-39-3	Barium	5.0	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.62 ~~0.12~~	~~J~~ U		P
7440-43-9	Cadmium	0.17	J		P
7440-70-2	Calcium	5550		~~*~~ J	P
7440-47-3	Chromium	7.4		~~*~~	P
7440-48-4	Cobalt	1.4	J		P
7440-50-8	Copper	~~18.1~~		~~*~~ ~~N~~ R	P
7439-89-6	Iron	7650		~~*~~	P
7439-92-1	Lead	326			P
7439-95-4	Magnesium	728			P
7439-96-5	Manganese	~~51.7~~		~~*~~ ~~N~~ R	P
7440-02-0	Nickel	3.2	J		P
7440-09-7	Potassium	283	J		P
7782-49-2	Selenium	0.63	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	2490		~~E~~ J	P
7440-28-0	Thallium	3.1	U	~~N~~ J	P
7440-31-5	Tin	12.8 ~~10.2~~	~~J~~ U	~~*~~ ~~E~~ J	P
7440-62-2	Vanadium	11.0		~~N~~ J	P
7440-66-6	Zinc	41.1		~~N~~ ~~E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5384

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-10

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 70.8

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1500~~		~~*~~ ~~N~~ R	P
7440-36-0	Antimony	~~15.1~~		~~*~~ ~~N~~ E R	P
7440-38-2	Arsenic	~~12.5~~		~~*~~ ~~N~~ E K	P
7440-39-3	Barium	12.3	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.71 ~~0.33~~	~~J~~ U		P
7440-43-9	Cadmium	0.17	J		P
7440-70-2	Calcium	3120		~~*~~ J	P
7440-47-3	Chromium	8.1		~~*~~	P
7440-48-4	Cobalt	1.0	J		P
7440-50-8	Copper	~~51.7~~		~~*~~ ~~N~~ R	P
7439-89-6	Iron	13700		~~*~~	P
7439-92-1	Lead	441			P
7439-95-4	Magnesium	660	J		P
7439-96-5	Manganese	~~29.5~~		~~*~~ ~~N~~ R	P
7440-02-0	Nickel	4.4	J		P
7440-09-7	Potassium	298	J		P
7782-49-2	Selenium	0.94	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	3030		~~E~~ J	P
7440-28-0	Thallium	3.5	U	~~N~~ J	P
7440-31-5	Tin	47.8		~~*~~ ~~E~~ J	P
7440-62-2	Vanadium	18.3		~~N~~ J	P
7440-66-6	Zinc	53.8		~~N~~ ~~E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5385

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-11

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 83.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1050~~		~~*~~ ~~N~~ R	P
7440-36-0	Antimony	~~26.0~~		~~*~~ ~~N~~ ~~E~~ R	P
7440-38-2	Arsenic	~~29.4~~		~~*~~ ~~N~~ ~~E~~ R	P
7440-39-3	Barium	5.1	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.60 ~~0.19~~	~~J~~ J		P
7440-43-9	Cadmium	0.25	J		P
7440-70-2	Calcium	2740		~~*~~ J	P
7440-47-3	Chromium	10.4		~~*~~	P
7440-48-4	Cobalt	1.2	J		P
7440-50-8	Copper	~~31.8~~		~~*~~ ~~N~~ R	P
7439-89-6	Iron	14300		~~*~~	P
7439-92-1	Lead	660			P
7439-95-4	Magnesium	426	J		P
7439-96-5	Manganese	~~23.4~~		~~*~~ ~~N~~ R	P
7440-02-0	Nickel	5.8			P
7440-09-7	Potassium	168	J		P
7782-49-2	Selenium	0.78	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	1310		~~E~~ J	P
7440-28-0	Thallium	3.0	U	~~N~~ U	P
7440-31-5	Tin	53.6		~~*~~ ~~E~~ J	P
7440-62-2	Vanadium	20.4		~~N~~ J	P
7440-66-6	Zinc	54.9		~~N~~ ~~E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5390

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-12

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 70.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~716~~		~~N~~ R	P
7440-36-0	Antimony	8.J ~~2.3~~	~~J~~	~~N E~~ R	P
7440-38-2	Arsenic	~~2.4~~		~~N E~~ R	P
7440-39-3	Barium	2.7	~~J~~	~~E~~ J	P
7440-41-7	Beryllium	0.7J ~~0.060~~	~~U~~		P
7440-43-9	Cadmium	0.22	J		P
7440-70-2	Calcium	565	~~J~~	~~E~~ J	P
7440-47-3	Chromium	4.9		~~E~~	P
7440-48-4	Cobalt	0.48	J		P
7440-50-8	Copper	~~10.2~~		~~N~~ R	P
7439-89-6	Iron	5570		~~E~~	P
7439-92-1	Lead	75.7			P
7439-95-4	Magnesium	719			P
7439-96-5	Manganese	~~16.8~~		~~N~~ R	P
7440-02-0	Nickel	1.3	J		P
7440-09-7	Potassium	286	J		P
7782-49-2	Selenium	5.0	U	~~N~~ J	P
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	4140		~~E~~ J	P
7440-28-0	Thallium	3.5	U	~~N~~ J	P
7440-31-5	Tin	14.2 ~~4.4~~	~~U~~ J	~~E~~ J	P
7440-62-2	Vanadium	10.6		~~N~~ J	P
7440-66-6	Zinc	27.6		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5391

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-13

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 62.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1460~~		~~*~~ ~~N~~ R	P
7440-36-0	Antimony	~~3.1~~	~~J~~	~~*~~ ~~N~~ ~~E~~ R	P
7440-38-2	Arsenic	~~5.6~~		~~*~~ ~~N~~ ~~E~~ R	P
7440-39-3	Barium	3.9 ~~6.9~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.90 ~~0.12~~	~~J~~ U		P
7440-43-9	Cadmium	0.80 ~~0.19~~	~~J~~ U		P
7440-70-2	Calcium	2590		~~*~~ J	P
7440-47-3	Chromium	8.3		~~*~~	P
7440-48-4	Cobalt	8.0 ~~1.2~~	~~J~~ U		P
7440-50-8	Copper	~~18.6~~		~~*~~ ~~N~~ R	P
7439-89-6	Iron	8370		~~*~~	P
7439-92-1	Lead	186			P
7439-95-4	Magnesium	952			P
7439-96-5	Manganese	~~46.8~~		~~*~~ ~~N~~ R	P
7440-02-0	Nickel	2.7	J		P
7440-09-7	Potassium	436	J		P
7782-49-2	Selenium	0.71	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.6 ~~0.60~~	~~J~~ U		P
7440-23-5	Sodium	4260		~~E~~ J	P
7440-28-0	Thallium	4.0	U	~~N~~ J	P
7440-31-5	Tin	16.0 ~~8.6~~	~~J~~ U	~~E~~ J	P
7440-62-2	Vanadium	15.7		~~N~~ J	P
7440-66-6	Zinc	52.7		~~N~~ ~~E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5392

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-14

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 66.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1820~~		~~*~~ ~~N~~ R	P
7440-36-0	Antimony	~~2.1~~	~~J~~	~~*~~ ~~N~~ E R	P
7440-38-2	Arsenic	~~6.3~~		~~*~~ ~~N~~ E R	P
7440-39-3	Barium	29.9 ~~6.1~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.25 ~~0.17~~	~~J~~ U		P
7440-43-9	Cadmium	0.2 J ~~0.11~~	~~J~~ U		P
7440-70-2	Calcium	1420		~~*~~ J	P
7440-47-3	Chromium	9.1		~~*~~	P
7440-48-4	Cobalt	7.5 ~~1.4~~	~~J~~ U		P
7440-50-8	Copper	~~11.0~~		~~*~~ ~~N~~ R	P
7439-89-6	Iron	12100		~~*~~	P
7439-92-1	Lead	93.5			P
7439-95-4	Magnesium	1110			P
7439-96-5	Manganese	~~43.1~~		~~*~~ ~~N~~ R	P
7440-02-0	Nickel	3.2	J		P
7440-09-7	Potassium	476	J		P
7782-49-2	Selenium	0.88	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.5 ~~0.27~~	~~J~~ U		P
7440-23-5	Sodium	4060		~~E~~ J	P
7440-28-0	Thallium	3.7	U	~~N~~ J	P
7440-31-5	Tin	15 ~~6.1~~	~~J~~ U	~~*~~ ~~E~~ J	P
7440-62-2	Vanadium	17.6		~~N~~ J	P
7440-66-6	Zinc	43.2		~~N~~ E J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5393

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-15

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 65.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~2950~~		~~N~~ R	P
7440-36-0	Antimony	~~0.58~~	~~J~~	~~N E~~ R	P
7440-38-2	Arsenic	~~9.4~~		~~N E~~ R	P
7440-39-3	Barium	30.4 ~~11.4~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.76 ~~0.16~~	~~J~~ U		P
7440-43-9	Cadmium	0.26 ~~0.25~~	~~J~~ U		P
7440-70-2	Calcium	3680		~~J~~	P
7440-47-3	Chromium	19.6			P
7440-48-4	Cobalt	7.6 ~~1.9~~	~~J~~ U		P
7440-50-8	Copper	~~22.1~~		~~N~~ R	P
7439-89-6	Iron	10700			P
7439-92-1	Lead	58.2			P
7439-95-4	Magnesium	1160			P
7439-96-5	Manganese	~~40.8~~		~~N~~ R	P
7440-02-0	Nickel	7.4			P
7440-09-7	Potassium	678	J		P
7782-49-2	Selenium	1.6	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.5 ~~0.58~~	~~J~~ U		P
7440-23-5	Sodium	3590		~~E~~ J	P
7440-28-0	Thallium	3.8	U	~~N~~ J	P
7440-31-5	Tin	15.2 ~~4.8~~	~~J~~ U	~~E~~ J	P
7440-62-2	Vanadium	23.7		~~N~~ J	P
7440-66-6	Zinc	59.2		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5394

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-16

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 76.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~820~~		~~N~~ R	P
7440-36-0	Antimony	~~0.46~~	~~J~~	~~N E~~ R	P
7440-38-2	Arsenic	~~2.0~~		~~N E~~ R	P
7440-39-3	Barium	26.2 ~~3.2~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.65 ~~0.089~~	~~J~~ U		P
7440-43-9	Cadmium	0.65 ~~0.070~~	~~J~~ U		P
7440-70-2	Calcium	9740		~~E~~ J	P
7440-47-3	Chromium	5.7		~~E~~	P
7440-48-4	Cobalt	6.5 ~~0.66~~	~~J~~ U		P
7440-50-8	Copper	~~7.4~~		~~N~~ R	P
7439-89-6	Iron	5020		~~E~~	P
7439-92-1	Lead	48.1			P
7439-95-4	Magnesium	425	J		P
7439-96-5	Manganese	~~17.4~~		~~N~~ R	P
7440-02-0	Nickel	1.2	J		P
7440-09-7	Potassium	217	J		P
7782-49-2	Selenium	0.76	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	2120		~~E~~ J	P
7440-28-0	Thallium	3.3	U	~~N~~ J	P
7440-31-5	Tin	13.1 ~~2.7~~	~~J~~ U	~~E~~ J	P
7440-62-2	Vanadium	10.4		~~N~~ J	P
7440-66-6	Zinc	32.2		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-17

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 73.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~1200~~		~~*N~~ K	P
7440-36-0	Antimony	8.2	U	~~*N E~~	P
7440-38-2	Arsenic	~~1.6~~		~~*N E~~ R	P
7440-39-3	Barium	27.4 ~~3.1~~	~~J~~ U	~~E~~ J	P
7440-41-7	Beryllium	0.68 ~~0.13~~	~~J~~ U		P
7440-43-9	Cadmium	0.68	U		P
7440-70-2	Calcium	882		~~*~~ J	P
7440-47-3	Chromium	5.0		~~*~~	P
7440-48-4	Cobalt	6.2 ~~0.94~~	~~J~~ U		P
7440-50-8	Copper	~~1.8~~	~~J~~	~~*N~~ R	P
7439-89-6	Iron	4830		~~*~~	P
7439-92-1	Lead	7.3			P
7439-95-4	Magnesium	781			P
7439-96-5	Manganese	~~27.1~~		~~*N~~ R	P
7440-02-0	Nickel	1.9	J		P
7440-09-7	Potassium	647	J		P
7782-49-2	Selenium	0.46	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.4 ~~0.23~~	~~J~~ U		P
7440-23-5	Sodium	2440		~~E~~ J	P
7440-28-0	Thallium	3.4	U	~~N~~ J	P
7440-31-5	Tin	13.7 ~~1.4~~	~~J~~ U	~~*E~~ J	P
7440-62-2	Vanadium	6.8	~~J~~	~~N~~ J	P
7440-66-6	Zinc	13.1		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB5336

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809181-18

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 89.8

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	~~790~~		~~N~~ R	P
7440-36-0	Antimony	6.7	U	~~N~~ E	P
7440-38-2	Arsenic	~~1.3~~		~~N~~ E R	P
7440-39-3	Barium	22.3 ~~1.4~~	J U	~~E~~ J	P
7440-41-7	Beryllium	0.5~6 ~~0.071~~	~~J~~ U		P
7440-43-9	Cadmium	0.56	U		P
7440-70-2	Calcium	959		~~E~~ J	P
7440-47-3	Chromium	2.9			P
7440-48-4	Cobalt	5.6 ~~0.85~~	J U		P
7440-50-8	Copper	~~1.6~~	J	~~N~~ R	P
7439-89-6	Iron	4220			P
7439-92-1	Lead	4.4			P
7439-95-4	Magnesium	477	J		P
7439-96-5	Manganese	~~49.3~~		~~N~~ R	P
7440-02-0	Nickel	2.0	J		P
7440-09-7	Potassium	245	J		P
7782-49-2	Selenium	0.37	~~J~~	~~N~~ J	P
7440-22-4	Silver	1.1 ~~0.095~~	J U		P
7440-23-5	Sodium	958		~~E~~ J	P
7440-28-0	Thallium	2.8	U	~~N~~ J	P
7440-31-5	Tin	11.1 ~~1.0~~	J U	~~E~~ J	P
7440-62-2	Vanadium	5.2	~~J~~	~~N~~ J	P
7440-66-6	Zinc	7.9		~~N E~~ J	P

Color Before: BROWM Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

RECEIVED
SEP 29 2008
HAZ. WASTE SUPPORT SEC

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB5336
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 13, 2008, we received 18 soil samples under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temp was determined to be 4.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/21/2008 @ 1220 hrs. MB5380 was over the linear range for Fe and Pb; the sample was reanalyzed at an appropriate dilution. CRI03 failed for Ag; associated samples were reanalyzed. The matrix spike failed for As, Cu, Mn, Sb, Se, Tl, V and Zn; a post spike was analyzed at twice the CRQL for Se and Tl and at twice the indigenous level for As, Cu, Mn, Sb, V and Zn.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809181-01 EPA Sample # MB5336

Date & Time 9/21/2008 @ 1312

Metals: 112.80 µg/L (0.100 L) 100 % 1000 g 1 mg
(Analyte Cr) * * * * * (1.00 g) 85.5% 1 kg 1000 µg = 13.2 mg/Kg

Authorized by _____
Daniel Antrim
Document Control Officer

RECEIVED
SEP 29 2008
HAZ. WASTE SUPPORT SE

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB5336

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB5336	7) MB5381	13) MB5391	19)
2) MB5337	8) MB5382	14) MB5392	20)
3) MB5338	9) MB5383	15) MB5393	21)
4) MB5339	10) MB5384	16) MB5394	22)
5) MB5340	11) MB5385	17) MB53M5	23)
6) MB5380	12) MB5390	18) MB53M6	24) 9-13-08

MB5336
First Sample in SDG

MB53M6
Last Sample in SDG

09/13/2008
First Sample Receipt Date

09/13/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-13-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 9:57 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDG MB5395. The laboratory would like to perform laboratory QC on sample MB5395.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Monday, September 15, 2008 6:55 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 13, 2008, we received 65 soil samples in 4 coolers under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temps were determined to be 3.5°C, 4.5°C, and 5.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

2. There is no QC listed on the TR/COC for SDG MB5395. We would like to use MB5395 as QC. Please advise if this is acceptable.

Thanks,

Beth Whitehead
Bonner Analytical

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-01

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 95.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1050		~~N~~ J	P
7440-36-0	Antimony	6.3	U	~~N~~ J	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	20.4 ~~2.2~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.52 ~~0.093~~	~~J~~ U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	419	J		P
7440-47-3	Chromium	6.2			P
7440-48-4	Cobalt	5.2 ~~0.99~~	~~J~~ U		P
7440-50-8	Copper	1.2	J		P
7439-89-6	Iron	5590			P
7439-92-1	Lead	3.0			P
7439-95-4	Magnesium	556			P
7439-96-5	Manganese	110			P
7440-02-0	Nickel	4.2 ~~2.2~~	~~J~~ U		P
7440-09-7	Potassium	347	J		P
7782-49-2	Selenium	3.7	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	524 ~~369~~	~~J~~ U		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.1 ~~1.2~~	~~J~~ U		P
7440-62-2	Vanadium	6.9		~~E~~ J	P
7440-66-6	Zinc	7.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-02

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 95.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1160		~~N~~ J	P
7440-36-0	Antimony	6.3	U	~~N~~ J	P
7440-38-2	Arsenic	2.9			P
7440-39-3	Barium	20.9 ~~1.4~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.52 ~~0.12~~	~~J~~ U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	2600			P
7440-47-3	Chromium	21.4			P
7440-48-4	Cobalt	5.2 ~~1.1~~	~~J~~ U		P
7440-50-8	Copper	2.2	J		P
7439-89-6	Iron	10600			P
7439-92-1	Lead	3.0			P
7439-95-4	Magnesium	550			P
7439-96-5	Manganese	39.9			P
7440-02-0	Nickel	4.2 ~~2.5~~	~~J~~ U		P
7440-09-7	Potassium	274	J		P
7782-49-2	Selenium	3.7	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	524 ~~355~~	~~J~~ U		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~1.2~~	~~J~~ U		P
7440-62-2	Vanadium	18.0		~~E~~ J	P
7440-66-6	Zinc	11.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-03

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 92.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	947		~~N~~ J	P
7440-36-0	Antimony	6.5	U	~~N~~ J	P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	21.7 ~~1.6~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.57 ~~0.11~~	~~J~~ U		P
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	526	J		P
7440-47-3	Chromium	5.1			P
7440-48-4	Cobalt	5.4 ~~1.1~~	~~J~~ U		P
7440-50-8	Copper	0.99	J		P
7439-89-6	Iron	5880			P
7439-92-1	Lead	2.5			P
7439-95-4	Magnesium	554			P
7439-96-5	Manganese	53.4			P
7440-02-0	Nickel	4.3 ~~2.8~~	~~J~~ U		P
7440-09-7	Potassium	334	J		P
7782-49-2	Selenium	3.8	U		P
7440-22-4	Silver	1.1	U	~~N~~ J	P
7440-23-5	Sodium	555			P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.7 ~~1.2~~	~~J~~ U		P
7440-62-2	Vanadium	6.3		~~E~~ J	P
7440-66-6	Zinc	9.7			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-17

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 98.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	875		~~N~~ J	P
7440-36-0	Antimony	6.1	U	~~N~~ J	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	20.4 ~~2.1~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.51 ~~0.089~~	~~J~~ U		P
7440-43-9	Cadmium	0.51	U		P
7440-70-2	Calcium	682			P
7440-47-3	Chromium	4.0			P
7440-48-4	Cobalt	5.1 ~~0.85~~	~~J~~ U		P
7440-50-8	Copper	1.5	J		P
7439-89-6	Iron	6170			P
7439-92-1	Lead	5.5			P
7439-95-4	Magnesium	407	J		P
7439-96-5	Manganese	51.6			P
7440-02-0	Nickel	4.1 ~~1.6~~	~~J~~ U		P
7440-09-7	Potassium	311	J		P
7782-49-2	Selenium	3.6	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	510 ~~254~~	~~J~~ U		P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	10.2 ~~4.0~~	~~J~~ U		P
7440-62-2	Vanadium	7.3		~~E~~ J	P
7440-66-6	Zinc	8.6			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-04

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 79.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	921		~~N~~ J	P
7440-36-0	Antimony	7.6	U	~~N~~ J	P
7440-38-2	Arsenic	1.5			P
7440-39-3	Barium	25.3 ~~1.6~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.63 ~~0.081~~	~~J~~ U		P
7440-43-9	Cadmium	0.63	U		P
7440-70-2	Calcium	430	J		P
7440-47-3	Chromium	4.1			P
7440-48-4	Cobalt	6.3 ~~0.83~~	~~J~~ U		P
7440-50-8	Copper	1.1	J		P
7439-89-6	Iron	3940			P
7439-92-1	Lead	2.0		J	P
7439-95-4	Magnesium	696			P
7439-96-5	Manganese	41.5			P
7440-02-0	Nickel	5.1 ~~1.7~~	~~J~~ U		P
7440-09-7	Potassium	539	J		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	1.3	U	~~N~~ J	P
7440-23-5	Sodium	1890			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	12.6 ~~1.3~~	~~J~~ U		P
7440-62-2	Vanadium	6.3 ~~5.0~~	~~J~~ U	~~E~~ J	P
7440-66-6	Zinc	7.6 ~~7.0~~	~~J~~ U		P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-05

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 96.4

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1090		~~N~~ J	P
7440-36-0	Antimony	6.2	U	~~N~~ J	P
7440-38-2	Arsenic	3.1			P
7440-39-3	Barium	207 ~~1.9~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.52 ~~0.12~~	~~J~~ U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	2180		J	P
7440-47-3	Chromium	~~3.6~~		R	P
7440-48-4	Cobalt	5.2 ~~1.0~~	~~J~~ U		P
7440-50-8	Copper	0.94	J		P
7439-89-6	Iron	6010			P
7439-92-1	Lead	~~1.9~~		R	P
7439-95-4	Magnesium	475	J		P
7439-96-5	Manganese	47.9			P
7440-02-0	Nickel	4.5 ~~2.0~~	~~J~~ U		P
7440-09-7	Potassium	334	J		P
7782-49-2	Selenium	3.6	U		P
7440-22-4	Silver	1.0	U	~~N~~ J	P
7440-23-5	Sodium	579 ~~362~~	~~J~~		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.4 ~~1.0~~	~~J~~ U		P
7440-62-2	Vanadium	5.6		~~E~~ J	P
7440-66-6	Zinc	9.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-06

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 96.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1120		~~N~~ J	P
7440-36-0	Antimony	6.2 ~~0.38~~	~~J~~ U	~~N~~ J	P
7440-38-2	Arsenic	2.0			P
7440-39-3	Barium	20.7 ~~1.8~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.52 ~~0.096~~	~~J~~ U		P
7440-43-9	Cadmium	0.52			P
7440-70-2	Calcium	667		J	P
7440-47-3	Chromium	8.1			P
7440-48-4	Cobalt	5.2 ~~1.1~~	~~J~~ U		P
7440-50-8	Copper	0.89	J		P
7439-89-6	Iron	5580			P
7439-92-1	Lead	11.4			P
7439-95-4	Magnesium	559			P
7439-96-5	Manganese	55.3			P
7440-02-0	Nickel	4.1 ~~2.3~~	~~J~~ U		P
7440-09-7	Potassium	390	J		P
7782-49-2	Selenium	3.6	U		P
7440-22-4	Silver	0.16 ~~J~~	~~J~~	~~N~~ J	P
7440-23-5	Sodium	518 ~~315~~	~~J~~ U		P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.4 ~~1.3~~	~~J~~ U		P
7440-62-2	Vanadium	7.9		~~E~~ J	P
7440-66-6	Zinc	9.6			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-07

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 90.2

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	987		~~N~~ J	P
7440-36-0	Antimony	6.7	U	~~N~~ J	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	22.2 ~~1.3~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.55 ~~0.11~~	~~J~~ U		P
7440-43-9	Cadmium	0.55 ~~0.15~~	~~J~~ U		P
7440-70-2	Calcium	809			P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	5.5 ~~1.1~~	~~J~~ U		P
7440-50-8	Copper	0.58	J		P
7439-89-6	Iron	6340			P
7439-92-1	Lead	4.2			P
7439-95-4	Magnesium	494	J		P
7439-96-5	Manganese	39.9			P
7440-02-0	Nickel	4.4 ~~2.6~~	~~J~~ U		P
7440-09-7	Potassium	336	J		P
7782-49-2	Selenium	3.9	U		P
7440-22-4	Silver	1.1	U	~~N~~ J	P
7440-23-5	Sodium	640			P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	11.1 ~~1.2~~	~~J~~ U		P
7440-62-2	Vanadium	7.7		~~E~~ J	P
7440-66-6	Zinc	8.5			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-08

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 91.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1030		~~N~~ J	P
7440-36-0	Antimony	6.6	U	~~N~~ J	P
7440-38-2	Arsenic	3.1			P
7440-39-3	Barium	21.9 ~~1.5~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.57 ~~0.074~~	~~J~~ U		P
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	647			P
7440-47-3	Chromium	5.6			P
7440-48-4	Cobalt	0.95	J		P
7440-50-8	Copper	2.0	J		P
7439-89-6	Iron	5820			P
7439-92-1	Lead	2.6			P
7439-95-4	Magnesium	581			P
7439-96-5	Manganese	85.9			P
7440-02-0	Nickel	1.8	J		P
7440-09-7	Potassium	396	J		P
7782-49-2	Selenium	3.8	U		P
7440-22-4	Silver	1.1	U	~~N~~ J	P
7440-23-5	Sodium	627			P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	11.0 ~~1.1~~	~~J~~		P
7440-62-2	Vanadium	7.3		~~E~~ J	P
7440-66-6	Zinc	6.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-09

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 84.4

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	910		~~N~~ J	P
7440-36-0	Antimony	7.1	U	~~N~~ J	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	23.7 ~~1.5~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.59 ~~0.10~~	~~J~~ U		P
7440-43-9	Cadmium	0.59	U		P
7440-70-2	Calcium	414	J		P
7440-47-3	Chromium	3.9			P
7440-48-4	Cobalt	0.94	J		P
7440-50-8	Copper	0.66	J		P
7439-89-6	Iron	6660			P
7439-92-1	Lead	1.8		J	P
7439-95-4	Magnesium	586	J		P
7439-96-5	Manganese	41.4			P
7440-02-0	Nickel	2.0	J		P
7440-09-7	Potassium	340	J		P
7782-49-2	Selenium	4.1	U		P
7440-22-4	Silver	1.2	U	~~N~~ J	P
7440-23-5	Sodium	1530			P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	11.4 ~~1.3~~	~~J~~ U		P
7440-62-2	Vanadium	6.0		~~E~~ J	P
7440-66-6	Zinc	10.4			P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53B9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-10

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 86.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1110		~~N~~ J	P
7440-36-0	Antimony	6.9	U	~~N~~ J	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	23.0 ~~1.8~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.5 J ~~0.11~~	~~J~~ U		P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	515	J		P
7440-47-3	Chromium	5.1			P
7440-48-4	Cobalt	1.1	J		P
7440-50-8	Copper	0.74	J		P
7439-89-6	Iron	5150			P
7439-92-1	Lead	2.4			P
7439-95-4	Magnesium	656			P
7439-96-5	Manganese	45.3			P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	594			P
7782-49-2	Selenium	4.0	U		P
7440-22-4	Silver	0.10	~~J~~	~~N~~ J	P
7440-23-5	Sodium	1080			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	1.3 ~~1.3~~	~~J~~ U		P
7440-62-2	Vanadium	7.0		~~E~~ J	P
7440-66-6	Zinc	8.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-11

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 90.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	707		~~N~~ J	P
7440-36-0	Antimony	6.7	U	~~N~~ J	P
7440-38-2	Arsenic	1.1			P
7440-39-3	Barium	22.2 ~~1.5~~	~~J~~	J	P
7440-41-7	Beryllium	0.51 ~~0.050~~	~~J~~		P
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	9510			P
7440-47-3	Chromium	2.8			P
7440-48-4	Cobalt	0.76	J		P
7440-50-8	Copper	0.48	J		P
7439-89-6	Iron	3720			P
7439-92-1	Lead	1.2		J	P
7439-95-4	Magnesium	385	J		P
7439-96-5	Manganese	36.0			P
7440-02-0	Nickel	1.6	J		P
7440-09-7	Potassium	172	J		P
7782-49-2	Selenium	3.9	U		P
7440-22-4	Silver	1.1	U	~~N~~ J	P
7440-23-5	Sodium	690			P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	1.1 ~~1.2~~	~~J~~		P
7440-62-2	Vanadium	5.5 ~~4.8~~	~~J~~	~~B~~ J	P
7440-66-6	Zinc	5.1	J		P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-12

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 70.9

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1020		~~N~~ J	P
7440-36-0	Antimony	8.5	U	~~N~~ J	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	24.2 ~~1.8~~	~~J~~	~~J~~	P
7440-41-7	Beryllium	0.21 ~~0.10~~	~~J~~		P
7440-43-9	Cadmium	0.71	U		P
7440-70-2	Calcium	608	J		P
7440-47-3	Chromium	5.7			P
7440-48-4	Cobalt	1.0	J		P
7440-50-8	Copper	0.71	J		P
7439-89-6	Iron	5810			P
7439-92-1	Lead	2.1		~~J~~	P
7439-95-4	Magnesium	651	J		P
7439-96-5	Manganese	47.0			P
7440-02-0	Nickel	2.3	J		P
7440-09-7	Potassium	461	J		P
7782-49-2	Selenium	4.9	U		P
7440-22-4	Silver	1.4	U	~~N~~ J	P
7440-23-5	Sodium	1620			P
7440-28-0	Thallium	3.5	U		P
7440-31-5	Tin	10.1 ~~1.6~~	~~J~~		P
7440-62-2	Vanadium	7.3		~~B~~ J	P
7440-66-6	Zinc	8.7			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-13

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 86.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1140		~~N~~ J	P
7440-36-0	Antimony	7.0	U	~~N~~ J	P
7440-38-2	Arsenic	3.7			P
7440-39-3	Barium	23.2 ~~2.1~~	~~J~~	J	P
7440-41-7	Beryllium	0.56 ~~0.16~~	~~J~~		P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	4360			P
7440-47-3	Chromium	11.2			P
7440-48-4	Cobalt	0.87	J		P
7440-50-8	Copper	4.3			P
7439-89-6	Iron	10700			P
7439-92-1	Lead	1.9		J	P
7439-95-4	Magnesium	619			P
7439-96-5	Manganese	47.0			P
7440-02-0	Nickel	1.6	J		P
7440-09-7	Potassium	328	J		P
7782-49-2	Selenium	0.47	J		P
7440-22-4	Silver	0.13	~~J~~	~~N~~ J	P
7440-23-5	Sodium	1050			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.6 ~~1.4~~	~~J~~		P
7440-62-2	Vanadium	5.8 ~~5.0~~	~~J~~	~~E~~ J	P
7440-66-6	Zinc	10.1			P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-14

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 82.2

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	996		~~N~~ J	P
7440-36-0	Antimony	7.3	U	~~N~~ J	P
7440-38-2	Arsenic	1.6			P
7440-39-3	Barium	24.3 ~~1.7~~	~~J~~	J	P
7440-41-7	Beryllium	0.61 ~~0.11~~	~~J~~		P
7440-43-9	Cadmium	0.61	U		P
7440-70-2	Calcium	1680			P
7440-47-3	Chromium	4.7			P
7440-48-4	Cobalt	0.81	J		P
7440-50-8	Copper	0.44	J		P
7439-89-6	Iron	4240			P
7439-92-1	Lead	2.2		J	P
7439-95-4	Magnesium	660			P
7439-96-5	Manganese	32.8			P
7440-02-0	Nickel	1.7	J		P
7440-09-7	Potassium	626			P
7782-49-2	Selenium	4.3	U		P
7440-22-4	Silver	1.2	U	~~N~~ J	P
7440-23-5	Sodium	1490			P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	12.2 ~~1.2~~	~~J~~		P
7440-62-2	Vanadium	6.1 ~~5.3~~	~~J~~	~~E~~ J	P
7440-66-6	Zinc	6.9	J		P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-15

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 85.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1060		~~N~~ J	P
7440-36-0	Antimony	7.0	U	~~N~~ J	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	23.4 ~~1.9~~	~~J~~	J	P
7440-41-7	Beryllium	0.58 ~~0.097~~	~~J~~		P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	836			P
7440-47-3	Chromium	4.4			P
7440-48-4	Cobalt	5.8 ~~1.1~~	~~J~~		P
7440-50-8	Copper	0.67	J		P
7439-89-6	Iron	5730			P
7439-92-1	Lead	2.0			P
7439-95-4	Magnesium	629			P
7439-96-5	Manganese	26.4			P
7440-02-0	Nickel	4.2 ~~2.3~~	~~J~~		P
7440-09-7	Potassium	421	J		P
7782-49-2	Selenium	4.1	U		P
7440-22-4	Silver	0.13	~~J~~	~~N~~ J	P
7440-23-5	Sodium	1220			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.7 ~~1.3~~	~~J~~		P
7440-62-2	Vanadium	9.0		~~E~~ J	P
7440-66-6	Zinc	7.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-16

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 86.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	992		N J	P
7440-36-0	Antimony	6.9	U	N UJ	P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	23.1 ~~1.6~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.57 ~~0.13~~	~~J~~	UJ	P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	505	J		P
7440-47-3	Chromium	4.5			P
7440-48-4	Cobalt	5.8 ~~0.89~~	~~J~~	UJ	P
7440-50-8	Copper	0.69	J		P
7439-89-6	Iron	5160			P
7439-92-1	Lead	2.3			P
7439-95-4	Magnesium	597			P
7439-96-5	Manganese	36.7			P
7440-02-0	Nickel	4.6 ~~2.2~~	~~J~~	UJ	P
7440-09-7	Potassium	515	J		P
7782-49-2	Selenium	4.0	U		P
7440-22-4	Silver	1.2	U	N UJ	P
7440-23-5	Sodium	991			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.5 ~~1.2~~	~~J~~	UJ	P
7440-62-2	Vanadium	6.6		E J	P
7440-66-6	Zinc	7.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-18

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 81.2

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1040		~~N~~ J	P
7440-36-0	Antimony	7.4	U	~~N~~ J	P
7440-38-2	Arsenic	2.0			P
7440-39-3	Barium	24.6 ~~1.7~~	~~J~~	J	P
7440-41-7	Beryllium	.62 ~~0.10~~	~~J~~		P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	526	J		P
7440-47-3	Chromium	5.1			P
7440-48-4	Cobalt	6.2 ~~0.98~~	~~J~~		P
7440-50-8	Copper	0.54	J		P
7439-89-6	Iron	4560			P
7439-92-1	Lead	2.1			P
7439-95-4	Magnesium	624			P
7439-96-5	Manganese	37.0			P
7440-02-0	Nickel	4.9 ~~2.1~~	~~J~~		P
7440-09-7	Potassium	650			P
7782-49-2	Selenium	4.3	U		P
7440-22-4	Silver	1.2	U	~~N~~ J	P
7440-23-5	Sodium	1140			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.3 ~~1.3~~	~~J~~		P
7440-62-2	Vanadium	6.3		~~E~~ J	P
7440-66-6	Zinc	3.4 ~~7.4~~	~~J~~		P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A9

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809183-19

Level: (low/med) LOW Date Received: 09/13/2008

% Solids 85.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1020		~~N~~ J	P
7440-36-0	Antimony	7.1	U	~~N~~ J	P
7440-38-2	Arsenic	1.8			P
7440-39-3	Barium	23.5 ~~2.4~~	~~J~~ U	J	P
7440-41-7	Beryllium	0.59 ~~0.097~~	~~J~~ U		P
7440-43-9	Cadmium	0.59	U		P
7440-70-2	Calcium	820			P
7440-47-3	Chromium	4.9			P
7440-48-4	Cobalt	5.9 ~~0.80~~	~~J~~ U		P
7440-50-8	Copper	0.56	J		P
7439-89-6	Iron	4930			P
7439-92-1	Lead	2.4			P
7439-95-4	Magnesium	596			P
7439-96-5	Manganese	22.4			P
7440-02-0	Nickel	4.2 ~~1.7~~	~~J~~ U		P
7440-09-7	Potassium	543	J		P
7782-49-2	Selenium	4.1	U		P
7440-22-4	Silver	1.2	U	~~N~~ J	P
7440-23-5	Sodium	1250			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	11.5 ~~4.0~~	~~J~~ U		P
7440-62-2	Vanadium	5.9		~~B~~ J	P
7440-66-6	Zinc	8.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

RECEIVED
SEP 29 2008
HAZ. WASTE SUPPORT SEC

Testing Your World for a Safer Tomorrow
2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB53A9
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 13, 2008, we received 19 soil samples under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temp was determined to be 5.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

2: Sample MB53B2 was received at the laboratory but is not listed on the TR/COC. The sample collection date/time is 9/12/08 / 0942, the analysis is TM + Sn, and the station location is RBS-SED39.
Resolution 2: Per Region 2, the laboratory should proceed with the analysis of the sample and note the issue in the SDG Narrative.

3: Sample MB53L1 is listed on the TR/COC; however, it was not received at the laboratory. This sample does not have the same collection date/time or station location as sample MB53B2 that was received.
Resolution 3: Per Region 2, the laboratory should note the issue in the SDG Narrative. Sample MB53L1 was not sent.

Metals
The analytical run began 9/26/2008 @ 1055 hrs. The matrix spike failed for Sb and Ag; a post spike was analyzed at twice the CRQL for Sb and Ag.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809183-01 EPA Sample # MB53A9

Date & Time 9/26/2008 @ 1154

Metals: 9991.9 µg/L * (0.100 L) / (1.00 g) * 100 % / 95.5 % * 1000 g / 1 kg * 1 mg / 1000 µg = 1050 mg/Kg

(Analyte Al)

Authorized by _____

Daniel Antrim
Document Control Officer

RECEIVED
SEP 29 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB53A9

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB53A9	7) MB53B5	13) MB53C1	19) MB53M4
2) MB53B0	8) MB53B6	14) MB53C2	20)
3) MB53B1	9) MB53B7	15) MB53C3	21)
4) MB53B2	10) MB53B8	16) MB53C4	22)
5) MB53B3	11) MB53B9	17) MB53C5	23)
6) MB53B4	12) MB53C0	18) MB53M3	24)

MB53A9	MB53M4
First Sample in SDG	**Last Sample in SDG**
09/13/2008	09/13/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature **Date** 9-13-08

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 9:57 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDG MB5395. The laboratory would like to perform laboratory QC on sample MB5395.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Monday, September 15, 2008 6:55 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 13, 2008, we received 65 soil samples in 4 coolers under FedEx master airbill number 8541 0029 6901. Custody seals were present and intact. Cooler temps were determined to be 3.5°C, 4.5°C, and 5.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
2. There is no QC listed on the TR/COC for SDG MB5395. We would like to use MB5395 as QC. Please advise if this is acceptable.

69

Thanks,

Beth Whitehead
Bonner Analytical

(70)

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Friday, September 19, 2008 2:18 PM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Documentation | FINAL

Beth,

Summary Start
-Samples received at laboratory but not listed on TR/COC-
Issue 1: Sample MB53B2 was received at the laboratory but is not listed on the TR/COC. The sample collection date/time is 9/12/08 / 0942, the analysis is TM + Sn, and the station location is RBS-SED39.
Resolution 1: Per Region 2, the laboratory should proceed with the analysis of the sample and note the issue in the SDG Narrative.

-Samples listed on TR/COC but not received at laboratory-
Issue 2: Sample MB53L1 is listed on the TR/COC; however, it was not received at the laboratory. This sample does not have the same collection date/time or station location as sample MB53B2 that was received.
Resolution 2: Per Region 2, the laboratory should note the issue in the SDG Narrative. Sample MB53L1 was not sent.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin E. Von Moll
Environmental Coordinator - Regions 2 & 7
CSC

15000 Conference Center Drive, Chantilly, VA 20151
Civil Division | (p) 703-818-4235 | (f) 703-818-4602 | kvonmoll@fedcsc.com | www.csc.com

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

9/19/2008 2:55PM phone conversation between Adly Michael, Region 2, and Kristin Von Moll, SMO. Adly told Kristin to advise the laboratory to note issue 1 in the SDG Narrative and proceed with the analysis of the sample. For issue 1, the laboratory should note the issue in the SDG Narrative. This sample was not sent.

From: Von Moll, Kristin
Sent: Friday, September 19, 2008 1:40 PM
To: 'Adly Michael'; 'Jennifer Ferranda'
Subject: NEW ISSUE #12 | Case 37836 | Lab BONNER | Issue Documentation

Adly,

BONNER is reporting the following issues regarding Case 37836.

-Samples received at laboratory but not listed on TR/COC-
Issue 1: Sample MB53B2 was received at the laboratory but is not listed on the TR/COC. The sample collection date/time is 9/12/08 / 0942, the analysis is TM + Sn, and the station location is RBS-SED39.

-Samples listed on TR/COC but not received at laboratory-

Issue 2: Sample MB53L1 is listed on the TR/COC; however, it was not received at the laboratory. This sample does not have the same collection date/time or station location as sample MB53B2 that was received.

Please advise on how the laboratory should proceed.
Thanks,

Kristin Von Moll
CSC

From: Beth Whitehead [mailto:bwhitehead@batco.com]
Sent: Friday, September 19, 2008 2:08 PM
To: Von Moll, Kristin
Subject: RE: Region 2 | Case 37836 | Lab BONNER | Issue Documentation

Kristin:

See two emails down.

Thanks,

Beth Whitehead
Bonner Analytical

> -----Original Message-----
> **From:** Von Moll, Kristin [mailto:kvonmoll@fedcsc.com]
> **Sent:** Friday, September 19, 2008 11:30 AM
> **To:** Bethany Whitehead
> **Subject:** RE: Region 2 | Case 37836 | Lab BONNER | Issue Documentation
>
> Can you please give me the information that is listed for sample MB53B2 (station location, collection date time, analysis)?
>
> Thanks,
>
> Kristin Von Moll
> CSC

> **From:** Beth Whitehead [mailto:bwhitehead@batco.com]
> **Sent:** Friday, September 19, 2008 1:03 PM
> **To:** Von Moll, Kristin
> **Subject:** RE: Region 2 | Case 37836 | Lab BONNER | Issue Documentation
>
> Kristin:
>
> No, the info is not the same.
>
> Thanks,
>
> Beth Whitehead
> Bonner Analytical
>
> > -----Original Message-----
> > **From:** Von Moll, Kristin [mailto:kvonmoll@fedcsc.com]
> > **Sent:** Friday, September 19, 2008 11:05 AM
> > **To:** Bethany Whitehead; Chris Bonner
> > **Subject:** Region 2 | Case 37836 | Lab BONNER | Issue Documentation

(72)

Hi Beth,

Does sample MB53L1 that is listed on the TR/COC list all of the same information as the containers for sample MB53B2 that is not listed on the TR/COC? For example do they have the same station location, collection date and time, and anlaysis?

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
CSC

From: Beth Whitehead [mailto:bwhitehead@batco.com]
Sent: Friday, September 19, 2008 12:49 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: RE: Region 02 | Case 37836 | Lab BONNER | Issue Non-sampler issues | SDG MB53A9

Kristin:

I have a further discrepancy for this case:

We received sample MB53B2, which is not listed on the TR/COC. Date/time 9/12/08 / 0942, Analysis: TM + Sn, Sample # RBS-SED39; however, sample MB53L1 is listed on the TR/COC, but was not received. Please advise how to proceed.

Thanks,

Beth Whitehead
Bonner Analytical

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Inorganic Data Review Narrative

Case# 37836	Site: RARITAM BAY SLAG	Soil: 56
SDG# MB53A9, MB5319, MB5336	Lab: BONNER	Water: 0
Sampling Team: W-SAT	Reviewer: C. STANCA	Other: 0

A.2.1 Data Validation Flags:

The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:

The CLP laboratory applies a contractual qualifier on all Form I=S and the QC Form when a QC analysis is outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their meanings are as follows:

N: This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E: This qualifier indicates the presence of interference, and is applied when the ICP serial dilution is outside the control limits.

*: This qualifier indicates the lack of precision, and is applied on Form I=S and Form VI when the Lab Duplicate analysis is outside the control limits.

U: This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit (MDL). A non-detected result of an analyte is indicated by the Contract Required Quantitation Limit (CRQL) of that analyte suffixed with "U".

J: This is also a concentration qualifier that laboratory applies to a positive result below the CRQL.

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

A.2.3.1 **Data Case Description:**

This case consists of fifty-six (56) soil samples collected at the Raritan Bay Slag site on 9/12/09 for TAL Metals and Tin analysis according to the USEPA CLP SOW No. ILM05.4. Matrix spike, laboratory duplicate and serial dilution analyses were performed on samples MB53C5, MB5325, and MB5385. Samples MB53B4/MB53B5, MB5334/MB5335, and MB5394/MB5395 are the field duplicate pairs for this sampling event. Sample MB5395 belongs to SDG MB5395 and it is not present in this package.

As per EPA Technical Direction Form (TDF) only the following criteria were reviewed by the data validator: Holding Time, CRQL Standard, Matrix Spike, ICS, Laboratory Duplicate, Field Duplicate, ICP Serial Dilution, Percent Solids, and Field Blank. The qualifiers applied on Form Is and CADRE EXCEL spreadsheets are based on ESAT data review of the above mentioned criteria and the attached CADRE Reports.

A.2.3.2 **CSF Audit**: No problems.

A.2.3.3 **Technical Review**:

SDG MB53A9 (SOIL ICP-AES, MA 1630.0)

CRQL STANDARD

The CRQL standard recoveries fell outside the control limits of 70 - 130% for Pb (%R_1 = 132). (Only out of control recoveries that affected samples in this SDG were mentioned.) All associated positive results within the affected range of True Value $\pm$ CRQL have been considered estimated and flagged "J".

"J" -> Pb -> MB53B3, MB53B4*, MB53B8, MB53C0 - MB53C3

ICB/CCB

The Calibration Blanks values were $\geq$MDL but $\leq$CRQL for Sb, Ba, Be, Cd, Co, Ni, Na, V, and Zn. (Only analytes that required qualifications were mentioned.) The following associated positive results $\leq$CRQL were raised to the CRQL and qualified "U".

"U" -> Be -> MB53A9, MB53B0 - MB53B9, MB53C0 - MB53C5, MB53M3, MB53M4
Cd -> MB53B6
V -> MB53B3, MB53C0, MB53C2, MB53C3
Sb -> MB53B5
Ba -> MB53A9, MB53B0 - MB53B9, MB53C0 - MB53C5, MB53M3, MB53M4
Co -> MB53A9, MB53B0 - MB53B6, MB53C4, MB53C5, MB53M3, MB53M4
Ni -> MB53A9, MB53B0 - MB53B6, MB53C4, MB53C5, MB53M3, MB53M4

Na -> MB53A9, MB53B0, MB53B2, MB53B4, MB53B5

Zn -> MB53B3, MB53M3

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB53A9, MB53B0 - MB53B9, MB53C0 - MB53C5, MB53M3, MB53M4

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Al (%R = 136), Sb (%R = 55) and Ag (%R = 68). All associated Sb and Ag and all associated positive Al results have been considered estimated and qualified "J".

"J" -> Al, Sb, Ag -> MB53A9, MB53B0 - MB53B9, MB53C0 - MB53C5, MB53M3, MB53M4

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba was less than the lower control limit. All associated results have been considered estimated and flagged "J".

"J" -> Ba -> MB53A9, MB53B0 - MB53B9, MB53C0 - MB53C5, MB53M3, MB53M4

FIELD DUPLICATE

The absolute difference between sample (MB53B4) and duplicate (MB53B5) results was greater than 2X CRQL for Ca and greater than 4 X CRQL for Cr and Pb when sample and/or duplicate results were less than 5 X CRQL. All associated Ca results ≤5XCRQL have been considered estimated and flagged "J". All associated Cr and Pb results ≤5XCRQL were rejected.

"J" -> Ca -> MB53B4, MB53B5

"R" -> Cr, Pb -> MB53B4

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 when the initial concentration was equal to or greater than 50 X MDL for V (%D = 12). All associated sample results greater than MDL have been considered estimated and flagged "J".

"J" -> V -> MB53A9, MB53B0 - MB53B9, MB53C0 - MB53C5, MB53M3, MB53M4

SDG MB5319 (SOIL ICP-AES, MA 1630.0)

The Calibration Blanks values were ≥MDL but ≤CRQL for Sb, Ba, Be, Cd, Co, and Se. (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sb -> MB5319 -MB5321, MB5323, MB5324
Ba -> MB5319 - MB5335, MB53M1, MB53M2
Be -> MB5319 - MB5335, MB53M1, MB53M2
Cd -> MB5319, MB5320, MB5322 - MB5325, MB5331
Co -> MB5319 - MB5335, MB53M1, MB53M2
Se -> MB5319 - MB5324, MB5332, MB5334, MB5335, MB53M1, MB53M2

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB5319 - MB5335, MB53M1, MB53M2

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Al (%R = 165), Sb (%R = 59), Pb (%R = 69), and Ag (%R = 73). All associated Sb, Pb and Ag and all associated positive Al results have been considered estimated and qualified "J".

"J" -> Al, Sb, Pb, Ag -> MB5319 - MB5335, MB53M1, MB53M2

FIELD DUPLICATE

The absolute difference between sample (MB5334) and duplicate (MB5335) results was greater than 2X CRQL for V and greater than 4 X CRQL for Ca when sample and/or duplicate results were less than 5 X CRQL. All associated V results ≤5XCRQL have been considered estimated and flagged "J". All associated Ca results ≤5XCRQL were rejected.

"J" -> V -> MB5334, MB5335

"R" -> Ca -> MB5335

The RPD between sample (MB5334) and duplicate (MB5335) results was ≥ 35% but less than 120% for Fe when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J".

"J" -> Fe -> MB5334, MB5335

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba was less than the lower control limit. All associated results have been considered estimated and flagged "J".

"J" -> Ba -> MB5319 - MB5335, MB53M1, MB53M2

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 when the initial concentration was equal to or greater than 50 X MDL for Pb (%D = 11) and Zn (11). All associated sample results greater than MDL have been considered estimated and flagged "J".

"J" -> Pb*, Zn -> MB5319 - MB5335, MB53M1, MB53M2

SDG MB5336 (SOIL ICP-AES, MA 1630.0)

The Calibration Blanks values were ≥MDL but ≤CRQL for Sb, Ba, Be, Cd, Co, Ag and V. (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sb -> MB5390
Be -> MB5336 - MB5340, MB5381 - MB5385, MB5390 - MB5394, MB53M5, MB53M6
V -> MB5336
Ba -> MB5391 - MB5394, MB53M5, MB53M6
Cd -> MB5391 - MB5394
Co -> MB5391 - MB5394, MB53M5, MB53M6
Ag -> MB5391 - MB5393, MB53M5, MB53M6

PREPARATION BLANK

The Preparation Blank values were ≥MDL but ≤CRQL for Sn. (Only analytes that required qualifications were mentioned.) The associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" -> Sn -> MB5336 - MB5340, MB5383, MB5390 - MB5394, MB53M5, MB53M6

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% when sample concentration was less than 4 X spike concentration for Al (%R = 709), Sb (%R = 171), As (%R = 336), Cu (%R = 408), Mn (%R = 242), Se (%R = 68), Tl (%R = 68), V (%R = 134) and Zn (%R = 145). All associated Se and Tl and all

associated positive Sb, V, and Zn results have been considered estimated and qualified "J". The associated positive Al, As, Cu and Mn results were rejected.

"J" -> Se, Tl, V, Zn -> MB5336 - MB5340, MB5380 - MB5385, MB5390 - MB5394, MB53M5, MB53M6

Sb* -> MB5380 - MB5385, MB5390 - MB5394

"R" -> Al, As, Cu, Mn -> MB5336 - MB5340, MB5380 - MB5385, MB5390 - MB5394, MB53M5, MB53M6

LABORATORY DUPLICATE

The RPD between sample and duplicate results was ≥ 35% but less than 120% for Ca when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J".

"J" -> Ca -> MB5336 - MB5340, MB5380 - MB5385, MB5390 - MB5394, MB53M5, MB53M6

The absolute difference between sample and duplicate results was greater than 2X CRQL for Sn when sample and/or duplicate results were less than 5 X CRQL. All associated sample results ≤5XCRQL have been considered estimated and flagged "J".

"J" -> Sn -> MB5336 - MB5340, MB5381, MB5390 - MB5394, MB53M5, MB53M6

FIELD DUPLICATE

The RPD between sample (MB5394) and duplicate (MB5395) results was ≥ 35% but less than 120% for Ca when both sample and duplicate results were greater than 5 X CRQL. All associated sample results greater or equal to CRQL have been considered estimated and flagged "J". Sample MB5395 belongs to SDG MB5395 and it is not present in this package.

"J" -> Ca -> MB5394

LABORATORY CONTROL SAMPLE

The LCS Found value for Ba was less than the lower control limit. All associated results have been considered estimated and flagged "J".

"J" -> Ba -> MB5336 - MB5340, MB5380 - MB5385, MB5390 - MB5394, MB53M5, MB53M6

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 for As (%D = 54), Ba (%D = 15), Na (%D = 12), Zn (%D = 11),

and Sn (%D = 25) and greater than 100 for Sb (%D = 171) when the initial concentration was equal to or greater than 50 X MDL. All associated As, Ba, Na, Zn, and Sn results greater than MDL have been considered estimated and flagged "J". The associated positive Sb results have been rejected.

"J" -> As*, Ba, Na, Sn*, Zn* -> MB5336 - MB5340, MB5380 - MB5385, MB5390 - MB5394, MB53M5, MB53M6

"R" -> Sb -> MB5380 - MB5385, MB5390 - MB5394

*** already qualified**

A.2.3.4 Contract-Problem/Non-Compliance:

All SDGs:

1. All Form Is: Lab code was missing or was incorrect. Some analytes were not qualified "U" or "J" although the results were non-detects or detects with values below CRQL, respectively.
2. All Form 9s: CRQLs and MDLs were incorrect for Method Preparation NP1.
3. All Form 7s: Almost all Found values were outside the acceptable limits. The provided limits, both lower and higher, were incorrect.
4. All Form 4: The Final Found Solution AB results were incorrect, they did not match the raw data.

Re-submittals from the laboratory were requested by the reviewer and were received on 10/09/08 and 10/24/08. Several re-submitted Form Is had the silver results qualified "U" although the values were between MDL and CRQL. The above mentioned "U" qualifiers were changed by the reviewer to "J" for detects less than the CRQL.

HWSS Reviewer: HS (Signature) Date: 10/30/08

Contractor Reviewer: Constantin Stanciu (Signature) Date: 10/30/08

Verified by: _____ (Signature) Date: _____

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REFERENCE 24

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

ROC #2

TDF# 09-0043

DATE: 9/26/2008
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: Hazardous Waste Support Section (HWSS)/RSCC
TO: HWSS ESAT-TOPO

Attached is the following INORGANIC Data Package to be reviewed for Quality Assurance

SITE: Raritan Bay Slag **CASE #: 37836**

SDG#: MB53A0, MB52W6, MB52Y7 **SAMPLER: W-SAT**

PROJ. CODE: RS SITE SPILL #: A205	**#SAMPLES**	**MATRIX**
LAB: BONNER OPERABLE UNIT: 00	**52**	**Soil**
TURN-AROUND-TIME: 14 day		

CERCLIS ID # : NJN000206276 **FRACTION: Metals (MA #1630.0)**

Contaminant(s) of Concern (If known)

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	**Date/Time**	**Signature**	**Date/Time**
[signature]	10/1/08 1:41 pm	[signature]	10/1/08 1:41 pm
[signature]		R. J. Shelley	10/6/08.
R. J. Shelley	11/13/08 1:20 pm	[signature]	11/13/08 1:20 pm
[signature]	11/13/08 2:25 pm	Hanif Sheikh	11/13/08 2:25 pm
Hanif Sheikh	11/13/08 3:20 PM	[signature]	11/13/08 3:20 pm
[signature]	11/14/08 8:42 pm	[signature]	8:42 am
[signature]	11/14/08 9:25 pm	[signature]	11/14/08 9:25 pm

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-01

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 80.9

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1280		~~J~~ ~~N~~	P
7440-36-0	Antimony	8.8		~~J~~ ~~N~~	P
7440-38-2	Arsenic	22.2		~~J~~ ~~N~~	P
7440-39-3	Barium	6.0	~~J~~	~~J~~ ~~E~~	P
7440-41-7	Beryllium	0.23	~~J~~	~~J~~ ~~E~~	P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	9700		✓	P
7440-47-3	Chromium	12.9		✓	P
7440-48-4	Cobalt	0.88	J		P
7440-50-8	Copper	14.3		J	P
7439-89-6	Iron	20700		J ✓	P
7439-92-1	Lead	311			P
7439-95-4	Magnesium	633			P
7439-96-5	Manganese	56.3			P
7440-02-0	Nickel	3.1	J		P
7440-09-7	Potassium	186	J		P
7782-49-2	Selenium	1.2	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	1720			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.4 ~~8.3~~	~~J~~	U	P
7440-62-2	Vanadium	26.1		✓	P
7440-66-6	Zinc	43.6			P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: \ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-02

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 72.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	757		J ~~N~~	P
7440-36-0	Antimony	14.0		J ~~N~~	P
7440-38-2	Arsenic	10.2		J ~~N~~	P
7440-39-3	Barium	5.7	~~U~~	J ~~B~~	P
7440-41-7	Beryllium	0.064	~~U~~	J ~~B~~	P
7440-43-9	Cadmium	0.69	U		P
7440-70-2	Calcium	688 ~~687~~	~~J~~	J R	P
7440-47-3	Chromium	5.6		J	P
7440-48-4	Cobalt	0.38	J		P
7440-50-8	Copper	13.7		J	P
7439-89-6	Iron	7720		J	P
7439-92-1	Lead	394			P
7439-95-4	Magnesium	530	J		P
7439-96-5	Manganese	20.5		J	P
7440-02-0	Nickel	1.4	J		P
7440-09-7	Potassium	260	J		P
7782-49-2	Selenium	4.8	U	J ~~N~~	P
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	2780			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	17.8			P
7440-62-2	Vanadium	9.9			P
7440-66-6	Zinc	26.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-03

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 77.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1670		~~J~~ ~~N~~	P
7440-36-0	Antimony	4.6	~~J~~	~~J~~ ~~N~~	P
7440-38-2	Arsenic	5.1		~~J~~ ~~N~~	P
7440-39-3	Barium	7.2	~~J~~	~~J~~ ~~E~~	P
7440-41-7	Beryllium	0.026	~~J~~	~~J~~ ~~E~~	P
7440-43-9	Cadmium	0.65	U		P
7440-70-2	Calcium	894		R ~~J~~	P
7440-47-3	Chromium	8.4		~~J~~	P
7440-48-4	Cobalt	1.1	J		P
7440-50-8	Copper	15.7		~~J~~	P
7439-89-6	Iron	7770		~~J~~ ~~J~~	P
7439-92-1	Lead	200			P
7439-95-4	Magnesium	817			P
7439-96-5	Manganese	27.4		J	P
7440-02-0	Nickel	2.7	J		P
7440-09-7	Potassium	424	J		P
7782-49-2	Selenium	0.70	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	2190			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	13.0 ~~10.7~~	~~J~~	()	P
7440-62-2	Vanadium	13.4		~~J~~	P
7440-66-6	Zinc	27.2			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-04

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 86.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1770		J ~~N~~	P
7440-36-0	Antimony	32.9		J ~~N~~	P
7440-38-2	Arsenic	48.2		J ~~N~~	P
7440-39-3	Barium	5.9	~~J~~	J ~~E~~	P
7440-41-7	Beryllium	0.27	~~J~~	J ~~E~~	P
7440-43-9	Cadmium	0.015	J		P
7440-70-2	Calcium	7560		~~*~~	P
7440-47-3	Chromium	14.6		~~*~~	P
7440-48-4	Cobalt	4.0	J		P
7440-50-8	Copper	46.7		J	P
7439-89-6	Iron	26200		J ~~*~~	P
7439-92-1	Lead	530			P
7439-95-4	Magnesium	679			P
7439-96-5	Manganese	66.3			P
7440-02-0	Nickel	14.5			P
7440-09-7	Potassium	222	J		P
7782-49-2	Selenium	1.3	~~J~~	J ~~N~~	P
7440-22-4	Silver	0.30	J		P
7440-23-5	Sodium	1230			P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	27.0			P
7440-62-2	Vanadium	30.2		~~*~~	P
7440-66-6	Zinc	65.7			P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-05

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 68.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	718		J ~~* N~~	P
7440-36-0	Antimony	9.6		J ~~N~~	P
7440-38-2	Arsenic	10.4		J ~~* N~~	P
7440-39-3	Barium	5.9	~~J~~	J ~~B~~	P
7440-41-7	Beryllium	0.062	~~J~~	J ~~B~~	P
7440-43-9	Cadmium	0.73	U		P
7440-70-2	Calcium	727 ~~718~~	~~J~~	UR ~~*~~	P
7440-47-3	Chromium	4.3		J ~~*~~	P
7440-48-4	Cobalt	0.34	J		P
7440-50-8	Copper	12.7		J	P
7439-89-6	Iron	7530		J ~~*~~	P
7439-92-1	Lead	280			P
7439-95-4	Magnesium	514	J		P
7439-96-5	Manganese	32.8		J	P
7440-02-0	Nickel	1.4	J		P
7440-09-7	Potassium	255	J		P
7782-49-2	Selenium	0.64	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.5	U		P
7440-23-5	Sodium	2670			P
7440-28-0	Thallium	3.6	U		P
7440-31-5	Tin	14.5 ~~13.6~~	~~J~~	U ~~*~~	P
7440-62-2	Vanadium	9.6			P
7440-66-6	Zinc	24.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-06

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 69.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1440		J ~~N~~	P
7440-36-0	Antimony	8.6		J ~~N~~	P
7440-38-2	Arsenic	10.4		J ~~N~~	P
7440-39-3	Barium	5.7	J	J E	P
7440-41-7	Beryllium	0.44	J	J E	P
7440-43-9	Cadmium	0.011	J		P
7440-70-2	Calcium	1690		R	P
7440-47-3	Chromium	10.1			P
7440-48-4	Cobalt	0.67	J		P
7440-50-8	Copper	18.8		J	P
7439-89-6	Iron	12300		J	P
7439-92-1	Lead	318			P
7439-95-4	Magnesium	719			P
7439-96-5	Manganese	26.5		J	P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	321	J		P
7782-49-2	Selenium	0.61	J	J N	P
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	3090			P
7440-28-0	Thallium	3.6	U		P
7440-31-5	Tin	16.6			P
7440-62-2	Vanadium	24.6			P
7440-66-6	Zinc	34.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-07

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 84.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2810		J ~~N~~	P
7440-36-0	Antimony	31.3		J ~~N~~	P
7440-38-2	Arsenic	55.7		J ~~N~~	P
7440-39-3	Barium	23.6 ~~13.7~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.87		J ~~E~~	P
7440-43-9	Cadmium	0.18	J		P
7440-70-2	Calcium	5600		~~J~~	P
7440-47-3	Chromium	32.6		~~J~~	P
7440-48-4	Cobalt	2.0	J		P
7440-50-8	Copper	26.3		J	P
7439-89-6	Iron	68300		J ~~D~~	P
7439-92-1	Lead	533			P
7439-95-4	Magnesium	851			P
7439-96-5	Manganese	116			P
7440-02-0	Nickel	7.4			P
7440-09-7	Potassium	291	J		P
7782-49-2	Selenium	1.3	~~J~~	J ~~N~~	P
7440-22-4	Silver	0.11	J		P
7440-23-5	Sodium	1470			P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	30.1			P
7440-62-2	Vanadium	53.9		~~J~~	P
7440-66-6	Zinc	114			P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-08

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 68.9

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1060		J ~~N~~	P
7440-36-0	Antimony	6.6	~~J~~	J ~~N~~	P
7440-38-2	Arsenic	10.2		J ~~N~~	P
7440-39-3	Barium	29.0 ~~5.2~~	~~J~~	UJ ~~B~~	P
7440-41-7	Beryllium	0.099	~~J~~	J ~~B~~	P
7440-43-9	Cadmium	0.73	U		P
7440-70-2	Calcium	726 ~~542~~	~~J~~	UR*	P
7440-47-3	Chromium	6.5		J	P
7440-48-4	Cobalt	0.50	J		P
7440-50-8	Copper	17.2		J	P
7439-89-6	Iron	8710		J	P
7439-92-1	Lead	307			P
7439-95-4	Magnesium	636	J		P
7439-96-5	Manganese	26.0		J	P
7440-02-0	Nickel	1.8	J		P
7440-09-7	Potassium	334	J		P
7782-49-2	Selenium	0.70	~~J~~	J ~~N~~	P
7440-22-4	Silver	0.13	J		P
7440-23-5	Sodium	2950			P
7440-28-0	Thallium	3.6	U		P
7440-31-5	Tin	20.8			P
7440-62-2	Vanadium	12.1			P
7440-66-6	Zinc	32.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53A8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-09

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 68.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1220		J ~~+N~~	P
7440-36-0	Antimony	6.7	~~J~~	J ~~N~~	P
7440-38-2	Arsenic	6.3		J ~~+N~~	P
7440-39-3	Barium	29.1 ~~8.1~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.090	~~J~~	J ~~E~~	P
7440-43-9	Cadmium	0.73	U		P
7440-70-2	Calcium	729 ~~380~~	~~J~~	UR ~~*~~	P
7440-47-3	Chromium	5.6		J ~~*~~	P
7440-48-4	Cobalt	0.64	J		P
7440-50-8	Copper	29.2		J	P
7439-89-6	Iron	7220		J ~~*~~	P
7439-92-1	Lead	304			P
7439-95-4	Magnesium	679	J		P
7439-96-5	Manganese	20.6		J	P
7440-02-0	Nickel	2.4	J		P
7440-09-7	Potassium	344	J		P
7782-49-2	Selenium	0.50	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.5	U		P
7440-23-5	Sodium	2840			P
7440-28-0	Thallium	3.6	U		P
7440-31-5	Tin	14.6 ~~14.0~~	~~J~~	U /	P
7440-62-2	Vanadium	11.0			P
7440-66-6	Zinc	35.4			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53L8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-10

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 79.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	568		J ~~N~~	P
7440-36-0	Antimony	14.1		J ~~N~~	P
7440-38-2	Arsenic	12.6		J ~~N~~	P
7440-39-3	Barium	25.3 ~~2.7~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.074	~~J~~	J ~~E~~	P
7440-43-9	Cadmium	0.63	U		P
7440-70-2	Calcium	633 ~~621~~	~~J~~	~~J~~ R	P
7440-47-3	Chromium	4.5		J	P
7440-48-4	Cobalt	0.42	J		P
7440-50-8	Copper	22.3		J	P
7439-89-6	Iron	7270		J	P
7439-92-1	Lead	463			P
7439-95-4	Magnesium	312	J		P
7439-96-5	Manganese	38.3			P
7440-02-0	Nickel	1.9	J		P
7440-09-7	Potassium	151	J		P
7782-49-2	Selenium	0.60	~~J~~	J N	P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	1550			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	25.8			P
7440-62-2	Vanadium	9.4		~~J~~	P
7440-66-6	Zinc	25.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53L9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-11

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 71.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1220		J ~~N~~	P
7440-36-0	Antimony	8.9		J ~~N~~	P
7440-38-2	Arsenic	10.4		J ~~N~~	P
7440-39-3	Barium	27.9 ~~7.0~~	~~J~~	UJ ~~B~~	P
7440-41-7	Beryllium	0.12	~~J~~	J ~~B~~	P
7440-43-9	Cadmium	0.092	J		P
7440-70-2	Calcium	1840		R	P
7440-47-3	Chromium	6.1		J	P
7440-48-4	Cobalt	0.62	J		P
7440-50-8	Copper	24.6		J	P
7439-89-6	Iron	8140		J	P
7439-92-1	Lead	422			P
7439-95-4	Magnesium	687	J		P
7439-96-5	Manganese	27.6		J	P
7440-02-0	Nickel	2.5	J		P
7440-09-7	Potassium	360	J		P
7782-49-2	Selenium	0.69	~~J~~	J ~~N~~	P
7440-22-4	Silver	0.12	J		P
7440-23-5	Sodium	2620			P
7440-28-0	Thallium	3.5	U		P
7440-31-5	Tin	18.3			P
7440-62-2	Vanadium	12.1			P
7440-66-6	Zinc	41.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53M0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53A0

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809161-12

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 76.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1020		J ~~N~~	P
7440-36-0	Antimony	7.1	~~U~~	J ~~N~~	P
7440-38-2	Arsenic	7.4		J ~~N~~	P
7440-39-3	Barium	26.2 ~~6.1~~	~~U~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.10	~~U~~	J ~~E~~	P
7440-43-9	Cadmium	0.015	J		P
7440-70-2	Calcium	654 ~~329~~	~~U~~	J R ~~*~~	P
7440-47-3	Chromium	5.4		J ~~*~~	P
7440-48-4	Cobalt	0.64	J		P
7440-50-8	Copper	17.7		J	P
7439-89-6	Iron	8000		J ~~*~~	P
7439-92-1	Lead	318			P
7439-95-4	Magnesium	498	J		P
7439-96-5	Manganese	18.7		J	P
7440-02-0	Nickel	1.9	J		P
7440-09-7	Potassium	261	J		P
7782-49-2	Selenium	0.67	~~U~~	J ~~N~~	P
7440-22-4	Silver	0.21	J		P
7440-23-5	Sodium	2020			P
7440-28-0	Thallium	3.3	U		P
7440-31-5	Tin	17.4			P
7440-62-2	Vanadium	11.1		~~*~~	P
7440-66-6	Zinc	34.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

2

RECEIVED
SEP 26 2008
HAZ. WASTE SUPPORT SEC

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB53A0
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 12, 2008, we received 12 soil samples under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temp was determined to be 6.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/19/2008 @ 2334 hrs. The matrix spike failed for Sb, As and Se; a post spike was analyzed at twice the indigenous level for As and at twice the CRQL for Sb and Se.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809161-01 EPA Sample # MB53A0

Date & Time 9/20/2008@0026

Metals: SM8.7 µg/L * (0.100 L) / (1.00 g) * 100 % / 80.9% * 1000 g / 1 kg * 1 mg / 1000 µg = 633 mg/kg
(Analyte Mg)

Authorized by _____
Daniel Antrim
Document Control Officer

11

RECEIVED
SEP 26 2008
HAZ. WASTE SUPPORT SEC

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB53A0

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: $ 852.00 **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: ___

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB53A0	7) MB53A6	13)	19)
2) MB53A1	8) MB53A7	14)	20)
3) MB53A2	9) MB53A8	15)	21)
4) MB53A3	10) MB53L8	16)	22)
5) MB53A4	11) MB53L9	17)	23)
6) MB53A5	12) MB53M0	18)	24) mw 9-12-08

MB53A0	MB53M0
First Sample in SDG	**Last Sample in SDG**
09/12/2008	09/12/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

mw

Signature

9-12-08

Date

(15)

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Monday, September 15, 2008 8:02 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Non-sampler issues | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. **The Resolution will be applied to all samples received for this Case.**
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Saturday, September 13, 2008 2:23 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 12, 2008, we received 7 water samples and 70 soil samples in 5 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 4.5° C, 5°C, 5.5°C, 6°C, and 6.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

Thanks,

Beth Whitehead
Bonner Analytical

(16)

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52W5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-01

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 94.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3260		J ✓	P
7440-36-0	Antimony	54.4		R ~~N E~~	P
7440-38-2	Arsenic	28.1		R ~~*N E~~	P
7440-39-3	Barium	21.2 ~~17.4~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.53 ~~0.48~~	~~J~~	U	P
7440-43-9	Cadmium	0.53 ~~0.40~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	680		J ✓	P
7440-47-3	Chromium	30.2		✓	P
7440-48-4	Cobalt	5.3 ~~2.5~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	74.4		J ✓	P
7439-89-6	Iron	51400		J ~~*E~~	P
7439-92-1	Lead	1600		J ~~E~~	P
7439-95-4	Magnesium	767		J ~~E~~	P
7439-96-5	Manganese	123		J ~~*N~~	P
7440-02-0	Nickel	8.4			P
7440-09-7	Potassium	251	J		P
7782-49-2	Selenium	3.7 ~~1.2~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	1.1 ~~0.46~~	~~J~~	U	P
7440-23-5	Sodium	558		J ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	55.7		J ~~*E~~	P
7440-62-2	Vanadium	91.2		J ~~*N~~	P
7440-66-6	Zinc	112		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52W6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-02

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 93.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2040		J	P
7440-36-0	Antimony	41.5		R ~~N E~~	P
7440-38-2	Arsenic	29.9		R ~~N E~~	P
7440-39-3	Barium	21.4 ~~4.5~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.54 ~~0.41~~	~~J~~	U	P
7440-43-9	Cadmium	0.54 ~~0.31~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	536 ~~332~~	~~J~~	UJ	P
7440-47-3	Chromium	24.0			P
7440-48-4	Cobalt	5.4 ~~1.9~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	27.5		J	P
7439-89-6	Iron	40700		J ~~E~~	P
7439-92-1	Lead	912		J ~~E~~	P
7439-95-4	Magnesium	536 ~~481~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	76.9		J ~~N~~	P
7440-02-0	Nickel	5.9			P
7440-09-7	Potassium	249	J		P
7782-49-2	Selenium	3.8 ~~0.80~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	1.1 ~~0.22~~	~~J~~	U	P
7440-23-5	Sodium	536 ~~424~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	23.8		J ~~E~~	P
7440-62-2	Vanadium	47.1		J ~~N~~	P
7440-66-6	Zinc	56.4		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52W8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-03

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 95.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2350		J ~~-~~	P
7440-36-0	Antimony	152		R ~~N E~~	P
7440-38-2	Arsenic	72.8		R ~~N E~~	P
7440-39-3	Barium	106		J ~~B~~	P
7440-41-7	Beryllium	0.52 ~~0.45~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.24~~	~~J~~	UJ ~~B~~	P
7440-70-2	Calcium	715		J ~~-~~	P
7440-47-3	Chromium	24.8		~~-~~	P
7440-48-4	Cobalt	5.0 ~~2.0~~	~~J~~	UJ ~~B~~	P
7440-50-8	Copper	29.7		J ~~-~~	P
7439-89-6	Iron	40000		J ~~E~~	P
7439-92-1	Lead	1040		J ~~B~~	P
7439-95-4	Magnesium	657		J ~~B~~	P
7439-96-5	Manganese	184		J ~~N~~	P
7440-02-0	Nickel	8.6			P
7440-09-7	Potassium	355	J		P
7782-49-2	Selenium	3.7 ~~1.2~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	1.0 ~~0.46~~	~~J~~	U	P
7440-23-5	Sodium	523 ~~325~~	~~J~~	UJ ~~B~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	40.4		J ~~B~~	P
7440-62-2	Vanadium	39.3		J ~~N~~	P
7440-66-6	Zinc	83.4		J ~~B~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52W9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-04

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 94.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1860		RJ	P
7440-36-0	Antimony	100		R ~~N~~	P
7440-38-2	Arsenic	53.9		R ~~N~~	P
7440-39-3	Barium	21.2 ~~5.4~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.53 ~~0.42~~	~~J~~	U	P
7440-43-9	Cadmium	0.53 ~~0.24~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	2120		J	P
7440-47-3	Chromium	34.4			P
7440-48-4	Cobalt	5.3 ~~1.9~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	51.4		J	P
7439-89-6	Iron	38400		J ~~E~~	P
7439-92-1	Lead	1100		J E	P
7439-95-4	Magnesium	530 ~~416~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	92.1		J ~~N~~	P
7440-02-0	Nickel	9.2			P
7440-09-7	Potassium	184	J		P
7782-49-2	Selenium	3.7 ~~1.0~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	0.29	J		P
7440-23-5	Sodium	530 ~~101~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	100		J ~~E~~	P
7440-62-2	Vanadium	37.3		J ~~N~~	P
7440-66-6	Zinc	68.7		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-05

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 87.0

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	943		J ~~J~~	P
7440-36-0	Antimony	37.9		R ~~N~~ ~~E~~	P
7440-38-2	Arsenic	7.4		R ~~N~~ ~~E~~	P
7440-39-3	Barium	23.0 ~~3.1~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.57 ~~0.19~~	~~J~~	U	P
7440-43-9	Cadmium	0.57 ~~0.20~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	956		J ~~J~~	P
7440-47-3	Chromium	19.1		~~J~~	P
7440-48-4	Cobalt	5.7 ~~0.65~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	13.6		J ~~J~~	P
7439-89-6	Iron	16800		J ~~E~~	P
7439-92-1	Lead	1130		J E	P
7439-95-4	Magnesium	575 ~~351~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	60.4		J ~~N~~	P
7440-02-0	Nickel	4.6 ~~1.9~~	~~J~~	U	P
7440-09-7	Potassium	176	J		P
7782-49-2	Selenium	4.0 ~~0.80~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	0.30	J		P
7440-23-5	Sodium	951		J ~~E~~	P
7440-28-0	Thallium	2.9	U		P
7440-31-5	Tin	28.0		J ~~E~~	P
7440-62-2	Vanadium	16.3		J ~~N~~	P
7440-66-6	Zinc	50.5		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-06

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 98.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	271		J	P
7440-36-0	Antimony	6.1 ~~1.3~~	~~J~~	R ~~N E~~	P
7440-38-2	Arsenic	1.2		R ~~N E~~	P
7440-39-3	Barium	20.4 ~~1.8~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.51 ~~0.030~~	~~J~~	U	P
7440-43-9	Cadmium	0.51 ~~0.053~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	510 ~~194~~	~~J~~	UJ	P
7440-47-3	Chromium	2.0			P
7440-48-4	Cobalt	5.1 ~~0.24~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	1.5	J		P
7439-89-6	Iron	3020		J ~~E~~	P
7439-92-1	Lead	44.8		J E	P
7439-95-4	Magnesium	510 ~~63.2~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	46.1		J ~~N~~	P
7440-02-0	Nickel	4.1 ~~0.34~~	~~J~~	U	P
7440-09-7	Potassium	41.1	J		P
7782-49-2	Selenium	3.6	U	J ~~N~~	P
7440-22-4	Silver	0.11 ~~1.0~~	~~UJ~~		P
7440-23-5	Sodium	510 ~~34.9~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.5	U		P
7440-31-5	Tin	15.8		J ~~E~~	P
7440-62-2	Vanadium	5.1 ~~3.9~~	~~J~~	UJ ~~N~~	P
7440-66-6	Zinc	8.7		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-07

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 95.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	327		J	P
7440-36-0	Antimony	6.3 ~~0.42~~ ~~6.3~~	~~U~~	R ~~N~~ E	P
7440-38-2	Arsenic	1.6		R ~~* N~~ E	P
7440-39-3	Barium	21.0 ~~1.2~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.52 ~~0.034~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.051~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	525 ~~58.6~~	~~J~~	UJ ~~*~~	P
7440-47-3	Chromium	2.5		~~*~~	P
7440-48-4	Cobalt	5.2 ~~0.22~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	2.7		UJ ~~*~~	P
7439-89-6	Iron	3620		UJ ~~* E~~	P
7439-92-1	Lead	22.5		UJ ~~E~~	P
7439-95-4	Magnesium	525 ~~77.2~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	36.7		UJ ~~* N~~	P
7440-02-0	Nickel	4.2 ~~0.52~~	~~J~~	U	P
7440-09-7	Potassium	48.5	J		P
7782-49-2	Selenium	3.7	U	UJ ~~N~~	P
7440-22-4	Silver	0.18 ~~1.0~~	~~UJ~~		P
7440-23-5	Sodium	525 ~~24.9~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~1.6~~	~~J~~	UJ ~~* B~~	P
7440-62-2	Vanadium	5.6		UJ ~~* N~~	P
7440-66-6	Zinc	8.8		UJ ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52X7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-08

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 97.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	690		J ~~*~~	P
7440-36-0	Antimony	6.1 ~~3.5~~	~~J~~	R ~~N E~~	P
7440-38-2	Arsenic	4.7		R * N E	P
7440-39-3	Barium	20.5 ~~2.1~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.51 ~~0.090~~	~~J~~	U	P
7440-43-9	Cadmium	0.51 ~~0.086~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	512 ~~137~~	~~J~~	UJ ~~*~~	P
7440-47-3	Chromium	8.0		~~*~~	P
7440-48-4	Cobalt	5.1 ~~0.55~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	6.1		J ~~*~~	P
7439-89-6	Iron	13500		J ~~*E~~	P
7439-92-1	Lead	63.5		J ~~E~~	P
7439-95-4	Magnesium	512 ~~134~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	49.5		J ~~*N~~	P
7440-02-0	Nickel	4.1 ~~1.7~~	~~J~~	U	P
7440-09-7	Potassium	69.7	J		P
7782-49-2	Selenium	3.6 ~~0.64~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	0.19 ~~1.0~~	~~UJ~~		P
7440-23-5	Sodium	512 ~~65.6~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.2 ~~3.9~~	~~J~~	UJ ~~*E~~	P
7440-62-2	Vanadium	14.4		J ~~*N~~	P
7440-66-6	Zinc	21.0		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-09

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 97.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	357		J	P
7440-36-0	Antimony	7.1		R ~~N E~~	P
7440-38-2	Arsenic	1.9		R ~~N E~~	P
7440-39-3	Barium	20.6 ~~1.4~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.51 ~~0.025~~	~~J~~	U	P
7440-43-9	Cadmium	0.51 ~~0.048~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	514 ~~194~~	~~J~~	UJ	P
7440-47-3	Chromium	3.3		R	P
7440-48-4	Cobalt	5.1 ~~0.32~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	9.9		J	P
7439-89-6	Iron	4000		J ~~E~~	P
7439-92-1	Lead	117		J ~~E~~	P
7439-95-4	Magnesium	514 ~~107~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	41.9		J ~~N~~	P
7440-02-0	Nickel	4.2 ~~0.80~~	~~J~~	U	P
7440-09-7	Potassium	54.7	J		P
7782-49-2	Selenium	3.6 ~~0.35~~ ~~3.6~~	~~UJ~~	UJ ~~N~~	P
7440-22-4	Silver	0.12 ~~1.0~~	~~UJ~~		P
7440-23-5	Sodium	514 ~~54.6~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.3 ~~2.3~~	~~J~~	UJ ~~E~~	P
7440-62-2	Vanadium	5.8		J ~~N~~	P
7440-66-6	Zinc	10.3		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5307

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-10

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 95.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1270		J ~~E~~	P
7440-36-0	Antimony	6.3 ~~1.3~~	~~J~~	R ~~N E~~	P
7440-38-2	Arsenic	5.4		R ~~N E~~	P
7440-39-3	Barium	21.0 ~~3.7~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.53 ~~0.16~~	~~J~~	U	P
7440-43-9	Cadmium	0.53 ~~0.044~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	2130		J ~~E~~	P
7440-47-3	Chromium	8.2		J ~~E~~	P
7440-48-4	Cobalt	5.3 ~~1.1~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	3.2		J ~~E~~	P
7439-89-6	Iron	8850		J ~~E~~	P
7439-92-1	Lead	57.9		J ~~E~~	P
7439-95-4	Magnesium	590		J ~~E~~	P
7439-96-5	Manganese	31.0		J ~~N~~	P
7440-02-0	Nickel	4.2 ~~2.6~~	~~J~~	U	P
7440-09-7	Potassium	546			P
7782-49-2	Selenium	3.7 0.44 ~~3.7~~	~~UJ~~	UJ N	P
7440-22-4	Silver	0.14 ~~1.1~~	~~UJ~~		P
7440-23-5	Sodium	526 ~~30.7~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~2.6~~	~~J~~	UJ ~~E~~	P
7440-62-2	Vanadium	9.2		J ~~N~~	P
7440-66-6	Zinc	13.2		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5309

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-11

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 94.9

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1150		J ~~*~~	P
7440-36-0	Antimony	15.4		R ~~N E~~	P
7440-38-2	Arsenic	14.5		R ~~*N E~~	P
7440-39-3	Barium	39.4		J ~~E~~	P
7440-41-7	Beryllium	0.53 ~~0.099~~	~~J~~	U	P
7440-43-9	Cadmium	0.53 ~~0.093~~	~~J~~	U J ~~E~~	P
7440-70-2	Calcium	1640		J ~~*~~	P
7440-47-3	Chromium	6.1		~~*~~	P
7440-48-4	Cobalt	5.3 ~~1.2~~	~~J~~	U J ~~E~~	P
7440-50-8	Copper	16.6		J ~~*~~	P
7439-89-6	Iron	9200		J ~~*E~~	P
7439-92-1	Lead	459		J ~~E~~	P
7439-95-4	Magnesium	527 ~~492~~	~~J~~	U J ~~E~~	P
7439-96-5	Manganese	75.4		J ~~*N~~	P
7440-02-0	Nickel	4.2 ~~3.0~~	~~J~~	U	P
7440-09-7	Potassium	281	J		P
7782-49-2	Selenium	3.7 ~~0.63~~ ~~3.7~~	~~UJ~~	U J ~~N~~	P
7440-22-4	Silver	1.0 ~~0.24~~	~~J~~	U	P
7440-23-5	Sodium	527 ~~210~~	~~J~~	U J ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	23.5		J ~~E~~	P
7440-62-2	Vanadium	10.5		J ~~N~~	P
7440-66-6	Zinc	42.2		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5310

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-12

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 96.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1060		J	P
7440-36-0	Antimony	8.1		R ~~N E~~	P
7440-38-2	Arsenic	10.4		R ~~* N E~~	P
7440-39-3	Barium	26.8 ~~12.1~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.52 ~~0.33~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.12~~	~~J~~	UJ E	P
7440-70-2	Calcium	546		J	P
7440-47-3	Chromium	7.7			P
7440-48-4	Cobalt	5.2 ~~0.90~~	~~J~~	UJ E	P
7440-50-8	Copper	10.3		J	P
7439-89-6	Iron	15500		J ~~E~~	P
7439-92-1	Lead	235		J ~~E~~	P
7439-95-4	Magnesium	520 ~~332~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	42.7		J ~~* N~~	P
7440-02-0	Nickel	4.2 ~~2.0~~	~~J~~	U	P
7440-09-7	Potassium	190	J		P
7782-49-2	Selenium	0.76	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.0 ~~0.25~~	~~J~~	U	P
7440-23-5	Sodium	520 ~~73.0~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	13.2		J ~~E~~	P
7440-62-2	Vanadium	18.7		J ~~N~~	P
7440-66-6	Zinc	29.6		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5311

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-13

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 44.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3190		J	P
7440-36-0	Antimony	13.0	J	R	P
7440-38-2	Arsenic	37.5		R	P
7440-39-3	Barium	45.2 ~~21.4~~	~~J~~	UJ	P
7440-41-7	Beryllium	1.1 ~~0.62~~	~~J~~	UJ	P
7440-43-9	Cadmium	1.1 ~~0.57~~	~~J~~	UJ	P
7440-70-2	Calcium	10400		J	P
7440-47-3	Chromium	42.1		J	P
7440-48-4	Cobalt	11.3 ~~4.4~~	~~J~~	UJ	P
7440-50-8	Copper	75.7		J	P
7439-89-6	Iron	23200		J	P
7439-92-1	Lead	935		J	P
7439-95-4	Magnesium	4130		J	P
7439-96-5	Manganese	216		J	P
7440-02-0	Nickel	10.7		J	P
7440-09-7	Potassium	1130	~~J~~	J	P
7782-49-2	Selenium	2.4	J	J	P
7440-22-4	Silver	2.3 ~~0.90~~	~~J~~	UJ	P
7440-23-5	Sodium	8610		J	P
7440-28-0	Thallium	5.6	U	UJ	P
7440-31-5	Tin	22.6 ~~18.9~~	~~J~~	UJ	P
7440-62-2	Vanadium	42.4		J	P
7440-66-6	Zinc	173		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5312

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-14

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 70.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2470		J ~~J~~	P
7440-36-0	Antimony	8.5		R ~~N E~~	P
7440-38-2	Arsenic	13.8		R ~~N E~~	P
7440-39-3	Barium	47.3		J ~~E~~	P
7440-41-7	Beryllium	0.71 ~~0.34~~	~~J~~	U	P
7440-43-9	Cadmium	0.71 ~~0.23~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	8940		~~J~~	P
7440-47-3	Chromium	19.5		~~J~~	P
7440-48-4	Cobalt	7.1 ~~1.7~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	26.1		J ~~J~~	P
7439-89-6	Iron	24000		J ~~E~~	P
7439-92-1	Lead	365		J ~~E~~	P
7439-95-4	Magnesium	1590		J ~~E~~	P
7439-96-5	Manganese	87.2		J ~~N~~	P
7440-02-0	Nickel	5.7 ~~4.5~~	~~J~~	U	P
7440-09-7	Potassium	423	J		P
7782-49-2	Selenium	1.2	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.4 ~~0.32~~	~~J~~	U	P
7440-23-5	Sodium	2240		J ~~E~~	P
7440-28-0	Thallium	3.5	U		P
7440-31-5	Tin	17.7		J ~~E~~	P
7440-62-2	Vanadium	34.3		J ~~N~~	P
7440-66-6	Zinc	53.7		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5313

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-15

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 78.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	748		J	P
7440-36-0	Antimony	3.6	~~J~~	~~R~~ ~~N E~~	P
7440-38-2	Arsenic	4.5		~~R~~ * ~~N E~~	P
7440-39-3	Barium	25.5 ~~12.5~~	~~J~~	~~U J E~~	P
7440-41-7	Beryllium	0.64 ~~0.072~~	~~J~~	U	P
7440-43-9	Cadmium	0.64 ~~0.10~~	~~J~~	~~U J E~~	P
7440-70-2	Calcium	875		J	P
7440-47-3	Chromium	4.0			P
7440-48-4	Cobalt	6.4 ~~0.32~~	~~J~~	~~U J E~~	P
7440-50-8	Copper	8.6		J	P
7439-89-6	Iron	5330		~~J E~~	P
7439-92-1	Lead	111		~~J E~~	P
7439-95-4	Magnesium	638 ~~454~~	~~J~~	~~U J E~~	P
7439-96-5	Manganese	15.2		~~J N~~	P
7440-02-0	Nickel	5.1 ~~0.95~~	~~J~~	U	P
7440-09-7	Potassium	343	J		P
7782-49-2	Selenium	4.5	U	J ~~N~~	P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	1910		J ~~E~~	P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	2.8 ~~7.7~~	~~J~~	~~U J E~~	P
7440-62-2	Vanadium	8.1		J ~~N~~	P
7440-66-6	Zinc	18.4		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5314

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-16

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 75.7

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1310		J	P
7440-36-0	Antimony	7.7		R N E	P
7440-38-2	Arsenic	10.3		R * N E	P
7440-39-3	Barium	26.4 ~~6.0~~	~~J~~	UJ E	P
7440-41-7	Beryllium	0.66 ~~0.16~~		U	P
7440-43-9	Cadmium	0.66 ~~0.17~~		UJ E	P
7440-70-2	Calcium	1610		J	P
7440-47-3	Chromium	9.2			P
7440-48-4	Cobalt	6.6 ~~0.54~~	~~J~~	UJ E	P
7440-50-8	Copper	8.4		J	P
7439-89-6	Iron	11300		J ~~E~~	P
7439-92-1	Lead	215		J E	P
7439-95-4	Magnesium	660 ~~517~~	~~J~~	UJ E	P
7439-96-5	Manganese	20.6		J ~~N~~	P
7440-02-0	Nickel	5.3 ~~2.0~~	~~J~~	U	P
7440-09-7	Potassium	351	J		P
7782-49-2	Selenium	0.65 ~~4.6~~	~~UJ~~	J N	P
7440-22-4	Silver	1.3 ~~0.25~~ ~~1.3~~	~~UJ~~	U	P
7440-23-5	Sodium	2140		J E	P
7440-28-0	Thallium	3.3	U		P
7440-31-5	Tin	13.2 ~~9.3~~	~~J~~	UJ ~~E~~	P
7440-62-2	Vanadium	20.7		J ~~N~~	P
7440-66-6	Zinc	34.2		J E	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5315

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-17

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 96.1

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	820		~~J~~	P
7440-36-0	Antimony	9.8		~~R~~ ~~N~~ ~~E~~	P
7440-38-2	Arsenic	9.4		~~R~~ ~~N~~ ~~E~~	P
7440-39-3	Barium	22.3		~~J~~ ~~E~~	P
7440-41-7	Beryllium	0.52 ~~0.081~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.084~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	758		~~J~~	P
7440-47-3	Chromium	5.6			P
7440-48-4	Cobalt	5.2 ~~0.73~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	9.4		~~J~~	P
7439-89-6	Iron	7940		~~J~~ ~~E~~	P
7439-92-1	Lead	217		~~J~~ ~~E~~	P
7439-95-4	Magnesium	520 ~~295~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	38.1		~~J~~ ~~N~~	P
7440-02-0	Nickel	4.2 ~~2.9~~	~~J~~	U	P
7440-09-7	Potassium	170	J		P
7782-49-2	Selenium	0.41 ~~3.6~~	~~U~~	~~J~~ ~~N~~	P
7440-22-4	Silver	1.0 ~~0.22~~	~~J~~	U	P
7440-23-5	Sodium	520 ~~95.6~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	12.1		~~J~~ ~~E~~	P
7440-62-2	Vanadium	11.5		~~J~~ ~~N~~	P
7440-66-6	Zinc	30.4		~~J~~ ~~E~~	P

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5316

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-18

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 84.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1650		J ~~*~~	P
7440-36-0	Antimony	14.4		R ~~N E~~	P
7440-38-2	Arsenic	35.4		R ~~*N E~~	P
7440-39-3	Barium	23.7 ~~9.8~~	~~J~~	UJ E	P
7440-41-7	Beryllium	0.59 ~~0.37~~	~~J~~	U	P
7440-43-9	Cadmium	0.59 ~~0.19~~	~~J~~	UJ E	P
7440-70-2	Calcium	9130		~~*~~	P
7440-47-3	Chromium	17.9		~~*~~	P
7440-48-4	Cobalt	5.9 ~~2.1~~	~~J~~	UJ E	P
7440-50-8	Copper	26.4		J ~~*~~	P
7439-89-6	Iron	22900		J ~~* E~~	P
7439-92-1	Lead	285		J ~~E~~	P
7439-95-4	Magnesium	1150		J ~~E~~	P
7439-96-5	Manganese	119		J ~~* N~~	P
7440-02-0	Nickel	4.7 ~~4.5~~	~~J~~	U	P
7440-09-7	Potassium	301	J		P
7782-49-2	Selenium	0.96	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.2 ~~0.27~~	~~J~~	U	P
7440-23-5	Sodium	592 ~~520~~	~~J~~	UJ E	P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	11.8 ~~6.4~~	~~J~~	UJ ~~* E~~	P
7440-62-2	Vanadium	32.8		J ~~* N~~	P
7440-66-6	Zinc	66.0		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5317

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-19

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 82.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2070		J ~~*~~	P
7440-36-0	Antimony	5.1	~~J~~	R ~~N~~ ~~E~~	P
7440-38-2	Arsenic	11.3		R ~~*~~ ~~N~~ ~~E~~	P
7440-39-3	Barium	24.4 ~~18.9~~	~~J~~	UJ ~~E~~	P
7440-41-7	Beryllium	0.61 ~~0.21~~	~~J~~	U	P
7440-43-9	Cadmium	0.61 ~~0.21~~	~~J~~	UJ ~~E~~	P
7440-70-2	Calcium	4530		~~*~~	P
7440-47-3	Chromium	10.2		~~*~~	P
7440-48-4	Cobalt	6.1 ~~1.0~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	14.9		J ~~*~~	P
7439-89-6	Iron	17100		J ~~*~~ ~~E~~	P
7439-92-1	Lead	190		J ~~E~~	P
7439-95-4	Magnesium	770		J ~~E~~	P
7439-96-5	Manganese	47.4		J ~~*~~ ~~N~~	P
7440-02-0	Nickel	4.9 ~~2.2~~	~~J~~	U	P
7440-09-7	Potassium	346	J		P
7782-49-2	Selenium	0.97	~~J~~	J ~~N~~	P
7440-22-4	Silver	1.2 ~~0.48~~ ~~1.2~~	~~UJ~~	U	P
7440-23-5	Sodium	1690		J ~~E~~	P
7440-28-0	Thallium	3.0	U		P
7440-31-5	Tin	12.2 ~~7.7~~	~~J~~	UJ ~~*~~ ~~E~~	P
7440-62-2	Vanadium	27.7		J ~~*~~ ~~N~~	P
7440-66-6	Zinc	63.2		J ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5318

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52W6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809158-20

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 96.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	577		UJ ~~*~~	P
7440-36-0	Antimony	3.9	~~J~~	~~R N E~~	P
7440-38-2	Arsenic	4.7		~~R * N E~~	P
7440-39-3	Barium	20.8 ~~9.3~~	~~J~~	UJ E	P
7440-41-7	Beryllium	0.52 ~~0.067~~	~~J~~	U	P
7440-43-9	Cadmium	0.50 ~~0.064~~	~~J~~	UJ E	P
7440-70-2	Calcium	519 ~~405~~	~~J~~	UJ ~~*~~	P
7440-47-3	Chromium	3.2		~~*~~	P
7440-48-4	Cobalt	5.2 ~~0.34~~	~~J~~	UJ ~~E~~	P
7440-50-8	Copper	4.2		UJ ~~*~~	P
7439-89-6	Iron	5630		UJ ~~* E~~	P
7439-92-1	Lead	109		UJ E	P
7439-95-4	Magnesium	519 ~~205~~	~~J~~	UJ ~~E~~	P
7439-96-5	Manganese	29.7		UJ ~~* N~~	P
7440-02-0	Nickel	4.2 ~~0.94~~	~~J~~	U	P
7440-09-7	Potassium	159	J		P
7782-49-2	Selenium	0.43 ~~3.6~~	~~UJ~~	~~J N~~	P
7440-22-4	Silver	1.0 ~~0.71 1.0~~	~~UJ~~	U	P
7440-23-5	Sodium	519 ~~434~~	~~J~~	UJ ~~E~~	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.4 ~~5.0~~	~~J~~	UJ ~~* E~~	P
7440-62-2	Vanadium	9.6		UJ ~~* N~~	P
7440-66-6	Zinc	18.0		UJ ~~E~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

RECEIVED
SEP 26 2008
HAZ. WASTE SUPPORT SEC

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB52W6
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 12, 2008, we received 20 soil samples in 3 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 4.5 °C, 5.5°C and 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/18/2008 @ 2058 hrs. The matrix spike failed for As, Se, Mn and V; a post spike was analyzed at twice the CRQL for Se and at twice the indigenous level for As, Mn and V.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809158-01 EPA Sample # MB52W5

Date & Time 9/18/2008@2215

Metals: 79.56 µg/L * (0.100 L) / (1.00 g) * 100 % / 94.5% * 1000 g / 1 kg * 1 mg / 1000 µg = 8.4 mg/kg
(Analyte Ni)

Authorized by _____
Daniel Antrim
Document Control Officer

RECEIVED
SEP 26 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB52W6

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 31836

Analysis Price: $ 1,420.00 **SDG Turnaround:** 14 days

Modified Analysis (if applicable):

Modification Reference No.:

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB52W5	7) MB52X5	13) MB5311	19) MB5317
2) MB52W6	8) MB52X7	14) MB5312	20) MB5318
3) MB52W8	9) MB52Y0	15) MB5313	21)
4) MB52W9	10) MB5307	16) MB5314	22)
5) MB52X1	11) MB5309	17) MB5315	23)
6) MB52X4	12) MB5310	18) MB5316	24)

MB52W5
First Sample in SDG

MB5318
Last Sample in SDG

09/12/2008
First Sample Receipt Date

09/12/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-12-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Monday, September 15, 2008 8:02 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Non-sampler issues | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. **The Resolution will be applied to all samples received for this Case.**
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Saturday, September 13, 2008 2:23 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 12, 2008, we received 7 water samples and 70 soil samples in 5 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 4.5° C, 5°C, 5.5°C, 6°C, and 6.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

Thanks,

Beth Whitehead
Bonner Analytical

(39)

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-01

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 90.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2190			P
7440-36-0	Antimony	74.2		N J	P
7440-38-2	Arsenic	90.7		*	P
7440-39-3	Barium	28.1		J	P
7440-41-7	Beryllium	0.56 ~~0.36~~	~~J~~	U	P
7440-43-9	Cadmium	0.58 ~~0.46~~	~~J~~	U	P
7440-70-2	Calcium	17600		*	P
7440-47-3	Chromium	22.1			P
7440-48-4	Cobalt	5.6 ~~2.5~~	~~J~~	U	P
7440-50-8	Copper	87.3			P
7439-89-6	Iron	31600			P
7439-92-1	Lead	1430		J *	P
7439-95-4	Magnesium	1080			P
7439-96-5	Manganese	180		*	P
7440-02-0	Nickel	8.1			P
7440-09-7	Potassium	201	J		P
7782-49-2	Selenium	0.96	J		P
7440-22-4	Silver	0.38	~~J~~	J N	P
7440-23-5	Sodium	671			P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	66.9			P
7440-62-2	Vanadium	39.1			P
7440-66-6	Zinc	113			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: ORANGE Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-02

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 90.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2720			P
7440-36-0	Antimony	445		J N	P
7440-38-2	Arsenic	299		*	P
7440-39-3	Barium	24.0		J	P
7440-41-7	Beryllium	0.55 ~~0.36~~	~~J~~	U	P
7440-43-9	Cadmium	2.4			P
7440-70-2	Calcium	6470		*	P
7440-47-3	Chromium	24.8			P
7440-48-4	Cobalt	6.3			P
7440-50-8	Copper	704			P
7439-89-6	Iron	59200		D	P
7439-92-1	Lead	18400		J D	P
7439-95-4	Magnesium	855			P
7439-96-5	Manganese	147		*	P
7440-02-0	Nickel	34.8			P
7440-09-7	Potassium	180	J		P
7782-49-2	Selenium	1.7	J		P
7440-22-4	Silver	0.88	~~J~~	J N	P
7440-23-5	Sodium	563 ~~489~~	~~J~~	U	P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	377			P
7440-62-2	Vanadium	47.1			P
7440-66-6	Zinc	219			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: ORANGE Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-03

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 88.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4120			P
7440-36-0	Antimony	832		J N	P
7440-38-2	Arsenic	602		*	P
7440-39-3	Barium	284		J	P
7440-41-7	Beryllium	0.66			P
7440-43-9	Cadmium	1.7			P
7440-70-2	Calcium	8520		*	P
7440-47-3	Chromium	28.8			P
7440-48-4	Cobalt	5.7 ~~3.8~~	~~U~~	U	P
7440-50-8	Copper	563			P
7439-89-6	Iron	69300		~~D~~	P
7439-92-1	Lead	23800		J ~~D~~ *	P
7439-95-4	Magnesium	1150			P
7439-96-5	Manganese	398		*	P
7440-02-0	Nickel	46.6			P
7440-09-7	Potassium	427	J		P
7782-49-2	Selenium	2.0	J		P
7440-22-4	Silver	1.2		J N	P
7440-23-5	Sodium	1320			P
7440-28-0	Thallium	2.8	U		P
7440-31-5	Tin	501			P
7440-62-2	Vanadium	49.6			P
7440-66-6	Zinc	463			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: ORANGE Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-04

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 93.1

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1200			P
7440-36-0	Antimony	44.5		J ~~N~~	P
7440-38-2	Arsenic	43.8		~~J~~	P
7440-39-3	Barium	21.5 ~~10.3~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.54 ~~0.12~~	~~J~~	U	P
7440-43-9	Cadmium	0.54 ~~0.23~~	~~J~~	U	P
7440-70-2	Calcium	537 ~~283~~	~~J~~	U ~~J~~	P
7440-47-3	Chromium	5.4			P
7440-48-4	Cobalt	5.4 ~~0.85~~	~~J~~	U	P
7440-50-8	Copper	114			P
7439-89-6	Iron	8990			P
7439-92-1	Lead	1110		J ~~J~~	P
7439-95-4	Magnesium	189	J		P
7439-96-5	Manganese	26.0		J ~~J~~	P
7440-02-0	Nickel	4.3 ~~3.7~~	~~J~~	U	P
7440-09-7	Potassium	195	J		P
7782-49-2	Selenium	0.68 ~~3.8~~	~~UJ~~		P
7440-22-4	Silver	1.1	U	J ~~N~~	P
7440-23-5	Sodium	537 ~~21.0~~	~~J~~	U	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	36.6			P
7440-62-2	Vanadium	10.7			P
7440-66-6	Zinc	35.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-05

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 91.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2250			P
7440-36-0	Antimony	18.3		J N	P
7440-38-2	Arsenic	20.0		✓	P
7440-39-3	Barium	35.9		J	P
7440-41-7	Beryllium	0.55 ~~0.25~~	~~J~~	U	P
7440-43-9	Cadmium	0.55 ~~0.22~~	~~J~~	U	P
7440-70-2	Calcium	575		✓	P
7440-47-3	Chromium	14.9			P
7440-48-4	Cobalt	5.5 ~~1.5~~	~~J~~	U	P
7440-50-8	Copper	27.1			P
7439-89-6	Iron	19400			P
7439-92-1	Lead	649		J ✓	P
7439-95-4	Magnesium	601			P
7439-96-5	Manganese	45.7		✓	P
7440-02-0	Nickel	6.6			P
7440-09-7	Potassium	495	J		P
7782-49-2	Selenium	0.69	J		P
7440-22-4	Silver	0.17 ~~1.1~~	~~U~~	J N	P
7440-23-5	Sodium	548 ~~64.0~~	~~J~~	U	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	25.6			P
7440-62-2	Vanadium	17.6			P
7440-66-6	Zinc	56.1			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-06

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 92.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1950			P
7440-36-0	Antimony	34.3		J N	P
7440-38-2	Arsenic	29.0			P
7440-39-3	Barium	148		J	P
7440-41-7	Beryllium	0.54 ~~0.12~~	~~J~~	U	P
7440-43-9	Cadmium	0.54 ~~0.29~~	~~J~~	U	P
7440-70-2	Calcium	1210			P
7440-47-3	Chromium	9.2			P
7440-48-4	Cobalt	5.4 ~~1.4~~	~~J~~	U	P
7440-50-8	Copper	58.2			P
7439-89-6	Iron	18000			P
7439-92-1	Lead	1250		J	P
7439-95-4	Magnesium	418	J		P
7439-96-5	Manganese	143			P
7440-02-0	Nickel	5.5			P
7440-09-7	Potassium	351	J		P
7782-49-2	Selenium	0.81	J		P
7440-22-4	Silver	0.14 ~~1.1~~	~~U~~ J	J N	P
7440-23-5	Sodium	540 ~~265~~	~~J~~	U	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	90.8			P
7440-62-2	Vanadium	13.2			P
7440-66-6	Zinc	151			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-07

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 91.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1260			P
7440-36-0	Antimony	2.7	~~J~~	~~J~~ N	P
7440-38-2	Arsenic	3.5		N	P
7440-39-3	Barium	21.9 ~~10.1~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.55 ~~0.078~~	~~J~~	U	P
7440-43-9	Cadmium	0.55 ~~0.036~~	~~J~~	U	P
7440-70-2	Calcium	547 ~~255~~	~~J~~	U N	P
7440-47-3	Chromium	4.6			P
7440-48-4	Cobalt	5.5 ~~0.59~~	~~J~~	U	P
7440-50-8	Copper	7.8			P
7439-89-6	Iron	6300			P
7439-92-1	Lead	118		J N	P
7439-95-4	Magnesium	255	J		P
7439-96-5	Manganese	19.8		J N	P
7440-02-0	Nickel	4.4 ~~1.7~~	~~J~~	U	P
7440-09-7	Potassium	224	J		P
7782-49-2	Selenium	3.8	U		P
7440-22-4	Silver	1.1	U	J N	P
7440-23-5	Sodium	547 ~~17.2~~	~~J~~	U	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.9 ~~3.8~~	~~J~~	U	P
7440-62-2	Vanadium	9.2			P
7440-66-6	Zinc	12.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-08

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 91.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1180			P
7440-36-0	Antimony	2.6	~~J~~	J ~~N~~	P
7440-38-2	Arsenic	3.2		*	P
7440-39-3	Barium	21.9 ~~6.8~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	0.55 ~~0.021~~	~~J~~	U	P
7440-70-2	Calcium	548 ~~279~~	~~J~~	U *	P
7440-47-3	Chromium	4.4			P
7440-48-4	Cobalt	5.5 ~~0.57~~	~~J~~	U	P
7440-50-8	Copper	7.1			P
7439-89-6	Iron	4740			P
7439-92-1	Lead	102		J *	P
7439-95-4	Magnesium	359	J		P
7439-96-5	Manganese	18.0		J *	P
7440-02-0	Nickel	4.4 ~~1.5~~	~~J~~	U	P
7440-09-7	Potassium	180	J		P
7782-49-2	Selenium	3.8	U		P
7440-22-4	Silver	1.1	U	J ~~N~~	P
7440-23-5	Sodium	548 ~~14.1~~	~~J~~	U	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.9 ~~3.7~~	~~J~~	U	P
7440-62-2	Vanadium	8.1			P
7440-66-6	Zinc	10.7			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-09

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 71.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	677			P
7440-36-0	Antimony	14.2		J N	P
7440-38-2	Arsenic	12.5		J	P
7440-39-3	Barium	27.8 ~~5.2~~	~~J~~	U J	P
7440-41-7	Beryllium	0.70 ~~0.074~~	~~J~~	U	P
7440-43-9	Cadmium	0.70 ~~0.031~~	~~J~~	U	P
7440-70-2	Calcium	696 ~~389~~	~~J~~	U J	P
7440-47-3	Chromium	4.7			P
7440-48-4	Cobalt	7.0 ~~0.46~~	~~J~~	U	P
7440-50-8	Copper	13.3			P
7439-89-6	Iron	7760			P
7439-92-1	Lead	356		J	P
7439-95-4	Magnesium	199	J		P
7439-96-5	Manganese	26.2		J	P
7440-02-0	Nickel	5.6 ~~1.7~~	~~J~~	U	P
7440-09-7	Potassium	112	J		P
7782-49-2	Selenium	4.9	U		P
7440-22-4	Silver	1.4	U	J N	P
7440-23-5	Sodium	696 ~~340~~	~~J~~	U	P
7440-28-0	Thallium	3.5	U		P
7440-31-5	Tin	16.9			P
7440-62-2	Vanadium	10.5			P
7440-66-6	Zinc	25.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-10

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 96.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1560			P
7440-36-0	Antimony	42.7		J N	P
7440-38-2	Arsenic	32.8			P
7440-39-3	Barium	20.8 ~~19.2~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.52 ~~0.18~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.32~~	~~J~~	U	P
7440-70-2	Calcium	879			P
7440-47-3	Chromium	11.4			P
7440-48-4	Cobalt	5.2 ~~1.3~~	~~J~~	U	P
7440-50-8	Copper	62.7			P
7439-89-6	Iron	21100			P
7439-92-1	Lead	1290		J	P
7439-95-4	Magnesium	253	J		P
7439-96-5	Manganese	58.6			P
7440-02-0	Nickel	5.9			P
7440-09-7	Potassium	175	J		P
7782-49-2	Selenium	0.76	J		P
7440-22-4	Silver	0.21	~~J~~	J N	P
7440-23-5	Sodium	520 ~~48.3~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	54.7			P
7440-62-2	Vanadium	22.7			P
7440-66-6	Zinc	61.7			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-11

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 94.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1410			P
7440-36-0	Antimony	16.8		J N	P
7440-38-2	Arsenic	15.0			P
7440-39-3	Barium	34.1		J	P
7440-41-7	Beryllium	0.53 ~~0.078~~	~~J~~	U	P
7440-43-9	Cadmium	0.53 ~~0.21~~	~~J~~	U	P
7440-70-2	Calcium	527 ~~407~~	~~J~~	U	P
7440-47-3	Chromium	6.4			P
7440-48-4	Cobalt	5.3 ~~0.89~~	~~J~~	U	P
7440-50-8	Copper	44.6			P
7439-89-6	Iron	9820			P
7439-92-1	Lead	688		J	P
7439-95-4	Magnesium	181	J		P
7439-96-5	Manganese	44.3			P
7440-02-0	Nickel	4.4			P
7440-09-7	Potassium	207	J		P
7782-49-2	Selenium	0.52 ~~3.7~~	UJ		P
7440-22-4	Silver	0.22	~~U~~	J N	P
7440-23-5	Sodium	527 ~~77.9~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	41.6			P
7440-62-2	Vanadium	10.5			P
7440-66-6	Zinc	52.5			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-12

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 92.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1610			P
7440-36-0	Antimony	1.7	~~J~~	J N	P
7440-38-2	Arsenic	3.3			P
7440-39-3	Barium	21.7 ~~7.9~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	0.54 ~~0.027~~	~~J~~	U	P
7440-70-2	Calcium	543 ~~520~~	~~J~~	U	P
7440-47-3	Chromium	4.7			P
7440-48-4	Cobalt	5.4 ~~1.3~~	~~J~~	U	P
7440-50-8	Copper	12.1			P
7439-89-6	Iron	5460			P
7439-92-1	Lead	80.5		J	P
7439-95-4	Magnesium	584			P
7439-96-5	Manganese	54.4			P
7440-02-0	Nickel	4.3 ~~2.2~~	~~J~~	U	P
7440-09-7	Potassium	211	J		P
7782-49-2	Selenium	3.8	U		P
7440-22-4	Silver	1.1	U	J N	P
7440-23-5	Sodium	543 ~~51.5~~	~~J~~	U	P
7440-28-0	Thallium	2.7	U		P
7440-31-5	Tin	10.9 ~~3.8~~	~~J~~	U	P
7440-62-2	Vanadium	9.8			P
7440-66-6	Zinc	10.4			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Z9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-13

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 97.5

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	505			P
7440-36-0	Antimony	7.3		J N	P
7440-38-2	Arsenic	8.0			P
7440-39-3	Barium	20.5 ~~3.8~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.51 ~~0.065~~	~~J~~	U	P
7440-43-9	Cadmium	0.51 ~~0.015~~	~~J~~	U	P
7440-70-2	Calcium	513 ~~424~~	~~J~~	U	P
7440-47-3	Chromium	3.9			P
7440-48-4	Cobalt	5.1 ~~0.33~~	~~J~~	U	P
7440-50-8	Copper	8.3			P
7439-89-6	Iron	5690			P
7439-92-1	Lead	211		J	P
7439-95-4	Magnesium	138	J		P
7439-96-5	Manganese	24.3		J	P
7440-02-0	Nickel	4.1 ~~0.99~~	~~J~~	U	P
7440-09-7	Potassium	67.4	J		P
7782-49-2	Selenium	0.35 ~~3.6~~	~~B~~J		P
7440-22-4	Silver	1.0	U	J N	P
7440-23-5	Sodium	513 ~~20.4~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.3 ~~2.0~~	~~J~~	U	P
7440-62-2	Vanadium	7.4			P
7440-66-6	Zinc	18.3			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5300

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-14

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 96.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1960			P
7440-36-0	Antimony	45.2		J N	P
7440-38-2	Arsenic	41.8		*	P
7440-39-3	Barium	20.7 ~~9.5~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.52 ~~0.32~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.28~~	~~J~~	U	P
7440-70-2	Calcium	4200		*	P
7440-47-3	Chromium	14.8			P
7440-48-4	Cobalt	5.2 ~~2.3~~	~~J~~	U	P
7440-50-8	Copper	53.9			P
7439-89-6	Iron	35400			P
7439-92-1	Lead	1630		J *	P
7439-95-4	Magnesium	406	J		P
7439-96-5	Manganese	115		*	P
7440-02-0	Nickel	5.9			P
7440-09-7	Potassium	162	J		P
7782-49-2	Selenium	0.61 ~~3.6~~	~~U~~ J		P
7440-22-4	Silver	0.24	~~J~~	J N	P
7440-23-5	Sodium	516 ~~75.7~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	25.6			P
7440-62-2	Vanadium	40.4			P
7440-66-6	Zinc	71.7			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5301

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-15

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 95.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1210			P
7440-36-0	Antimony	5.4	~~J~~	J N	P
7440-38-2	Arsenic	8.6			P
7440-39-3	Barium	20.9 ~~7.4~~	~~J~~	U J	P
7440-41-7	Beryllium	0.52 ~~0.098~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.032~~	~~J~~	U	P
7440-70-2	Calcium	523 ~~330~~	~~J~~	U	P
7440-47-3	Chromium	7.1			P
7440-48-4	Cobalt	5.2 ~~0.68~~	~~J~~	U	P
7440-50-8	Copper	11.0			P
7439-89-6	Iron	12100			P
7439-92-1	Lead	219		J	P
7439-95-4	Magnesium	223	J		P
7439-96-5	Manganese	25.9			P
7440-02-0	Nickel	4.2 ~~1.5~~	~~J~~	U	P
7440-09-7	Potassium	301	J		P
7782-49-2	Selenium	0.55 ~~3.7~~	~~U~~ J		P
7440-22-4	Silver	0.086 ~~1.0~~	~~U~~ J	J N	P
7440-23-5	Sodium	523 ~~25.6~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~8.6~~	~~J~~	U	P
7440-62-2	Vanadium	15.7			P
7440-66-6	Zinc	14.2			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5302

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-16

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 95.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	985			P
7440-36-0	Antimony	2.7	~~J~~	J ~~N~~	P
7440-38-2	Arsenic	4.6		~~*~~	P
7440-39-3	Barium	20.9 ~~4.6~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.52 ~~0.10~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.046~~	~~J~~	U	P
7440-70-2	Calcium	1100		~~*~~	P
7440-47-3	Chromium	4.9			P
7440-48-4	Cobalt	5.2 ~~0.72~~	~~J~~	U	P
7440-50-8	Copper	5.2			P
7439-89-6	Iron	10000			P
7439-92-1	Lead	121		J ~~*~~	P
7439-95-4	Magnesium	254	J		P
7439-96-5	Manganese	27.6		~~*~~	P
7440-02-0	Nickel	4.2 ~~1.7~~	~~J~~	U	P
7440-09-7	Potassium	238	J		P
7782-49-2	Selenium	0.39 ~~3.7~~	~~U~~ J		P
7440-22-4	Silver	1.0	U	J ~~N~~	P
7440-23-5	Sodium	522 ~~17.3~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.4 ~~3.3~~	~~J~~	U	P
7440-62-2	Vanadium	11.7			P
7440-66-6	Zinc	16.0			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5303

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-17

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 97.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	626			P
7440-36-0	Antimony	38.3		J ~~N~~	P
7440-38-2	Arsenic	30.4		~~*~~	P
7440-39-3	Barium	20.6 ~~15.0~~	~~J~~	U J	P
7440-41-7	Beryllium	0.52 ~~0.084~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.11~~	~~J~~	U	P
7440-70-2	Calcium	515 ~~183~~	~~J~~	U ~~*~~	P
7440-47-3	Chromium	6.9			P
7440-48-4	Cobalt	5.2 ~~0.73~~	~~J~~	U	P
7440-50-8	Copper	27.4			P
7439-89-6	Iron	10300			P
7439-92-1	Lead	994		J ~~*~~	P
7439-95-4	Magnesium	169	J		P
7439-96-5	Manganese	46.6		~~*~~	P
7440-02-0	Nickel	4.5			P
7440-09-7	Potassium	83.9	J		P
7782-49-2	Selenium	0.46 ~~3.6~~	~~U~~ J		P
7440-22-4	Silver	0.11 ~~1.0~~	~~U~~ ~~*~~	J ~~N~~	P
7440-23-5	Sodium	515 ~~49.5~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	51.1			P
7440-62-2	Vanadium	11.9			P
7440-66-6	Zinc	39.8			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5304

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-18

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 97.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	679			P
7440-36-0	Antimony	23.4		J N	P
7440-38-2	Arsenic	19.6			P
7440-39-3	Barium	20.4 ~~7.0~~	~~J~~	U J	P
7440-41-7	Beryllium	0.5 | ~~0.072~~	~~J~~	U	P
7440-43-9	Cadmium	0.51 ~~0.048~~	~~J~~	U	P
7440-70-2	Calcium	32800			P
7440-47-3	Chromium	4.0			P
7440-48-4	Cobalt	5.1 ~~0.77~~	~~J~~	U	P
7440-50-8	Copper	29.3			P
7439-89-6	Iron	5840			P
7439-92-1	Lead	413		J	P
7439-95-4	Magnesium	255	J		P
7439-96-5	Manganese	28.0			P
7440-02-0	Nickel	4.1 ~~2.7~~	~~J~~	U	P
7440-09-7	Potassium	176	J		P
7782-49-2	Selenium	0.74	J		P
7440-22-4	Silver	1.0	U	J N	P
7440-23-5	Sodium	511 ~~404~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	18.8			P
7440-62-2	Vanadium	6.6			P
7440-66-6	Zinc	22.4			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5305

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-19

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 94.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1140			P
7440-36-0	Antimony	0.77	~~J~~	J N	P
7440-38-2	Arsenic	3.6		~~J~~	P
7440-39-3	Barium	21.1 ~~3.6~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.53 ~~0.079~~	~~J~~	U	P
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	954		~~J~~	P
7440-47-3	Chromium	4.5			P
7440-48-4	Cobalt	5.3 ~~1.2~~	~~J~~	U	P
7440-50-8	Copper	2.8			P
7439-89-6	Iron	4370			P
7439-92-1	Lead	63.6		J ~~J~~	P
7439-95-4	Magnesium	503	J		P
7439-96-5	Manganese	26.2		~~J~~	P
7440-02-0	Nickel	4.2 ~~2.5~~	~~J~~	U	P
7440-09-7	Potassium	416	J		P
7782-49-2	Selenium	3.7	U		P
7440-22-4	Silver	1.1	U	J N	P
7440-23-5	Sodium	527 ~~21.7~~	~~J~~	UJ	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~2.3~~	~~J~~	U	P
7440-62-2	Vanadium	5.7			P
7440-66-6	Zinc	8.9			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5306

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y7

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809160-20

Level: (low/med) LOW Date Received: 09/12/2008

% Solids 95.5

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1250			P
7440-36-0	Antimony	2.3	~~J~~	J ~~N~~	P
7440-38-2	Arsenic	5.0		~~J~~	P
7440-39-3	Barium	20.9 ~~9.2~~	~~J~~	UJ	P
7440-41-7	Beryllium	0.52 ~~0.10~~	~~U~~	U	P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	3820		~~J~~	P
7440-47-3	Chromium	5.6		UJ	P
7440-48-4	Cobalt	5.2 ~~1.1~~	~~J~~	U	P
7440-50-8	Copper	4.2			P
7439-89-6	Iron	5530		J	P
7439-92-1	Lead	66.0		J ~~J~~	P
7439-95-4	Magnesium	690			P
7439-96-5	Manganese	92.3		J ~~J~~	P
7440-02-0	Nickel	4.2 ~~2.3~~	~~J~~	U	P
7440-09-7	Potassium	458	J		P
7782-49-2	Selenium	0.38 ~~3.7~~	~~UJ~~		P
7440-22-4	Silver	1.0	U	J ~~N~~	P
7440-23-5	Sodium	524 ~~74.3~~	~~J~~	U	P
7440-28-0	Thallium	2.6	U		P
7440-31-5	Tin	10.5 ~~4.3~~	~~J~~	U	P
7440-62-2	Vanadium	6.6			P
7440-66-6	Zinc	13.1			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

RECEIVED
SEP 26 2008
HAZ. WASTE SUPPORT SEC.

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB52Y7
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 12, 2008, we received 20 soil samples under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temp was determined to be 5.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/23/2008 @ 1138 hrs. The matrix spike failed for Sb and Ag; a post spike was analyzed at twice the CRQL for Sb and Ag. MB52Y8 and Y9 were over the range for Fe and Pb; the samples were reanalyzed at appropriate dilutions.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809160-01 EPA Sample # MB52Y7

Date & Time 9/23/2008@

Metals: 19746 µg/L * (0.100 L) / (1.00 g) * 100 % / 90 % * 1000 g / 1 kg * 1 mg / 1000 µg = 2190 mg/Kg
(Analyte Al)

Authorized by _____
Daniel Antrim
Document Control Officer

RECEIVED 12
SEP 2 6 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB52Y7

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: $ 1,420.00 **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: ____ ____

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB52Y7	7) MB52Z3	13) MB52Z9	19) MB5305
2) MB52Y8	8) MB52Z4	14) MB5300	20) MB5306
3) MB52Y9	9) MB52Z5	15) MB5301	21)
4) MB52Z0	10) MB52Z6	16) MB5302	22)
5) MB52Z1	11) MB52Z7	17) MB5303	23)
6) MB52Z2	12) MB52Z8	18) MB5304	24) 9-12-08

MB52Y7	MB5306
First Sample in SDG	**Last Sample in SDG**
09/12/2008	09/12/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature **Date** 9-12-08

(61)

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Monday, September 15, 2008 8:02 AM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Non-sampler issues | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. **The Resolution will be applied to all samples received for this Case**.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Saturday, September 13, 2008 2:23 AM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

On September 12, 2008, we received 7 water samples and 70 soil samples in 5 coolers under FedEx master airbill number 8541 0029 6912. Custody seals were present and intact. Cooler temps were determined to be 4.5° C, 5°C, 5.5°C, 6°C, and 6.5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.

Thanks,

Beth Whitehead
Bonner Analytical

62

Inorganic Data Review Narrative

Case# 37836	Site: Raritan Bay Slag	Soil: 52
SDG# MB53A0,MB52W6,MB52Y7	Lab: Bonner Analytical	Water: 0
Sampling Team: W-SAT	Reviewer:.RAXA SHELLEY	Other: 0

A.2.1 Data Validation Flags:

The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:

The CLP laboratory applies a contractual qualifier on all Form I=S and the QC Form when a QC analysis is outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their meanings are as follows:

N: This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E: This qualifier indicates the presence of interference, and is applied when the ICP serial dilution is outside the control limits.

*: This qualifier indicates the lack of precision, and is applied on Form I=S and Form VI when the Lab Duplicate analysis is outside the control limits.

U: This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit (MDL). A non-detected result of an analyte is indicated by the Contract Required Quantitation Limit (CRQL) of that analyte suffixed with "U".

J: This is also a concentration qualifier that laboratory applies to a positive result below the CRQL.

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

A.2.3.1 **Data Case Description:**

This case consists of fifty two (52) soil samples collected at the Raritan Bay Slag site on 9/11/08 for TAL Metals and Tin analysis according to the USEPA CLP SOW No. ILM05.4. Matrix spike, laboratory duplicate and serial dilution analyses were performed on samples MB53A5, MB52W5 and MB5305. Samples MB52Y0, MB5307 and MB52Z4 were collected as field duplicates of samples MB52X7, MB5306 and MB52Z3, respectively.

As per EPA Technical Direction Form (TDF) only the following criteria were reviewed by the data validator: Holding Time, CRQL Standard, Matrix Spike, ICS, Laboratory Duplicate, ICP Serial Dilution, and Percent Solids. The qualifiers applied on Form Is and CADRE EXCEL spreadsheets are based on ESAT data review of the above mentioned criteria and the attached CADRE Reports.

A.2.3.2 **CSF Audit**: No problems.

A.2.3.3 **Technical Review**:

SDG MB53A0

ICB/CCB

The calibration blank values were ≥MDL but ≤CRQL for Ba and Ca (Only analytes that required qualifications were mentioned). The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Ba -> MB53A6, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

Ca -> MB53A1, MB53A4, MB53A7, MB53A8, MB53L8, MB53M0

PREPARATION BLANK

The Preparation blank values were ≥MDL but ≤CRQL for Ca and Sn (Only analytes that required qualifications were mentioned.) The following Sn positive results ≤CRQL were raised to the CRQL and qualified "U". The Ca results were previously qualified due to ICB/CCB criteria; no action was taken.

"U" → Sn -> MB53A0, MB53A2, MB53A4, MB53A8

FIELD BLANK

The Fe (1190 ug/l) and Mn (24.3 ug/l)in field blank MB53L4 results were greater than CRQL indicating sample contamination due to poor decontamination procedures. The following Mn positive results whose raw values in ug/L in the instrument printout between field blank value and 10x field blank value were considered estimated and qualified "J". Field blank belongs to SDG MB53H0.

"J" → Mn -> MB53A1, MB53A2, MB53A4, MB53A5, MB53A7, MB53A8, MB53L9, MB53M0

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% (between 10-74) when sample concentration was less than 4 X spike concentration for Al (%R = 30), Sb (%R = 62), As (%R = 67,) Se (%R = 74). The following detected and non-detected Al, Sb, As and Se results have been considered estimated and qualified "J".

"J" -> Al, Sb, As, Se -> MB53A0, MB53A1, MB53A2, MB53A3, MB53A4, MB53A5, MB53A6, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

LAB DUPLICATE

The RPD between sample and duplicate results was ≥ 35% but less than 120% for Fe when both sample and duplicate results were ≥ 5x CRQL. The associated Fe results ≥ CRQL have been considered estimated and flagged "J".
The absolute difference between sample and duplicate results was > ± 2x CRQL for Cr when the sample and/or duplicate results were <5 X CRQL. The associated Cr results ≥ MDL but < 5x CRQL have been considered estimated and qualified "J".
The absolute difference between sample and duplicate results was > ± 4x CRQL for Ca when the sample and/or duplicate results were <5 X CRQL. The associated Ca results ≥ MDL but < 5x CRQL have been rejected and qualified "R".

"J" -> Fe -> MB53A0, MB53A1, MB53A2, MB53A3, MB53A4, MB53A5, MB53A6, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

Cr -> MB53A1, MB53A4, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

"R" -> Ca -> MB53A1, MB53A2, MB53A4, MB53A5, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

LABORATORY CONROL SAMPLE

The LCS Found values for Ba and Cu were less than the lower control limits. The associated Ba and Cu results have been considered estimated and flagged "J".

"J" -> Ba, Cu -> MB53A0, MB53A1, MB53A2, MB53A3, MB53A4, MB53A5, MB53A6, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 for Ba and Be when the initial concentration was equal to or greater than 50 X MDL. The associated Ba and Be results ≥ MDL have been considered estimated and flagged "J".

"J" -> Ba*, Be -> MB53A0, MB53A1, MB53A2, MB53A3, MB53A4, MB53A5, MB53A6, MB53A7, MB53A8, MB53L8, MB53L9, MB53M0

* already qualified

SDG MB52W6

ICB/CCB

The calibration blank values were ≥MDL but ≤CRQL for Sb, Ba, Be, Cd, Ca, Co, Mg, Ni, Se, Ag, Na and V (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Sb -> MB52X4, MB52X5, MB52X7, MB5307

Ba -> MB52W5, MB52W6, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5310, MB5311, MB5313, MB5314, MB5316, MB5317, MB5318

Be, Cd -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

Ca -> MB52W6, MB52X4, MB52X5, MB52X7, MB52Y0, MB5318

Co -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

Mg -> MB52W6, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5309, MB5310, MB5313, MB5314, MB5315, MB5318

Ni -> MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

Se -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X7, MB52Y0, MB5307, MB5309

Ag -> MB52W5, MB52W6, MB52W8, MB5309, MB5310, MB5311, MB5312, MB5314, MB5315, MB5316, MB5317, MB5318

Na -> MB52W6, MB52W8, MB52W9, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5315, MB5316, MB5318

Sn -> MB52X5, MB52X7, MB52Y0, MB5307, MB5311, MB5313, MB5314, MB5316, MB5317, MB5318

V -> MB52X4

PREPARATION BLANK

The Preparation blank values were ≥MDL but ≤CRQL for Sn (Only analytes that required qualifications were mentioned). The Sn results were previously qualified due to ICB/CCB criteria; no action was taken.

FIELD BLANK

The Fe (1190 ug/l) and Mn (24.3 ug/l)in field blank MB53L4 results were greater than CRQL indicating sample contamination due to poor decontamination procedures. The following Mn positive results whose raw values in ug/L in the instrument printout between field blank value and 10x field blank value were considered estimated and qualified "J". Field blank belongs to SDG MB53H0.

"J" → Mn -> MB5315, MB5316

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% (between 10-74) when sample concentration was less than 4 X spike concentration for Se (%R = 72) and V (%R = 69) and between 126-200% for Mn(%R = 132) and greater than 200% Sb (%R = 466) and As (%R = 439). The following detected and non-detected Se and V results have been considered estimated and qualified "J". The associated Mn results ≥ MDL have been considered estimated and qualified "J". The associated Sb and As results ≥ MDL have been rejected and qualified "R".

"J" -> Se, Mn, V -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

"R" -> Sb, As -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

LAB DUPLICATE

The RPD between sample and duplicate results was ≥ 35% but less than 120% for Al, Cu, Mn and V when both sample and duplicate results were ≥ 5x CRQL. The associated Al, Cu, Mn and V results ≥ CRQL have been considered estimated and flagged "J".
The absolute difference between sample and duplicate results was > ± 2x CRQL for Ca and Sn when the sample and/or duplicate results were <5 X CRQL. The associated Ca, and Sn results ≥ MDL but < 5x CRQL have been considered estimated and qualified "J".

"J" -> Al -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

Cu, Mn*, V* -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

Ca -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5313, MB5314, MB5315, MB5318

Sn -> MB52W6, MB52W8, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

LABORATORY CONROL SAMPLE

The LCS Found value for Ba was less than the lower control limits. The associated Ba results have been considered estimated and flagged "J".

"J" -> Ba -> MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 for Al, Sb, As, Ba, Cd, Co, Fe, Pb, Mg, Na, Sn and Zn when the initial concentration was equal to or greater than 50 X MDL. The associated Al, Sb, As, Ba, Cd, Co, Fe, Pb, Mg, Na, Sn and Zn results ≥ MDL have been considered estimated and flagged "J".

**"J" -> Sb*, As*, Ba*, Cd, Co, Fe, Pb, Mg, Na, Sn*, Zn ->
MB52W5, MB52W6, MB52W8, MB52W9, MB52X1, MB52X4, MB52X5, MB52X7, MB52Y0, MB5307, MB5309, MB5310, MB5311, MB5312, MB5313, MB5314, MB5315, MB5316, MB5317, MB5318**

FIELD DUPLICATE

Sample MB52Y0 was collected as field duplicate of sample MB52X7. The RPD between sample and duplicate results was ≥ 35% but less than 120% for Al, Fe and Pb when both sample and duplicate results were ≥ 5x CRQL. The associated sample and the field duplicate Al, Fe and Pb results ≥ CRQL have been considered estimated and flagged "J". The absolute difference between sample and duplicate results was > ± 2x CRQL for As when the sample and/or duplicate results were <5 X CRQL. The associated As results ≥ MDL but < 5x CRQL have been considered estimated and qualified "J". The absolute difference between sample and duplicate results was > ± 4x CRQL for Cr when the sample and/or duplicate results were <5 X CRQL. The associated Cr results ≥ MDL but < 5x CRQL have been rejected and qualified "R".

"J" -> Al*, As*, Fe*, Pb* -> MB52X7, MB52Y0

"R" -> Cr -> MB52Y0

Sample MB5307 was collected as field duplicate of sample MB5306.
Note: Sample MB5306 is associated with different SDG # MB52Y7.
The RPD between sample and duplicate results was ≥ 35% but less than 120% for Cr, Fe and Mn when both sample and duplicate results were ≥ 5x CRQL. The associated sample and the field duplicate Cr, Fe and Mn results ≥ CRQL have been considered estimated and flagged "J". The absolute difference between sample and duplicate results was > ± 2x CRQL for Ca when the sample and/or duplicate results were <5 X CRQL. The associated Ca results ≥ MDL but < 5x CRQL have been considered estimated and qualified "J".

"J" -> Cr, Fe*, Mn* -> MB5307

Ca -> MB5307

PERCENT SOLIDS OF SEDIMENTS

The percent solids in sample MB5311 is less than 50%. The detected and non-detected analyte results have been considered estimated and flagged "J" and "UJ", respectively (Note: only the sample results that were not previously flagged due to other QC criteria).

*** already qualified**

SDG MB52Y7

ICB/CCB

The calibration blank values were ≥MDL but ≤CRQL for Ba, Be, Cd, Ca, Co, Ni and Na (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Ba -> MB52Z0, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

Be -> MB52Y7, MB52Y8, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z5, MB52Z6, MB52Z7, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

Cd -> MB52Y7, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z7, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304

Ca -> MB52Z0, MB52Z3, MB52Z4, MB52Z5, MB52Z7, MB52Z8, MB52Z9, MB5301, MB5303

Co -> MB52Y7, MB52Y9, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z7, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

Ni -> MB52Z0, MB52Z3, MB52Z4, MB52Z5, MB52Z8, MB52Z9, MB5301, MB5302, MB5304, MB5305, MB5306

Na -> MB52Y8, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z7, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

PREPARATION BLANK

The Preparation blank values were ≥MDL but ≤CRQL for Sn (Only analytes that required qualifications were mentioned). The following Sn positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Sn -> MB52Z3, MB52Z4, MB52Z8, MB52Z9, MB5301, MB5302, MB5305, MB5306

FIELD BLANK

The Fe (1190 ug/l) and Mn (24.3 ug/l)in field blank MB53L4 results were greater than CRQL indicating sample contamination due to poor decontamination procedures. The following Mn positive results whose raw values in ug/L in the instrument printout between field blank value and 10x field blank value were considered estimated and qualified "J". Field blank belongs to SDG MB53H0.

"J" → Mn -> MB52Z0, MB52Z3, MB52Z4, MB52Z5, MB52Z9

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% (between

10-74) when sample concentration was less than 4 X spike concentration for Sb (%R = 68) and Ag (%R = 72). The following detected and non-detected Sb and Ag results have been considered estimated and qualified "J".

"J" -> Sb, Ag -> MB52Y7, MB52Y8, MB52Y9, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z7, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

LAB DUPLICATE

The RPD between sample and duplicate results was ≥ 35% but less than 120% for Pb when both sample and duplicate results were ≥ 5x CRQL. The associated Pb results ≥ CRQL have been considered estimated and flagged "J".

"J" -> Pb -> MB52Y7, MB52Y8, MB52Y9, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z7, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

LABORATORY CONROL SAMPLE

The LCS Found value for Ba was less than the lower control limits. The associated Ba results have been considered estimated and flagged "J".

"J" -> Ba -> MB52Y7, MB52Y8, MB52Y9, MB52Z0, MB52Z1, MB52Z2, MB52Z3, MB52Z4, MB52Z5, MB52Z6, MB52Z7, MB52Z8, MB52Z9, MB5300, MB5301, MB5302, MB5303, MB5304, MB5305, MB5306

FIELD DUPLICATE

Sample MB5307 was collected as field duplicate of sample MB5306.
Note: Sample MB5307 is associated with different SDG # MB52W6.
The RPD between sample and duplicate results was ≥ 35% but less than 120% for Cr, Fe and Mn when both sample and duplicate results were ≥ 5x CRQL. The associated sample and the field duplicate Cr, Fe and Mn results ≥ CRQL have been considered estimated and flagged "J". The absolute difference between sample and duplicate results was > ± 2x CRQL for Ca when the sample and/or duplicate results were <5 X CRQL. The associated Ca results ≥ MDL but < 5x CRQL have been considered estimated and qualified "J".

"J" -> Cr, Fe, Mn -> MB5306, MB5307

"J" -> Ca -> MB5307

A.2.3.4 Contract-Problem/Non-Compliance:

All SDGs:

1. Form Is: Lab code was missing or was incorrect.
2. Form 1s: Some analytes were not qualified "J" although the results were detects with values below CRQL.
3. Form 4s: The Final Found Solution AB results were incorrect, they do not match with the raw data.
4. Form 9s: CRQLs were incorrect for Method Preparation NP1.
5. Form 7s: Almost all Found values were outside the acceptable limits. It appears the provided limits, both lower and higher, were incorrect.
6. Form 6s: Sample and Duplicate results for several analytes are non-dtected. The CRQL was not calculated on dry weight basis. This reviewer has corrected this on Form 6s.

SDG MB52W6, MB52Y7:

1. Form-1s: Several analytes were reported as non-detected (U) on the resubmitted Form-1. Based on a review of the raw data, these analytes values are greater than MDL. So these results should be reported as J values. This reviewer has corrected this error on Form-1.

SDG MB53A0:

1. Form-13: The dilution factor for sample MB53A6 is reported incorrectly as 1.0 (analyzed at 1:47) on the analysis run log. Based on a review of the Form-1 and raw data, sample was re-analyzed for Fe dilution and the correct dilution factor should be 2.0. This data reviewer has corrected this on the analysis run log.

SDG MB52W6:

1. Form 8s: The Serial Dilution analysis results for Al do not match with raw data when multiply by 5 on the Form 8s. Only Al result was not multiplied by 5. Remaining analytes results were multiplied by 5. This reviewer has corrected this error and also recalculated and corrected %D on Form 8s. %D value for Al fell within control limits so this reviewer has crossed "E" qualifier on form 8s. Additionally, the Serial Dilution analysis results for Se reported as non-detected (12.6 U). Based on a raw data the correct value is Se= 12.6 J. This reviewer has corrected this error and also recalculated and corrected %D on Form 8s.
2. Form 13: Samples MB52X7 and MB5313 were missing on Form 13 and the associated raw data was also missing. The lab submitted revised From 13. Based on this revised Form 13, this reviewer has corrected the sample ID on the raw data.

SDG MB52Y7:

1. Form 6s and Form 8s: The Serial Dilution analysis results do not match with raw data when multiply by 5 on the Form 8s. The lab resubmitted Form 8s and the dilution results were very high on this form. The lab was contacted and Form 1s, 6s and 8s were resubmitted. According to the lab, the duplicate and serial dilution were reversed. This reviewer has corrected this sample ID on Form 13 (page No 58 and 60) and on the instrument raw data (page No 105 and 107). After this corrected sample ID the reported values on Form 6s and 8s were matched correctly with the raw data.

Corrected forms were requested by the reviewer and were received from the laboratory.

HWSS Reviewer: HS Signature Date: 11/13/08

Contractor Reviewer: R. J. Shelley Signature Date: 11/13/08

Verified by: C-Stanton Signature Date: 11/13/08

REFERENCE 25

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

ROC #6

TDF# 09-0803-Ext-09-0135

DATE: 10/2/2008
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: Hazardous Waste Support Section (HWSS)/RSCC
TO: HWSS ESAT-TOPO

Attached is the following INORGANIC Data Package to be reviewed for Quality Assurance

SITE: Raritan Bay Slag **CASE #: 37836**

SDG#: MB52Y1, MB53C6, MB53H6, MB53L6 **SAMPLER: W-SAT**

PROJ. CODE: RS SITE SPILL #: A205	**#SAMPLES**	**MATRIX**
LAB: BONNER OPERABLE UNIT: 00	**31**	**Soil**
TURN-AROUND-TIME: 14 day	**20**	**Water**
CERCLIS ID # : NJN000206276	**FRACTION: Metals (MA #1630.0)**	

Contaminant(s) of Concern (If known)

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	**Date/Time**	**Signature**	**Date/Time**
[illegible]	10/10/08 1[illegible]	[illegible]	10/10/08 1[illegible]
[illegible]	10/13/08	R. J. Shelley	10/13/08.
R. J. Shelley	10/[illegible]/08.	[illegible]	10/30/08
[illegible]	10/30/08 10 07am	[illegible]	[illegible]
[illegible]	10/30/08 10	Hanif Sheikh	10/30/08 10:14 AM
Hanif Sheikh	10/30/08 2:12 PM	[illegible]	10/30/08 2:[illegible]
[illegible]		[illegible]	
Hanif Sheikh	10/30/08 ~~3:54~~ 3:55pm	R. J. Shelley	10/30/08 3:[illegible]
R. J. Shelley	10/30/08 4:30pm	Hanif Sheikh	10/30/08 4:30P.

(1)

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-01

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 90.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3090			P
7440-36-0	Antimony	815			P
7440-38-2	Arsenic	1520		J D*	P
7440-39-3	Barium	265			P
7440-41-7	Beryllium	~~0.31~~	~~J~~	J	P
7440-43-9	Cadmium	14.9		R N	P
7440-70-2	Calcium	2620		*	P
7440-47-3	Chromium	30.8		*	P
7440-48-4	Cobalt	17.8		*	P
7440-50-8	Copper	2820		*	P
7439-89-6	Iron	117000		J D*	P
7439-92-1	Lead	54800		D*	P
7439-95-4	Magnesium	1760		*	P
7439-96-5	Manganese	438		J N	P
7440-02-0	Nickel	98.8		J *	P
7440-09-7	Potassium	347	J		P
7782-49-2	Selenium	~~2.6~~	~~J~~	UJ N	P
7440-22-4	Silver	1.3		J * N	P
7440-23-5	Sodium	1410			P
7440-28-0	Thallium	2.8	U	* N	P
7440-31-5	Tin	824			P
7440-62-2	Vanadium	25.1			P
7440-66-6	Zinc	1260		J *	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-02

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 87.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7010			P
7440-36-0	Antimony	6.8 ~~0.67~~	~~J~~	U	P
7440-38-2	Arsenic	15.4		J	P
7440-39-3	Barium	67.1			P
7440-41-7	Beryllium	0.37 ~~0.31~~	~~J~~	U	P
7440-43-9	Cadmium	3.5		R ~~N~~	P
7440-70-2	Calcium	3350		~~N~~	P
7440-47-3	Chromium	14.0			P
7440-48-4	Cobalt	5.7 ~~5.6~~	~~J~~	U	P
7440-50-8	Copper	76.6			P
7439-89-6	Iron	19000		J	P
7439-92-1	Lead	731			P
7439-95-4	Magnesium	2530			P
7439-96-5	Manganese	354		J ~~N~~	P
7440-02-0	Nickel	14.0		J	P
7440-09-7	Potassium	1010			P
7782-49-2	Selenium	4.0 ~~0.99~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	0.41	~~J~~	J ~~N~~	P
7440-23-5	Sodium	1370			P
7440-28-0	Thallium	2.8	U	J ~~N~~	P
7440-31-5	Tin	11.4 ~~5.1~~	~~J~~	U	P
7440-62-2	Vanadium	22.2			P
7440-66-6	Zinc	664		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB52Y3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-03

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 88.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6410			P
7440-36-0	Antimony	6.8 ~~0.35~~	~~J~~	U	P
7440-38-2	Arsenic	7.5		J ~~*~~	P
7440-39-3	Barium	61.9			P
7440-41-7	Beryllium	0.57 ~~0.33~~	~~J~~	U	P
7440-43-9	Cadmium	0.88		R ~~N~~	P
7440-70-2	Calcium	2370		~~*~~	P
7440-47-3	Chromium	13.1		~~*~~	P
7440-48-4	Cobalt	5.7 ~~5.1~~	~~J~~	U ~~*~~	P
7440-50-8	Copper	34.4		~~*~~	P
7439-89-6	Iron	14300		J ~~*~~	P
7439-92-1	Lead	172		~~*~~	P
7439-95-4	Magnesium	2210		~~*~~	P
7439-96-5	Manganese	225		J ~~N~~	P
7440-02-0	Nickel	11.4		J ~~*~~	P
7440-09-7	Potassium	887			P
7782-49-2	Selenium	4.0 ~~0.75~~	~~J~~	UJ ~~N~~	P
7440-22-4	Silver	0.27	~~J~~	J ~~N~~	P
7440-23-5	Sodium	1100			P
7440-28-0	Thallium	2.8	U	J ~~N~~	P
7440-31-5	Tin	1.4 ~~1.2~~	~~J~~	U ~~*~~	P
7440-62-2	Vanadium	20.1			P
7440-66-6	Zinc	232		J ~~*~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5341

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-16

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 74.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1500			P
7440-36-0	Antimony	67.5			P
7440-38-2	Arsenic	103		J	P
7440-39-3	Barium	75.0			P
7440-41-7	Beryllium	0.67 ~~0.12~~	~~J~~	U	P
7440-43-9	Cadmium	0.67 ~~0.47~~	~~J~~	J N R	P
7440-70-2	Calcium	1290		N	P
7440-47-3	Chromium	11.4		N	P
7440-48-4	Cobalt	6.7 ~~1.9~~	~~J~~	U N	P
7440-50-8	Copper	183		N	P
7439-89-6	Iron	15700		J N	P
7439-92-1	Lead	2390		N	P
7439-95-4	Magnesium	975		N	P
7439-96-5	Manganese	130		J N	P
7440-02-0	Nickel	9.9		J N	P
7440-09-7	Potassium	306	J		P
7782-49-2	Selenium	0.85	~~J~~	J N	P
7440-22-4	Silver	0.26	~~J~~	J ~~*~~ N	P
7440-23-5	Sodium	2530			P
7440-28-0	Thallium	3.4	U	J N	P
7440-31-5	Tin	47.3			P
7440-62-2	Vanadium	16.5			P
7440-66-6	Zinc	113		J N	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5342

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-17

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 75.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5340			P
7440-36-0	Antimony	419			P
7440-38-2	Arsenic	228		J *	P
7440-39-3	Barium	79.0			P
7440-41-7	Beryllium	0.67	U		P
7440-43-9	Cadmium	1.2		R N	P
7440-70-2	Calcium	3280		✓	P
7440-47-3	Chromium	20.3		✓	P
7440-48-4	Cobalt	8.2		✓	P
7440-50-8	Copper	489		✓	P
7439-89-6	Iron	32200		J ✓	P
7439-92-1	Lead	21500		D *	P
7439-95-4	Magnesium	4550		✓	P
7439-96-5	Manganese	332		J N	P
7440-02-0	Nickel	21.8		J ✓	P
7440-09-7	Potassium	855			P
7782-49-2	Selenium	1.8	J	J N	P
7440-22-4	Silver	0.63	J	J * N	P
7440-23-5	Sodium	2410			P
7440-28-0	Thallium	3.3	U	J N	P
7440-31-5	Tin	207			P
7440-62-2	Vanadium	36.2			P
7440-66-6	Zinc	266		J ✓	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB5344

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-18

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 80.7

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3830			P
7440-36-0	Antimony	616			P
7440-38-2	Arsenic	198		J	P
7440-39-3	Barium	573			P
7440-41-7	Beryllium	0.62 ~~0.25~~	~~J~~	U	P
7440-43-9	Cadmium	1.2		R ~~N~~	P
7440-70-2	Calcium	4640			P
7440-47-3	Chromium	30.2			P
7440-48-4	Cobalt	6.2 ~~4.0~~	~~J~~	U	P
7440-50-8	Copper	340			P
7439-89-6	Iron	49200		J	P
7439-92-1	Lead	14200		D	P
7439-95-4	Magnesium	1360			P
7439-96-5	Manganese	896		J ~~N~~	P
7440-02-0	Nickel	21.9		J	P
7440-09-7	Potassium	866			P
7782-49-2	Selenium	1.5	~~J~~	J ~~N~~	P
7440-22-4	Silver	0.65	J	J ~~N~~	P
7440-23-5	Sodium	1510			P
7440-28-0	Thallium	3.1	U	J N	P
7440-31-5	Tin	335			P
7440-62-2	Vanadium	37.2			P
7440-66-6	Zinc	1670		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-07

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 10.4

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4720		J	P
7440-36-0	Antimony	21.1	~~J~~	UJ	P
7440-38-2	Arsenic	41.8		J *	P
7440-39-3	Barium	22.0	~~J~~	J	P
7440-41-7	Beryllium	4.8 ~~0.45~~	~~J~~	J	P
7440-43-9	Cadmium	4.8 ~~0.92~~	~~J~~	UJ N R	P
7440-70-2	Calcium	7460		J *	P
7440-47-3	Chromium	25.7		J *	P
7440-48-4	Cobalt	48.1 ~~7.5~~	~~J~~	UJ *	P
7440-50-8	Copper	178		J *	P
7439-89-6	Iron	26300		J *	P
7439-92-1	Lead	1770		J *	P
7439-95-4	Magnesium	10500		J *	P
7439-96-5	Manganese	355		J N	P
7440-02-0	Nickel	16.6	~~J~~	J *	P
7440-09-7	Potassium	3870	~~J~~	J	P
7782-49-2	Selenium	33.6 ~~5.1~~	~~J~~	UJ N	P
7440-22-4	Silver	2.7	~~J~~	J ~~* N~~	P
7440-23-5	Sodium	60000		J	P
7440-28-0	Thallium	24.0	U	J N	P
7440-31-5	Tin	16.1 ~~35.3~~	~~J~~	UJ	P
7440-62-2	Vanadium	53.2		J	P
7440-66-6	Zinc	215		J *	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-08

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 52.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5800			P
7440-36-0	Antimony	33.6			P
7440-38-2	Arsenic	44.7		J*	P
7440-39-3	Barium	32.3	J		P
7440-41-7	Beryllium	0.16 ~~0.43~~	~~J~~	U	P
7440-43-9	Cadmium	1.3		R N*	P
7440-70-2	Calcium	2720		*	P
7440-47-3	Chromium	28.0		*	P
7440-48-4	Cobalt	9.6 ~~5.8~~	~~J~~	U *	P
7440-50-8	Copper	138		*	P
7439-89-6	Iron	22000		J *	P
7439-92-1	Lead	2150		*	P
7439-95-4	Magnesium	2880		*	P
7439-96-5	Manganese	138		J N*	P
7440-02-0	Nickel	19.4		J *	P
7440-09-7	Potassium	1300			P
7782-49-2	Selenium	6.7 ~~1.7~~	~~J~~	UJ N*	P
7440-22-4	Silver	1.2	~~J~~	J *N*	P
7440-23-5	Sodium	5650			P
7440-28-0	Thallium	4.8	U	J N*	P
7440-31-5	Tin	63.0			P
7440-62-2	Vanadium	32.5			P
7440-66-6	Zinc	218		J *	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-09

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 60.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3230			P
7440-36-0	Antimony	9.4	J		P
7440-38-2	Arsenic	16.2		J	P
7440-39-3	Barium	16.7	J		P
7440-41-7	Beryllium	0.83 ~~0.27~~	~~J~~	U	P
7440-43-9	Cadmium	0.85 ~~0.37~~	~~J~~	UJ N R	P
7440-70-2	Calcium	1640			P
7440-47-3	Chromium	15.7			P
7440-48-4	Cobalt	8.3 ~~2.7~~	~~J~~	U	P
7440-50-8	Copper	53.0			P
7439-89-6	Iron	12400		J	P
7439-92-1	Lead	542			P
7439-95-4	Magnesium	1720			P
7439-96-5	Manganese	70.9		J N	P
7440-02-0	Nickel	6.4	J		P
7440-09-7	Potassium	827	J		P
7782-49-2	Selenium	5.3 ~~0.93~~	~~J~~	UJ N	P
7440-22-4	Silver	0.39	~~J~~	J N	P
7440-23-5	Sodium	4450			P
7440-28-0	Thallium	4.2	U	J N	P
7440-31-5	Tin	16.6 ~~16.3~~	~~J~~	U	P
7440-62-2	Vanadium	19.8			P
7440-66-6	Zinc	94.5		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-10

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 46.9

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5960		J	P
7440-36-0	Antimony	2.7	J	UJ	P
7440-38-2	Arsenic	12.6		J +	P
7440-39-3	Barium	24.2	J	UJ	P
7440-41-7	Beryllium	1.1 ~~0.39~~	J	UJ	P
7440-43-9	Cadmium	1.1 ~~0.45~~	J	U N R	P
7440-70-2	Calcium	3460		J +	P
7440-47-3	Chromium	25.5		J N	P
7440-48-4	Cobalt	10.7 ~~4.9~~	J	UJ +	P
7440-50-8	Copper	60.8		J +	P
7439-89-6	Iron	17200		J +	P
7439-92-1	Lead	251		J +	P
7439-95-4	Magnesium	3040		J +	P
7439-96-5	Manganese	126		J N	P
7440-02-0	Nickel	10.9		J +	P
7440-09-7	Potassium	1440		J	P
7782-49-2	Selenium	7.5 ~~1.8~~	J	UJ N	P
7440-22-4	Silver	0.74	J	UJ N	P
7440-23-5	Sodium	7970		J	P
7440-28-0	Thallium	5.3	U	U N	P
7440-31-5	Tin	21.3 ~~11.8~~	J	UJ	P
7440-62-2	Vanadium	28.0		J	P
7440-66-6	Zinc	138		J +	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-11

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 57.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3070			P
7440-36-0	Antimony	2.7	J		P
7440-38-2	Arsenic	7.5		J	P
7440-39-3	Barium	13.7	J		P
7440-41-7	Beryllium	0.88 ~~0.26~~	~~J~~	U	P
7440-43-9	Cadmium	0.88 ~~0.27~~	~~J~~	U N R	P
7440-70-2	Calcium	22800			P
7440-47-3	Chromium	14.1			P
7440-48-4	Cobalt	8.8 ~~2.3~~	~~J~~	U	P
7440-50-8	Copper	34.4			P
7439-89-6	Iron	10400		J	P
7439-92-1	Lead	197			P
7439-95-4	Magnesium	1640			P
7439-96-5	Manganese	59.3		J N	P
7440-02-0	Nickel	5.3	J		P
7440-09-7	Potassium	815	J		P
7782-49-2	Selenium	5.1 ~~1.3~~	~~J~~	UJ N	P
7440-22-4	Silver	0.50	~~J~~	U ~~N~~	P
7440-23-5	Sodium	5610			P
7440-28-0	Thallium	4.4	U	J N	P
7440-31-5	Tin	17.5 ~~7.0~~	~~J~~	U	P
7440-62-2	Vanadium	17.9			P
7440-66-6	Zinc	97.2		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-12

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 60.5

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2850			P
7440-36-0	Antimony	0.90	J		P
7440-38-2	Arsenic	4.2		J	P
7440-39-3	Barium	10.1	J		P
7440-41-7	Beryllium	0.33 ~~0.22~~	~~J~~	U	P
7440-43-9	Cadmium	0.83 ~~0.23~~	~~J~~	~~U~~ R	P
7440-70-2	Calcium	949			P
7440-47-3	Chromium	13.3			P
7440-48-4	Cobalt	8.3 ~~2.3~~	~~J~~	U	P
7440-50-8	Copper	30.7			P
7439-89-6	Iron	9220		J	P
7439-92-1	Lead	90.1			P
7439-95-4	Magnesium	1340			P
7439-96-5	Manganese	47.5		J	P
7440-02-0	Nickel	4.7	J		P
7440-09-7	Potassium	692	J		P
7782-49-2	Selenium	0.83	~~J~~	J	P
7440-22-4	Silver	0.38	~~J~~	J	P
7440-23-5	Sodium	3870			P
7440-28-0	Thallium	4.1	U	J	P
7440-31-5	Tin	16.5 ~~4.6~~	~~J~~	U	P
7440-62-2	Vanadium	16.8			P
7440-66-6	Zinc	75.0		J	P

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-13

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 64.1

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2740			P
7440-36-0	Antimony	1.1	J		P
7440-38-2	Arsenic	4.1		J	P
7440-39-3	Barium	8.9	J		P
7440-41-7	Beryllium	0.78 ~~0.20~~	~~J~~	U	P
7440-43-9	Cadmium	0.78 ~~0.22~~	~~J~~	U N R	P
7440-70-2	Calcium	1080			P
7440-47-3	Chromium	13.0			P
7440-48-4	Cobalt	7.8 ~~2.1~~	~~J~~	U	P
7440-50-8	Copper	28.4			P
7439-89-6	Iron	9430		J	P
7439-92-1	Lead	80.1			P
7439-95-4	Magnesium	1290			P
7439-96-5	Manganese	46.6		J N	P
7440-02-0	Nickel	4.5	J		P
7440-09-7	Potassium	665	J		P
7782-49-2	Selenium	0.73	~~J~~	J N	P
7440-22-4	Silver	0.34	~~J~~	J ~~N~~	P
7440-23-5	Sodium	3770			P
7440-28-0	Thallium	3.9	U	J N	P
7440-31-5	Tin	15.6 ~~4.5~~	~~J~~	U	P
7440-62-2	Vanadium	17.8			P
7440-66-6	Zinc	70.3		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-14

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 73.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2650			P
7440-36-0	Antimony	0.77	J		P
7440-38-2	Arsenic	5.1		J ~~X~~	P
7440-39-3	Barium	5.9	J		P
7440-41-7	Beryllium	0.68 ~~0.42~~	~~J~~	U	P
7440-43-9	Cadmium	0.68 ~~0.099~~	~~J~~	~~U~~ ~~N~~ R	P
7440-70-2	Calcium	2620		~~X~~	P
7440-47-3	Chromium	12.2		~~X~~	P
7440-48-4	Cobalt	6.8 ~~1.5~~	~~J~~	U ~~X~~	P
7440-50-8	Copper	18.0		~~X~~	P
7439-89-6	Iron	17600		J ~~X~~	P
7439-92-1	Lead	36.3		~~X~~	P
7439-95-4	Magnesium	1090		~~X~~	P
7439-96-5	Manganese	31.4		J ~~N~~	P
7440-02-0	Nickel	3.1	J	~~X~~	P
7440-09-7	Potassium	466	J		P
7782-49-2	Selenium	0.79	~~J~~	J ~~N~~	P
7440-22-4	Silver	0.20	~~J~~	~~J~~ ~~N~~	P
7440-23-5	Sodium	2950			P
7440-28-0	Thallium	3.4	U	J ~~N~~	P
7440-31-5	Tin	13.5 ~~2.8~~	~~J~~	U	P
7440-62-2	Vanadium	28.5			P
7440-66-6	Zinc	54.8		J ~~X~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53D7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-15

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 73.0

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2970			P
7440-36-0	Antimony	0.92	J		P
7440-38-2	Arsenic	7.7		J *	P
7440-39-3	Barium	5.8	J		P
7440-41-7	Beryllium	0.63 ~~0.45~~	~~J~~	U	P
7440-43-9	Cadmium	0.68 ~~0.33~~	~~J~~	U N R	P
7440-70-2	Calcium	1750		*	P
7440-47-3	Chromium	23.9		*	P
7440-48-4	Cobalt	6.8 ~~3.1~~	~~J~~	U *	P
7440-50-8	Copper	20.5		*	P
7439-89-6	Iron	24700		J *	P
7439-92-1	Lead	29.6		*	P
7439-95-4	Magnesium	1030		*	P
7439-96-5	Manganese	49.6		J ~~N~~	P
7440-02-0	Nickel	6.2		J *	P
7440-09-7	Potassium	557	J		P
7782-49-2	Selenium	0.92	~~J~~	J N	P
7440-22-4	Silver	0.32	~~J~~	J ~~N~~	P
7440-23-5	Sodium	3030			P
7440-28-0	Thallium	3.4	U	J N	P
7440-31-5	Tin	13.7 ~~2.8~~	~~J~~	U	P
7440-62-2	Vanadium	36.5			P
7440-66-6	Zinc	89.0		J *	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-04

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 91.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8430			P
7440-36-0	Antimony	1870		~~B~~	P
7440-38-2	Arsenic	1150		J ~~D~~	P
7440-39-3	Barium	970			P
7440-41-7	Beryllium	0.55 ~~0.024~~	~~J~~	U	P
7440-43-9	Cadmium	4.7		R ~~N~~	P
7440-70-2	Calcium	7180		~~*~~	P
7440-47-3	Chromium	50.6		~~*~~	P
7440-48-4	Cobalt	6.9		~~*~~	P
7440-50-8	Copper	1570		~~*~~	P
7439-89-6	Iron	118000		J ~~D~~	P
7439-92-1	Lead	65600		~~D~~	P
7439-95-4	Magnesium	1510		~~*~~	P
7439-96-5	Manganese	870		J ~~N~~	P
7440-02-0	Nickel	54.9		J ~~*~~	P
7440-09-7	Potassium	938			P
7782-49-2	Selenium	3.8 ~~2.8~~	~~U~~	UJ ~~N~~	P
7440-22-4	Silver	4.5		J ~~*N~~	P
7440-23-5	Sodium	4050			P
7440-28-0	Thallium	2.7	U	J ~~N~~	P
7440-31-5	Tin	1900		~~D~~	P
7440-62-2	Vanadium	64.1			P
7440-66-6	Zinc	834		J ~~*~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-05

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 97.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3920			P
7440-36-0	Antimony	23.5			P
7440-38-2	Arsenic	30.6		J ~~N~~	P
7440-39-3	Barium	35.9			P
7440-41-7	Beryllium	0.54			P
7440-43-9	Cadmium	0.53		R ~~N~~	P
7440-70-2	Calcium	7910		~~*~~	P
7440-47-3	Chromium	71.7		~~*~~	P
7440-48-4	Cobalt	5.1 ~~2.8~~	~~J~~	U ~~*~~	P
7440-50-8	Copper	315		~~*~~	P
7439-89-6	Iron	32600		J ~~*~~	P
7439-92-1	Lead	969		~~*~~	P
7439-95-4	Magnesium	1240		~~*~~	P
7439-96-5	Manganese	126		J ~~N~~	P
7440-02-0	Nickel	8.6		J ~~*~~	P
7440-09-7	Potassium	357	J		P
7782-49-2	Selenium	3.6 ~~0.48~~	~~J~~	U ~~N~~	P
7440-22-4	Silver	0.17	~~J~~	U ~~N~~	P
7440-23-5	Sodium	172	J		P
7440-28-0	Thallium	2.6	U	J ~~N~~	P
7440-31-5	Tin	20.2			P
7440-62-2	Vanadium	67.2			P
7440-66-6	Zinc	115		J ~~*~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-06

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 96.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2600			P
7440-36-0	Antimony	10.7			P
7440-38-2	Arsenic	19.3		J	P
7440-39-3	Barium	54.2			P
7440-41-7	Beryllium	0.52 ~~0.41~~	~~J~~	U	P
7440-43-9	Cadmium	0.52 ~~0.10~~	~~J~~	U N R	P
7440-70-2	Calcium	3330			P
7440-47-3	Chromium	38.9			P
7440-48-4	Cobalt	5.2 ~~2.9~~	~~J~~	U	P
7440-50-8	Copper	175			P
7439-89-6	Iron	33100		J	P
7439-92-1	Lead	231			P
7439-95-4	Magnesium	1040			P
7439-96-5	Manganese	138		J N	P
7440-02-0	Nickel	5.3		J	P
7440-09-7	Potassium	231	J		P
7782-49-2	Selenium	3.6 ~~0.72~~	~~J~~	UJ N	P
7440-22-4	Silver	0.19	~~J~~	J ~~N~~	P
7440-23-5	Sodium	96.4	J		P
7440-28-0	Thallium	2.6	U	J N	P
7440-31-5	Tin	10.7			P
7440-62-2	Vanadium	43.9			P
7440-66-6	Zinc	103		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-19

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 93.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5070			P
7440-36-0	Antimony	1910		D	P
7440-38-2	Arsenic	797		J	P
7440-39-3	Barium	671			P
7440-41-7	Beryllium	0.54 ~~0.16~~	J	U	P
7440-43-9	Cadmium	54.0		R N	P
7440-70-2	Calcium	4960			P
7440-47-3	Chromium	29.6			P
7440-48-4	Cobalt	14.4			P
7440-50-8	Copper	1850			P
7439-89-6	Iron	57900		J D	P
7439-92-1	Lead	198000		D	P
7439-95-4	Magnesium	1820			P
7439-96-5	Manganese	695		J N	P
7440-02-0	Nickel	174		J	P
7440-09-7	Potassium	502	J		P
7782-49-2	Selenium	4.5		J N	P
7440-22-4	Silver	3.8		J N	P
7440-23-5	Sodium	1940			P
7440-28-0	Thallium	1.7	J	J N	P
7440-31-5	Tin	1310		D	P
7440-62-2	Vanadium	26.8			P
7440-66-6	Zinc	1490		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB52Y1

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809210-20

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 95.0

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13400			P
7440-36-0	Antimony	3120			P
7440-38-2	Arsenic	2470		J D	P
7440-39-3	Barium	961			P
7440-41-7	Beryllium	0.53 ~~0.52~~	J	U	P
7440-43-9	Cadmium	38.3		R ~~N~~	P
7440-70-2	Calcium	10800		~~*~~	P
7440-47-3	Chromium	38.6		~~*~~	P
7440-48-4	Cobalt	24.1		~~*~~	P
7440-50-8	Copper	4630		~~*~~	P
7439-89-6	Iron	183000		J ~~D~~	P
7439-92-1	Lead	83800		~~D~~	P
7439-95-4	Magnesium	1900		~~*~~	P
7439-96-5	Manganese	1420		J ~~N~~	P
7440-02-0	Nickel	268		J ~~*~~	P
7440-09-7	Potassium	1440			P
7782-49-2	Selenium	0.50	J	J ~~N~~	P
7440-22-4	Silver	3.3		J ~~N~~	P
7440-23-5	Sodium	6220			P
7440-28-0	Thallium	2.6	U	J ~~N~~	P
7440-31-5	Tin	3580		~~D~~	P
7440-62-2	Vanadium	62.5			P
7440-66-6	Zinc	2700		~~*~~	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

RECEIVED
SEP 30 2008
HAZ. WASTE SUPPORT SEC.

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB52Y1
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 16, 2008, we received 20 soil samples in 3 coolers under FedEx master airbill number 8541 0029 6522. Custody seals were present and intact. Cooler temps were determined to be 5°C, 5.5°C, and 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were included in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

2. There are no samples designated for laboratory QC on the TR/COC for SDGs MB52Y1 and MB5341. The laboratory would like to perform laboratory QC on sample MB52Y1 for both SDGs.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

Metals
The analytical run began 9/26/2008 @ 0335 hrs. MB52Y1, Y1D and Y1S were over the range for As, Fe and Pb; N1 was over the linear range for As, Sb, Fe, Pb and Sn; 42 and 44 were over the linear range for Pb; N4 was over the linear range for Sb, Fe, Sn and Pb; N5 was over the range for As, Fe and Pb—the samples were reanalyzed at appropriate dilutions. The matrix spike failed for Tl, Ag, Cd, Mn and Se; a post spike was analyzed at twice the CRQL for Tl and Se and at twice the indigenous level for Ag, Cd and Mn. There were QC failures on the first run; associated samples were reanalyzed.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809210-01 EPA Sample # MB52Y1

Date & Time 9/26/2008@0427

Metals: 28025 µg/L * (0.100 L) / (1.00 g) * 100 % / 90.7% * 1000 g / 1 kg * 1 mg / 1000 µg = 3090 mg/Kg
(Analyte Al)

Authorized by: _____
Daniel Antrim
Document Control Officer

RECEIVED
SEP 30 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB52Y1

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Numbers in SDG (Listed in Numerical Order)

1) MB52Y1	7) MB53C9	13) MB53D5	19) MB53N4
2) MB52Y2	8) MB53D0	14) MB53D6	20) MB53N5
3) MB52Y3	9) MB53D1	15) MB53D7	21)
4) MB5341	10) MB53D2	16) MB53N1	22)
5) MB5342	11) MB53D3	17) MB53N2	23)
6) MB5344	12) MB53D4	18) MB53N3	24)

MB52Y1
First Sample in SDG

MB53N5
Last Sample in SDG

09/16/2008
First Sample Receipt Date

09/16/2008
Last Sample Receipt Date

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-16-08
Date

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 1:12 PM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDGs MB52Y1 and MB5341. The laboratory would like to perform laboratory QC on sample MB52Y1 for both SDGs.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Tuesday, September 16, 2008 2:18 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | case 37836 | Sample Receipt

Kristin:

Today we received 20 soil samples and 19 water samples in 3 coolers under FedEx master airbill number 8541 0029 6522. Custody seals were present and intact. Cooler temps were determined to be 5°C, 5.5°C, and 6°C. Samples were received in good condition except for the following discrepancies:

1. No QC was listed on the TR/COC for SDGs MB52Y1 and MB5341. We would like to use MB52Y1 as QC for both. Please advise if this is acceptable.

2. No sample tags were included in this shipment. Please advise.

(25)

Thanks,

Beth Whitehead
Bonner Analytical

(26)

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-01

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 41.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6410		J N	P
7440-36-0	Antimony	44.2		J	P
7440-38-2	Arsenic	36.2		J N	P
7440-39-3	Barium	38.4	J	J	P
7440-41-7	Beryllium	0.36	J	J	P
7440-43-9	Cadmium	1.8		J	P
7440-70-2	Calcium	5000		J	P
7440-47-3	Chromium	26.6		J *	P
7440-48-4	Cobalt	5.7	J	J	P
7440-50-8	Copper	151		J	P
7439-89-6	Iron	22800		J	P
7439-92-1	Lead	2910		R N	P
7439-95-4	Magnesium	3830		J	P
7439-96-5	Manganese	147		J	P
7440-02-0	Nickel	18.3		J	P
7440-09-7	Potassium	1640		J	P
7782-49-2	Selenium	2.0	J	J	P
7440-22-4	Silver	0.71	J	J N	P
7440-23-5	Sodium	11200		J	P
7440-28-0	Thallium	6.1	U	J	P
7440-31-5	Tin	89.3		J	P
7440-62-2	Vanadium	28.4		J	P
7440-66-6	Zinc	205		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-02

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 28.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000		J * N	P
7440-36-0	Antimony	53.7		J	P
7440-38-2	Arsenic	62.9		J N	P
7440-39-3	Barium	53.8	J	J	P
7440-41-7	Beryllium	0.54	J	J	P
7440-43-9	Cadmium	2.8		J	P
7440-70-2	Calcium	14700		J	P
7440-47-3	Chromium	43.5		J *	P
7440-48-4	Cobalt	8.7	J	J	P
7440-50-8	Copper	204		J	P
7439-89-6	Iron	32300		J	P
7439-92-1	Lead	4130		R * N	P
7439-95-4	Magnesium	6270		J	P
7439-96-5	Manganese	250		J	P
7440-02-0	Nickel	28.5		R	P
7440-09-7	Potassium	2600		J	P
7782-49-2	Selenium	2.4	J	J	P
7440-22-4	Silver	1.2	J	J N	P
7440-23-5	Sodium	17900		J	P
7440-28-0	Thallium	8.7	U	J	P
7440-31-5	Tin	127		J	P
7440-62-2	Vanadium	43.5		J	P
7440-66-6	Zinc	268		J	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53C8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-03

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 65.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2100		J *N	P
7440-36-0	Antimony	0.86	J		P
7440-38-2	Arsenic	3.4		J N	P
7440-39-3	Barium	6.4	J	J	P
7440-41-7	Beryllium	0.17	J		P
7440-43-9	Cadmium	0.049	J		P
7440-70-2	Calcium	4140			P
7440-47-3	Chromium	9.2		R	P
7440-48-4	Cobalt	1.8	J		P
7440-50-8	Copper	11.0		J	P
7439-89-6	Iron	7270			P
7439-92-1	Lead	21.2		R *N	P
7439-95-4	Magnesium	1320			P
7439-96-5	Manganese	50.5			P
7440-02-0	Nickel	6.1 ~~3.1~~	J	U	P
7440-09-7	Potassium	968			P
7782-49-2	Selenium	0.69	J		P
7440-22-4	Silver	1.5	U	N	P
7440-23-5	Sodium	4110			P
7440-28-0	Thallium	3.8	U		P
7440-31-5	Tin	15.3 ~~2.8~~	J	U	P
7440-62-2	Vanadium	11.7			P
7440-66-6	Zinc	33.3		R	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-04

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 76.3

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	357		J ~~N~~	P
7440-36-0	Antimony	7.9	U		P
7440-38-2	Arsenic	1.3 ~~1.0~~	~~J~~	UJ ~~N~~	P
7440-39-3	Barium	1.9	~~J~~	J	P
7440-41-7	Beryllium	0.66	U		P
7440-43-9	Cadmium	0.023	J		P
7440-70-2	Calcium	224	J		P
7440-47-3	Chromium	1.7		R ~~N~~	P
7440-48-4	Cobalt	0.35	J		P
7440-50-8	Copper	1.4	~~J~~	J	P
7439-89-6	Iron	1650		J	P
7439-92-1	Lead	4.9		R ~~N~~	P
7439-95-4	Magnesium	335	J		P
7439-96-5	Manganese	7.6		J	P
7440-02-0	Nickel	5.2 ~~0.50~~	~~J~~	J	P
7440-09-7	Potassium	162	J		P
7782-49-2	Selenium	4.6	U		P
7440-22-4	Silver	1.3	U	~~N~~	P
7440-23-5	Sodium	2090			P
7440-28-0	Thallium	3.3	U		P
7440-31-5	Tin	13.1 ~~1.6~~	~~J~~	U	P
7440-62-2	Vanadium	6.5 ~~4.6~~	~~J~~	U	P
7440-66-6	Zinc	9.1		R	P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-05

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 73.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	496		J * N	P
7440-36-0	Antimony	8.2	U		P
7440-38-2	Arsenic	2.0		J N	P
7440-39-3	Barium	1.4	~~J~~	J	P
7440-41-7	Beryllium	0.070	J		P
7440-43-9	Cadmium	0.014	J		P
7440-70-2	Calcium	997			P
7440-47-3	Chromium	4.5		R	P
7440-48-4	Cobalt	0.27	J		P
7440-50-8	Copper	1.8	~~J~~	J	P
7439-89-6	Iron	5650			P
7439-92-1	Lead	3.2		R * N	P
7439-95-4	Magnesium	535	J		P
7439-96-5	Manganese	16.5		J	P
7440-02-0	Nickel	5.4 ~~0.28~~	~~J~~	U	P
7440-09-7	Potassium	202	J		P
7782-49-2	Selenium	0.57	J		P
7440-22-4	Silver	1.4	U	N	P
7440-23-5	Sodium	3520			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	13.6 ~~1.4~~	~~J~~	U	P
7440-62-2	Vanadium	11.2			P
7440-66-6	Zinc	10.8		R	P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-06

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 73.6

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	487		J * N	P
7440-36-0	Antimony	8.2	U		P
7440-38-2	Arsenic	1.4 ~~1.0~~	~~J~~	UJ ~~N~~	P
7440-39-3	Barium	3.2	~~J~~	J	P
7440-41-7	Beryllium	0.68	U		P
7440-43-9	Cadmium	0.058	J		P
7440-70-2	Calcium	722			P
7440-47-3	Chromium	2.7		R *	P
7440-48-4	Cobalt	0.28	J		P
7440-50-8	Copper	2.3	~~J~~	J	P
7439-89-6	Iron	2250		J	P
7439-92-1	Lead	7.7		R ~~* N~~	P
7439-95-4	Magnesium	401	J		P
7439-96-5	Manganese	12.1		J	P
7440-02-0	Nickel	5.4 ~~0.59~~	~~J~~	U	P
7440-09-7	Potassium	222	J		P
7782-49-2	Selenium	4.8	U		P
7440-22-4	Silver	1.4	U	~~N~~	P
7440-23-5	Sodium	2120			P
7440-28-0	Thallium	3.4	U		P
7440-31-5	Tin	13.6 ~~1.6~~	~~J~~	U	P
7440-62-2	Vanadium	6.8 ~~5.7~~	~~J~~	J	P
7440-66-6	Zinc	14.4		R	P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-07

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 81.8

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	893		J ~~N~~	P
7440-36-0	Antimony	0.41	J		P
7440-38-2	Arsenic	4.4		J ~~N~~	P
7440-39-3	Barium	1.0	~~J~~	J	P
7440-41-7	Beryllium	0.21	J		P
7440-43-9	Cadmium	0.61	U		P
7440-70-2	Calcium	485	J		P
7440-47-3	Chromium	5.8		R	P
7440-48-4	Cobalt	0.45	J		P
7440-50-8	Copper	3.4		J	P
7439-89-6	Iron	16200			P
7439-92-1	Lead	8.3		R ~~N~~	P
7439-95-4	Magnesium	426	J		P
7439-96-5	Manganese	27.9			P
7440-02-0	Nickel	4.9 ~~0.82~~	~~J~~	U	P
7440-09-7	Potassium	142	J		P
7782-49-2	Selenium	0.56	J		P
7440-22-4	Silver	1.2	U	N	P
7440-23-5	Sodium	2340			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.2 ~~1.4~~	~~J~~	U	P
7440-62-2	Vanadium	13.6			P
7440-66-6	Zinc	22.7		R	P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-08

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 63.6

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1190		J N	P
7440-36-0	Antimony	9.4	U		P
7440-38-2	Arsenic	3.1		J N	P
7440-39-3	Barium	4.9	J	J	P
7440-41-7	Beryllium	0.79 ~~0.11~~	~~J~~	U	P
7440-43-9	Cadmium	0.091	J		P
7440-70-2	Calcium	3860			P
7440-47-3	Chromium	7.1		R N	P
7440-48-4	Cobalt	1.1	J		P
7440-50-8	Copper	3.8	J	J	P
7439-89-6	Iron	5810			P
7439-92-1	Lead	9.3		R N	P
7439-95-4	Magnesium	861			P
7439-96-5	Manganese	18.7		J	P
7440-02-0	Nickel	6.3 ~~2.5~~	~~J~~	U	P
7440-09-7	Potassium	400	J		P
7782-49-2	Selenium	0.68	J		P
7440-22-4	Silver	1.6	U	N	P
7440-23-5	Sodium	4320			P
7440-28-0	Thallium	3.9	U		P
7440-31-5	Tin	15.7 ~~1.7~~	~~J~~	U	P
7440-62-2	Vanadium	15.6			P
7440-66-6	Zinc	21.6		R	P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53E7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-09

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 81.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2300		J ~~N~~	P
7440-36-0	Antimony	1.1	J		P
7440-38-2	Arsenic	10.6		J ~~N~~	P
7440-39-3	Barium	1.7	~~J~~	J	P
7440-41-7	Beryllium	0.99			P
7440-43-9	Cadmium	0.029	J		P
7440-70-2	Calcium	1360			P
7440-47-3	Chromium	34.4		J ~~*~~	P
7440-48-4	Cobalt	2.9	J		P
7440-50-8	Copper	4.9		J	P
7439-89-6	Iron	40100			P
7439-92-1	Lead	8.6		R ~~*N~~	P
7439-95-4	Magnesium	654			P
7439-96-5	Manganese	59.5			P
7440-02-0	Nickel	6.3		R	P
7440-09-7	Potassium	229	J		P
7782-49-2	Selenium	0.82	J		P
7440-22-4	Silver	0.17	J	~~N~~	P
7440-23-5	Sodium	1890			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	12.3 ~~2.0~~	~~J~~	U	P
7440-62-2	Vanadium	45.4			P
7440-66-6	Zinc	47.3		R	P

Color Before: BROWN Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-10

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 78.1

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9410		J* N	P
7440-36-0	Antimony	3270		D	P
7440-38-2	Arsenic	2100		J D N	P
7440-39-3	Barium	1340		J	P
7440-41-7	Beryllium	0.64 ~~0.37~~	~~J~~	U	P
7440-43-9	Cadmium	11.9			P
7440-70-2	Calcium	14000			P
7440-47-3	Chromium	55.5		J *	P
7440-48-4	Cobalt	20.2			P
7440-50-8	Copper	2050		J	P
7439-89-6	Iron	154000		~~D~~	P
7439-92-1	Lead	89200		R D * N	P
7439-95-4	Magnesium	3150			P
7439-96-5	Manganese	1250			P
7440-02-0	Nickel	88.8		J	P
7440-09-7	Potassium	1250			P
7782-49-2	Selenium	0.86	J		P
7440-22-4	Silver	2.4		N	P
7440-23-5	Sodium	7230			P
7440-28-0	Thallium	3.2	U		P
7440-31-5	Tin	1980		D	P
7440-62-2	Vanadium	63.8			P
7440-66-6	Zinc	1380			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53C6

Matrix: (Soil/Water) SOIL Lab Sample ID: 0809220-11

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 80.2

Concentration Units (**ug/L** or **mg/kg** dry weight): mg/Kg

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7660		J ~~N~~	P
7440-36-0	Antimony	1720		~~D~~	P
7440-38-2	Arsenic	933		J ~~N~~	P
7440-39-3	Barium	1090		J	P
7440-41-7	Beryllium	0.62 ~~0.31~~	~~J~~	U	P
7440-43-9	Cadmium	22.1			P
7440-70-2	Calcium	8550			P
7440-47-3	Chromium	3500		~~D~~	P
7440-48-4	Cobalt	22.3			P
7440-50-8	Copper	969		J	P
7439-89-6	Iron	120000		~~D~~	P
7439-92-1	Lead	42200		R ~~D~~ ~~N~~	P
7439-95-4	Magnesium	2640			P
7439-96-5	Manganese	1710			P
7440-02-0	Nickel	1500		~~D~~	P
7440-09-7	Potassium	1130			P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	0.93	J	~~N~~	P
7440-23-5	Sodium	5720			P
7440-28-0	Thallium	3.1	U		P
7440-31-5	Tin	1480		J ~~D~~	P
7440-62-2	Vanadium	73.4			P
7440-66-6	Zinc	1300			P

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments:

Bonner Analytical Testing Company

RECEIVED
OCT 0 1 2008
HAZ. WASTE SUPPORT SEC.

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB53C6
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 17, 2008, we received 11 soil samples under FedEx airbill number 8541 0029 6496. Custody seals were present and intact. Cooler temp was determined to be 5°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were received in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
The analytical run began 9/27/2008 @ 1441 hrs. The ICV was made at 750 ppb instead of 1000 ppb; the data was reported. MB53N7 was over the linear range for Sb, As, Fe, Pb and Sn; N8 was over the range for Sb, Cr, Fe, Pb, Ni and Sn—the samples were reanalyzed at appropriate dilutions. The initial run had various closing QC errors; associated samples were reanalyzed. The matrix spike failed for As and Pb; a post spike was analyzed at twice the indigenous level for As and Pb.

CSF
No Discrepancies

Sample Equation:

Lab ID 0809220-01 EPA Sample # MB53C6

Date & Time 9/27/2008 @ 1534

Metals: 18237 µg/L * (0.100 L) / (1.00 g) * 100 % / 41.3% * 1000 g / 1 kg * 1 mg / 1000 µg = 44.2 mg/kg

(Analyte Sb)

Authorized by: _____
Daniel Antrim
Document Control Officer

11

RECEIVED

OCT 0 1 2008

HAZ. WASTE SUPPORT SEC

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB53C6

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 16301

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB53C6	7) MB53E5	13)	19)
2) MB53C7	8) MB53E6	14)	20)
3) MB53C8	9) MB53E7	15)	21)
4) MB53E2	10) MB53N7	16)	22)
5) MB53E3	11) MB53N8	17)	23)
6) MB53E4	12) 9-17-08	18)	24) 9-17-08

MB53C6	MB53N8
First Sample in SDG	**Last Sample in SDG**
09/17/2008	09/17/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature

9-17-08

Signature **Date**

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Wednesday, September 17, 2008 1:24 PM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no sample designated for laboratory QC on the TR/COC for SDG MB53L6. The laboratory would like to perform laboratory QC on sample MB53L6.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
CSC
kvonmoll@fedcsc.com
1-703-818-4235

This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CSC to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Wednesday, September 17, 2008 2:59 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

Today we received 11 soil samples and 1 water sample under FedEx airbill number 8541 0029 6496. Custody seals were present and intact. Cooler temp was determined to be 5°C. Samples were received in good condition except for the following discrepancies:

1. No QC is listed on the TR/COC for SDG MB53L6. We would like to use MB53L6 as QC. Please advise if this is acceptable.

2. No sample tags were received in this shipment. Please advise.

(40)

Thanks,

Beth Whitehead
Bonner Analytical

(4L)

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53H6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-01

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6780		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	15.2			P
7440-39-3	Barium	44.4	J	J E	P
7440-41-7	Beryllium	5.0 ~~3.1~~	J	U	P
7440-43-9	Cadmium	0.33	J		P
7440-70-2	Calcium	311000		J E	P
7440-47-3	Chromium	28.9		J	P
7440-48-4	Cobalt	17.0	J	J	P
7440-50-8	Copper	23.9	J	J E	P
7439-89-6	Iron	20500		J E	P
7439-92-1	Lead	99.0		J E	P
7439-95-4	Magnesium	730000		J E	P
7439-96-5	Manganese	2620		J E	P
7440-02-0	Nickel	20.4	J		P
7440-09-7	Potassium	214000		J E	P
7782-49-2	Selenium	3.4 ~~35.0~~	~~UJ~~		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1870000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	1.6	J	J E	P
7440-62-2	Vanadium	94.9		J	P
7440-66-6	Zinc	187		J E	P

RD 9/27/08

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53H7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-02

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5660		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	16.2			P
7440-39-3	Barium	40.7	J	J E	P
7440-41-7	Beryllium	2.0 ~~2.2~~	U	U	P
7440-43-9	Cadmium	0.23	J		P
7440-70-2	Calcium	295000		J E	P
7440-47-3	Chromium	25.1		J	P
7440-48-4	Cobalt	13.8	J	J	P
7440-50-8	Copper	14.0	J	J E	P
7439-89-6	Iron	19400		J E	P
7439-92-1	Lead	86.0		J E	P
7439-95-4	Magnesium	754000		J E	P
7439-96-5	Manganese	2140		J E	P
7440-02-0	Nickel	16.0	J		P
7440-09-7	Potassium	224000		J E	P
7782-49-2	Selenium	3.3 ~~35.0~~	~~U~~ J		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1590000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	83.4		J	P
7440-66-6	Zinc	145		J E	P

KD 10/27/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53H8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-03

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (**ug/L** or **mg/kg** dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3080		R E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	12.0		J	P
7440-39-3	Barium	26.3	~~J~~	J E	P
7440-41-7	Beryllium	5.0 ~~0.95~~	~~J~~	U R	P
7440-43-9	Cadmium	0.090	J		P
7440-70-2	Calcium	258000		J E	P
7440-47-3	Chromium	14.0		R	P
7440-48-4	Cobalt	6.8	~~J~~	R	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	12200		R E	P
7439-92-1	Lead	27.2		R E	P
7439-95-4	Magnesium	810000		E	P
7439-96-5	Manganese	987		R E	P
7440-02-0	Nickel	6.3	~~J~~	R	P
7440-09-7	Potassium	242000		J E	P
7782-49-2	Selenium	2.6 ~~35.0~~	~~UJ~~		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1540000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50.0 ~~36.6~~	~~J~~	UJ K	P
7440-66-6	Zinc	83.5		R E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53H9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-04

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6780		R E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	15.5		J	P
7440-39-3	Barium	35.5	~~J~~	J E	P
7440-41-7	Beryllium	5.0 ~~2.2~~	~~J~~	U R	P
7440-43-9	Cadmium	0.20	J		P
7440-70-2	Calcium	273000		J E	P
7440-47-3	Chromium	27.5		R	P
7440-48-4	Cobalt	13.5	~~J~~	R	P
7440-50-8	Copper	4.3	~~J~~	R E	P
7439-89-6	Iron	23900		R E	P
7439-92-1	Lead	60.8		R E	P
7439-95-4	Magnesium	767000		J E	P
7439-96-5	Manganese	2010		R E	P
7440-02-0	Nickel	12.5	~~J~~	R	P
7440-09-7	Potassium	235000		J E	P
7782-49-2	Selenium	2.6 ~~35.0~~	UJ		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1400000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	0.58	~~J~~	J E	P
7440-62-2	Vanadium	73.8		R	P
7440-66-6	Zinc	161		R E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53J0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-05

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6010		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	14.9			P
7440-39-3	Barium	34.0	~~J~~	J E	P
7440-41-7	Beryllium	5.0 ~~2.0~~	~~J~~	U	P
7440-43-9	Cadmium	0.10	J		P
7440-70-2	Calcium	255000		J E	P
7440-47-3	Chromium	23.8		J	P
7440-48-4	Cobalt	12.3	~~J~~	J	P
7440-50-8	Copper	4.0	~~J~~	J E	P
7439-89-6	Iron	20500		J E	P
7439-92-1	Lead	54.0		J E	P
7439-95-4	Magnesium	761000		J E	P
7439-96-5	Manganese	1710		J E	P
7440-02-0	Nickel	11.9	J		P
7440-09-7	Potassium	238000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	2.0	J		P
7440-23-5	Sodium	1350000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	0.90	~~J~~	J E	P
7440-62-2	Vanadium	68.3		J	P
7440-66-6	Zinc	142		J E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53J1

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-06

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4430		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	15.0			P
7440-39-3	Barium	29.0	~~J~~	J E	P
7440-41-7	Beryllium	5.0 ~~1.4~~	~~J~~	U	P
7440-43-9	Cadmium	0.14	J		P
7440-70-2	Calcium	250000		J E	P
7440-47-3	Chromium	20.3		J	P
7440-48-4	Cobalt	8.8	~~J~~	J	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	18000		J E	P
7439-92-1	Lead	39.0		J E	P
7439-95-4	Magnesium	760000		J E	P
7439-96-5	Manganese	1040		J E	P
7440-02-0	Nickel	8.9	J		P
7440-09-7	Potassium	239000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1330000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	52.0		J	P
7440-66-6	Zinc	108		J E	P

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53J2

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-14

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2910		J E	P
7440-36-0	Antimony	21.1	J	J	P
7440-38-2	Arsenic	22.0			P
7440-39-3	Barium	29.5	J	J E	P
7440-41-7	Beryllium	5.0 ~~0.19~~	~~J~~	J R	P
7440-43-9	Cadmium	0.34	J		P
7440-70-2	Calcium	234000		J E	P
7440-47-3	Chromium	12.5		J	P
7440-48-4	Cobalt	2.8	J	J	P
7440-50-8	Copper	32.4		J E	P
7439-89-6	Iron	6320		J E	P
7439-92-1	Lead	494		J E	P
7439-95-4	Magnesium	785000		J E	P
7439-96-5	Manganese	309		J E	P
7440-02-0	Nickel	6.3	J	J	P
7440-09-7	Potassium	253000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	1.3 ~~10.0~~	~~U~~	J	P
7440-23-5	Sodium	1310000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	7.0	J	R E	P
7440-62-2	Vanadium	50.0 ~~17.4~~	J	U	P
7440-66-6	Zinc	67.4		J E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53J3

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-15

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3920		J E	P
7440-36-0	Antimony	27.7	J	J	P
7440-38-2	Arsenic	26.3			P
7440-39-3	Barium	31.9	J	J E	P
7440-41-7	Beryllium	5.0 ~~0.39~~	~~J~~	J R	P
7440-43-9	Cadmium	0.35	J		P
7440-70-2	Calcium	231000		J E	P
7440-47-3	Chromium	14.7		J	P
7440-48-4	Cobalt	3.5	~~J~~	J	P
7440-50-8	Copper	45.2		J E	P
7439-89-6	Iron	7900		J E	P
7439-92-1	Lead	585		J E	P
7439-95-4	Magnesium	763000		J E	P
7439-96-5	Manganese	330		J E	P
7440-02-0	Nickel	8.1	~~J~~	J	P
7440-09-7	Potassium	250000		J E	P
7782-49-2	Selenium	2.6 ~~35.0~~	~~UJ~~		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1310000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	11.2	~~J~~	R E	P
7440-62-2	Vanadium	50.0 ~~19.6~~	~~J~~	UJ	P
7440-66-6	Zinc	81.6		J E	P

RS 10/27/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53J4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-16

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12600		J E	P
7440-36-0	Antimony	53.2	J		P
7440-38-2	Arsenic	70.9			P
7440-39-3	Barium	64.9	J	J E	P
7440-41-7	Beryllium	5.0 ~~0.71~~	J	J UJ	P
7440-43-9	Cadmium	5.0 ~~1.3~~	J	U	P
7440-70-2	Calcium	230000		J E	P
7440-47-3	Chromium	43.8		R	P
7440-48-4	Cobalt	50.0 ~~9.7~~	J	UJ	P
7440-50-8	Copper	154		J E	P
7439-89-6	Iron	27100		R E	P
7439-92-1	Lead	1580		J E	P
7439-95-4	Magnesium	745000		J E	P
7439-96-5	Manganese	874		R E	P
7440-02-0	Nickel	22.1	J		P
7440-09-7	Potassium	255000		J E	P
7782-49-2	Selenium	3.8 ~~35.0~~	UJ		P
7440-22-4	Silver	1.3 ~~10.0~~	UJ	J	P
7440-23-5	Sodium	1530000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	27.1	J	J E	P
7440-62-2	Vanadium	65.2		J	P
7440-66-6	Zinc	255		J E	P

(B 1-4-12

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53J5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-17

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15600		J E	P
7440-36-0	Antimony	61.6			P
7440-38-2	Arsenic	79.7			P
7440-39-3	Barium	76.6	J	J E	P
7440-41-7	Beryllium	5.0 ~~0.88~~	J	J UJ	P
7440-43-9	Cadmium	5.0 ~~1.8~~	J	UJ	P
7440-70-2	Calcium	230000		J E	P
7440-47-3	Chromium	51.6		R	P
7440-48-4	Cobalt	50.0 ~~11.8~~	J	UJ	P
7440-50-8	Copper	197		J E	P
7439-89-6	Iron	29300		R E	P
7439-92-1	Lead	1810		J E	P
7439-95-4	Magnesium	735000		J E	P
7439-96-5	Manganese	1100		R E	P
7440-02-0	Nickel	26.2	J		P
7440-09-7	Potassium	260000		J E	P
7782-49-2	Selenium	2.3 ~~35.0~~	UJ		P
7440-22-4	Silver	1.7 ~~10.0~~	UJ	UJ	P
7440-23-5	Sodium	1370000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	35.4	J	J E	P
7440-62-2	Vanadium	63.8		UJ	P
7440-66-6	Zinc	363		J E	P

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53K4

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-08

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	180	~~J~~	J ~~E~~	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	4.8	J		P
7440-39-3	Barium	21.4	~~J~~	J ~~E~~	P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	222000		J ~~E~~	P
7440-47-3	Chromium	10.0 ~~3.0~~	~~J~~	UJ	P
7440-48-4	Cobalt	1.1	~~J~~	J	P
7440-50-8	Copper	25.0	U	~~E~~	P
7439-89-6	Iron	345		J ~~E~~	P
7439-92-1	Lead	10.0	U	J ~~E~~	P
7439-95-4	Magnesium	754000		J ~~E~~	P
7439-96-5	Manganese	163		J ~~E~~	P
7440-02-0	Nickel	1.6	J		P
7440-09-7	Potassium	233000		J ~~E~~	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1510000		R ~~E~~	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50.0 ~~5.0~~	~~J~~	UJ	P
7440-66-6	Zinc	60.0 ~~10.8~~	~~J~~	UJ ~~E~~	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53K5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-09

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	184	~~J~~	J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	4.0	J		P
7440-39-3	Barium	22.2	~~J~~	J E	P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	226000		J E	P
7440-47-3	Chromium	10.0 ~~1.4~~ ~~10.0~~	~~UJ~~	~~J~~ UJ	P
7440-48-4	Cobalt	1.1	~~J~~	J	P
7440-50-8	Copper	25.0	U	~~E~~	P
7439-89-6	Iron	348		J E	P
7439-92-1	Lead	10.0	U	J ~~E~~	P
7439-95-4	Magnesium	761000		J ~~E~~	P
7439-96-5	Manganese	167		J E	P
7440-02-0	Nickel	1.7	J		P
7440-09-7	Potassium	238000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1570000		R ~~E~~	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	~~E~~	P
7440-62-2	Vanadium	50.0 ~~5.1~~	~~J~~	UJ	P
7440-66-6	Zinc	20.0 ~~13.6~~	~~J~~	UJ E	P

10/2/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53K6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-10

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	252		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	2.7	J		P
7440-39-3	Barium	22.0	J	J E	P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	222000		J E	P
7440-47-3	Chromium	10.0 ~~4.2~~	J	J UJ	P
7440-48-4	Cobalt	1.2	J	J	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	484		J E	P
7439-92-1	Lead	6.7	J	J E	P
7439-95-4	Magnesium	742000		J E	P
7439-96-5	Manganese	171		J E	P
7440-02-0	Nickel	1.4 ~~40.0~~	UJ		P
7440-09-7	Potassium	235000		J E	P
7782-49-2	Selenium	2.4 ~~35.0~~	UJ		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1360000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50.0 ~~4.8~~	J	UJ	P
7440-66-6	Zinc	60.0 ~~12.7~~	J	UJ E	P

B 10/27/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53K7

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-11

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	257		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	3.4	J		P
7440-39-3	Barium	22.2	~~J~~	J E	P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	223000		J E	P
7440-47-3	Chromium	10.0 ~~2.8~~	~~J~~	J UJ	P
7440-48-4	Cobalt	1.1	~~J~~	J	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	471		J E	P
7439-92-1	Lead	5.1	~~J~~	J E	P
7439-95-4	Magnesium	746000	-	J E	P
7439-96-5	Manganese	170		J E	P
7440-02-0	Nickel	1.4	J		P
7440-09-7	Potassium	237000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1330000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50 ~~25.0~~	~~J~~	UJ	P
7440-66-6	Zinc	60.0 ~~11.8~~	~~J~~	UJ E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53K8

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-18

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	235		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	3.8	J		P
7440-39-3	Barium	21.7	~~J~~	J E	P
7440-41-7	Beryllium	5.0 ~~0.10~~	~~J~~	UJ	P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	224000		J E	P
7440-47-3	Chromium	10.0 ~~1.9~~	~~J~~	UJ R	P
7440-48-4	Cobalt	50.0 ~~1.2~~	~~J~~	UJ	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	333		R E	P
7439-92-1	Lead	10.0	U	J E	P
7439-95-4	Magnesium	723000		J E	P
7439-96-5	Manganese	122		R E	P
7440-02-0	Nickel	2.1	J		P
7440-09-7	Potassium	259000		J E	P
7782-49-2	Selenium	3.1 ~~35.0~~	~~UJ~~		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1360000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50.0 ~~4.3~~ ~~50.0~~	~~UJ~~	UJ	P
7440-66-6	Zinc	60.0 ~~16.0~~	~~J~~	R E	P

(R) 12/23/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53K9

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-19

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	233		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	2.5	J		P
7440-39-3	Barium	21.0	~~U~~	J E	P
7440-41-7	Beryllium	5.0	U	J	P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	216000		J E	P
7440-47-3	Chromium	10.0 ~~10.0~~	~~U~~	U R	P
7440-48-4	Cobalt	50.0 ~~1.0~~	~~U~~	UJ	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	311		R E	P
7439-92-1	Lead	10.0	U	J E	P
7439-95-4	Magnesium	685000		J E	P
7439-96-5	Manganese	117		R E	P
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	255000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1280000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50.0 ~~5.1~~	~~U~~	UJ	P
7440-66-6	Zinc	60.0 ~~33.4~~	~~J~~	R E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53L0

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-12

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	196	~~J~~	J ~~E~~	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	2.7	J		P
7440-39-3	Barium	22.4	~~J~~	J ~~E~~	P
7440-41-7	Beryllium	5.0 ~~0.081 5.0~~	~~U~~	U	P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	228000		J ~~E~~	P
7440-47-3	Chromium	10.0 ~~5 10.0~~	~~U~~	U ~~J~~	P
7440-48-4	Cobalt	0.97	~~J~~	J	P
7440-50-8	Copper	25.0	U	~~E~~	P
7439-89-6	Iron	342		J ~~E~~	P
7439-92-1	Lead	10.0	U	~~J~~ ~~E~~	P
7439-95-4	Magnesium	772000		J ~~E~~	P
7439-96-5	Manganese	162		J ~~E~~	P
7440-02-0	Nickel	1.5	J		P
7440-09-7	Potassium	241000		J ~~E~~	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U	J	P
7440-23-5	Sodium	1340000		R ~~E~~	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	~~E~~	P
7440-62-2	Vanadium	50.0 ~~4.5 50.0~~	~~U~~	R	P
7440-66-6	Zinc	60.0 ~~11.6~~	~~J~~	UJ ~~E~~	P

(B) 1/12/09

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Rinsate Blank 9/15/08

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53L5

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-07

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U	~~E~~	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	10.0	U		P
7440-39-3	Barium	200	U	~~E~~	P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	149	~~U~~	J ~~E~~	P
7440-47-3	Chromium	0.82 ~~10.0~~	~~U~~	J	P
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	25.0	U	~~E~~	P
7439-89-6	Iron	(399)		J ~~E~~	P
7439-92-1	Lead	10.0	U	J ~~E~~	P
7439-95-4	Magnesium	32.8	~~U~~	J ~~E~~	P
7439-96-5	Manganese	5.9	~~U~~	J ~~E~~	P
7440-02-0	Nickel	2.7	J		P
7440-09-7	Potassium	639	~~U~~	J ~~E~~	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	4960	~~U~~	K ~~E~~	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	~~E~~	P
7440-62-2	Vanadium	0.94 ~~50.0~~	~~U~~	J	P
7440-66-6	Zinc	3.3	~~U~~	J ~~E~~	P

6 11/27/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA - CLP

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53N6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53H6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809211-13

Level: (low/med) LOW Date Received: 09/16/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	224		J E	P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	4.7	J		P
7440-39-3	Barium	22.2	J	J E	P
7440-41-7	Beryllium	5.0 ~~0.12~~	~~J~~	U	P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	225000		J E	P
7440-47-3	Chromium	10.0 ~~2.0~~	~~J~~	UJ	P
7440-48-4	Cobalt	1.1	~~J~~	J	P
7440-50-8	Copper	25.0	U	E	P
7439-89-6	Iron	429		J E	P
7439-92-1	Lead	3.4	~~J~~	J E	P
7439-95-4	Magnesium	765000		J E	P
7439-96-5	Manganese	157		J E	P
7440-02-0	Nickel	1.7	J		P
7440-09-7	Potassium	238000		J E	P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U	R	P
7440-23-5	Sodium	1320000		R E	P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	100	U	E	P
7440-62-2	Vanadium	50.0 ~~6.7~~	~~J~~	R	P
7440-66-6	Zinc	40.0 ~~13.0~~	~~J~~	UJ E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB53H6
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 16, 2008, we received 19 water samples in 3 coolers under FedEx master airbill number 8541 0029 6522. Custody seals were present and intact. Cooler temps were determined to be 5°C, 5.5°C, and 6°C. Samples were received in good condition except for the following discrepancies:

1. No sample tags were included in this shipment. Please advise.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
No Discrepancies

CSF
No Discrepancies

Sample Equation:

Lab ID 0809211-01 EPA Sample # MB53H6

Date & Time 9/27/2008@ 1836

Metals: 6778 µg/L * 1 (Dilution Factor) = 6780 ug/L
(Analyte Al)

Authorized by _____
Daniel Antrim
Document Control Officer

15

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SEP 30 2008
HAZ. WASTE SUPPORT SEC.

SAMPLE DELIVERY GROUP (SDG) COVER SHEET

SDG Number: MB53H6

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB53H6	7) MB53J2	13) MB53K6	19) MB53N6
2) MB53H7	8) MB53J3	14) MB53K7	20)
3) MB53H8	9) MB53J4	15) MB53K8	21)
4) MB53H9	10) MB53J5	16) MB53K9	22)
5) MB53J0	11) MB53K4	17) MB53L0	23)
6) MB53J1	12) MB53K5	18) MB53L5	24)

MB53H6	MB53N6
First Sample in SDG	**Last Sample in SDG**
09/16/2008	09/16/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature **Date** 9-16-08

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Tuesday, September 16, 2008 1:12 PM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no samples designated for laboratory QC on the TR/COC for SDGs MB52Y1 and MB5341. The laboratory would like to perform laboratory QC on sample MB52Y1 for both SDGs.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
kvonmoll@fedcsc.com
CSC
1-703-818-4235

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From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Tuesday, September 16, 2008 2:18 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | case 37836 | Sample Receipt

Kristin:

Today we received 20 soil samples and 19 water samples in 3 coolers under FedEx master airbill number 8541 0029 6522. Custody seals were present and intact. Cooler temps were determined to be 5°C, 5.5°C, and 6°C. Samples were received in good condition except for the following discrepancies:

1. No QC was listed on the TR/COC for SDGs MB52Y1 and MB5341. We would like to use MB52Y1 as QC for both. Please advise if this is acceptable.

2. No sample tags were included in this shipment. Please advise.

(63)

Thanks,

Beth Whitehead
Bonner Analytical

(64)

8

USEPA - CLP

Rinsate Blank 9/16/08

1A-IN
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MB53L6

Lab Name: Bonner Analytical Testing Contract: EPW06055

Lab Code: BONNER Case No.: 37836 NRAS No.: 1630.0 SDG No.: MB53L6

Matrix: (Soil/Water) WATER Lab Sample ID: 0809219-01

Level: (low/med) LOW Date Received: 09/17/2008

% Solids 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS NO.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	167	J		P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	10.0	U		P
7440-39-3	Barium	1.4	J		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	434	J		P
7440-47-3	Chromium	71.3			P
7440-48-4	Cobalt	2.2	J		P
7440-50-8	Copper	22.8	J		P
7439-89-6	Iron	1810			P
7439-92-1	Lead	42.7			P
7439-95-4	Magnesium	229	J		P
7439-96-5	Manganese	22.3			P
7440-02-0	Nickel	293			P
7440-09-7	Potassium	5000	U		P
7782-49-2	Selenium	2.5 ~~35.0~~	~~UJ~~		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	1260	J		P
7440-28-0	Thallium	25.0	U		P
7440-31-5	Tin	9.9	J		P
7440-62-2	Vanadium	1.8 ~~50.0~~	~~UJ~~		P
7440-66-6	Zinc	496			P

(R) 10/27/08

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Bonner Analytical Testing Company

2703 Oak Grove Road, Hattiesburg, MS 39402
Phone: (601) 264-2854 Fax: (601) 268-7084

SDG NARRATIVE:

SDG Number: MB53L6
Case Number: 37836
Contract Number: EPW06055

Sample Receipt:
On September 17, 2008, we received 1 water sample under FedEx airbill number 8541 0029 6496. Custody seals were present and intact. Cooler temp was determined to be 5°C. Samples were received in good condition except for the following discrepancies:

1. No QC is listed on the TR/COC for SDG MB53L6. We would like to use MB53L6 as QC. Please advise if this is acceptable.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.

2. No sample tags were received in this shipment. Please advise.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

Metals
No Discrepancies

CSF
No Discrepancies

Sample Equation:

Lab ID 0809219-01 EPA Sample # MB53L6

Date & Time 9/26/2008@2026

Metals: 167.07 µg/L * 1 (Dilution Factor) = 167 ug/L
(Analyte Al)

Authorized by
Daniel Antrim
Document Control Officer

SAMPLE DELIVERY GROUP (SDG)
COVER SHEET

SDG Number: MB53L6

☒ ICP-AES Analysis ☐ ICP-MS Analysis

Laboratory Name: Bonner Analytical Testing **Laboratory Code:** BONNER

Contract No.: EPW06055 **Case No.:** 37836

Analysis Price: _____ **SDG Turnaround:** 14 day

Modified Analysis (if applicable):

Modification Reference No.: 1630.0

EPA Sample Nmbers in SDG (Listed in Numerical Order)

1) MB53L6	7)	13)	19)
2)	8)	14)	20)
3)	9)	15)	21)
4)	10)	16)	22)
5)	11)	17)	23)
6) 9-17-08	12)	18)	24) 9-17-08

MB53L6	MB53L6
First Sample in SDG	**Last Sample in SDG**
09/17/2008	09/17/2008
First Sample Receipt Date	**Last Sample Receipt Date**

Note: There are a maximum of 20 samples (excluding PE Sample) in SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

_____ 9-17-08

Signature **Date**

Bethany Whitehead

From: Von Moll, Kristin [kvonmoll@fedcsc.com]
Sent: Wednesday, September 17, 2008 1:24 PM
To: Bethany Whitehead; Chris Bonner
Cc: Adly Michael; Jennifer Ferranda
Subject: Region 02 | Case 37836 | Lab BONNER | Issue Multiple | FINAL

Beth,

Summary Start
-Non-sampler issues-
Issue 1: No sample tags were included in this shipment.
Resolution 1: In accordance with previous direction from Region 2, the laboratory will note the issue in the SDG Narrative, and proceed with the analysis of the samples. This Region does not require sample tags. The Resolution will be applied to all samples received for this Case.

-Insufficient/inappropriate designation of laboratory QC-
Issue 2: There is no sample designated for laboratory QC on the TR/COC for SDG MB53L6. The laboratory would like to perform laboratory QC on sample MB53L6.
Resolution 2: In accordance with previous direction from Region 2, the laboratory will select a sample for laboratory QC as long as the sample is not a PE, blank, or rinsate sample. The laboratory will note the issue in the SDG Narrative, notify the SMO coordinator of the sample selected for laboratory QC, and proceed with the analysis of the samples.
Summary End

Please let me know if you have any questions.
Thanks,

Kristin Von Moll
Environmental Coordinator
CSC
kvonmoll@fedcsc.com
1-703-818-4235

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From: Bethany Whitehead [mailto:bwhitehead@batco.com]
Sent: Wednesday, September 17, 2008 2:59 PM
To: Von Moll, Kristin
Cc: Chris Bonner
Subject: Region 2 | Case 37836 | Sample Receipt

Kristin:

Today we received 11 soil samples and 1 water sample under FedEx airbill number 8541 0029 6496. Custody seals were present and intact. Cooler temp was determined to be 5°C. Samples were received in good condition except for the following discrepancies:

1. No QC is listed on the TR/COC for SDG MB53L6. We would like to use MB53L6 as QC. Please advise if this is acceptable.

2. No sample tags were received in this shipment. Please advise.

Thanks,

Beth Whitehead
Bonner Analytical

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Inorganic Data Review Narrative

Case# 37836	Site: Raritan Bay Slag	Soil: 31
SDG# MB52Y1,MB53C6,MB53H6, MB53L6	Lab: Bonner Analytical	Water: 20
Sampling Team: W-SAT	Reviewer: RAXA SHELLEY	Other: 0

A.2.1 Data Validation Flags:

The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:

The CLP laboratory applies a contractual qualifier on all Form I=S and the QC Form when a QC analysis is outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their meanings are as follows:

N: This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E: This qualifier indicates the presence of interference, and is applied when the ICP serial dilution is outside the control limits.

*: This qualifier indicates the lack of precision, and is applied on Form I=S and Form VI when the Lab Duplicate analysis is outside the control limits.

U: This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit (MDL). A non-detected result of an analyte is indicated by the Contract Required Quantitation Limit (CRQL) of that analyte suffixed with "U".

J: This is also a concentration qualifier that laboratory applies to a positive result below the CRQL.

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

A.2.3.1 **Data Case Description:**

This case consists of thirty one (31) soil samples and twenty (20)water samples collected at the Raritan Bay Slag site between 9/15/08-9/16/08 for TAL Metals, Tin and Dissolved Metals analysis according to the USEPA CLP SOW No. ILM05.4. Matrix spike, laboratory duplicate and serial dilution analyses were performed on samples MB53E5, MB52Y1 and MB53J5. Samples MB53D5, MB53L0 and MB53N6 were collected as field duplicates of samples MB53D4, MB53K4 and MB53K5, respectively.

As per EPA Technical Direction Form (TDF) only the following criteria were reviewed by the data validator: Holding Time, CRQL Standard, Matrix Spike, ICS, Laboratory Duplicate, ICP Serial Dilution, and Percent Solids. The qualifiers applied on Form Is and CADRE EXCEL spreadsheets are based on ESAT data review of the above mentioned criteria and the attached CADRE Reports.

A.2.3.2 **CSF Audit**: No problems.

A.2.3.3 **Technical Review:**

SDG MB52Y1

ICB/CCB

The calibration blank values were ≥MDL but ≤CRQL for Sb, Be, Cd, Co, Se and Sn (Only analytes that required qualifications were mentioned). The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Sb -> MB52Y2, MB52Y3

Be -> MB52Y1, MB52Y2, MB52Y3, MB5341, MB5344, MB53C9, MB53D0, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7, MB53N1, MB53N3, MB53N4, MB53N5

Cd -> MB5341, MB53C9, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7, MB53N3

Co -> MB52Y2, MB52Y3, MB5341, MB5344, MB53C9, MB53D0, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7, MB53N2, MB53N3

Se -> MB52Y1, MB52Y2, MB52Y3, MB53C9, MB53D0, MB53D1, MB53D2, MB53D3, MB53N1, MB53N2, MB53N3

Sn -> MB52Y2, MB52Y3

PREPARATION BLANK

The Preparation blank values were ≥MDL but ≤CRQL for Sn (Only analytes that required qualifications were mentioned.) The following Sn positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Sn -> MB53C9, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% (between 10-74) when sample concentration was less than 4 X spike concentration for Se (%R = 65), Ag (%R = 16) and Tl (%R = 72) and between 126-200% for Mn(%R = 196) and greater than 200% for Cd (%R = 221). The following detected and non-detected Se, Ag and Tl results have been considered estimated and qualified "J". The associated Mn results ≥ MDL have been considered estimated and qualified "J". The associated Cd results ≥ MDL have been rejected and qualified "R".

"J" -> Mn, Se, Ag, Tl -> MB52Y1, MB52Y2, MB52Y3, MB5341, MB5342, MB5344, MB53C9, MB53D0, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7, MB53N1, MB53N2, MB53N3, MB53N4, MB53N5

"R" -> Cd -> MB52Y1, MB52Y2, MB52Y3, MB5341, MB5342, MB5344, MB53C9, MB53D0, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7, MB53N1, MB53N2, MB53N3, MB53N4, MB53N5

LAB DUPLICATE

The RPD between sample and duplicate results was ≥ 35% but less than 120% for As, Fe, Ni and Zn when both sample and duplicate results were ≥ 5x CRQL. The associated As, Fe, Ni and Zn results ≥ CRQL have been considered estimated and flagged "J".

"J" -> As, Fe, Zn -> MB52Y1, MB52Y2, MB52Y3, MB5341, MB5342, MB5344, MB53C9, MB53D0, MB53D1, MB53D2, MB53D3, MB53D4, MB53D5, MB53D6, MB53D7, MB53N1, MB53N2, MB53N3, MB53N4, MB53N5

Ni -> MB52Y1, MB52Y2, MB52Y3, MB5341, MB5342, MB5344, MB53D0, MB53D2, MB53D7, MB53N1, MB53N2, MB53N3, MB53N4, MB53N5

PERCENT SOLIDS OF SEDIMENTS

The percent solids in samples MB53C9 and MB53D2 is less than 50%. The detected and non-detected analyte results have been considered estimated and flagged "J" and "UJ", respectively (Note: only the sample results that were not previously flagged due to other QC criteria).

SDG MB53C6

ICV/CCV

The Continuing Calibration Verification (CCV) percent recovery was outside the control limits of 90 - 110% (between 75-89%) for Sn. The following detected and non-detected Sn results have been considered estimated and qualified "J".

"J" -> Sn -> MB53N7, MB53N8

INTERFERENCE CHECK SAMPLE

The ICSAB analyte recovery was outside the control limits of 80-120% (between 50-79%) for Pb. The following detected ≥MDL and non-detected Pb results have been considered estimated and qualified "J".

"J" → Pb -> MB53N7, MB53N8

ICB/CCB

The calibration blank values were ≥MDL but ≤CRQL for As, Be and V (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → As -> MB53E2, MB53E4

Be -> MB53E6, MB53N7, MB53N8

V -> MB53E2, MB53E4

PREPARATION BLANK

The Preparation blank values were ≥MDL but ≤CRQL for Sn (Only analytes that required qualifications were mentioned.) The following Sn positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Sn -> MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6, MB53E7

FIELD BLANK

The Field blank values were ≥CRQL for Cr, Fe, Pb, Mn, Ni and Zn (Only analytes that required qualifications were mentioned). The following positive results whose raw values in ug/L in the instrument printout between field blank value and 10x field blank value were considered estimated and qualified "J" and results ≥MDL but ≤CRQL were raised to the CRQL and qualified "U". The following positive results whose raw values in ug/L in the instrument printout are greater than CRQL but less than field blank value in ug/L have been rejected and qualified "R".

"U" → Ni -> MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6

"J" → Cr -> MB53C7, MB53E7, MB53N7

Fe -> MB53E2, MB53E4

Pb -> MB53C8, MB53E4, MB53E5, MB53E6, MB53E7

Mn -> MB53E2, MB53E3, MB53E4, MB53E6

Ni -> MB53N7

Zn -> MB53C7

"R" → Cr -> MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6

Pb -> MB53E2, MB53E3

Ni -> MB53C7, MB53E7

Zn -> MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6, MB53E7

MATRIX SPIKE

The matrix spike recovery was outside the control limits of 75 - 125% (between 10-74) when sample concentration was less than 4 X spike concentration for Al (%R = 27) and As (%R = 68) and less than 10% for Pb (%R = -22). The following detected and non-detected Al and As results have been considered estimated and qualified "J". The following detected and non-detected Pb results have been rejected and qualified "R".

"J" → Al, As -> MB53C6, MB53C7, MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6, MB53E7, MB53N7, MB53N8

"R" → Pb -> MB53C6, MB53C7, MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6, MB53E7, MB53N7, MB53N8

LAB DUPLICATE

The absolute difference between sample and duplicate results was > ± 2x CRQL for Pb when the sample and/or duplicate results were <5 X CRQL. The associated Pb results ≥ MDL but < 5x CRQL have been considered estimated and qualified "J". The absolute difference between sample and duplicate results was > ± 4x CRQL for Cr when the sample and/or duplicate results were <5 X CRQL. The associated Cr results ≥ MDL but < 5x CRQL have been rejected and qualified "R".

"J" → Pb* -> MB53E2, MB53E3

"R" → Cr -> MB53E2, MB53E3, MB53E4, MB53E5, MB53E6

LABORATORY CONTROL SAMPLE

The LCS found values were lower than the Lower Control Limits for Ba and Cu. The following detected and non-detected Ba and Cu results have been considered estimated and qualified "J".

"J" → Ba, Cu -> MB53C6, MB53C7, MB53C8, MB53E2, MB53E3, MB53E4, MB53E5, MB53E6, MB53E7, MB53N7, MB53N8

PERCENT SOLIDS OF SEDIMENTS

The percent solids in samples MB53C6 and MB53C7 is less than 50%. The detected and non-detected analyte results have been considered estimated and flagged "J" and "UJ", respectively (Note: only the sample results that were not previously flagged due to other QC criteria).

* already qualified

SDG MB53H6

ICV/CCV

The Continuing Calibration Verification (CCV) percent recovery was outside the control limits of 90 - 110% (between 75-89%) for Be, Cr, Fe, Mg, Mn, Ag and V and between 111-125% for Na. The following detected and non-detected Be, Cr, Fe, Mg, Mn, Ag and V results have been considered estimated and qualified "J" and Na results ≥ MDL have been considered estimated and flagged "J".

"J" -> Cr, Fe, Mn, Ag, V -> MB53J2, MB53J3, MB53K5, MB53K6, MB53K7, MB53L0, MB53N6

Be, Mg, Ag, V -> MB53J4, MB53J5, MB53K8, MB53K9

Na* -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53L5, MB53N6

The CCV percent recovery was outside the control limits of 90 - 110% (less than 75%) for Cr, Fe and Mn. The following detected and non-detected Cr, Fe and Mn results have been rejected and qualified "R".

"R" -> Cr, Fe, Mn -> MB53J4, MB53J5, MB53K8, MB53K9

CRQL STANDARD

The CRQL standard percent recovery was outside the control limits of 70 - 130% (between 131-180%) for Na (%R = 149). The detected Na results <2x CRQL have been considered estimated and flagged "J"

"J" → Na* -> MB53L5

ICB/CCB

The calibration blank values were ≥MDL but ≤CRQL for Be, Cd, Cr, Co and V (Only analytes that required qualifications were mentioned.) The following associated positive results ≤CRQL were raised to the CRQL and qualified "U".

"U" → Be -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K8, MB53L0, MB53N6

Cd -> MB53J4, MB53J5

Cr -> MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53N6

Co -> MB53J4, MB53J5, MB53K8, MB53K9

V -> MB53H8, MB53J2, MB53J3, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53N6

PREPARATION BLANK

The Preparation blank values were ≥MDL but ≤CRQL for Cr and Zn (Only analytes

that required qualifications were mentioned.) The following Zn positive results ≤CRQL were raised to the CRQL and qualified "U". The Cr results were previously qualified due to ICB/CCB criteria; no action was taken.

"U" → Zn -> MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53N6

INTERFERENCE CHECK SAMPLE

The ICSAB analyte recovery was outside the control limits of 80-120% (between 50-79%) for Cr, Fe, Pb, Mn and V. The following detected ≥MDL and non-detected Cr, Fe, Pb, Mn and V results have been considered estimated and qualified "J".

"J" → Cr*, Fe*, Mn*, V -> MB53J4, MB53J5, MB53K8, MB53K9

Pb -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53L5, MB53N6

ICP SERIAL DILUTION

The ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 for Al, Ba, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, K, Sn, V and Zn and ≥ 100% for Na when the initial concentration was equal to or greater than 50 X MDL. The associated Al, Ba, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, K, Sn, V and Zn results ≥ MDL have been considered estimated and flagged "J" and Na results ≥ MDL have been rejected and qualified "R".

"J" → Al, Ba, Co -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53N6

Ca, Cr, Fe -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53L5, MB53N6

Cu -> MB53H6, MB53H7, MB53H9, MB53J0, MB53J2, MB53J3, MB53J4, MB53J5

Pb* -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K6, MB53K7, MB53N6

Mg, Mn, K, V, Zn -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53L5, MB53N6

Sn -> MB53H6, MB53H9, MB53J0, MB53J2, MB53J3, MB53J4, MB53J5

"R" → Na -> MB53H6, MB53H7, MB53H8, MB53H9, MB53J0, MB53J1, MB53J2, MB53J3, MB53J4, MB53J5, MB53K4, MB53K5, MB53K6, MB53K7, MB53K8, MB53K9, MB53L0, MB53L5, MB53N6

TOTAL AND DISSOLVED METALS

The percent differences between the dissolved and total analyte concentrations greater than 20% for the following analytes when the dissolved concentration is

greater than its total concentration and ≥5x MDL. Both dissolved and total analytes concentrations have been considered estimated and flagged "J".

"J" -> As, Ba* -> MB53H8, MB53H9

Al*, Sb, Co*, Cu*, Fe*, Ni, Zn* -> MB53J2, MB53J3

Al*, Be, Co*, Cu*, Mn*, Zn*, Sn* -> MB53J4, MB53J5

Zn* -> MB53K4, MB53K5

Fe* -> MB53L0, MB53N6

The percent differences between the dissolved and total analyte concentrations greater than 50% for the following analytes when the dissolved concentration is greater than its total concentration and ≥5x MDL. Both dissolved and total analytes concentrations have been rejected and qualified "R".

"R" -> Al, Be, Cr, Co, Fe, Pb, Mn, Ni, V, Zn -> MB53H8, MB53H9

Be, Sn -> MB53J2, MB53J3

Zn -> MB53K8, MB53K9

V -> MB53L0, MB53N6

*** already qualified**

SDG MB53L6

ALL QC criteria have been satisfied and the data are assessed to be acceptable and fully usable without qualifications.

NOTE: The laboratory should not run any QC for this SDG since the associated sample is Rinsate blank. However, the laboratory used this field blank sample for MS/DUP/Serial Dilution analyses which is not required.

*** already qualified**

A.2.3.4 Contract-Problem/Non-Compliance:

All SDGs:

1. Form Is: Lab code was missing or was incorrect.
2. Form 4s: The Final Found Solution AB results were incorrect, they do not match with the raw data.

SDG MB52Y1, MB53C6:

1. Form 9s: CRQLs were incorrect for Method Preparation NP1.
2. Form 7s: Almost all Found values were outside the acceptable limits. It appears the provided limits, both lower and higher, were incorrect.

3. Form-1s: Some analytes were not qualified "J" although the results were detects with values below CRQL.

SDG MB53H6, MB53L6:

1. Form-1s: Several analytes were reported as non-detected (U) on the resubmitted Form-1. Based on a review of the raw data, these analytes values are greater than MDL. So these results should be reported as J values. This reviewer has corrected this error on Form-1.

SDG MB53H6:

1. Form-1s: Due to Serial Dilution analysis results for Cr, Co and V fell outside the control limits, Cr, Co and V results were not qualified as E on the resubmitted Form-1.

Corrected forms were requested by the reviewer and were received from the laboratory.

HWSS Reviewer: HS (Signature) Date: 10/30/08

Contractor Reviewer: R. J. Shelley (Signature) Date: 10/30/08

Verified by: C. Hanne (Signature) Date: 10/30/08

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REFERENCE 26

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 12 January 2009

SUBJECT: Grain Size Data for Sediment Samples – Raritan Bay Slag Site

Attached are the analytical data packages for grain size for sediment samples collected from the Raritan Bay in the vicinity of source areas associated with the Raritan Bay Slag site. Analyses for grain size were performed by TestAmerica, South Burlington, Vermont. Background and release samples were collected in the vicinity of two areas of slag material piles, including the Laurence Harbor Seawall (i.e., Source 1) and the western jetty of the Cheesequake Creek Inlet (i.e., Source 2). Background and release sample numbers for each source are as follows:

Source 1 – Laurence Harbor Seawall

Background Samples: RBS-SED01, RBS-SED02, RBS-SED13, RBS-SED84, RBS-SED85

Release Samples: RBS-SED05, RBS-SED06, RBS-SED07, RBS-SED16, RBS-SED17, RBS-SED18, RBS-SED08, RBS-SED19, RBS-SED09, RBS-SED20 RBS-SED10, RBS-SED11, RBS-SED23, RBS-SED12, RBS-SED24, RBS-SED26, RBS-SED25, RBS-SED81, RBS- SED82, RBS-SED83 RBS-SED87, RBS-SED88, RBS-SED33, RBS-SED34, RBS-SED35 RBS-SED30, RBS-SED31, RBS-SED32, RBS-SED27, RBS-SED28, and RBS-SED29

Source 2 – Western Jetty of Cheesequake Creek Inlet

Background Samples: RBS-SED84, RBS-SED85, RBS-SED86, RBS-SED52, RBS-SED63, and RBS-SED64

Note: Dan Gaughan, the project manager of this sampling event, informed me that on September 12, 2008, RBS-SED84, RBS-SED85, RBS-SED86 were incorrectly entered on the chain as RBS-SED81 (p. 108), RBS-SED82 (p. 109), and RBS-SED83 (p. 110).

Release Samples: RBS-SED56, RBS-SED57, RBS-SED58, RBS-SED59, RBS-SED60

A review of the background and release sediment samples associated with Source 1 and Source 2 indicates that sediments consisted of mostly course-grained materials (i.e., sands and gravels) with little organic materials (i.e., silt and clay). Due to the similarities between background and release samples for each of the sources, the analytical results are considered to be comparable for the purpose of Hazard Ranking System (HRS) evaluation. Summary sheets from are included in pages 184 and 185 of this project note.

Signature/Date Dennis J Foerter 1/12/09

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TestAmerica
South Burlington, VT

Extended Data Package

SDG: 127578

(2)

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Case Narrative

(4)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

September 30, 2008

TestAmerica Laboratories, Inc.

Mr. Daniel Gaughan
Weston Solutions
205 Campus Drive
Edison, NJ 08837-3939

Re: Laboratory Project No. 28000
Case: 28000; SDG: 127578

Dear Mr. Gaughan:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 12th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/12/08 ETR No: 127578		
767332	RBS-SED27	09/11/08	SEDIMENT
767333	RBS-SED28	09/11/08	SEDIMENT
767334	RBS-SED29	09/11/08	SEDIMENT
767335	RBS-SED30	09/11/08	SEDIMENT
767336	RBS-SED31	09/11/08	SEDIMENT
767337	RBS-SED32	09/11/08	SEDIMENT
767338	RBS-SED33	09/11/08	SEDIMENT
767339	RBS-SED34	09/11/08	SEDIMENT
767340	RBS-SED35	09/11/08	SEDIMENT
767341	RBS-SED81	09/11/08	SEDIMENT
767342	RBS-SED82	09/11/08	SEDIMENT
767343	RBS-SED83	09/11/08	SEDIMENT

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal.

The samples in this sample set were analyzed for particle size distribution by ASTM D422, and included both the sieve and hydrometer determinations.

Any reference within this report to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

(5)

30 Community Drive • Suite 11 · South Burlington, VT 05403 **tel** 802.660.1990 **fax** 802.660.1919 **www.testamericainc.com**

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

The analytical results associated with the samples presented in this test report were generated under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk Young
Project Manager

KFY/hsf
Enclosure

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody

(7)

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

4124 (0907)

Client	Project Manager	Date	Chain of Custody Number
Weston Solutions	Dan Gaughen	9/11/08	413283
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
205 Campus Dr.	(732) 417-5612		
City / State / Zip Code	**Site Contact**	**Lab Contact**	
Edison NJ 08837	D. Gaughen		
Project Name and Location (State)	**Carrier/Waybill Number**		
Raritan Bay Slag NJ	FedEx / 8541 0029 6923		
Contract/Purchase Order/Quote No.			
00643664			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Grain Size	Special Instructions/ Conditions of Receipt
RBS-SED27	9/11/08	1133			X		X						X	
RBS-SED28		1131			X		X						X	
RBS-SED29		1136			X		X						X	
RBS-SED30		1140			X		X						X	
(8) RBS-SED31		1140			X		X						X	
RBS-SED32		1145			X		X						X	
RBS-SED33		1147			X		X						X	
RBS-SED34		1146			X		X						X	
RBS-SED35		1153			X		X						X	
RBS-SED61		1201			X		X						X	
RBS-SED62		1200			X		X						X	
RBS-SED63		1208			X		X						X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time
1. Relinquished By (Scott Snyder)	9/11/08	1730
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By FedEx	9/11/08	1730
2. Received By	9/12/08	0925
3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

TestAmerica

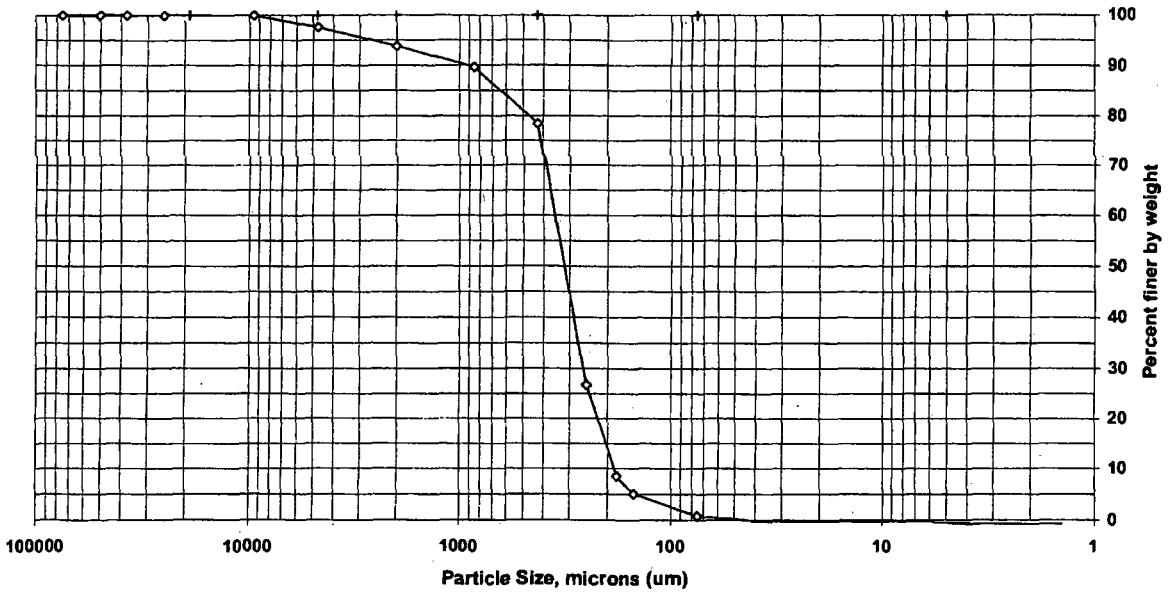
THE LEADER IN ENVIRONMENTAL TESTING

Particle Size Results

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED27	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767332			**End Date:**	09/30/2008

Percent Solids:	79.2%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	97.6	2.4
#10	2000	93.8	3.8
#20	850	89.6	4.1
#40	425	78.4	11.2
#60	250	26.7	51.7
#80	180	8.5	18.2
#100	150	5.1	3.4
#200	75	0.7	4.4
Hydrometer	38.0	-0.3	1.0
|	24.0	-0.3	0.0
|	13.9	-0.3	0.0
|	9.8	-0.3	0.0
|	7.0	-0.3	0.0
|	3.4	-0.8	0.5
V	1.4	-0.8	0.0

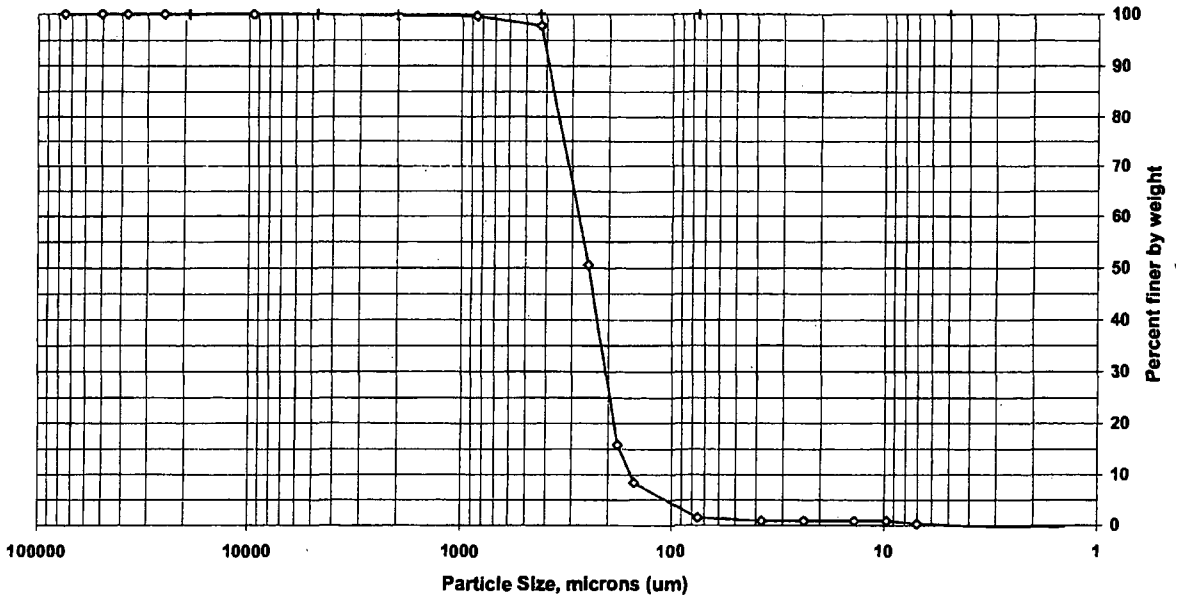
Soil Classification	Percent of Total Sample
Gravel	2.4
Sand	96.9
Coarse Sand	3.8
Medium Sand	15.4
Fine Sand	77.7
Silt	1.0
Clay	-0.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED28	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767333			**End Date:**	09/30/2008

Percent Solids:	77.1%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.7	0.3
#20	850	99.6	0.1
#40	425	97.8	1.8
#60	250	50.6	47.2
#80	180	15.9	34.7
#100	150	8.4	7.4
#200	75	1.5	7.0
Hydrometer	37.7	0.9	0.6
|	23.8	0.9	0.0
|	13.8	0.9	0.0
|	9.7	0.9	0.0
|	7.0	0.3	0.6
|	3.4	-0.3	0.6
V	1.4	-0.3	0.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	98.5
Coarse Sand	0.3
Medium Sand	1.9
Fine Sand	96.3
Silt	1.2
Clay	0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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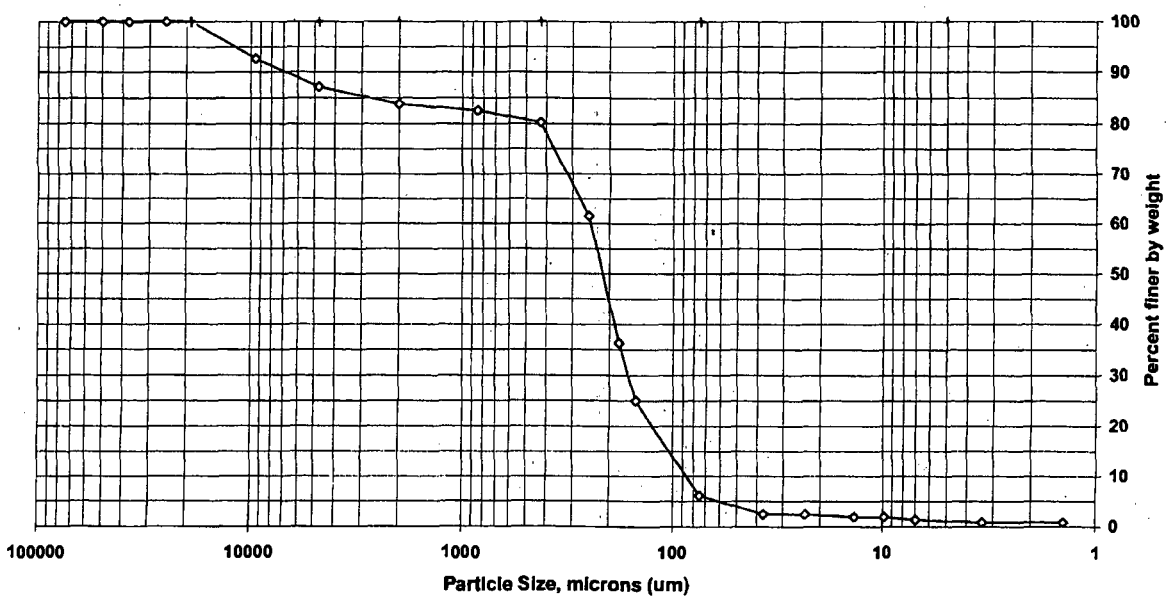
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED29	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767334			**End Date:**	09/30/2008

Percent Solids:	76.4%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	92.6	7.4
#4	4750	87.1	5.5
#10	2000	83.8	3.3
#20	850	82.5	1.3
#40	425	80.2	2.3
#60	250	61.5	18.7
#80	180	36.3	25.2
#100	150	25.0	11.3
#200	75	6.1	18.9
Hydrometer	37.2	2.4	3.7
|	23.5	2.4	0.0
|	13.6	1.9	0.5
|	9.8	1.9	0.0
|	7.0	1.4	0.5
|	3.4	0.8	0.5
V	1.4	0.8	0.0

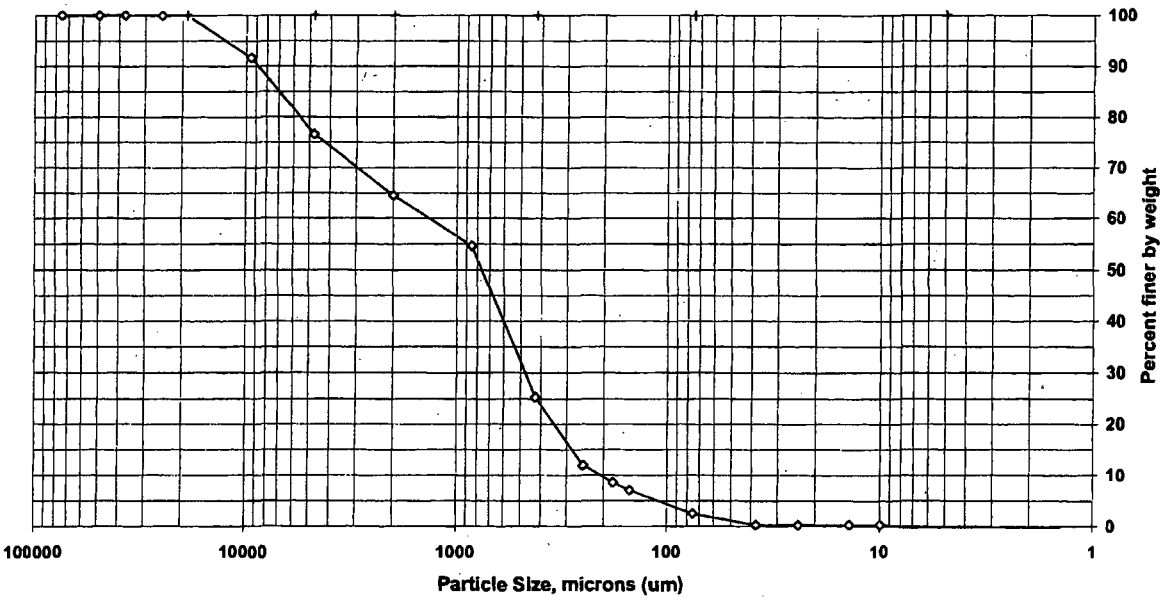
Soil Classification	Percent of Total Sample
Gravel	12.9
Sand	81.0
Coarse Sand	3.3
Medium Sand	3.6
Fine Sand	74.1
Silt	4.7
Clay	1.4

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED30	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767335			**End Date:**	09/30/2008

Percent Solids:	89.5%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	91.7	8.3
#4	4750	76.6	15.1
#10	2000	64.5	12.0
#20	850	54.6	9.9
#40	425	25.3	29.3
#60	250	11.9	13.4
#80	180	8.6	3.3
#100	150	7.1	1.5
#200	75	2.5	4.6
Hydrometer	37.9	0.2	2.2
I	23.9	0.2	0.0
I	13.8	0.2	0.0
I	9.9	0.2	0.0
I	6.8	-0.2	0.5
I	3.4	-0.2	0.0
V	1.4	-0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	23.4
Sand	74.1
Coarse Sand	12.0
Medium Sand	39.2
Fine Sand	22.9
Silt	2.7
Clay	-0.2

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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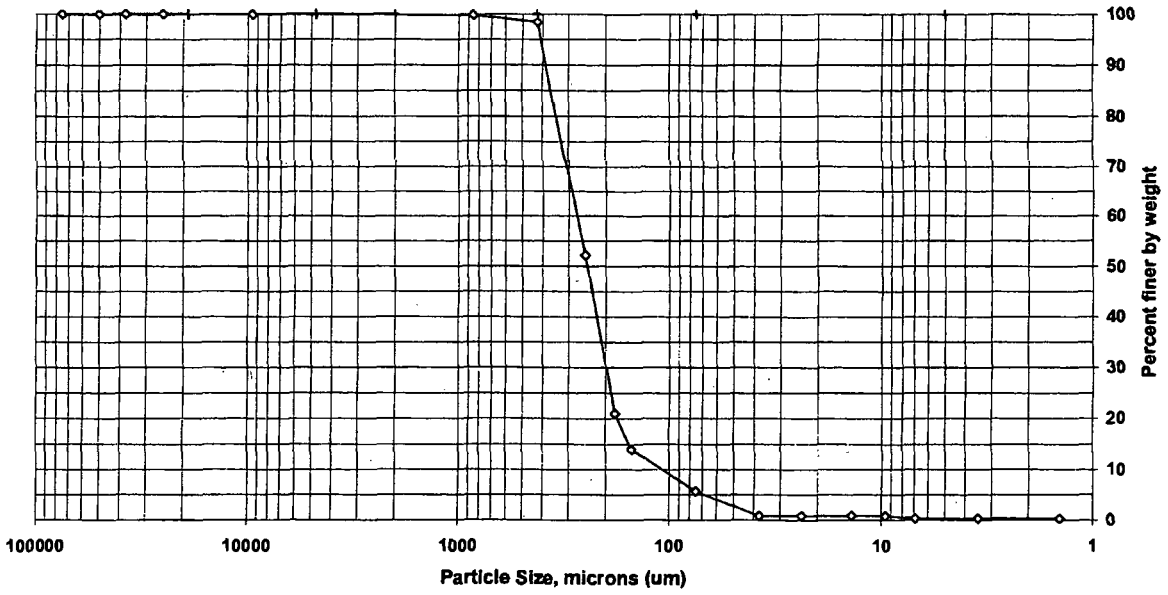
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED31	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767336			**End Date:**	09/30/2008

Percent Solids:	82.6%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.9	0.1
#20	850	99.8	0.1
#40	425	98.4	1.4
#60	250	52.1	46.3
#80	180	20.9	31.2
#100	150	14.0	7.0
#200	75	5.7	8.3
Hydrometer	37.7	0.8	4.8
|	23.8	0.8	0.0
|	13.8	0.8	0.0
|	9.6	0.8	0.0
|	6.9	0.3	0.5
|	3.5	0.3	0.0
V	1.4	0.3	0.0

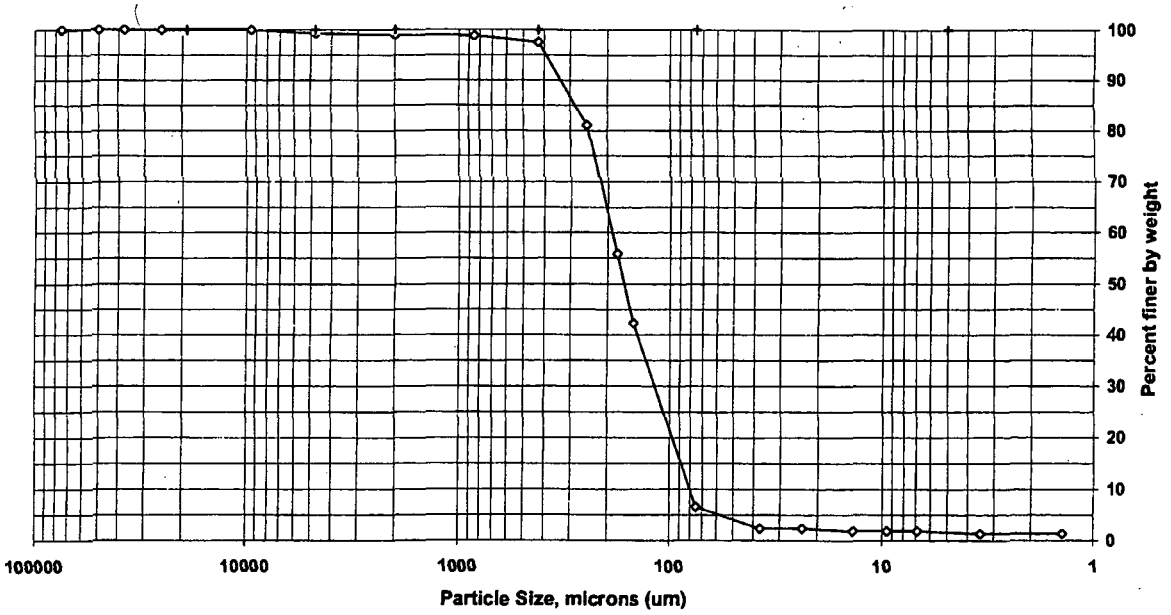
Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	94.3
Coarse Sand	0.1
Medium Sand	1.5
Fine Sand	92.8
Silt	5.4
Clay	0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED32	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767337			**End Date:**	09/30/2008

Percent Solids:	75.1%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	na
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.3	0.7
#10	2000	99.0	0.2
#20	850	98.8	0.2
#40	425	97.5	1.3
#60	250	81.1	16.5
#80	180	55.8	25.3
#100	150	42.3	13.5
#200	75	6.6	35.7
Hydrometer	37.2	2.4	4.2
|	23.5	2.4	0.0
|	13.6	1.8	0.5
|	9.5	1.8	0.0
|	6.9	1.8	0.0
|	3.5	1.3	0.5
V	1.4	1.3	0.0

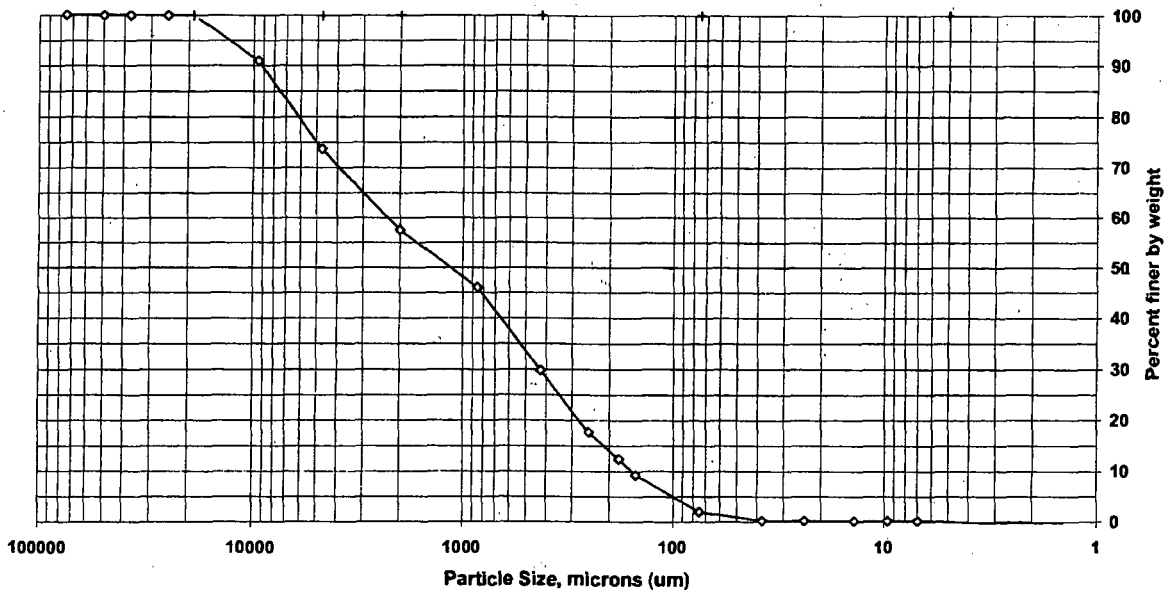
Soil Classification	Percent of Total Sample
Gravel	0.7
Sand	92.7
Coarse Sand	0.2
Medium Sand	1.5
Fine Sand	91.0
Silt	4.7
Clay	1.8

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED33	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767338			**End Date:**	09/30/2008

Percent Solids:	86.9%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	90.9	9.1
#4	4750	73.7	17.2
#10	2000	57.5	16.2
#20	850	46.0	11.5
#40	425	29.8	16.2
#60	250	17.7	12.1
#80	180	12.4	5.3
#100	150	9.3	3.1
#200	75	2.0	7.3
Hydrometer	37.9	0.2	1.8
|	23.9	0.2	0.0
|	13.8	0.2	0.0
|	9.6	0.2	0.0
|	7.0	0.2	0.0
|	3.3	-0.2	0.4
V	1.4	-0.2	0.0

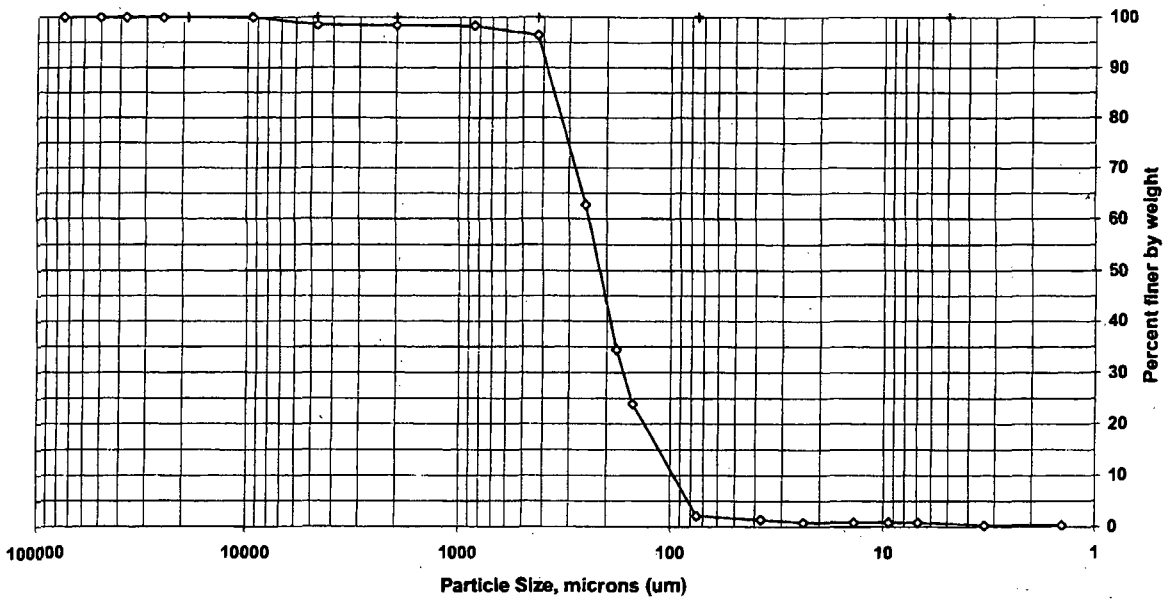
Soil Classification	Percent of Total Sample
Gravel	26.3
Sand	71.7
Coarse Sand	16.2
Medium Sand	27.7
Fine Sand	27.8
Silt	1.8
Clay	0.2

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED34	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767339			**End Date:**	09/30/2008

Percent Solids:	77.3%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	na
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.5	1.5
#10	2000	98.4	0.1
#20	850	98.3	0.1
#40	425	96.4	1.9
#60	250	62.7	33.7
#80	180	34.4	28.3
#100	150	23.9	10.5
#200	75	2.1	21.8
Hydrometer	37.5	1.3	0.8
|	23.8	0.8	0.5
|	13.8	0.8	0.0
|	9.4	0.8	0.0
|	*6.9*	*0.8*	*0.0*
|	3.3	0.3	0.5
V	1.4	0.3	0.0

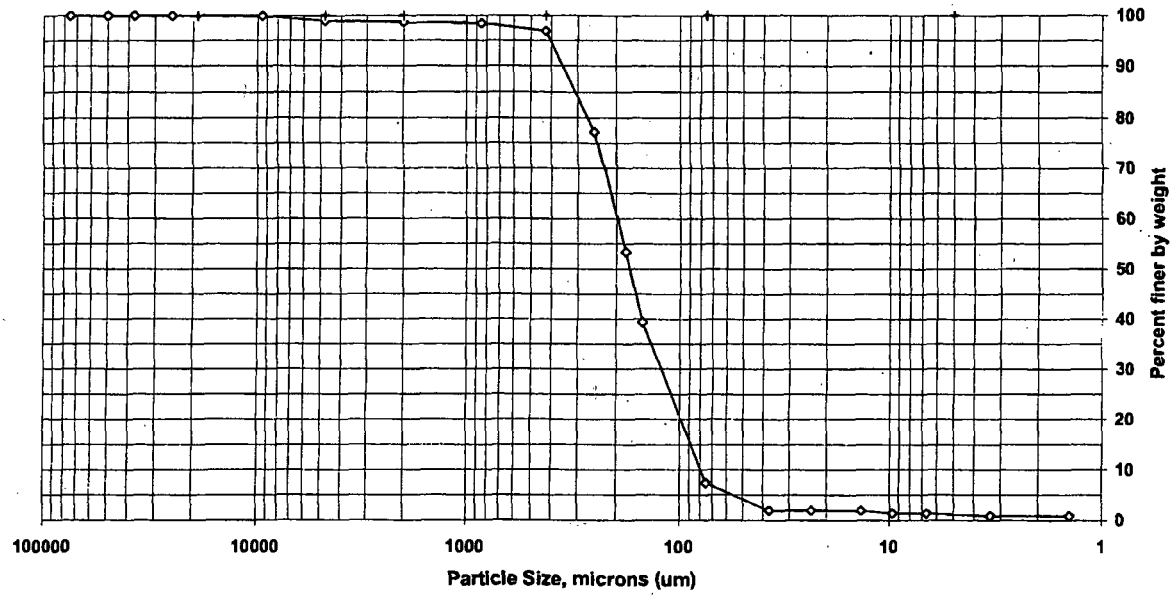
Soil Classification	Percent of Total Sample
Gravel	1.5
Sand	96.4
Coarse Sand	0.1
Medium Sand	2.0
Fine Sand	94.3
Silt	1.3
Clay	0.8

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED35	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767340			**End Date:**	09/30/2008

Percent Solids:	74.7%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	na
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.9	1.1
#10	2000	98.7	0.2
#20	850	98.5	0.3
#40	425	96.9	1.5
#60	250	77.2	19.7
#80	180	53.3	23.9
#100	150	39.4	13.9
#200	75	7.4	32.0
Hydrometer	37.4	1.9	5.5
|	23.6	1.9	0.0
|	13.6	1.9	0.0
|	9.7	1.4	0.5
|	6.7	1.4	0.0
|	3.4	0.8	0.5
V	1.4	0.8	0.0

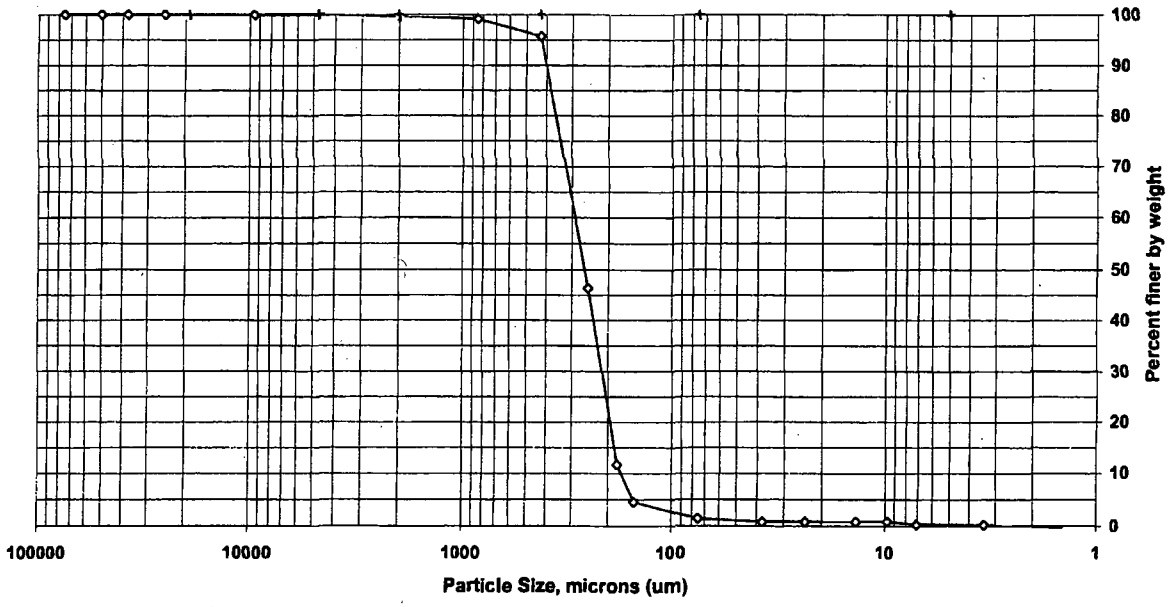
Soil Classification	Percent of Total Sample
Gravel	1.1
Sand	91.6
Coarse Sand	0.2
Medium Sand	1.8
Fine Sand	89.5
Silt	6.0
Clay	1.4

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED81	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767341			**End Date:**	09/30/2008

Percent Solids:	79.9%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	angular
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.6	0.4
#20	850	99.2	0.5
#40	425	95.7	3.5
#60	250	46.3	49.3
#80	180	11.7	34.7
#100	150	4.6	7.1
#200	75	1.4	3.2
Hydrometer	37.7	0.8	0.6
|	23.8	0.8	0.0
|	13.8	0.8	0.0
|	9.7	0.8	0.0
|	7.1	0.3	0.5
|	3.4	0.3	0.0
V	1.4	-0.3	0.5

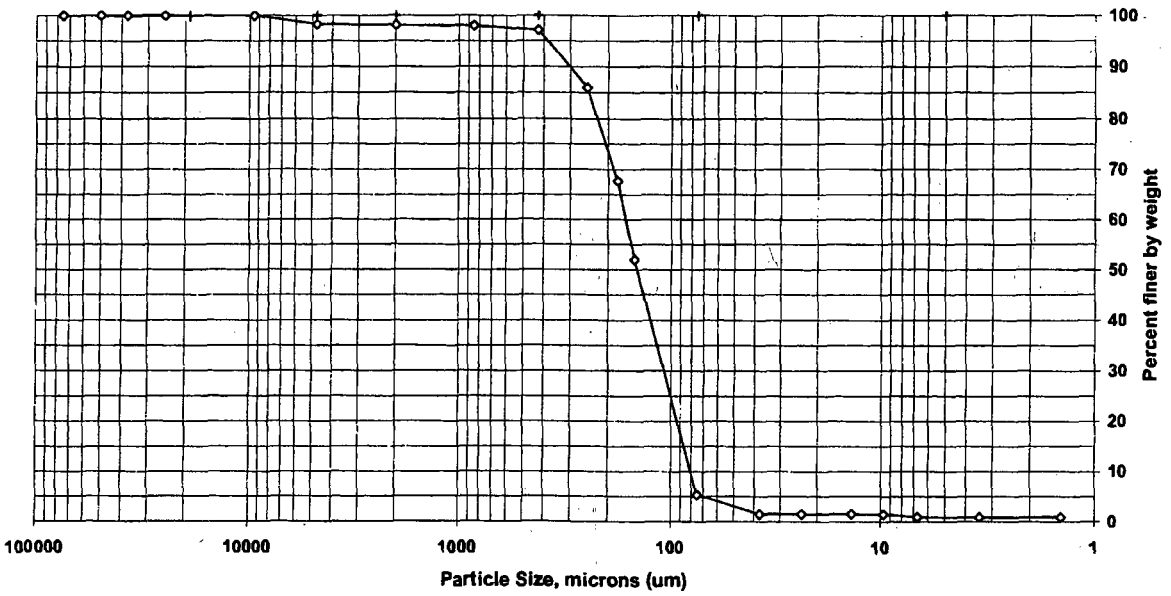
Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	98.6
Coarse Sand	0.4
Medium Sand	4.0
Fine Sand	94.3
Silt	1.1
Clay	0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED82	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767342			**End Date:**	09/30/2008

Percent Solids:	77.2%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	na
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.3	1.7
#10	2000	98.1	0.1
#20	850	98.0	0.1
#40	425	97.1	0.9
#60	250	85.9	11.2
#80	180	67.7	18.2
#100	150	52.0	15.8
#200	75	5.3	46.6
Hydrometer	37.5	1.4	3.9
|	23.7	1.4	0.0
|	13.7	1.4	0.0
|	9.7	1.4	0.0
|	6.7	0.9	0.6
|	3.4	0.9	0.0
V	1.4	0.9	0.0

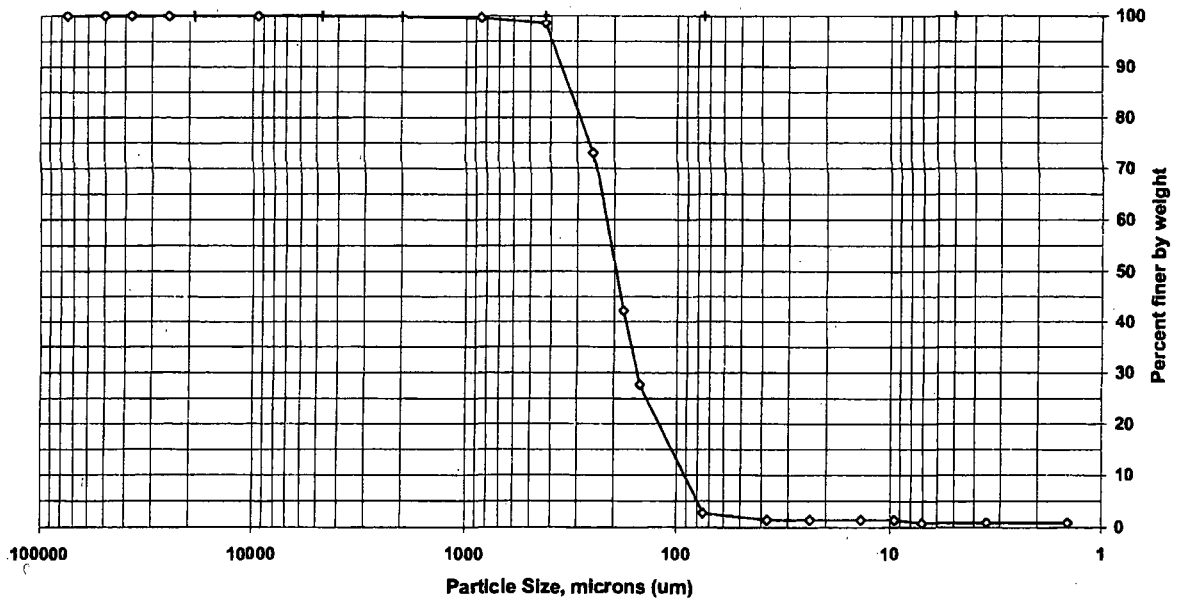
Soil Classification	Percent of Total Sample
Gravel	1.7
Sand	92.9
Coarse Sand	0.1
Medium Sand	1.0
Fine Sand	91.8
Silt	4.5
Clay	0.9

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127578	**Date Received:**	09/12/2008
Sample ID:	RBS-SED83	**ETR(s):**	127578	**Start Date:**	09/12/2008
Lab ID:	767343			**End Date:**	09/30/2008

Percent Solids:	72.3%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	99.7	0.2
#40	425	98.6	1.1
#60	250	73.0	25.6
#80	180	42.2	30.8
#100	150	27.7	14.5
#200	75	2.7	24.9
Hydrometer	37.5	1.4	1.3
|	23.7	1.4	0.0
|	13.7	1.4	0.0
|	9.5	1.4	0.0
|	7.1	0.9	0.6
|	3.5	0.9	0.0
V	1.4	0.9	0.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	97.3
Coarse Sand	0.2
Medium Sand	1.3
Fine Sand	95.9
Silt	1.9
Clay	0.9

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(21)

FSL024:07.29.05:0
TestAmerica Burlington

127578PS.xls 09/30/2008

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number
127578

Client Code: WESTN4
SDG: 127578
ETR(s): 127578

Date Received: 12-Sep-08
Start Date: 12-Sep-08
End Date: 30-Sep-08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9/25/08	MAP 9/25/08	DPS 9/26/08	MAP 9/26/08	DPS 9/26/08	DPS 9/29/08
DPS 9/26/08			DPS 9/27/08	DJP 9/30/08	DJP 9/30/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767332	767333	767334	767335	767336	767337	767338	767339	767340	767341	767342	767343
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0030	1.0040	1.0055	1.0035	1.0040	1.0055	1.0035	1.0045	1.0050	1.0040	1.0045	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0030	1.0040	1.0055	1.0035	1.0040	1.0055	1.0035	1.0040	1.0050	1.0040	1.0045	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0030	1.0040	1.0050	1.0035	1.0040	1.0050	1.0035	1.0040	1.0050	1.0040	1.0045	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0030	1.0040	1.0050	1.0035	1.0040	1.0050	1.0035	1.0040	1.0045	1.0040	1.0045	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0030	1.0035	1.0045	1.0030	1.0035	1.0050	1.0035	1.0040	1.0045	1.0035	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0025	1.0030	1.0040	1.0030	1.0035	1.0045	1.0030	1.0035	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0025	1.0030	1.0040	1.0030	1.0035	1.0045	1.0030	1.0035	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** ELE **Hydrometer start time:** 17:00

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0	1.0035	23.0	1.0030

Cal. Date: 09/09/07 **Hydrometer data entered:** DJP 9/30/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127578

Client Code: WESTN4
SDG: 127578
ETR(s): 127578

Date Received: 12-Sep-08
Start Date: 12-Sep-08
End Date: 9.30.08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9.25.08 DP= 9/26/08	MAP 9-25-08	DPS 9/26/08	MAP 9.26.08 DPS 9/27/08	DPS 9/26/08 DDN 9.30.08	DPS 09/29/08 DDN 9.30.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767332	767333	767334	767335	767336	767337	767338	767339	767340	767341	767342	767343
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0030	1.0040	1.0055	1.0035	1.0040	1.0055	1.0035	1.0045	1.0050	1.0050	1.0040	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0030	1.0040	1.0055	1.0035	1.0040	1.0055	1.0035	1.0040	1.0050	1.0035	1.0040	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0030	1.0040	1.0050	1.0035	1.0040	1.0050	1.0035	1.0040	1.0050	1.0040	1.0040	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0030	1.0040	1.0050	1.0035	1.0040	1.0050	1.0035	1.0040	1.0045	1.0040	1.0045	1.0045
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0030	1.0035	1.0045	1.0030	1.0035	1.0050	1.0035	1.0040	1.0045	1.0035	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0025	1.0030	1.0040	1.0030	1.0035	1.0045	1.0030	1.0035	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0025	1.0030	1.0040	1.0030	1.0035	1.0045	1.0030	1.0035	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: ~~152H~~ 151H Model #: ASTM 151H Manufacturer: Hydrometer start time: 1700

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0		23.0	

Cal. Date: Hydrometer data entered: DDN 9-30-08

513119

* MAP 9.26.08

Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 | ETR(s): 127578 | SDG: 127578 | Date Rec: 12-Sep-08 | Start Date: 12-Sep-08 | End Date: 30-Sep-08

SET: 127578

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767332	767333	767334	767335	767336	767337	767338	767339	767340	767341	767342	767343
Sample ID	RBS-SED27	RBS-SED28	RBS-SED29	RBS-SED30	RBS-SED31	RBS-SED32	RBS-SED33	RBS-SED34	RBS-SED35	RBS-SED01	RBS-SED02	RBS-SED03
Sample Prep	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217
Pan, g												
Pan/sample, g	194.02	183.69	194.48	187.53	176.83	203.68	210.75	199.80	197.05	186.03	179.92	194.73
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	1.05	1.02	1.01	1.06	1.05	1.04	1.03	1.04	1.05	1.05	1.05	1.02
Pan/sample, g	25.69	22.57	40.04	28.89	24.85	39.68	23.38	27.96	25.78	29.08	28.50	28.94
Pan/dry sample, g	20.58	17.64	30.82	25.07	20.79	30.04	20.43	21.85	19.63	23.45	23.01	19.75
HMCF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Description of >#10 particles												
Non-soil material	shells	shells	shells	shells	shells	shells	shells	shells	shells	shells	shells	shells
Shape	subangular	subangular	subangular	subangular	subangular	na	subangular	na	na	angular	na	na
Hardness	hard	hard	hard	hard	hard	na	hard	na	na	hard	na	na
Sample % Solids	79.2%	77.1%	76.4%	89.5%	82.6%	75.1%	88.9%	77.3%	74.7%	79.9%	77.2%	72.3%
Dry sample wt, g	153.63	141.67	148.54	167.85	146.05	153.00	183.10	150.43	147.25	149.38	138.88	140.71

24

Sieve (tares)		
Size	Mass, g	
3 inch		
2 inch		
1.5 inch		
1 inch		
3/4 inch	457.94	
3/8 inch	447.60	
#4	488.36	
#10	465.31	
#20	392.88	A
#40	380.62	A
#60	326.53	A
#80	335.06	A
#100	339.12	A
#200	323.29	A

Sieve + Sample Weights

Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch												
3/8 inch			458.81	461.58			464.18					
#4	492.09		496.48	513.69		489.46	519.60	490.50	488.91		490.75	
#10	471.14	465.71	470.24	485.53	465.46	465.69	494.66	465.47	465.63	465.86	465.40	465.53
#20	399.23	393.08	394.78	399.53	393.07	393.18	403.96	393.06	393.29	393.67	393.08	393.11
#40	397.88	393.17	394.09	429.75	392.81	392.62	410.31	393.42	392.90	395.84	391.64	392.16
#60	405.96	393.39	354.33	349.02	394.13	351.72	388.70	377.29	355.60	400.22	342.09	362.54
#80	393.08	394.25	372.49	340.67	390.66	373.71	344.74	377.91	370.19	396.84	360.33	376.38
#100	338.32	343.63	340.93	336.70	342.31	353.80	338.82	348.95	353.58	343.74	355.01	353.58
#200	330.00	393.18	351.31	330.99	336.43	377.95	336.64	356.06	370.46	328.02	368.03	358.39

Maximum Particle size

	9.5 mm	Crs sand	19 mm	19 mm	Crs sand	9.5 mm	19 mm	9.5 mm	9.5 mm	Crs sand	9.5 mm	Crs sand

Default SG 2.65

Specific gravity	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650

Sample Mass Parameters

Sample Mass >#10, g	9.56	0.40	24.06	59.53	0.14	1.48	77.77	2.40	1.87	0.55	2.57	0.22
Sample mass <#10, g	144.07	141.27	124.48	108.32	145.91	151.52	105.33	148.03	145.38	148.83	136.31	140.49

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THE LEADER IN ENVIRONMENTAL TESTING

Sample Handling

(25)

SDG: 127578

TestAmerica Burlington

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9/12/08
0925

FedEx. US Airbill
Express.

8541 0029 6923

0200

Form ID No.

FedEx Retrieval Copy

1 From

Date 9/11/08 Sender's FedEx Account Number 3967758823

Sender's Name Scott Snyder Phone 732 417-5800

Company Weston Solutions, Inc.

Address 205 Campus Dr

Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference

3 To

Recipient's Name Kirk Young Phone 802 660-1990

Company Test America Labs

Recipient's Address 30 Community Dr. Ste 11

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Dept./Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. Packages up to 150 lbs. * To most locations.

1 [X] FedEx Priority Overnight Next business morning.* 5 [ ] FedEx Standard Overnight Next business afternoon.* 6 [ ] FedEx First Overnight Earliest next business morning delivery to select locations.*

20 [ ] FedEx 2Day Second business day.* 20 [ ] FedEx Express Saver Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. Packages over 150 lbs. ** To most locations.

7 [ ] FedEx 1Day Freight* Next business day.** 22 [ ] FedEx 2Day Freight Second business day.** 23 [ ] FedEx 3Day Freight Third business day.**

* Call for Confirmation.

5 Packaging * Declared value limit $500.

6 [ ] FedEx Envelope* 2 [ ] FedEx Pak* Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak. 3 [ ] FedEx Box 4 [ ] FedEx Tube 1 [X] Other

6 Special Handling Include FedEx address in Section 3.

3 [ ] SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.

1 [ ] HOLD Weekday at FedEx Location Not available for FedEx First Overnight.

31 [ ] HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

[X] No 4 [ ] Yes As per attached Shipper's Declaration [ ] Yes Shipper's Declaration not required. 6 [ ] Dry Ice Dry Ice, 9, UN 1845 x kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging. [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip Acct. No. [ ]

1 [X] Sender Acct. No. in Section 1 will be billed. 2 [ ] Recipient 3 [ ] Third Party 4 [ ] Credit Card 5 [ ] Cash/Check

FedEx Acct. No. Credit Card No. Exp. Date

Total Packages Total Weight Total Charges

Credit Card Auth

Our liability is limited to $100 unless you declare a higher value. See the current FedEx Service Guide for details.

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

[ ] No Signature Required Package may be left without obtaining a signature for delivery. 10 [ ] Direct Signature Anyone at recipient's address may sign for delivery. Fee applies. 34 [ ] Indirect Signature If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

520

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8541 0029 6923

TestAmerica Burlington

SAMPLE RECEIPT & LOG IN CHECKLIST

Client: WESTN4	Date Received: 09-12-08	Log In Date: 9/12/08
ETR: 127578	Time Received: 0925	By: BY
SDG: 127578	Received By: GTM	Signature:
Project: 28000	# Coolers Received: 1	PM Signature:
Samples Delivered By: ☒ Shipping Service ☐ Courier ☐ Hand ☐ Other (specify)		Date: 09/15/08
List Air bill Number(s) or Attach a photocopy of the Air Bill:		

COOLER SCREEN	YES	NO	NA	COMMENTS
There is *no* evidence to indicate tampering	X			
Custody seals are present and intact	X			
Custody seal numbers are present		X		
If yes, list custody seal numbers:				

Thermal Preservation Type: ☒ Wet Ice ☐ Blue Ice ☐ None ☐ Other (specify)

IR Gun ID: 96	Correction Factor (CF) = -1 °C		
Cooler 1: 3.1 °C	Cooler 6 °C	Cooler 11 °C	Cooler 16 °C
Cooler 2: °C	Cooler 7 °C	Cooler 12 °C	Cooler 17 °C
Cooler 3: °C	Cooler 8 °C	Cooler 13 °C	Cooler 18 °C
Cooler 4: °C	Cooler 9 °C	Cooler 14 °C	Cooler 19 °C
Cooler 5 °C	Cooler 10 °C	Cooler 15 °C	Cooler 20 °C

Unless otherwise documented, the recorded temperature readings are adjusted readings to account for the CF of the IR Gun

EPA Criteria: 0-6°C, except for air and geo samples which should be at ambient temperature and tissue samples, which may be frozen.

Some clients require thermal preservation criteria of 2-4°C or other such criteria. The PM must notify SM when alternate criteria is specified.

SAMPLE CONDITION	YES	NO	NA	COMMENTS
Sample containers were received intact	X			
Legible sample labels are affixed to each container	X			

CHAIN OF CUSTODY (COC)	YES	NO	NA	COMMENTS
COC is present and includes the following information for each container:				
• Sample ID / Sample Description	X			
• Date of Sample Collection	X			
• Time of Sample Collection	X			
• Identification of the Sampler	X			
• Preservation Type			X	
• Requested Tests Method(s)	X			
• Necessary Signatures	X			
Internal Chain of Custody (ICOC) Required		X		
If yes to above, ICOC Record initiated for every Worksheet			X	

SAMPLE INTEGRITY / USABILITY	YES	NO	NA	COMMENTS
The sample container matches the COC	X			
Appropriate sample containers were received for the tests requested	X			
Samples were received within holding time	X			
Sufficient amount of sample is provided for requested analyses	X			
VOA vials do not have headspace or a bubble >6mm (1/4" diameter)			X	
Appropriate preservatives were used for the tests requested			X	
pH of inorganic samples checked and is within method specification			X	
If no, attach Inorganic Sample pH Adjustment Form			X	

ANOMALY / NCR SUMMARY

FSR002:12.19.07:3
TestAmerica Burlington

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THE LEADER IN ENVIRONMENTAL TESTING

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TestAmerica
South Burlington, VT

Extended Data Package

SDG: 127554

(2a)

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Chain of Custody 2
Particle Size Results 5
Sample Handling 25
Last Page of this Document 27

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Case Narrative

(31)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

September 30, 2008

TestAmerica Laboratories, Inc.

Mr. Daniel Gaughan
Weston Solutions
205 Campus Drive
Edison, NJ 08837-3939

Re: Laboratory Project No. 28000
Case: 28000; SDG: 127554

Dear Mr. Gaughan:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 11th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/11/08 ETR No: 127554		
767234	RBS-SED01	09/10/08	SEDIMENT
767235	RBS-SED03	09/10/08	SEDIMENT
767236	RBS-SED04	09/10/08	SEDIMENT
767237	RBS-SED05	09/10/08	SEDIMENT
767238	RBS-SED13	09/10/08	SEDIMENT
767239	RBS-SED14	09/10/08	SEDIMENT
767240	RBS-SED15	09/10/08	SEDIMENT
767241	RBS-SED06	09/10/08	SEDIMENT
767242	RBS-SED16	09/10/08	SEDIMENT
767243	RBS-SED65	09/10/08	SEDIMENT
767244	RBS-SED66	09/10/08	SEDIMENT
767245	RBS-SED67	09/10/08	SEDIMENT
767246	RBS-SED68	09/10/08	SEDIMENT

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal.

The samples in this sample set were analyzed for particle size distribution by ASTM D422, and included both the sieve and hydrometer determinations.

Any reference within this report to Severn Trent Laboratories, Inc. or STL, should be understood

30 Community Drive • Suite 11 South Burlington, VT 05403 tel 802.660.1990 fax 802.660.1919 www.testamericainc.com

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.) The analytical results associated with the samples presented in this test report were generated under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk Young
Project Manager

Enclosure

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody

(34)

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: Weston	Project Manager: Dan Croughan	Date: 9/10/08	Chain of Custody Number: 364635
Address: 205 Campus Dr.	Telephone Number (Area Code)/Fax Number: 732-417-5869 732-417-5801	Lab Number:	Page 1 of 2
City: Edison; State: NJ; Zip Code: 08837	Site Contact: Dan Croughan	Lab Contact: Kate Young	
Project Name and Location (State): Raritan River Study	Carrier/Waybill Number: 8541 6029 6577		
Contract/Purchase Order/Quote No.: CO641364			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Ice	Analysis: Grain Size/Hydrometer	Special Instructions/ Conditions of Receipt
RBS-SED01	9/10/08	0921			X								X	X	
RBS-SED03	9/10/08	0945			X								X	X	
RBS-SED04	9/10/08	1002			X								X	X	
RBS-SED05	9/10/08	1030			X								X	X	
RBS-SED12	9/10/08	0930			X								X	X	
RBS-SED14	9/10/08	1000			X								X	X	
RBS-SED15	9/10/08	1015			X								X	X	
RBS-SED06	9/10/08	1048			X								X	X	
RBS-SED10	9/10/08	1040			X								X	X	
RBS-SED65	9/10/08	1359			X								X	X	
RBS-SED66	9/10/08	1417			X								X	X	
RBS-SED67	9/10/08	1500			X								X	X	

(35)

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: [illegible]	9/10/08	1730	1. Received By: FedEx	9/10/08	1730
2. Relinquished By	Date	Time	2. Received By: Samples received by James Garham on 09/11/08 @ 0942 hours	Date	Time
3. Relinquished By	Date	Time	3. Received By: JEC 9/30/08	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: Weston	Project Manager: Dan Gaughan	Date: 9/10/08	Chain of Custody Number: 061636
Address: 205 Campus Dr.	Telephone Number (Area Code)/Fax Number: 732-417-5869 732-417-5861	Lab Number:	Page 2 of 2
City: Edison; State: NJ; Zip Code: 08837	Site Contact: Dan Gaughan; Lab Contact: Kirk Young		
Project Name and Location (State): Raritan Bay Slag	Carrier/Waybill Number: 8541 0029 6577		
Contract/Purchase Order/Quote No.: [illegible]			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	ICE	Grain Size w/Hydrometry	Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt
KBS-SED68	9/10/08	1439			X								X	X		

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify):

	Date	Time		Date	Time
1. Relinquished By: [signature]	9/10/08	1730	1. Received By: Fed Ex	9/10/08	1730
2. Relinquished By:			2. Received By: Samples received by James Gorham on 09/11/08 @ 0940 hours		
3. Relinquished By:			3. Received By: JEG 9/30/08		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

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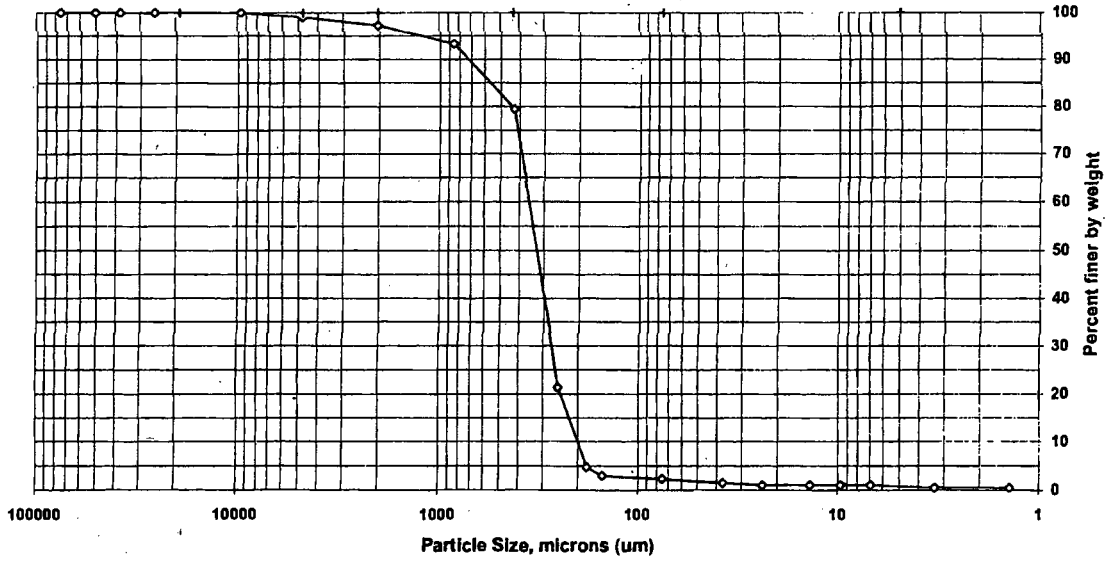
THE LEADER IN ENVIRONMENTAL TESTING

Particle Size Results

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED01	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767234			**End Date:**	9/30/2008

Percent Solids:	81.2%		**Non-soil material:**	na
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.0	1.0
#10	2000	97.2	1.8
#20	850	93.3	4.0
#40	425	79.4	13.8
#60	250	21.4	58.1
#80	180	4.8	16.6
#100	150	3.0	1.8
#200	75	2.3	0.7
Hydrometer	37.2	1.5	0.8
|	23.6	1.0	0.5
|	13.6	1.0	0.0
|	9.6	1.0	0.0
|	6.9	1.0	0.0
|	3.3	0.5	0.5
V	1.4	0.5	0.0

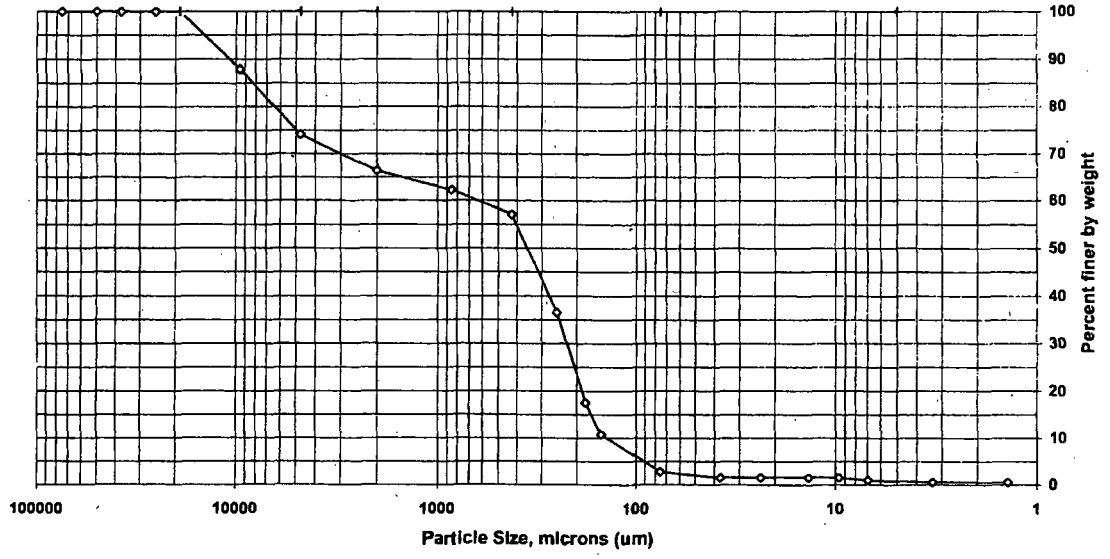
Soil Classification	Percent of Total Sample
Gravel	1.0
Sand	96.8
Coarse Sand	1.8
Medium Sand	17.8
Fine Sand	77.2
Silt	1.3
Clay	1.0

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED03	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767235			**End Date:**	9/30/2008

Percent Solids:	81.5%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	87.9	12.1
#4	4750	74.2	13.7
#10	2000	66.4	7.8
#20	850	62.2	4.2
#40	425	57.1	5.1
#60	250	36.5	20.6
#80	180	17.5	19.0
#100	150	10.8	6.7
#200	75	2.8	8.0
Hydrometer	37.2	1.6	1.3
I	23.5	1.6	0.0
I	13.6	1.6	0.0
I	9.6	1.6	0.0
I	6.9	1.0	0.5
I	3.3	0.5	0.5
V	1.4	0.5	0.0

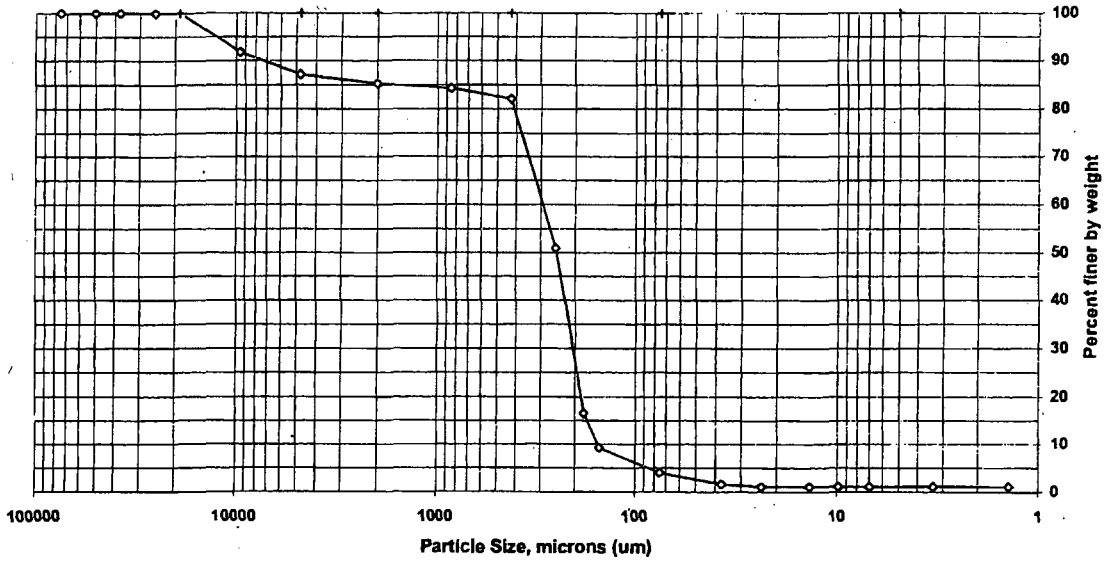
Soil Classification	Percent of Total Sample
Gravel	25.8
Sand	71.3
Coarse Sand	7.8
Medium Sand	9.3
Fine Sand	54.3
Silt	1.8
Clay	1.0

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED04	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767236			**End Date:**	9/30/2008

Percent Solids:	76.0%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	91.8	8.2
#4	4750	87.2	4.6
#10	2000	85.3	1.8
#20	850	84.3	1.0
#40	425	82.1	2.2
#60	250	50.9	31.2
#80	180	16.6	34.4
#100	150	9.2	7.4
#200	75	4.0	5.2
Hydrometer	37.2	1.6	2.4
|	23.6	1.1	0.5
|	13.6	1.1	0.0
|	9.8	1.1	0.0
|	6.9	1.1	0.0
|	3.3	1.1	0.0
V	1.4	1.1	0.0

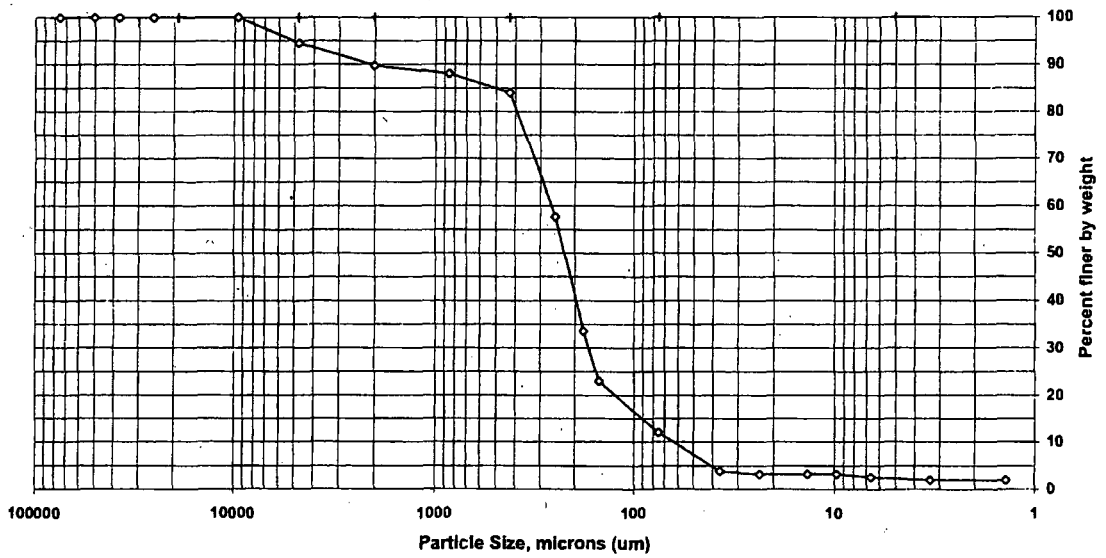
Soil Classification	Percent of Total Sample
Gravel	12.8
Sand	83.2
Coarse Sand	1.8
Medium Sand	3.2
Fine Sand	78.1
Silt	2.9
Clay	1.1

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED05	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767237			**End Date:**	9/30/2008

Percent Solids:	73.4%		**Non-soil material:**	shells,plant
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	94.5	5.5
#10	2000	89.8	4.8
#20	850	88.1	1.7
#40	425	84.0	4.0
#60	250	57.7	26.3
#80	180	33.6	24.1
#100	150	23.1	10.6
#200	75	12.0	11.1
Hydrometer	36.7	3.8	8.2
I	23.3	3.2	0.6
I	13.5	3.2	0.0
I	9.7	3.2	0.0
I	6.6	2.6	0.6
I	3.3	1.9	0.6
V	1.4	1.9	0.0

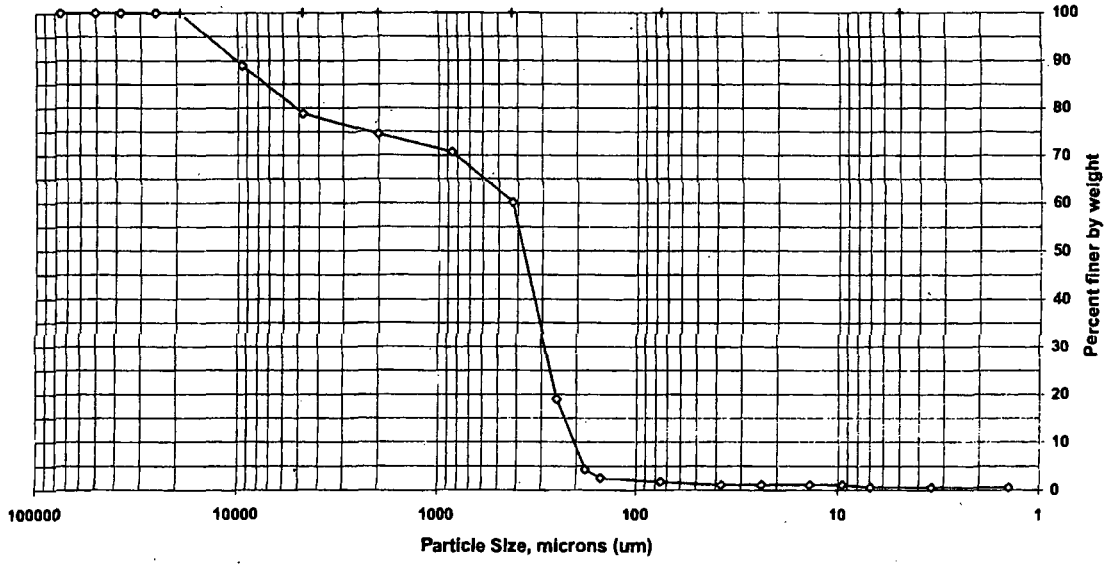
Soil Classification	Percent of Total Sample
Gravel	5.5
Sand	82.5
Coarse Sand	4.8
Medium Sand	5.7
Fine Sand	72.0
Silt	9.5
Clay	2.6

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED13	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767238			**End Date:**	9/30/2008

Percent Solids:	82.4%		**Non-soil material:**	plant
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	88.9	11.1
#4	4750	78.8	10.1
#10	2000	74.6	4.2
#20	850	70.7	3.8
#40	425	60.2	10.5
#60	250	19.0	41.2
#80	180	4.3	14.7
#100	150	2.5	1.8
#200	75	1.7	0.7
Hydrometer	37.4	1.1	0.7
|	23.6	1.1	0.0
|	13.6	1.1	0.0
|	9.5	1.1	0.0
|	6.9	0.5	0.5
|	3.4	0.5	0.0
V	1.4	0.5	0.0

Soil Classification	Percent of Total Sample
Gravel	21.2
Sand	77.1
Coarse Sand	4.2
Medium Sand	14.4
Fine Sand	58.5
Silt	1.2
Clay	0.5

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(12)

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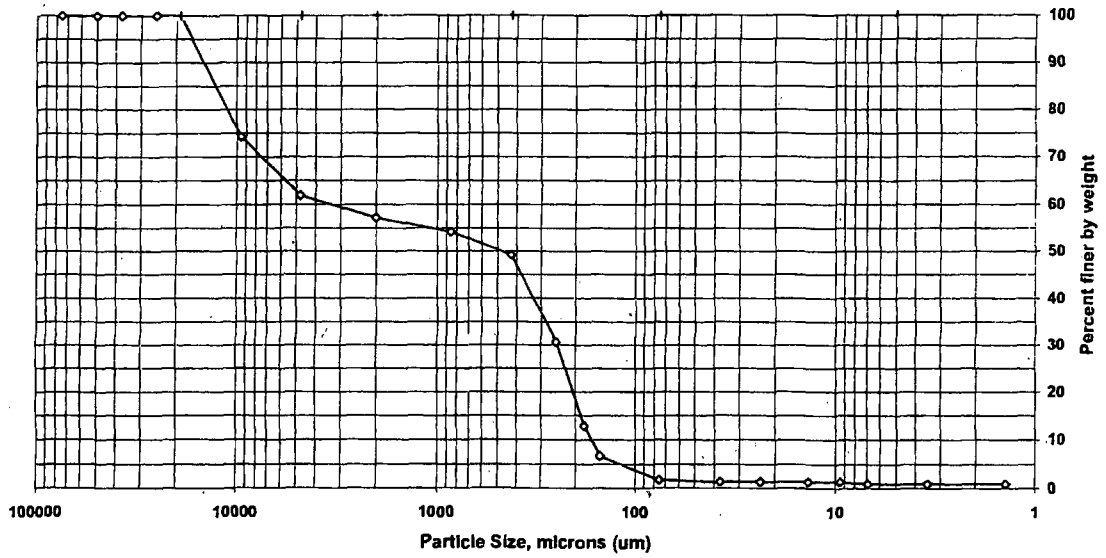
127554PS 9/30/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED14	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767239			**End Date:**	9/30/2008

Percent Solids:	79.9%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	74.2	25.8
#4	4750	61.9	12.3
#10	2000	57.2	4.7
#20	850	54.2	3.0
#40	425	49.2	5.0
#60	250	30.7	18.5
#80	180	12.8	17.9
#100	150	6.7	6.2
#200	75	1.7	4.9
Hydrometer	37.2	1.3	0.4
I	23.5	1.3	0.0
I	13.6	1.3	0.0
I	9.4	1.3	0.0
I	6.9	0.9	0.4
I	3.5	0.9	0.0
V	1.4	0.9	0.0

Soil Classification	Percent of Total Sample
Gravel	38.1
Sand	60.2
Coarse Sand	4.7
Medium Sand	8.0
Fine Sand	47.4
Silt	0.8
Clay	0.9

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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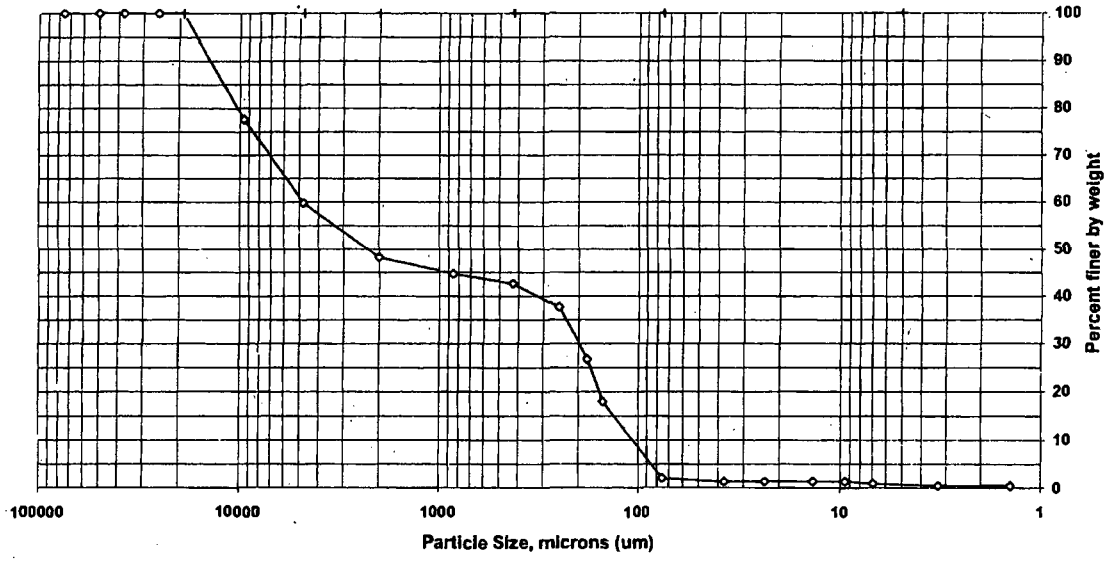
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127554	Date Received:	9/11/2008
Sample ID:	RBS-SED15	ETR(s):	127554	Start Date:	9/12/2008
Lab ID:	767240			End Date:	9/30/2008

Percent Solids:	82.5%		Non-soil material:	metal,shells	
Specific Gravity:	2.650	(assumed)	Shape (> #10):	subrounded	
Maximum Particle Size:	19 mm		Hardness (> #10):	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	77.7	22.3
#4	4750	59.8	17.8
#10	2000	48.3	11.6
#20	850	44.7	3.5
#40	425	42.6	2.1
#60	250	37.7	5.0
#80	180	26.8	10.9
#100	150	17.9	8.9
#200	75	2.0	15.9
Hydrometer	37.2	1.3	0.7
|	23.5	1.3	0.0
|	13.6	1.3	0.0
|	9.4	1.3	0.0
|	6.9	0.9	0.4
|	3.3	0.4	0.4
V	1.4	0.4	0.0

Soil Classification	Percent of Total Sample
Gravel	40.2
Sand	57.8
Coarse Sand	11.6
Medium Sand	5.6
Fine Sand	40.6
Silt	1.2
Clay	0.9

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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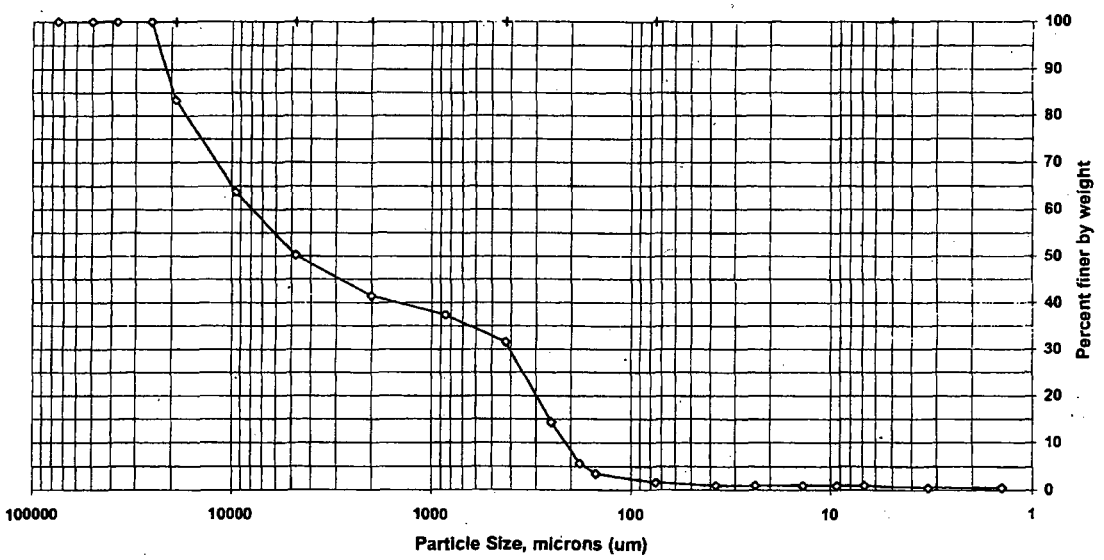
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127554	Date Received:	9/11/2008
Sample ID:	RBS-SED06	ETR(s):	127554	Start Date:	9/12/2008
Lab ID:	767241			End Date:	9/30/2008

Percent Solids:	86.2%		Non-soil material:	shell,plant
Specific Gravity:	2.650	(assumed)	Shape (> #10):	subrounded
Maximum Particle Size:	25 mm		Hardness (> #10):	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	83.5	16.5
3/8 inch	9500	63.7	19.7
#4	4750	50.3	13.5
#10	2000	41.4	8.9
#20	850	37.4	4.0
#40	425	31.6	5.8
#60	250	14.3	17.3
#80	180	5.7	8.7
#100	150	3.5	2.2
#200	75	1.7	1.8
Hydrometer	37.4	0.9	0.8
|	23.6	0.9	0.0
|	13.6	0.9	0.0
|	9.3	0.9	0.0
|	6.8	0.9	0.0
|	3.3	0.5	0.5
V	1.4	0.5	0.0

Soil Classification	Percent of Total Sample
Gravel	49.7
Sand	48.6
Coarse Sand	8.9
Medium Sand	9.8
Fine Sand	29.9
Silt	0.8
Clay	0.9

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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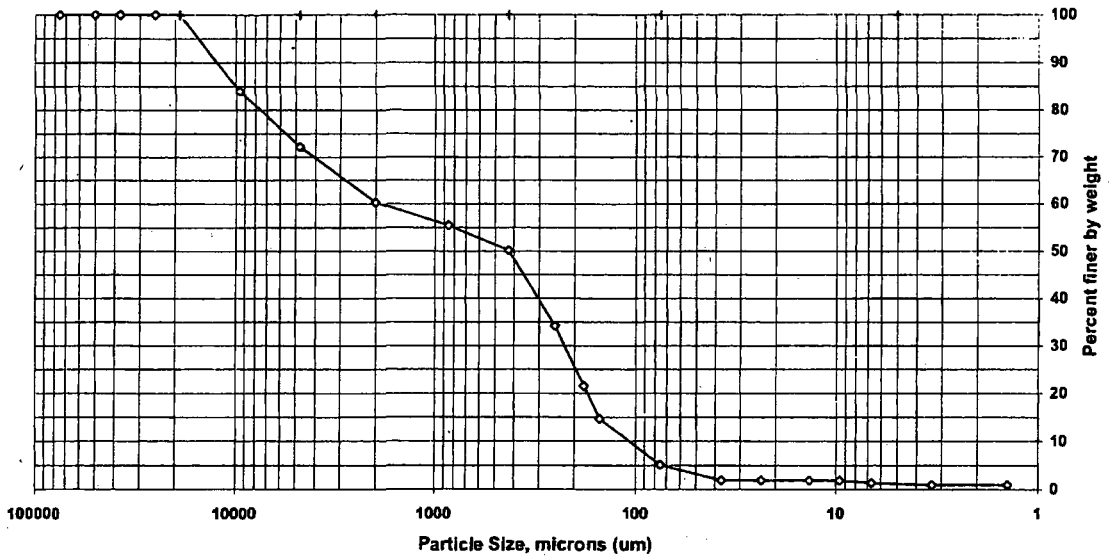
127554PS 9/30/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED16	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767242			**End Date:**	9/30/2008

Percent Solids:	77.9%		**Non-soil material:**	shell,plant
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	84.0	16.0
#4	4750	72.2	11.8
#10	2000	60.4	11.8
#20	850	55.5	4.9
#40	425	50.2	5.3
#60	250	34.2	15.9
#80	180	21.6	12.7
#100	150	14.6	6.9
#200	75	5.1	9.6
Hydrometer	37.0	1.9	3.2
|	23.4	1.9	0.0
|	13.5	1.9	0.0
|	9.6	1.9	0.0
|	6.7	1.3	0.5
|	3.3	0.9	0.4
V	1.4	0.9	0.0

Soil Classification	Percent of Total Sample
Gravel	27.8
Sand	67.1
Coarse Sand	11.8
Medium Sand	10.2
Fine Sand	45.1
Silt	3.8
Clay	1.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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FSL024:07.29.05:0
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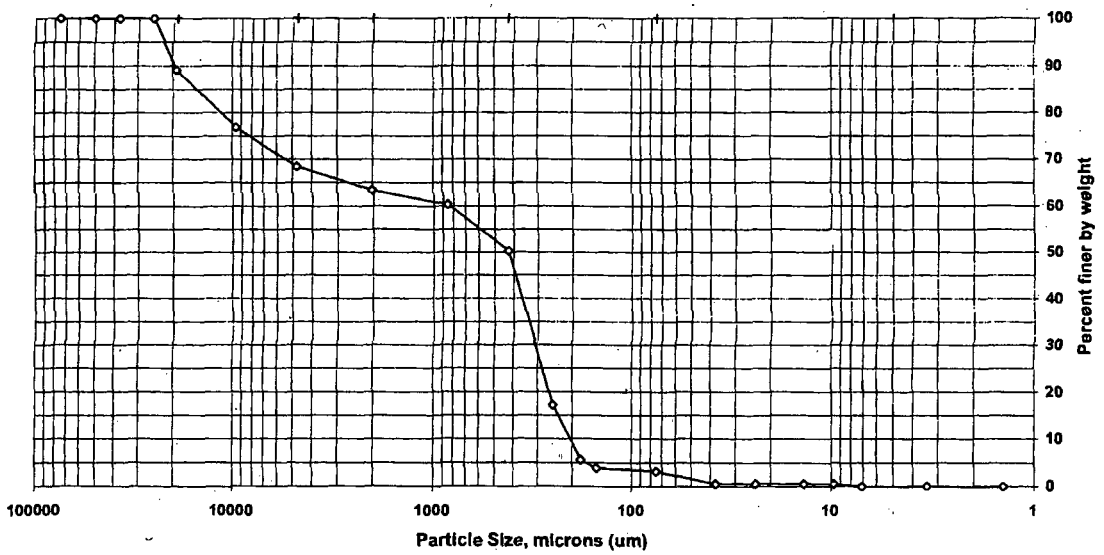
127554PS 9/30/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED65	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767243			**End Date:**	9/30/2008

Percent Solids:	84.3%		**Non-soil material:**	shell,plant	
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded	
Maximum Particle Size:	25 mm		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	89.1	10.9
3/8 inch	9500	76.9	12.3
#4	4750	68.4	8.4
#10	2000	63.4	5.0
#20	850	60.4	3.0
#40	425	50.3	10.1
#60	250	17.2	33.1
#80	180	5.6	11.6
#100	150	3.9	1.7
#200	75	3.2	0.7
Hydrometer	37.5	0.5	2.7
|	23.7	0.5	0.0
|	13.7	0.5	0.0
|	9.7	0.5	0.0
|	7.1	0.0	0.5
|	3.4	0.0	0.0
V	1.4	0.0	0.0

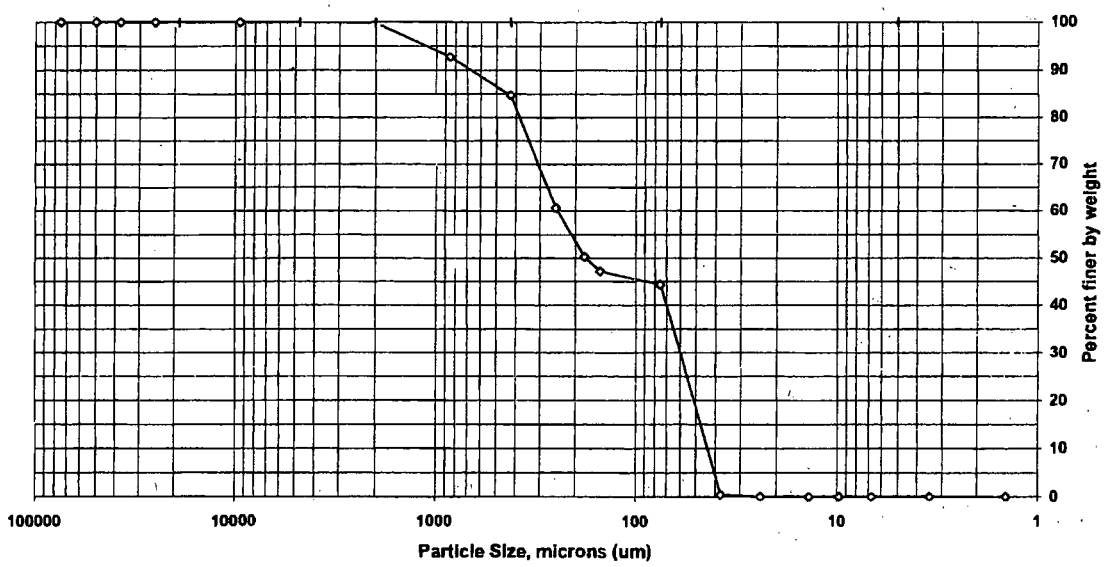
Soil Classification	Percent of Total Sample
Gravel	31.6
Sand	65.2
Coarse Sand	5.0
Medium Sand	13.1
Fine Sand	47.1
Silt	3.2
Clay	0.0

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED66	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767244			**End Date:**	9/30/2008

Percent Solids:	84.0%		**Non-soil material:**	plant
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	92.8	7.0
#40	425	84.7	8.1
#60	250	60.6	24.1
#80	180	50.3	10.3
#100	150	47.2	3.1
#200	75	44.3	2.8
Hydrometer	37.5	0.4	43.9
I	23.8	0.0	0.4
I	13.8	0.0	0.0
I	9.7	0.0	0.0
I	6.7	0.0	0.0
I	3.4	0.0	0.0
V	1.4	0.0	0.0

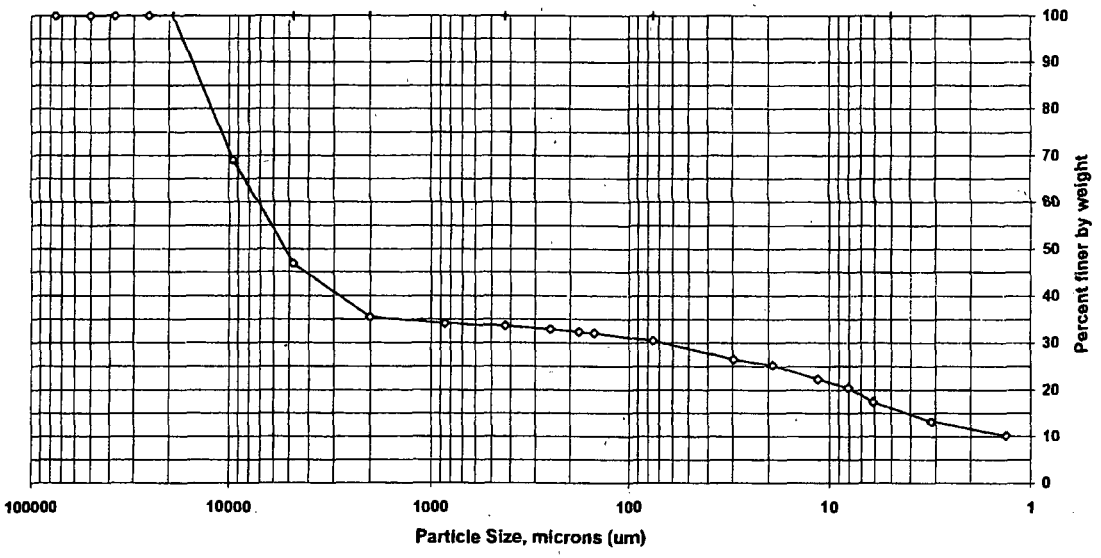
Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	55.7
Coarse Sand	0.2
Medium Sand	15.1
Fine Sand	40.4
Silt	44.3
Clay	0.0

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127554	Date Received:	9/11/2008
Sample ID:	RBS-SED67	ETR(s):	127554	Start Date:	9/12/2008
Lab ID:	767245			End Date:	9/30/2008

Percent Solids:	61.6%		Non-soil material:	shells	
Specific Gravity:	2.650	(assumed)	Shape (> #10):	subrounded	
Maximum Particle Size:	19 mm		Hardness (> #10):	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	69.0	31.0
#4	4750	46.8	22.2
#10	2000	35.5	11.4
#20	850	34.1	1.3
#40	425	33.6	0.6
#60	250	32.9	0.7
#80	180	32.4	0.5
#100	150	32.1	0.3
#200	75	30.5	1.6
Hydrometer	29.6	26.5	4.0
|	19.0	25.3	1.2
|	11.3	22.3	3.0
|	8.0	20.4	1.8
|	6.1	17.4	3.0
|	3.1	13.2	4.2
V	1.3	10.2	3.0

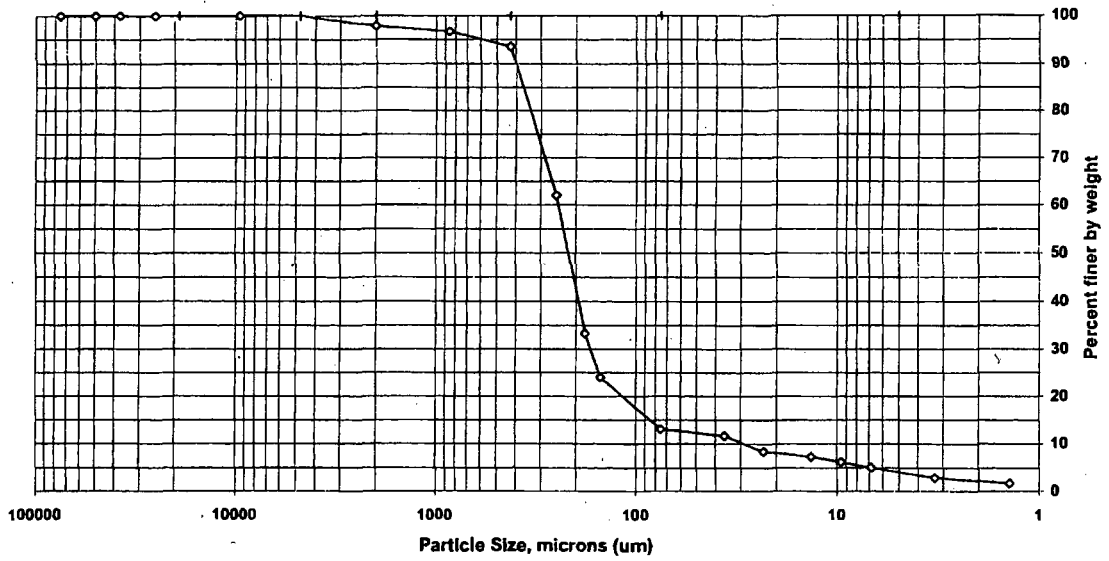
Soil Classification	Percent of Total Sample
Gravel	53.2
Sand	16.3
Coarse Sand	11.4
Medium Sand	1.9
Fine Sand	3.1
Silt	13.1
Clay	17.4

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127554	**Date Received:**	9/11/2008
Sample ID:	RBS-SED68	**ETR(s):**	127554	**Start Date:**	9/12/2008
Lab ID:	767246			**End Date:**	9/29/2008

Percent Solids:	46.0%	**Non-soil material:**	plant
Specific Gravity:	2.650	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand	**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	97.9	2.1
#20	850	96.7	1.2
#40	425	93.6	3.1
#60	250	62.0	31.6
#80	180	33.3	28.7
#100	150	24.0	9.3
#200	75	13.1	10.9
Hydrometer	36.0	11.7	1.4
|	23.1	8.4	3.3
|	13.4	7.3	1.1
|	9.5	6.2	1.1
|	6.8	5.1	1.1
|	3.3	2.9	2.2
V	1.4	1.7	1.2

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	86.9
Coarse Sand	2.1
Medium Sand	4.3
Fine Sand	80.5
Silt	8.1
Clay	5.1

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

FSL024:07.29.05:0
TestAmerica Burlington

(50)

127554BPS 9/30/2008

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127554

Client Code: WESTN4
SDG: 127554
ETR(s): 127554

Date Received: 11-Sep-08
Start Date: 12-Sep-08
End Date: 30-Sep-08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9/24/08	MAP 9/24/08	MAP 9/25/08	DPS 9/26/08	MAP 9/25/08	DPS 9/29/08
DJP 9/25/08			DPS 9/27/08	DJP 9/30/08	DJP 9/30/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767234	767235	767236	767237	767238	767239	767240	767241	767242	767243	767244	767245
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0055	1.0055	1.0055	1.0070	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0045	1.0260
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0050	1.0055	1.0050	1.0065	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0040	1.0250
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0050	1.0055	1.0050	1.0065	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0040	1.0225
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0050	1.0055	1.0050	1.0065	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0040	1.0210
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0050	1.0050	1.0050	1.0060	1.0045	1.0050	1.0050	1.0050	1.0055	1.0040	1.0040	1.0185
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	19.5	20.0	20.0	20.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0045	1.0045	1.0050	1.0055	1.0045	1.0050	1.0045	1.0045	1.0050	1.0040	1.0040	1.0150
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0045	1.0045	1.0050	1.0055	1.0045	1.0050	1.0045	1.0045	1.0050	1.0040	1.0040	1.0125
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: 705151 **Model #:** ASTM 151H **Manufacturer:** HB Instrument **Hydrometer start time:** 12:29

Calibrations:	L temp, C	L read	H Temp, C	H read	Cal. Date:	09/09/07	Hydrometer data entered:	DJP 9/30/08
	17.0	1.0045	23.0	1.0035				

FSL024:07.29.05:0
TestAmerica Burlington

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127554B

Client Code: WESTN4
SDG: 127554
ETR(s): 127554

Date Received: 11-Sep-08
Start Date: 12-Sep-08
End Date: 29-Sep-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 9/22/08 MAP 9/23/08	MAP 9/22/08	MAP 9/24/08	MAP 9/25/08 DPS 9/26/08	MAP 9/24/08 DJP 9/29/08	MAP 9/26/08 DJP 9/29/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767246											
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0085											
Temperature, C	20.5											
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0070											
Temperature, C	20.5											
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0065											
Temperature, C	20.5											
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0060											
Temperature, C	20.5											
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0055											
Temperature, C	20.5											
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0045											
Temperature, C	20.5											
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0040											
Temperature, C	20.0											

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** ELE **Hydrometer start time:** 17:07

Calibrations:

L temp, C	L read	H Temp, C	H read	Cal. Date:	09/09/07
17.0	1.0035	23.0	1.0030	Hydrometer data entered:	DJP 9/29/08

FSL024:07.29.05:0
TestAmerica Burlington

127554BPS 9/30/2008

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127554

Client Code: WESTN4
SDG: 127554
ETR(s): 127554

Date Received: 11-Sep-08
Start Date: 12-Sep-08
End Date: 9.30.08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MP 9.24.08 DM 9.25.08	MP 9.24.08	MP 9.25.08	DPS 09/26/08 DPS 09/27/08	MP 9.25.08 DM 9.30.08	DPS 9/29/08 DM 9.30.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767234	767235	767236	767237	767238	767239	767240	767241	767242	767243	767244	767245
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0055	1.0055	1.0055	1.0070	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0045	1.0260
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0050	1.0055	1.0050	1.0065	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0040	1.0250
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0050	1.0055	1.0050	1.0065	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0040	1.0235
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0050	1.0055	1.0050	1.0065	1.0050	1.0055	1.0055	1.0050	1.0060	1.0045	1.0040	1.0210
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0050	1.0050	1.0050	1.0060	1.0045	1.0050	1.0050	1.0050	1.0055	1.0040	1.0040	1.0185
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	19.5	20.0	20.0	20.0
Time, min. (250)	256	256	250	250	240	234	DPS 9/26/08 265	259	253	247	241	235
Reading	1.0045	1.0045	1.0050	1.0055	1.0045	1.0050	1.0045	1.0045	1.0050	1.0040	1.0040	1.0150
Temperature, C	20.0	20.0	19.5 20.0	19.5 20.0	20.0	20.0	19.5 20.0	19.5 20.0	19.5 20.0	19.5 20.0	19.5 20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0045	1.0045	1.0050	1.0055	1.0045	1.0050	1.0045	1.0045	1.0050	1.0040	1.0040	1.0125
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: 705151 Model #: ASTM 151H Manufacturer:

Hydrometer start time: 1229

Hydrometer data entered: DM 9-30-08

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0		23.0	

Cal. Date:

FSL024:07.29.05:0
TestAmerica Burlington

127554PS 09/12/08

127554B

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127554B

Client Code: WESTN4
SDG: 127554
ETR(s): 127554

Date Received: 11-Sep-08
Start Date: 12-Sep-08
End Date: 9.29.08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MSP 9.22.08 MSP 9-23-08	MSP 9.22.08	MSP 9.24.08	MSP 9.25.08 DPS 9-26-08	MSP 9.24.08 DJT 9.29.08	MSP 9.26.08 DJT 9.29.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767246											
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0085											
Temperature, C	20.5											
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0070											
Temperature, C	20.5											
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0065											
Temperature, C	20.5											
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0060											
Temperature, C	20.5											
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0055											
Temperature, C	20.5											
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0045											
Temperature, C	20.5											
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0040											
Temperature, C	20.0											

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** **Hydrometer start time:** 1707

Calibrations:

L temp, C	L read	H Temp, C	H read
17.0		23.0	

Cal. Date: **Hydrometer data entered:**

DJT 9.29.08

Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTON4 | ETR(s): 127554 | SDG: 127554 | Date Rec: 11-Sep-08 | Start Date: 12-Sep-08 | End Date: 30-Sep-08

SET: 127554

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sieve (tares)		
Size	Mass, g	
3 inch		
2 inch		
1.5 inch		
1 inch		
3/4 inch	457.94	
3/8 inch	447.80	
#4	488.36	
#10	465.31	
#20	392.51	D
#40	356.66	D
#60	347.78	D
#80	338.44	D
#100	332.13	D
#200	324.28	D

Default SG 2.65

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767234	767235	767236	767237	767238	767239	767240	767241	767242	767243	767244	767245
Sample ID	RBS-SED01	RBS-SED03	RBS-SED04	RBS-SED05	RBS-SED13	RBS-SED014	RBS-SED45	RBS-SED06	RBS-SED16	RBS-SED65	RBS-SED66	RBS-SED67
Sample Prep	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217
Pan, g												
Pan/sample, g	195.70	189.32	194.07	171.57	178.36	223.70	219.95	199.53	222.51	179.28	228.50	216.86
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	1.04	1.05	1.05	1.02	1.03	1.02	1.02	1.06	1.06	1.02	1.04	1.05
Pan/sample, g	40.53	28.68	37.49	21.67	33.55	29.88	29.36	42.74	36.66	27.88	33.97	37.80
Pan/dry sample, g	33.10	21.94	28.75	18.19	27.84	24.09	24.39	36.99	28.79	23.64	28.70	49.24
HMCF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Description of >#10 particles												
Non-soil material	na	angular	angular	angular	very angular	angular	subrounded	subrounded	subrounded	subrounded	na	angular
Shape		subrounded	subrounded	subrounded	subrounded	subrounded	subrounded	subrounded	subrounded	subrounded		subrounded
Hardness		hard	hard	hard	hard	hard	hard	hard	hard	hard		hard
Sample % Solids	81.2%	81.5%	76.0%	73.4%	82.4%	79.9%	82.5%	86.2%	77.9%	84.3%	84.0%	61.6%
Dry sample wt, g	158.88	154.31	147.58	125.96	147.87	178.82	181.38	172.01	173.32	151.15	191.93	133.52
Sieve + Sample Weights												
Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch								488.39		474.39		
3/8 inch		466.29	459.71		463.98	493.69	488.09	481.53	475.41	486.14		488.09
#4	489.89	509.55	495.19	495.23	503.81	510.32	520.72	511.53	508.78	501.11		517.95
#10	468.17	477.28	466.03	471.36	471.58	473.80	486.32	480.56	485.80	472.84	465.66	480.49
#20	398.82	398.93	395.95	394.62	398.18	397.92	398.88	399.40	400.95	397.09	405.96	394.29
#40	378.61	384.60	378.93	381.78	372.24	385.59	380.50	386.86	385.87	371.90	372.19	357.40
#60	440.02	379.49	393.78	380.91	408.82	390.80	356.74	377.84	375.37	397.77	393.98	348.67
#80	362.83	364.74	367.15	368.77	359.20	368.58	356.13	351.90	358.41	354.00	356.27	337.14
#100	335.01	342.53	342.09	345.45	334.84	343.14	348.25	335.64	344.12	334.70	338.11	332.55
#200	325.97	334.58	332.00	339.21	326.39	353.42	353.08	327.80	340.84	326.99	329.73	326.39
Maximum Particle size	9.5 mm	19 mm	19 mm	9.5 mm	19 mm	19 mm	19 mm	25 mm	19 mm	25 mm	Crs sand	19 mm
Specific gravity	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650
Sample Mass Parameters												
Sample Mass >#10, g	4.39	51.85	21.66	12.91	37.60	76.54	93.86	100.80	68.72	55.27	0.35	86.16
Sample mass <#10, g	154.49	102.46	125.92	113.05	110.27	102.28	87.52	71.21	104.60	95.88	191.58	47.36

Particle Size Analysis of Soils By ASTM D422
Sieve Data

Client Code: WESTN4 | ETR(s): 127554 | SDG: 127554 | Date Rec: 11-Sep-08 | Start Date: 12-Sep-08 | End Date: 29-Sep-08

SET: 127554B

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767246											
Sample ID	RBG-SED08											

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sample Prep	D2217											
Pan, g												
Pan/sample, g	12.458.04											
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	1.00											
Pan/sample, g	18.96											
Pan/dry sample, g	19.22											
HMCF	100.0%											
Description of >#10 particles												
Non-soil material	plant											
Shape	na											
Hardness	na											
Sample % Solids	46.0%											
Dry sample wt, g	72.66											

Sieve (tares)			**Sieve + Sample Weights**											
Size	Mass, g		Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch			3 inch											
2 inch			2 inch											
1.5 inch			1.5 inch											
1 inch			1 inch											
3/4 inch			3/4 inch											
3/8 inch			3/8 inch											
#4			#4											
#10	485.31		#10											
#20	382.90	A	#20	383.76										
#40	380.83	A	#40											
#60	326.52	A	#60	340.48										
#80	335.09	A	#80											
#100	329.11	A	#100											
#200	329.22	A	#200											

Maximum Particle size
Crs sand

Default SG 2.65 | **Specific gravity** 2.650

Sample Mass Parameters

Sample Mass >#10, g	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sample mass <#10, g	71.13	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

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Sample Handling

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TestAmerica Burlington
SAMPLE RECEIPT & LOG IN CHECKLIST

Client: WESTN4	Date Received: 4/11/08	Log In Date: 4/11/08	
ETR: 127554	Time Received: 0948	By: JEG	
SDG: 127554	Received By: GTM	Signature:	
Project: 28000	# Coolers Received: 1	PM Signature:	
Samples Delivered By: ☒ Shipping Service ☐ Courier ☐ Hand ☐ Other (specify)		Date: 09/12/08	
List Air bill Number(s) or Attach a photocopy of the Air Bill:			

COOLER SCREEN	YES	NO	NA	COMMENTS
There is *no* evidence to indicate tampering	X			
Custody seals are present and intact		X		
Custody seal numbers are present			X	
If yes, list custody seal numbers:				

Thermal Preservation Type: ☒ Wet Ice ☐ Blue Ice ☐ None ☐ Other (specify)

IR Gun ID: 96 Correction Factor (CF) = -1 °C

Cooler 1:	-1.5 °C	Cooler 6	°C	Cooler 11	°C	Cooler 16	°C
Cooler 2:	°C	Cooler 7	°C	Cooler 12	°C	Cooler 17	°C
Cooler 3:	°C	Cooler 8	°C	Cooler 13	°C	Cooler 18	°C
Cooler 4:	°C	Cooler 9	°C	Cooler 14	°C	Cooler 19	°C
Cooler 5	°C	Cooler 10	°C	Cooler 15	°C	Cooler 20	°C

Unless otherwise documented, the recorded temperature readings are adjusted readings to account for the CF of the IR Gun

EPA Criteria: 0-6°C, except for air and geo samples which should be at ambient temperature and tissue samples, which may be frozen.

Some clients require thermal preservation criteria of 2-4°C or other such criteria. The PM must notify SM when alternate criteria is specified.

SAMPLE CONDITION	YES	NO	NA	COMMENTS
Sample containers were received intact	X			
Legible sample labels are affixed to each container	X			

CHAIN OF CUSTODY (COC)	YES	NO	NA	COMMENTS
COC is present and includes the following information for each container:				
• Sample ID / Sample Description	X			
• Date of Sample Collection	X			
• Time of Sample Collection	X			
• Identification of the Sampler		X		
• Preservation Type			X	
• Requested Tests Method(s)	X			
• Necessary Signatures	X			
Internal Chain of Custody (ICOC) Required		X		
If yes to above, ICOC Record initiated for every Worksheet			X	

SAMPLE INTEGRITY / USABILITY	YES	NO	NA	COMMENTS
The sample container matches the COC	X			
Appropriate sample containers were received for the tests requested	X			
Samples were received within holding time	X			
Sufficient amount of sample is provided for requested analyses	X			
VOA vials do not have headspace or a bubble >6mm (1/4" diameter)			X	
Appropriate preservatives were used for the tests requested			X	
pH of inorganic samples checked and is within method specification			X	
If no, attach Inorganic Sample pH Adjustment Form			X	

ANOMALY / NCR SUMMARY

FSR002:12.19.07:3
TestAmerica Burlington

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THE LEADER IN ENVIRONMENTAL TESTING

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TestAmerica
South Burlington, VT

Extended Data Package

SDG: 127633

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THE LEADER IN ENVIRONMENTAL TESTING

Case Narrative

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THE LEADER IN ENVIRONMENTAL TESTING

September 30, 2008

TestAmerica Laboratories, Inc.

Mr. Daniel Gaughan
Weston Solutions
205 Campus Drive
Edison, NJ 08837-3939

Re: Laboratory Project No. 28000
Case: 28000; SDG: 127633

Dear Mr. Gaughan:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 16th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/16/08 ETR No: 127633		
767683	RBS-SED56	09/15/08	SEDIMENT
767684	RBS-SED57	09/15/08	SEDIMENT
767685	RBS-SED58	09/15/08	SEDIMENT
767686	RBS-SED59	09/15/08	SEDIMENT
767687	RBS-SED60	09/15/08	SEDIMENT
767688	RBS-SED61	09/15/08	SEDIMENT
767689	RBS-SED63	09/15/08	SEDIMENT
767690	RBS-SED64	09/15/08	SEDIMENT

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal.

The samples in this sample set were analyzed for particle size distribution by ASTM D422, and included both the sieve and hydrometer determinations.

Any reference within this report to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.) The analytical results associated with the samples presented in this test report were generated under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

30 Community Drive • Suite 11 South Burlington, VT 05403 **tel** 802.660.1990 **fax** 802.660.1919 **www.testamericainc.com**

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk Young
Project Manager

KFY/hsf
Enclosure

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
Phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Arb. No. 3541002965 33

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: D Gaughan	Date: 9/15/08	COC No:
Your Company Name here: WESTON	Tel/Fax:	Lab Contact:	Carrier: FedEx	1 of ____ COCs
Address: 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip: Edison NJ 08837	Calendar (C) or Work Days (W) ____			
(xxx) xxx-xxxx Phone: 732-417-5800	TAT if different from Below ____			SDG No.
(xxx) xxx-xxxx FAX	☒ 2 weeks			
Project Name: Raritan Bay Study	☐ 1 week			
Site:	☐ 2 days			
PO #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample: Grain Size	Sample Specific Notes:
RBS-SED 56	9/15/08	1417	G	Sed	1	X	
RBS-SED 57		1420				X	
RBS-SED 58		1432				X	
RBS-SED 59		1435				X	
RBS-SED 60		1450				X	
RBS-SED 61		1455				X	
~~RBS-SED 62~~		1457				X	
RBS-SED 63		1506				X	
RBS-SED 64		1509				X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other ____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements & Comments:

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Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
(Scott Snyder)	WESTON	9/15/08		TA	9/16/08 0935
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

TestAmerica

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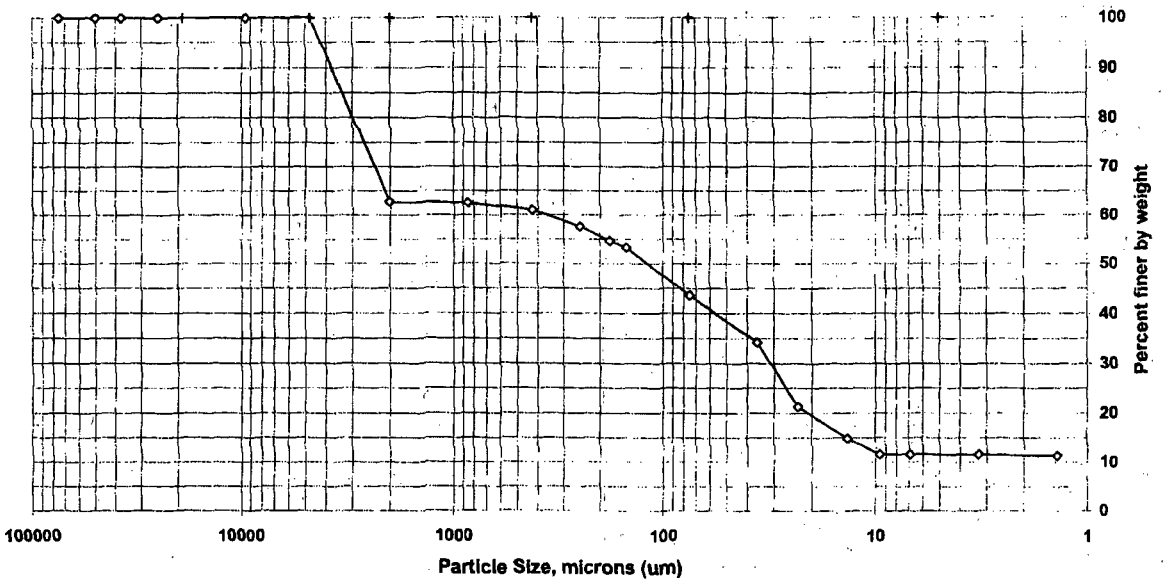
Particle Size Results

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED56	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767683			**End Date:**	9/29/2008

Percent Solids:	15.1%	**Non-soil material:**	plant,wood
Specific Gravity:	2.650	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand	**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	62.8	37.2
#20	850	62.5	0.3
#40	425	61.0	1.4
#60	250	57.6	3.4
#80	180	54.7	2.9
#100	150	53.2	1.4
#200	75	43.7	9.6
Hydrometer	36.0	34.2	9.4
|	23.2	21.3	12.9
|	13.5	14.8	6.5
|	9.6	11.6	3.2
|	6.9	11.6	0.0
|	3.3	11.6	0.0
V	1.4	11.3	0.3

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	56.3
Coarse Sand	37.2
Medium Sand	1.8
Fine Sand	17.4
Silt	32.1
Clay	11.6

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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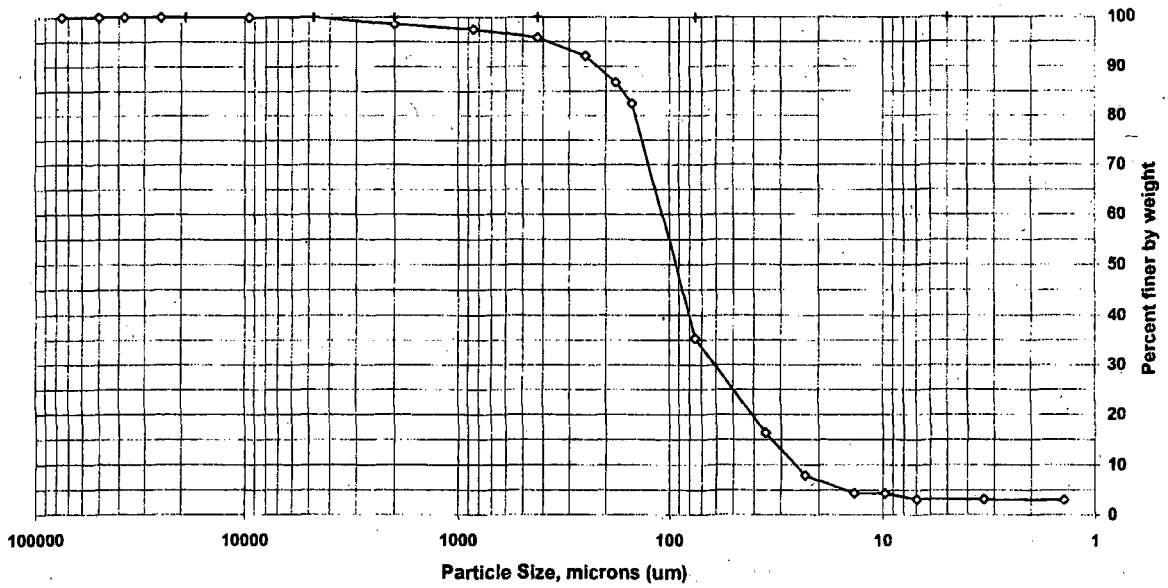
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED57	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767684			**End Date:**	9/29/2008

Percent Solids:	52.7%	**Non-soil material:**	plant
Specific Gravity:	2.650	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand	**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	98.6	1.4
#20	850	97.6	1.0
#40	425	95.8	1.8
#60	250	92.2	3.7
#80	180	86.8	5.4
#100	150	82.5	4.3
#200	75	35.4	47.1
Hydrometer	35.5	16.3	19.0
I	23.2	7.9	8.4
I	13.6	4.3	3.6
I	9.8	4.3	0.0
I	6.9	3.1	1.2
I	3.3	3.1	0.0
V	1.4	3.0	0.1

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	64.6
Coarse Sand	1.4
Medium Sand	2.8
Fine Sand	60.5
Silt	32.3
Clay	3.1

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

FSL024:07.29.05:0
TestAmerica Burlington

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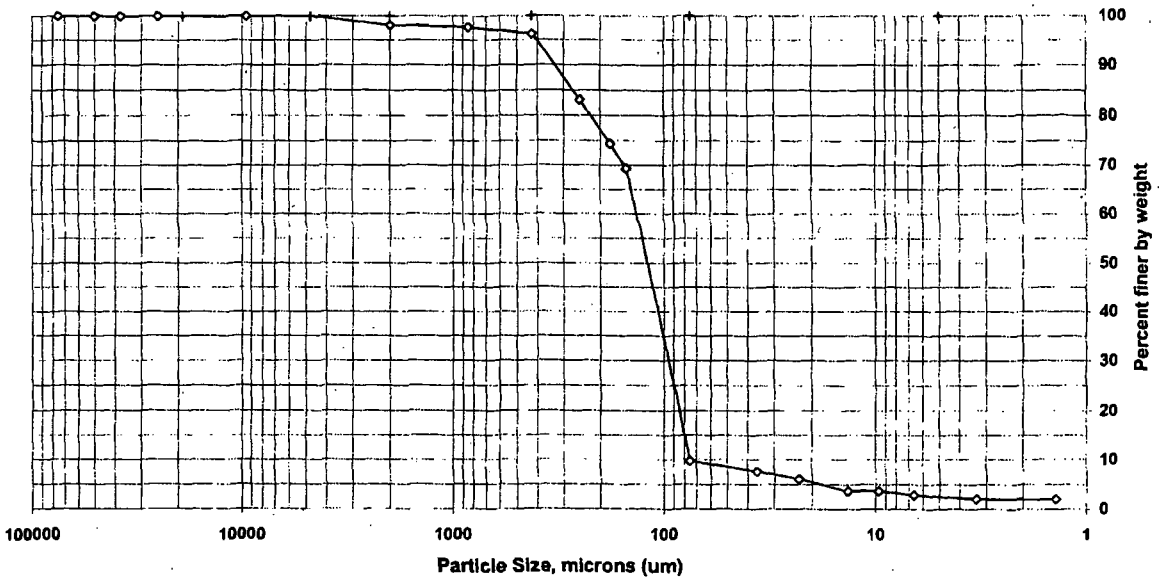
127633PS 9/29/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED58RBS-SED59	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767685			**End Date:**	9/29/2008

Percent Solids:	64.9%	**Non-soil material:**	shell,plant
Specific Gravity:	2.650	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand	**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	98.1	1.9
#20	850	97.7	0.4
#40	425	96.3	1.4
#60	250	83.1	13.2
#80	180	74.4	8.7
#100	150	69.3	5.1
#200	75	9.8	59.5
Hydrometer	36.1	7.6	2.1
I	23.1	6.0	1.6
I	13.5	3.6	2.4
I	9.7	3.6	0.0
I	6.6	2.9	0.8
I	3.3	2.1	0.8
V	1.4	2.0	0.1

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	90.2
Coarse Sand	1.9
Medium Sand	1.8
Fine Sand	86.5
Silt	6.9
Clay	2.9

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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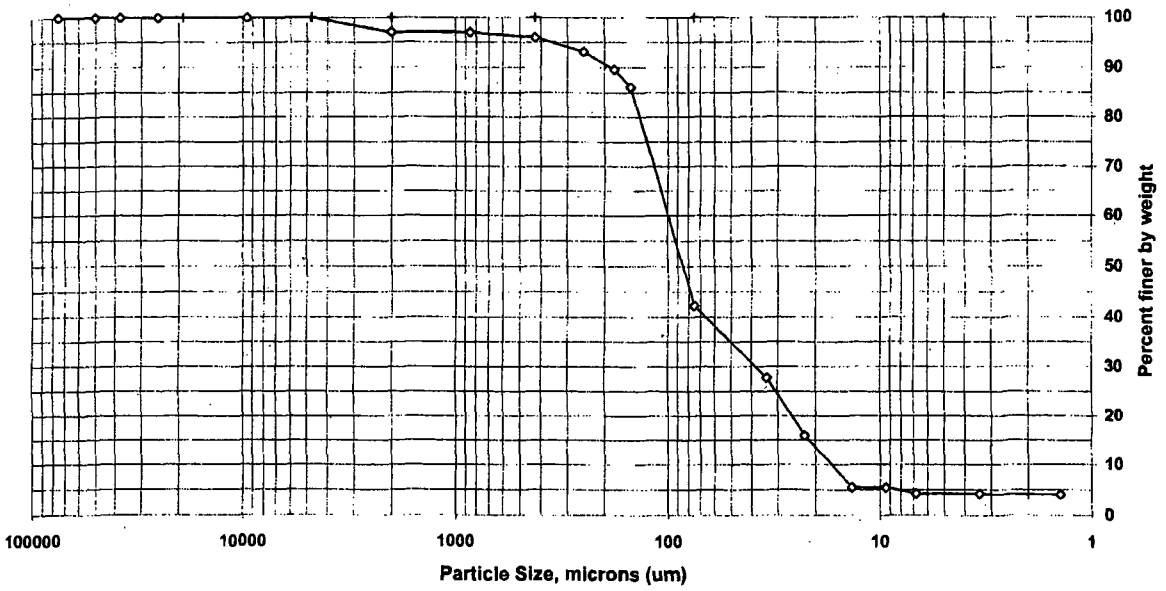
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED59	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767686			**End Date:**	9/29/2008

Percent Solids:	51.6%	**Non-soil material:**	shell,plant
Specific Gravity:	2.650	**Shape (> #10):**	na
Maximum Particle Size:	Crs sand	**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	97.0	3.0
#20	850	97.0	0.0
#40	425	96.0	1.0
#60	250	93.2	2.8
#80	180	89.6	3.6
#100	150	86.1	3.5
#200	75	42.3	43.8
Hydrometer	33.7	27.7	14.5
I	22.4	16.0	11.8
I	13.5	5.4	10.6
I	9.4	5.4	0.0
I	6.8	4.2	1.2
I	3.4	4.2	0.0
V	1.4	4.0	0.2

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	57.7
Coarse Sand	3.0
Medium Sand	1.1
Fine Sand	53.7
Silt	38.1
Clay	4.2

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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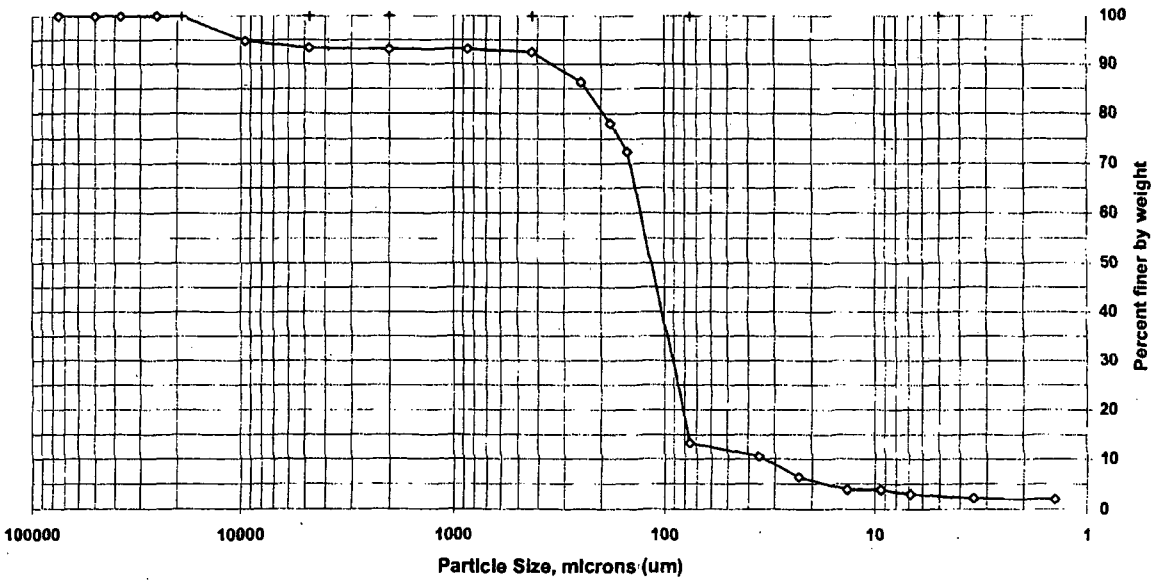
127633PS 9/29/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED60	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767687			**End Date:**	9/29/2008

Percent Solids:	65.0%	**Non-soil material:**	shell,plant
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	94.8	5.2
#4	4750	93.4	1.4
#10	2000	93.1	0.3
#20	850	93.1	0.0
#40	425	92.4	0.6
#60	250	86.3	6.1
#80	180	78.1	8.2
#100	150	72.4	5.8
#200	75	13.3	59.1
Hydrometer	35.6	10.6	2.7
I	23.1	6.4	4.2
I	13.5	3.8	2.5
I	9.4	3.8	0.0
I	6.8	3.0	0.8
I	3.4	2.2	0.8
V	1.4	2.0	0.1

Soil Classification	Percent of Total Sample
Gravel	6.6
Sand	80.1
Coarse Sand	0.3
Medium Sand	0.6
Fine Sand	79.1
Silt	10.3
Clay	3.0

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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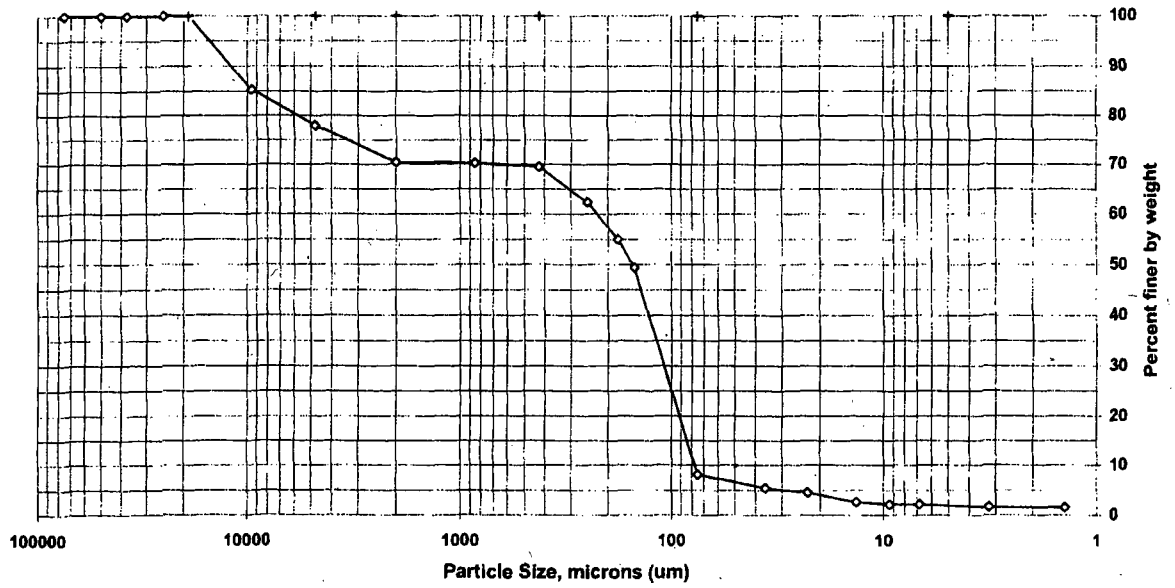
FSL024:07.29.05:0
TestAmerica Burlington

127633PS 9/29/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED61	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767688			**End Date:**	9/29/2008

Percent Solids:	86.8%	**Non-soil material:**	glass,shell
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	85.3	14.7
#4	4750	77.9	7.3
#10	2000	70.4	7.5
#20	850	70.2	0.2
#40	425	69.5	0.7
#60	250	62.3	7.1
#80	180	55.0	7.4
#100	150	49.4	5.6
#200	75	8.1	41.3
Hydrometer	35.8	5.5	2.7
|	22.9	4.5	0.9
|	13.4	2.6	1.9
|	9.4	2.2	0.5
|	6.8	2.2	0.0
|	3.2	1.7	0.5
V	1.4	1.6	0.1

Soil Classification	Percent of Total Sample
Gravel	22.1
Sand	69.8
Coarse Sand	7.5
Medium Sand	0.9
Fine Sand	61.4
Silt	6.0
Clay	2.2

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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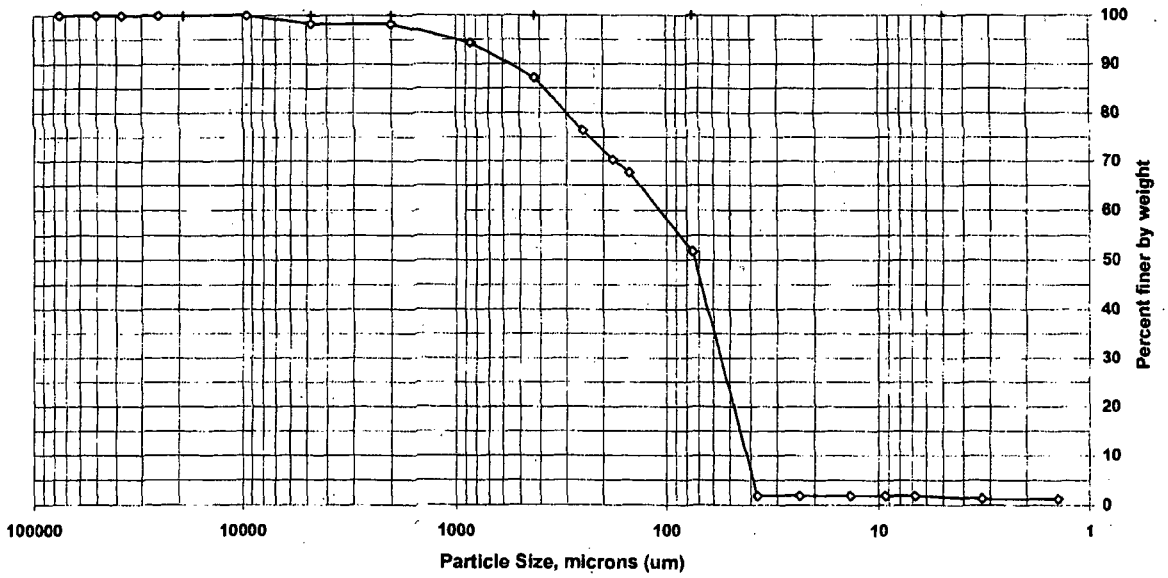
FSL024:07.29.05:0
TestAmerica Burlington

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED63	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767689			**End Date:**	9/29/2008

Percent Solids:	80.2%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	na
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.3	1.7
#10	2000	98.2	0.1
#20	850	94.3	3.9
#40	425	87.2	7.1
#60	250	76.4	10.8
#80	180	70.3	6.1
#100	150	67.7	2.7
#200	75	51.7	15.9
Hydrometer	37.1	1.8	49.9
|	23.5	1.8	0.0
|	13.6	1.8	0.0
|	9.3	1.8	0.0
|	6.8	1.8	0.0
|	3.3	1.3	0.5
V	1.4	1.3	0.0

Soil Classification	Percent of Total Sample
Gravel	1.7
Sand	46.5
Coarse Sand	0.1
Medium Sand	11.0
Fine Sand	35.5
Silt	49.9
Clay	1.8

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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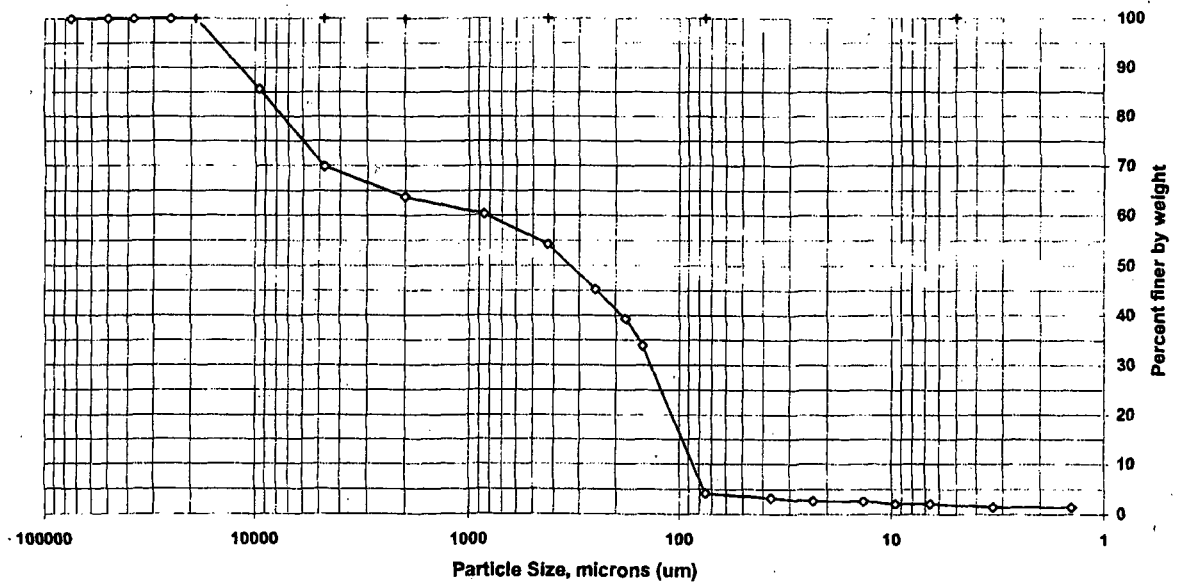
TestAmerica Burlington

127633PS 9/29/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127633	**Date Received:**	9/16/2008
Sample ID:	RBS-SED64	**ETR(s):**	127633	**Start Date:**	9/16/2008
Lab ID:	767690			**End Date:**	9/29/2008

Percent Solids:	77.4%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	85.6	14.4
#4	4750	69.8	15.8
#10	2000	63.8	6.1
#20	850	60.3	3.5
#40	425	54.2	6.1
#60	250	45.3	8.9
#80	180	39.2	6.0
#100	150	33.9	5.4
#200	75	4.1	29.8
Hydrometer	36.8	3.2	0.9
|	23.4	2.7	0.6
|	13.5	2.7	0.0
|	9.6	2.1	0.6
|	6.6	2.1	0.0
|	3.3	1.4	0.6
V	1.4	1.4	0.0

Soil Classification	Percent of Total Sample
Gravel	30.2
Sand	65.7
Coarse Sand	6.1
Medium Sand	9.6
Fine Sand	50.1
Silt	2.1
Clay	2.1

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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FSL024:07.29.05:0
TestAmerica Burlington

127633PS 9/29/2008

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127633

Client Code: WESTN4
SDG: 127633
ETR(s): 127633

Date Received: 16-Sep-08
Start Date: 16-Sep-08
End Date: 29-Sep-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 9/22/08 MAP 9/23/08	MAP 9/22/08	MAP 9/24/08	MAP 9/25/08 DPS 9/26/08	MAP 9/24/08 DJP 9/29/08	MAP 9/26/08 DJP 9/29/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number		767683	767684	767685	767686	767687	767688	767689	767690			
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading		1.0085	1.0100	1.0080	1.0150	1.0095	1.0090	1.0050	1.0060			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading		1.0065	1.0065	1.0070	1.0100	1.0070	1.0080	1.0050	1.0055			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading		1.0055	1.0050	1.0055	1.0055	1.0055	1.0060	1.0050	1.0055			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading		1.0050	1.0050	1.0055	1.0055	1.0055	1.0055	1.0050	1.0050			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading		1.0050	1.0045	1.0050	1.0050	1.0050	1.0055	1.0050	1.0050			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading		1.0050	1.0045	1.0045	1.0050	1.0045	1.0050	1.0045	1.0045			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.0			
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading		1.0050	1.0045	1.0045	1.0050	1.0045	1.0050	1.0045	1.0045			
Temperature, C		20.0	20.0	20.0	19.5	19.5	19.5	20.0	20.0			

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** ELE **Hydrometer start time:** 17:07

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0	1.0035	23.0	1.0030

Cal. Date: 09/09/07 **Hydrometer data entered:** DJP 9/29/08

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TestAmerica Burlington

127633PS 09/29/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127633

Client Code: WESTN4
SDG: 127633
ETR(s): 127633

Date Received: 16-Sep-08
Start Date: 16-Sep-08
End Date:

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9.22.08 MAP 9.23.08	MAP 9.22.08	MAP 9.24.08	MAP 9.25.08 DPS 9-26-08	MAP 9.24.08	MAP 9.26.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number		767683	767684	767685	767686	767687	767688	767689	767690			
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading		1.0085	1.0100	1.0080	1.0150	1.0095	1.0090	1.0050	1.0060			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading		1.0065	1.0065	1.0070	1.0100	1.0070	1.0080	1.0050	1.0055			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading		1.0055	1.0050	1.0055	1.0055	1.0055	1.0060	1.0050	1.0055			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading		1.0050	1.0050	1.0055	1.0055	1.0055	1.0055	1.0050	1.0050			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading		1.0050	1.0045	1.0050	1.0050	1.0050	1.0055	1.0050	1.0050			
Temperature, C		20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5			
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading		1.0050	1.0045	1.0045	1.0050	1.0045	1.0050	1.0045	1.0045			
Temperature, C		20.5	20.5	20.5	20.5	20.0	20.5	20.5	20.0			
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading		1.0050	1.0045	1.0045	1.0050	1.0045	1.0050	1.0045	1.0045			
Temperature, C		20.0	20.0	20.0	19.5	19.5	19.5	20.0	20.0			

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** **Hydrometer start time:** 1707

Callbrations:

L temp, C	L read	H Temp, C	H read
17.0		23.0	

Cal. Date: **Hydrometer data entered:**

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Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 | ETR(s): 127633 | SDG: 127633 | Date Rec: 16-Sep-08 | Start Date: 16-Sep-08 | End Date: 29-Sep-08

SET: 127633

Dry prep = D421
Wet prep = D2217

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No		767683	767684	767685	767686	767687	767688	767689	767690			
Sample ID		RBS-SED56	RBS-SED57	SED58RBS-S	RBS-SED59	RBS-SED60	RBS-SED61	RBS-SED63	RBS-SED64			
Sample Prep		D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217			
Pan, g												
Pan/sample, g		164.65	126.74	155.32	132.22	147.15	195.97	194.13	179.15			
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g		1.01	1.03	1.04	1.03	1.05	1.05	1.04	1.05			
Pan/sample, g		33.70	29.11	36.03	37.74	23.79	50.73	32.88	28.25			
Pan/dry sample, g		5.94	15.82	23.76	19.98	15.83	44.16	28.57	22.09			
HMCF		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Description of >#10 particles												
Non-soil material		plant,wood	plant	shell,plant	shell,plant	shell,plant	glass,shell	shell	shell			
Shape		na	na	na	na	rounded	subrounded	na	rounded			
Hardness		na	na	na	na	hard	hard	na	hard			
Sample % Solids		15.1%	52.7%	64.9%	51.6%	65.0%	86.8%	80.2%	77.4%			
Dry sample wt, g		24.83	66.76	100.85	68.25	95.64	170.05	155.66	138.58			

Standard Values

Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

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Sieve (tares)

Size	Mass, g		Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch			3 inch												
2 inch			2 inch												
1.5 inch			1.5 inch												
1 inch			1 inch												
3/4 inch			3/4 inch												
3/8 inch	447.60		3/8 inch					452.59	472.65		467.57				
#4	488.37		#4					489.73	500.83	491.08	510.20				
#10	465.31		#10	474.55	466.24	467.23	467.33	465.59	478.10	465.44	473.72				
#20	382.90	A	#20	382.98	383.67	383.27	382.93	382.90	383.27	382.97	382.75				
#40	380.63	A	#40	380.99	381.82	382.08	381.34	381.23	381.86	381.63	380.05				
#60	326.52	A	#60	327.36	328.96	339.86	328.41	332.40	338.66	343.31	338.66				
#80	335.03	A	#80	335.76	338.62	343.80	337.50	342.66	347.56	344.54	343.40				
#100	333.11	A	#100	333.47	335.98	338.25	335.49	338.61	342.59	337.25	340.54				
#200	323.22	A	#200	325.60	354.68	383.25	353.12	379.70	393.40	348.03	384.45				

Maximum Particle size

		Crs sand	Crs sand	Crs sand	Crs sand	19 mm	19 mm	9.5 mm	19 mm			
Default SG 2.65	**Specific gravity**	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650			

Sample Mass Parameters

Sample Mass >#10, g	0.00	9.24	0.93	1.92	2.02	6.63	50.30	2.84	50.21	0.00	0.00	0.00
Sample mass <#10, g	#VALUE!	15.59	65.83	98.93	66.23	89.01	119.75	152.82	88.37	#VALUE!	#VALUE!	#VALUE!

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Sample Handling

(79)

9/16/08 0935

FedEx Express US Airbill

FedEx Tracking Number 8541 0029 6533

Form ID No. 0200

From

Date 9/15/08 [redacted]

Sender's Name Scott Snyder Phone 732 417-5800

Company Winton Solutions Inc

Address 205 Campus Dr. Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

Your Internal Billing Reference 20401.035.010.2064

To

Recipient's Name Kirk Young Phone 802 660-1990

Company Test America Labs

Recipient's Address 30 Community Dr. Stall

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept./Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [x] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [x] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location — Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg
- [ ] Cargo Aircraft Only

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No. [ ]

- [x] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

[redacted]

Total Packages	Total Weight	Total Declared Value†	Total Charges
1	56	$ .00	Credit Card Auth.

†Our liability is limited to $100 unless you declare a higher value. See back for details.

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [x] No Signature Required — Package may be left with.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone

520

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TestAmerica Burlington
SAMPLE RECEIPT & LOG IN CHECKLIST

Client:	WESTN4	Date Received:	09/16/08	Log In Date:	9/16/08
ETR:	127633	Time Received:	0935	By:	JEG
SDG:	127633	Received By:	JEG	Signature:	
Project:	28000	# Coolers Received:	1	PM Signature:	
Samples Delivered By:	X Shipping Service ☐ Courier ☐ Hand ☐ Other (specify)			Date:	09/17/08
List Air bill Number(s) or Attach a photocopy of the Air Bill:					

COOLER SCREEN	YES	NO	NA	COMMENTS
There is *no* evidence to indicate tampering	X			
Custody seals are present and intact	X			
Custody seal numbers are present		X		
If yes, list custody seal numbers:				

Thermal Preservation Type: ☐ Wet Ice ☐ Blue Ice X None ☐ Other (specify)

IR Gun ID: 96 Correction Factor (CF) = − 1 °C

Cooler 1:	22.2 °C	Cooler 6	°C	Cooler 11	°C	Cooler 16	°C
Cooler 2:	°C	Cooler 7	°C	Cooler 12	°C	Cooler 17	°C
Cooler 3:	°C	Cooler 8	°C	Cooler 13	°C	Cooler 18	°C
Cooler 4:	°C	Cooler 9	°C	Cooler 14	°C	Cooler 19	°C
Cooler 5	°C	Cooler 10	°C	Cooler 15	°C	Cooler 20	°C

Unless otherwise documented, the recorded temperature readings are adjusted readings to account for the CF of the IR Gun

EPA Criteria: 0-6°C, except for air and geo samples which should be at ambient temperature and tissue samples, which may be frozen.

Some clients require thermal preservation criteria of 2-4°C or other such criteria. The PM must notify SM when alternate criteria is specified.

SAMPLE CONDITION	YES	NO	NA	COMMENTS
Sample containers were received intact	X			
Legible sample labels are affixed to each container	X			

CHAIN OF CUSTODY (COC)	YES	NO	NA	COMMENTS
COC is present and includes the following information for each container:				
• *Sample ID / Sample Description*	X			
• Date of Sample Collection	X			
• Time of Sample Collection	X			
• Identification of the Sampler		X		
• Preservation Type			X	
• Requested Tests Method(s)	X			
• Necessary Signatures	X			
Internal Chain of Custody (ICOC) Required		X		
If yes to above, ICOC Record initiated for every Worksheet			X	

SAMPLE INTEGRITY / USABILITY	YES	NO	NA	COMMENTS
The sample container matches the COC	X			
Appropriate sample containers were received for the tests requested	X			
Samples were received within holding time	X			
Sufficient amount of sample is provided for requested analyses	X			
VOA vials do not have headspace or a bubble >6mm (1/4" diameter)			X	
Appropriate preservatives were used for the tests requested			X	
pH of inorganic samples checked and is within method specification			X	
If no, attach Inorganic Sample pH Adjustment Form			X	

ANOMALY / NCR SUMMARY

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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TestAmerica
South Burlington, VT

Extended Data Package

SDG: 127611

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Case Narrative

(BT)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

October 2, 2008

TestAmerica Laboratories, Inc.

Mr. Daniel Gaughan
Weston Solutions
205 Campus Drive
Edison, NJ 08837-3939

Re: Laboratory Project No. 28000
Case: 28000; SDG: 127611

Dear Mr. Gaughan:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 15th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/15/08 ETR No: 127611		
767562	RBS-SED36	09/12/08	SEDIMENT
767563	RBS-SED37	09/12/08	SEDIMENT
767564	RBS-SED38	09/12/08	SEDIMENT
767565	RBS-SED39	09/12/08	SEDIMENT
767566	RBS-SED40	09/12/08	SEDIMENT
767567	RBS-SED41	09/12/08	SEDIMENT
767568	RBS-SED43	09/12/08	SEDIMENT
767569	RBS-SED44	09/12/08	SEDIMENT
767570	RBS-SED45	09/12/08	SEDIMENT
767571	RBS-SED46	09/12/08	SEDIMENT
767572	RBS-SED47	09/12/08	SEDIMENT
767573	RBS-SED48	09/12/08	SEDIMENT
767574	RBS-SED49	09/12/08	SEDIMENT
767575	RBS-SED50	09/12/08	SEDIMENT
767576	RBS-SED51	09/12/08	SEDIMENT
767577	RBS-SED52	09/12/08	SEDIMENT
767578	RBS-SED81	09/12/08	SEDIMENT
767579	RBS-SED82	09/12/08	SEDIMENT
767580	RBS-SED83	09/12/08	SEDIMENT
767581	RBS-SED19	09/12/08	SEDIMENT

Documentation of the condition of the samples at the time of their receipt and any exception to

30 Community Drive • Suite 11 South Burlington, VT 05403 tel 802.660.1990 fax 802.660.1919 www.testamericainc.com

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody

(87)

SDG: 127611

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
Phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

A.bill No. 5541 0029 6997

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: D. Gaughan	Date: 9/12/08	COC No:
Your Company Name here Weston Solutions	Tel/Fax: (732) 417-5500	Lab Contact:	Carrier: FedEx	1 of 3 COCs
Address 205 Campus Dr	Analysis Turnaround Time			Job No.
City/State/Zip Edison / NJ / 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			SDG No.
(xxx) xxx-xxxx FAX	☒ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO# 00643764	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample (Y/N)	Grain Size	Sample Specific Notes:
RBS-SED36	9/12/08	0927	G	Sed	1		X	
RBS-SED37		0935					X	
RBS-SED38		0936					X	
RBS-SED39		0942					X	
RBS-SED40		0942					X	
RBS-SED41		0948					X	
RBS-SED43		0948					X	
RBS-SED44		0951					X	
RBS-SED45		0956					X	
RBS-SED46		0957					X	
RBS-SED47		1004					X	
RBS-SED48		1002					X	

(88)

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☒

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by: (Scott Snyder)	Weston	9/12/08 1630	FedEx	—	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
				TA	9/15/08 0945
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No. 8541 0029 6697
TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughen	Site Contact: D Gaughen	Date: 9/12/08	COC No:
Your Company Name here: Weston Solutions	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: FedEx	2 of 3 COCs
Address: 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip: Edison, NJ / 08837	Calendar (C) or Work Days (W) _____			
(xxx) xxx-xxxx Phone	TAT if different from Below _____			SDG No.
(xxx) xxx-xxxx FAX	☒ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO# 0064364	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS-SED49	9/12/08	1004	G	Sed	1		X	
RBS-SED50		1005					X	
RBS-SED51		1012					X	
84 RBS-SED52		1015					X	
RBS-SED81		1021					X	
RBS-SED82		1021					X	
RBS-SED83		1030					X	
RBS SED 19		1235					X	
RBS SED 10		1310					X	
RBSSED 08		1229					X	
RBSSED 17		1215					X	
RBSSED 21		1310					X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

1630

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	WESTON	9/12/08	FedEx	—	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
				TA	9/15/08 0945
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

Airbill No. 8541 0029 6897

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: D Gaughan	Date: 9/12/08	COC No:
Your Company Name here: Weston Solutions	Tel/Fax: 732 417 5800	Lab Contact:	Carrier: Fed Ex	3 of 3 COCs
Address: 205 Campus Dr	Analysis Turnaround Time			Job No.
City/State/Zip: Edison NJ 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			SDG No.
(xxx) xxx-xxxx FAX	[X] 2 weeks			
Project Name: Raritan Bay Slag	[ ] 1 week			
Site:	[ ] 2 days			
PO# 0064364	[ ] 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS SED 26	9/12/08	1345	G	Sed	1	X		
RBS SED 20		1250				X		
RBS SED 23		1325				X		
RBS SED 09		1250				X		
RBS SED 12		1330				X		
RBS SED 18		1220				X		
RBS SED 24		1332				X		
RBS SED 25		1341				X		
RBS SED 11		1305				X		
RBS SED 07		1222				X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
[ ] Non-Hazard [ ] Flammable [ ] Skin Irritant Poison B [ ] Unknown [ ]

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] Return To Client [ ] Disposal By Lab [ ] Archive For _____ Months

Special Instructions/QC Requirements & Comments:

1630

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	WESTON	9/12/08	FedEx	-	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
				TA	9/15/08 0945
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

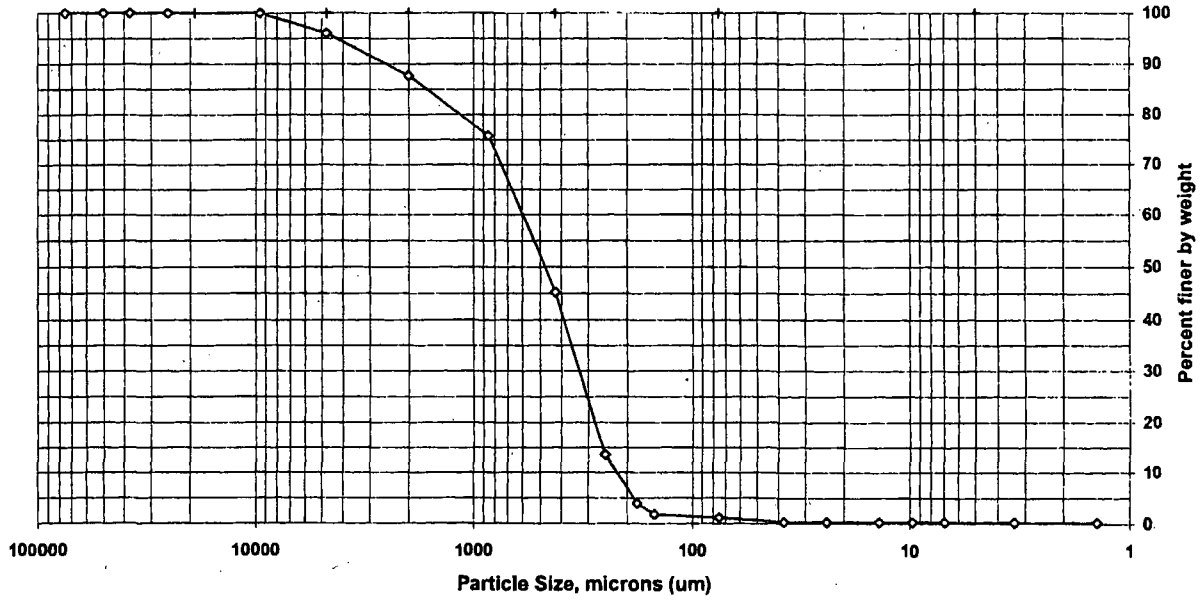
Particle Size Results

(91)

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED36	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767562			**End Date:**	10/1/2008

Percent Solids:	96.4%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	96.0	4.0
#10	2000	87.7	8.3
#20	850	75.8	11.9
#40	425	45.2	30.6
#60	250	13.6	31.6
#80	180	3.9	9.8
#100	150	1.7	2.1
#200	75	1.2	0.6
Hydrometer	37.6	0.3	0.9
|	23.8	0.3	0.0
|	13.7	0.3	0.0
|	9.7	0.3	0.0
|	6.9	0.3	0.0
|	3.3	0.2	0.0
V	1.4	0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	4.0
Sand	94.9
Coarse Sand	8.3
Medium Sand	42.5
Fine Sand	44.1
Silt	0.9
Clay	0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

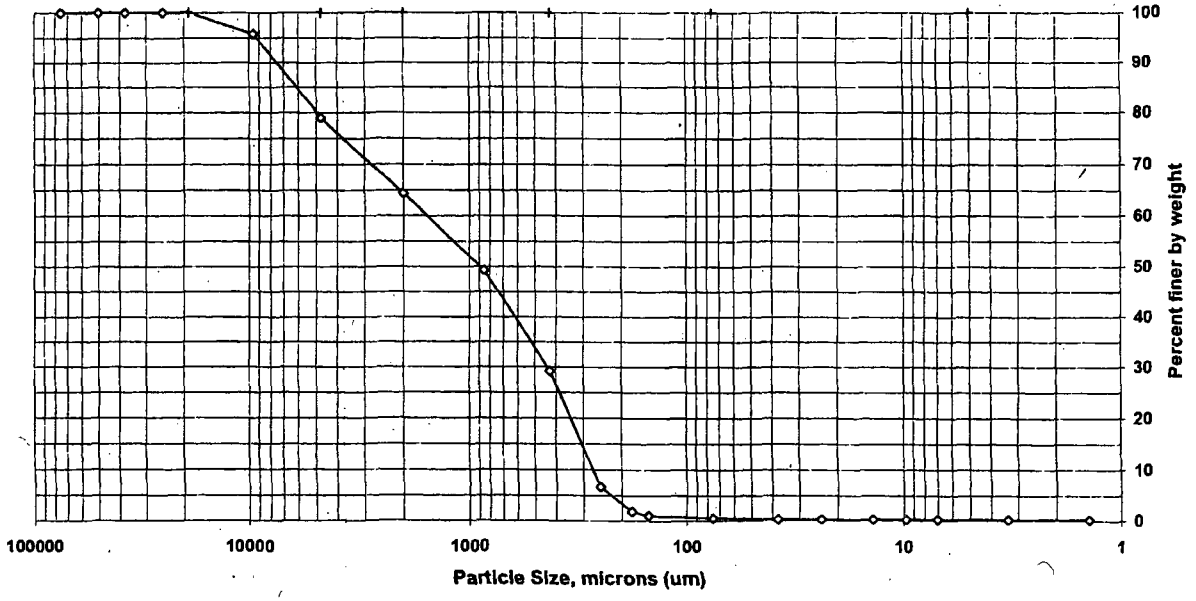
(92)

FSL024:07.29.05:0
TestAmerica Burlington

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED37	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767563			**End Date:**	10/1/2008

Percent Solids:	96.5%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	95.9	4.1
#4	4750	79.0	16.9
#10	2000	64.4	14.5
#20	850	49.3	15.1
#40	425	29.2	20.0
#60	250	6.7	22.6
#80	180	1.8	4.9
#100	150	1.0	0.8
#200	75	0.5	0.5
Hydrometer	37.6	0.3	0.3
|	23.8	0.3	0.0
|	13.7	0.3	0.0
|	9.7	0.3	0.0
|	7.0	0.3	0.0
|	3.3	0.2	0.0
V	1.4	0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	21.0
Sand	78.4
Coarse Sand	14.5
Medium Sand	35.2
Fine Sand	28.7
Silt	0.3
Clay	0.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

93

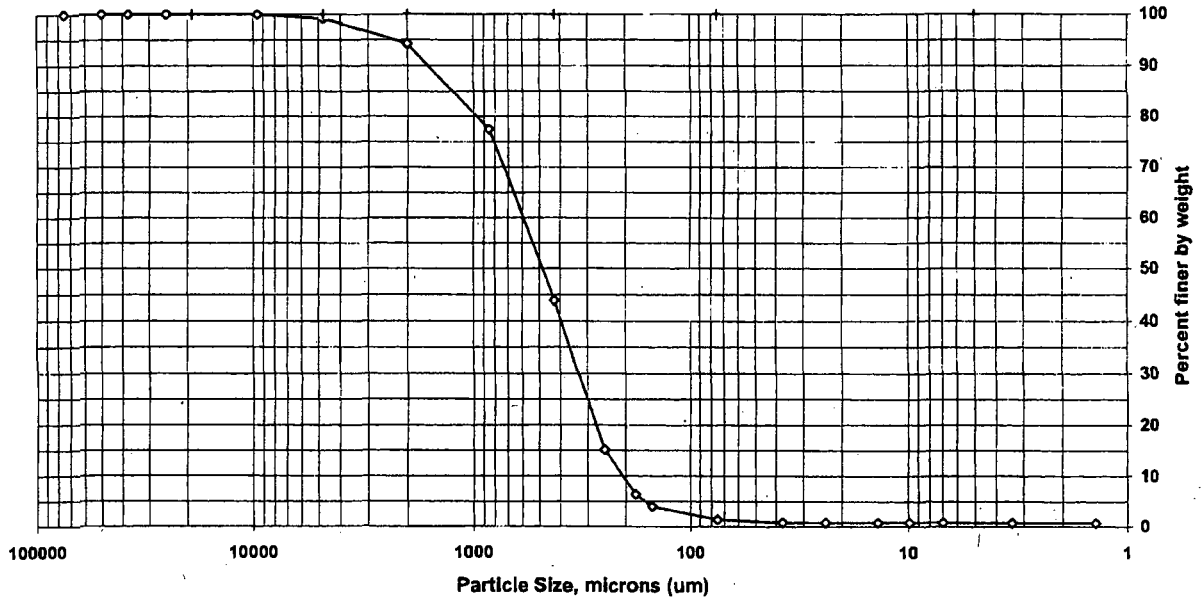
FSL024:07.29.05:0
TestAmerica Burlington

127611PS 10/2/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED38	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767564			**End Date:**	10/1/2008

Percent Solids:	92.7%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.2	0.8
#10	2000	94.3	4.9
#20	850	77.5	16.8
#40	425	43.9	33.6
#60	250	15.2	28.7
#80	180	6.3	8.9
#100	150	4.0	2.4
#200	75	1.4	2.6
Hydrometer	37.5	0.8	0.6
|	23.7	0.8	0.0
|	13.7	0.8	0.0
|	9.8	0.8	0.0
|	7.0	0.8	0.0
|	3.4	0.7	0.0
V	1.4	0.7	0.0

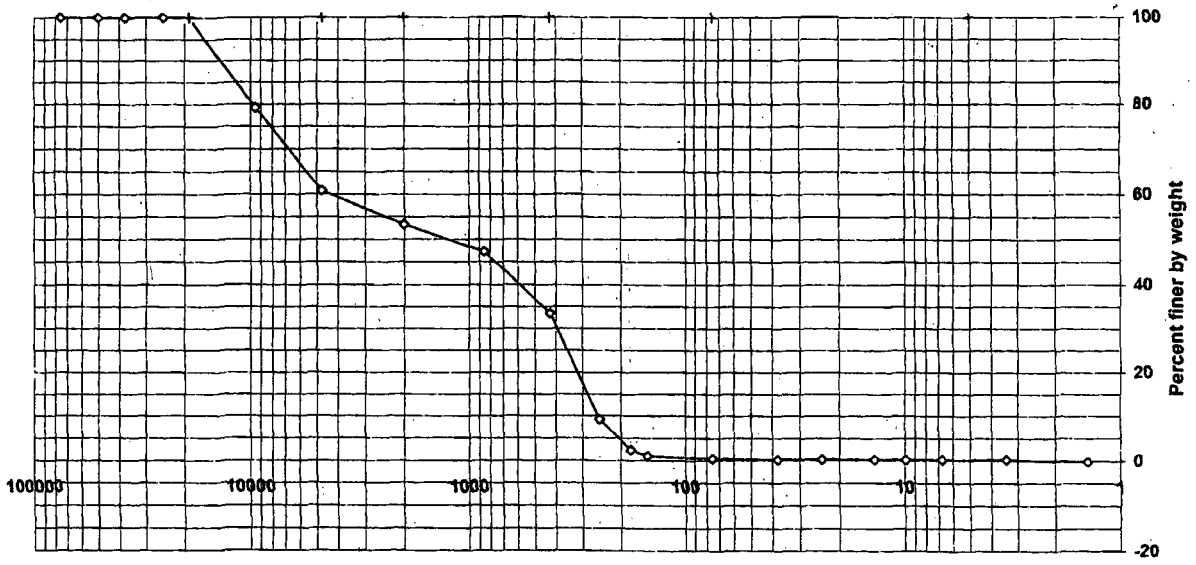
Soil Classification	Percent of Total Sample
Gravel	0.8
Sand	97.8
Coarse Sand	4.9
Medium Sand	50.4
Fine Sand	42.5
Silt	0.6
Clay	0.8

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED39	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767565			**End Date:**	10/1/2008

Percent Solids:	98.3%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	79.2	20.8
#4	4750	60.8	18.4
#10	2000	53.3	7.5
#20	850	47.3	6.0
#40	425	33.4	13.9
#60	250	9.2	24.2
#80	180	2.3	6.9
#100	150	1.0	1.2
#200	75	0.5	0.5
Hydrometer	37.6	0.2	0.2
|	23.8	0.2	0.0
|	13.7	0.2	0.0
|	9.9	0.2	0.0
|	6.7	0.2	0.0
|	3.4	0.2	0.0
V	1.4	-0.2	0.4

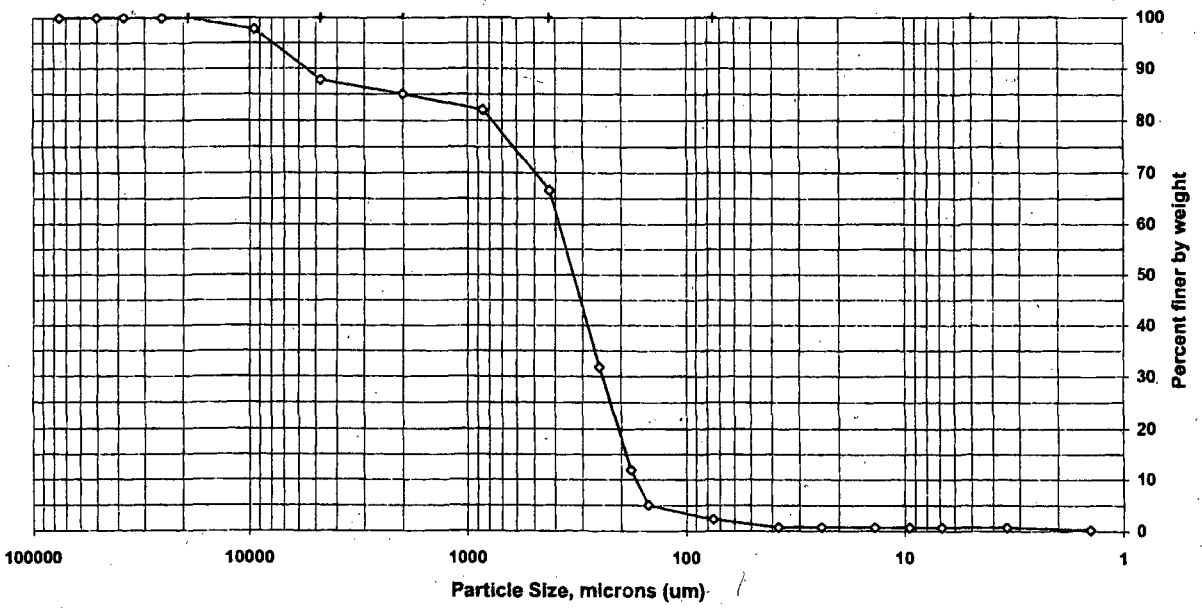
Soil Classification	Percent of Total Sample
Gravel	39.2
Sand	60.3
Coarse Sand	7.5
Medium Sand	19.9
Fine Sand	33.0
Silt	0.2
Clay	0.2

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED40	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767566			**End Date:**	10/1/2008

Percent Solids:	82.2%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.8	2.2
#4	4750	87.8	10.0
#10	2000	85.0	2.8
#20	850	82.1	3.0
#40	425	66.6	15.4
#60	250	31.8	34.9
#80	180	11.9	19.9
#100	150	5.0	6.9
#200	75	2.3	2.8
Hydrometer	37.5	0.7	1.5
|	23.7	0.7	0.0
|	13.7	0.7	0.0
|	9.5	0.7	0.0
|	6.8	0.7	0.0
|	3.4	0.7	0.0
V	1.4	0.2	0.5

Soil Classification	Percent of Total Sample
Gravel	12.2
Sand	85.6
Coarse Sand	2.8
Medium Sand	18.4
Fine Sand	64.4
Silt	1.5
Clay	0.7

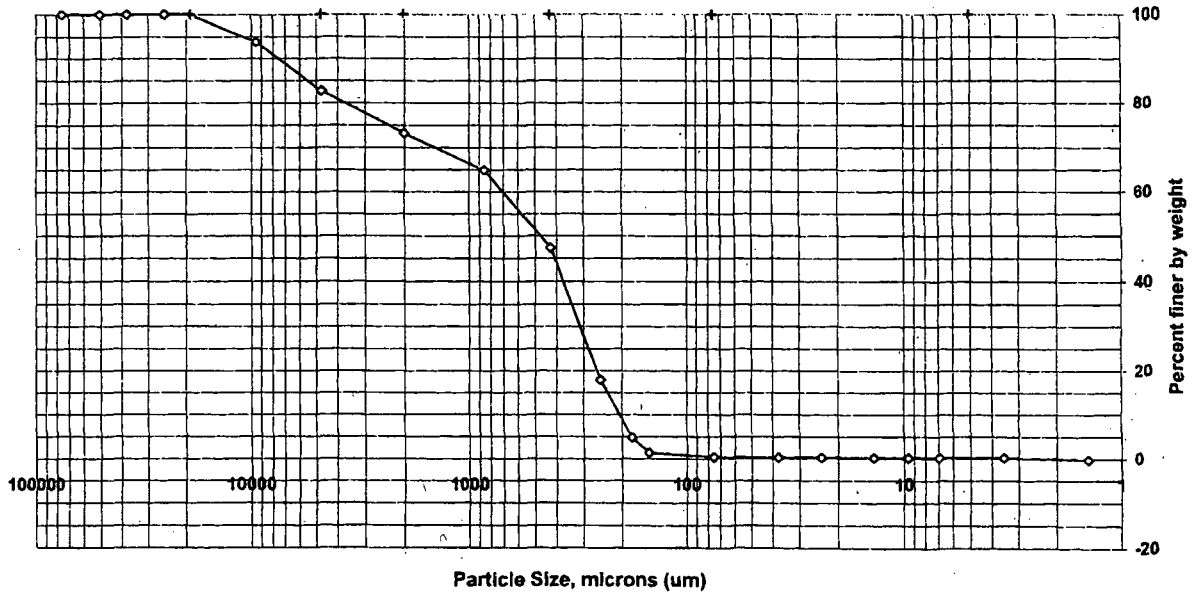
Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(96)

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED41	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767567			**End Date:**	10/1/2008

Percent Solids:	97.2%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	93.8	6.2
#4	4750	82.7	11.1
#10	2000	73.2	9.5
#20	850	64.9	8.3
#40	425	47.3	17.6
#60	250	17.9	29.5
#80	180	4.8	13.1
#100	150	1.3	3.5
#200	75	0.4	1.0
Hydrometer	37.6	0.3	0.1
|	23.8	0.3	0.0
|	13.7	0.3	0.0
|	9.6	0.3	0.0
|	6.9	0.3	0.0
|	3.5	0.2	0.0
V	1.4	-0.2	0.5

Soil Classification	Percent of Total Sample
Gravel	17.3
Sand	82.3
Coarse Sand	9.5
Medium Sand	25.9
Fine Sand	47.0
Silt	0.1
Clay	0.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

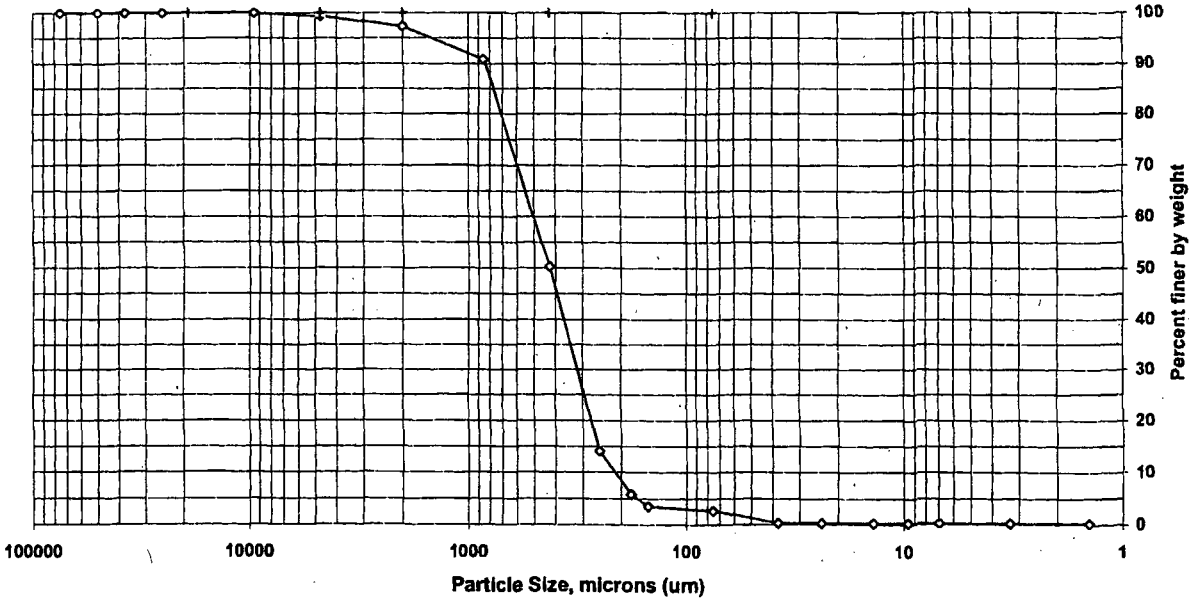
97

FSL024:07.29.05:0
TestAmerica Burlington

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED43	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767568			**End Date:**	10/1/2008

Percent Solids:	91.0%		**Non-soil material:**	na
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.3	0.7
#10	2000	97.3	2.0
#20	850	90.8	6.5
#40	425	50.2	40.6
#60	250	14.0	36.2
#80	180	5.8	8.2
#100	150	3.5	2.3
#200	75	2.7	0.8
Hydrometer	37.6	0.3	2.4
I	23.8	0.3	0.0
I	13.7	0.3	0.0
I	9.6	0.3	0.0
I	6.9	0.3	0.0
I	3.3	0.2	0.0
V	1.4	0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	0.7
Sand	96.7
Coarse Sand	2.0
Medium Sand	47.1
Fine Sand	47.5
Silt	2.4
Clay	0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(98)

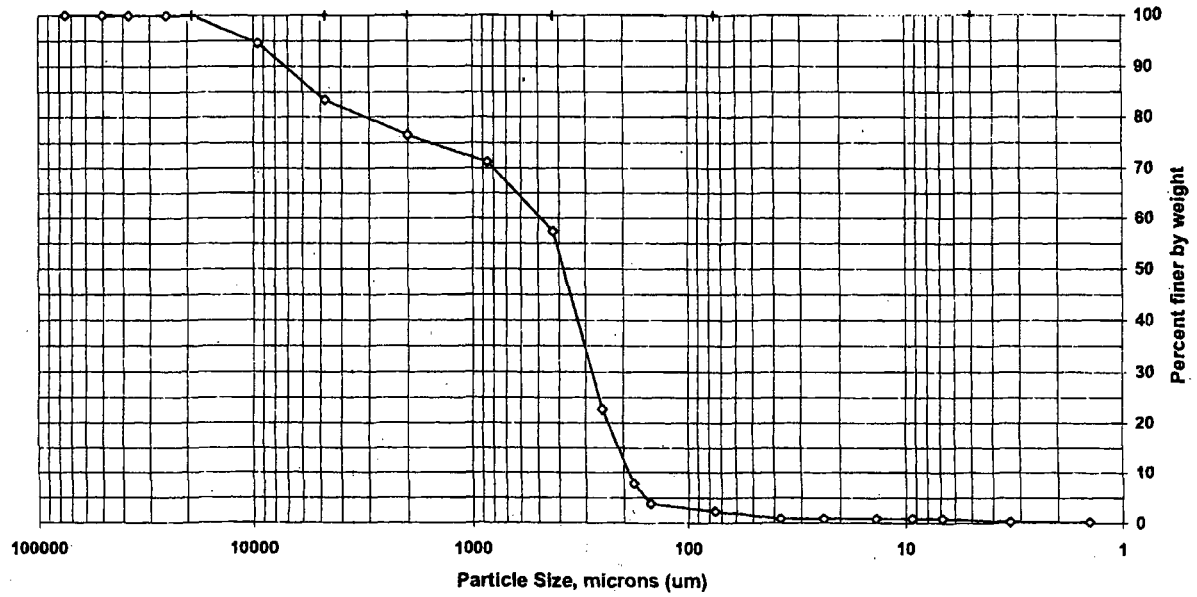
FSL024:07.29.05:0
TestAmerica Burlington

127611PS 10/2/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED44	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767569			**End Date:**	10/1/2008

Percent Solids:	94.3%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	94.6	5.4
#4	4750	83.4	11.2
#10	2000	76.6	6.9
#20	850	71.2	5.4
#40	425	57.4	13.8
#60	250	22.7	34.7
#80	180	7.8	14.9
#100	150	3.8	4.0
#200	75	2.3	1.4
Hydrometer	37.5	0.8	1.5
|	23.7	0.8	0.0
|	13.7	0.8	0.0
|	9.4	0.8	0.0
|	6.8	0.8	0.0
|	3.3	0.3	0.6
V	1.4	0.3	0.0

Soil Classification	Percent of Total Sample
Gravel	16.6
Sand	81.1
Coarse Sand	6.9
Medium Sand	19.2
Fine Sand	55.0
Silt	1.5
Clay	0.8

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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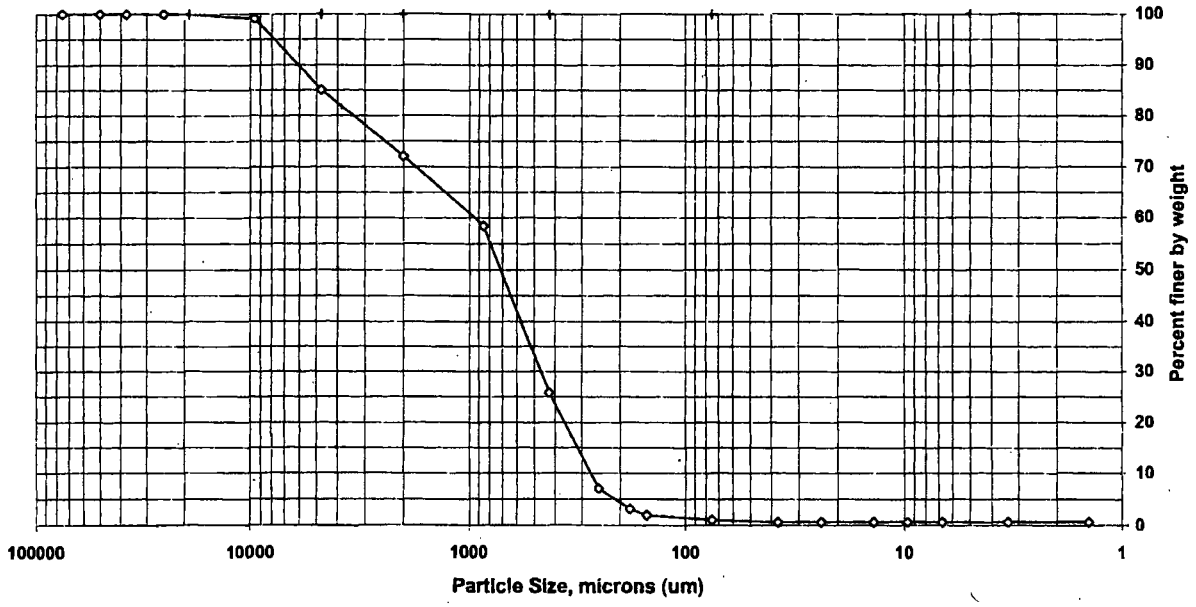
127611RS 10/2/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED45	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767570			**End Date:**	10/1/2008

Percent Solids:	84.6%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	99.1	0.9
#4	4750	85.0	14.0
#10	2000	72.1	12.9
#20	850	58.4	13.7
#40	425	25.9	32.5
#60	250	7.0	18.8
#80	180	3.1	3.9
#100	150	1.9	1.2
#200	75	1.0	0.9
Hydrometer	37.5	0.6	0.4
|	23.7	0.6	0.0
|	13.7	0.6	0.0
|	9.7	0.6	0.0
|	6.7	0.6	0.0
|	3.4	0.6	0.0
V	1.4	0.6	0.0

Soil Classification	Percent of Total Sample
Gravel	15.0
Sand	84.0
Coarse Sand	12.9
Medium Sand	46.2
Fine Sand	24.8
Silt	0.4
Clay	0.6

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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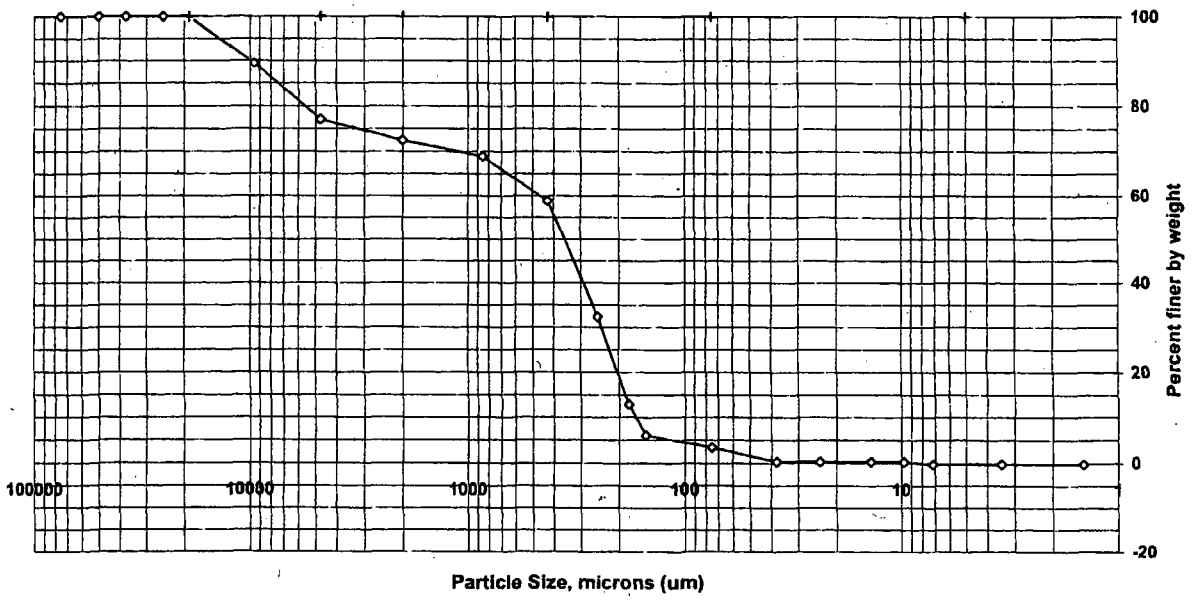
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED46	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767571			**End Date:**	10/1/2008

Percent Solids:	91.8%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	89.4	10.6
#4	4750	77.0	12.4
#10	2000	72.4	4.6
#20	850	68.9	3.5
#40	425	58.9	10.0
#60	250	32.3	26.6
#80	180	12.9	19.4
#100	150	6.0	6.8
#200	75	3.4	2.6
Hydrometer	37.6	0.3	3.2
|	23.8	0.3	0.0
|	13.7	0.3	0.0
|	9.7	0.3	0.0
|	7.1	-0.3	0.5
|	3.4	-0.3	0.0
V	1.4	-0.3	0.0

Soil Classification	Percent of Total Sample
Gravel	23.0
Sand	73.6
Coarse Sand	4.6
Medium Sand	13.6
Fine Sand	55.4
Silt	3.7
Clay	-0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

LDL

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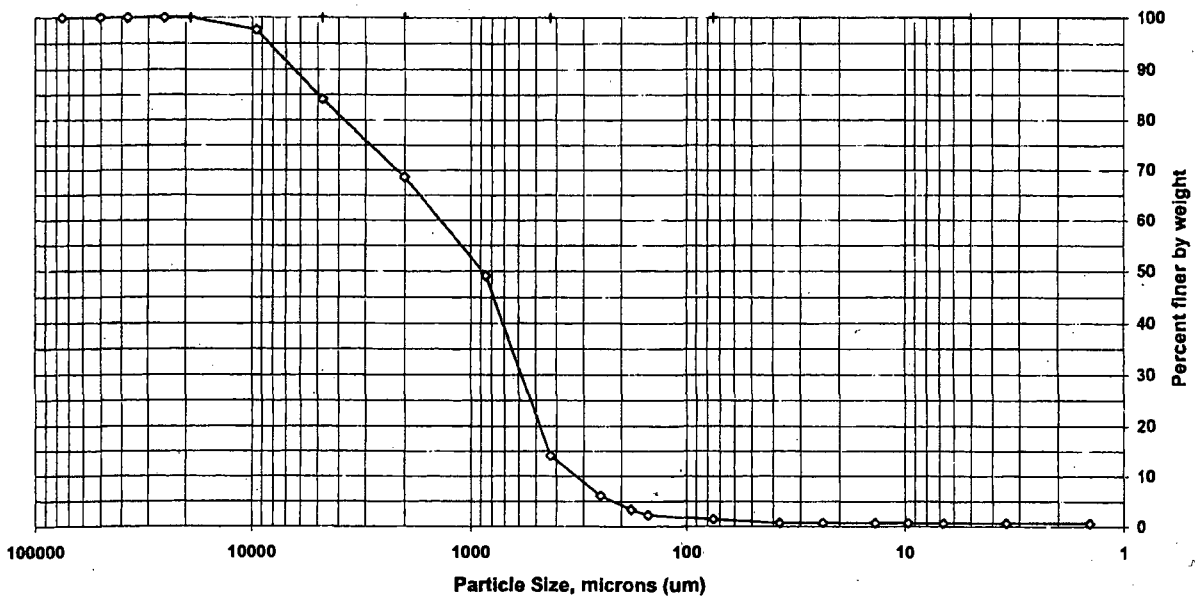
127611PS 10/2/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED47	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767572			**End Date:**	10/1/2008

Percent Solids:	83.8%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.7	2.3
#4	4750	84.1	13.5
#10	2000	68.6	15.5
#20	850	49.2	19.4
#40	425	14.1	35.1
#60	250	6.1	8.0
#80	180	3.3	2.8
#100	150	2.3	1.1
#200	75	1.4	0.9
Hydrometer	37.5	0.7	0.7
|	23.7	0.7	0.0
|	13.7	0.7	0.0
|	9.7	0.7	0.0
|	6.7	0.7	0.0
|	3.4	0.7	0.0
V	1.4	0.7	0.0

Soil Classification	Percent of Total Sample
Gravel	15.9
Sand	82.7
Coarse Sand	15.5
Medium Sand	54.5
Fine Sand	12.7
Silt	0.8
Clay	0.7

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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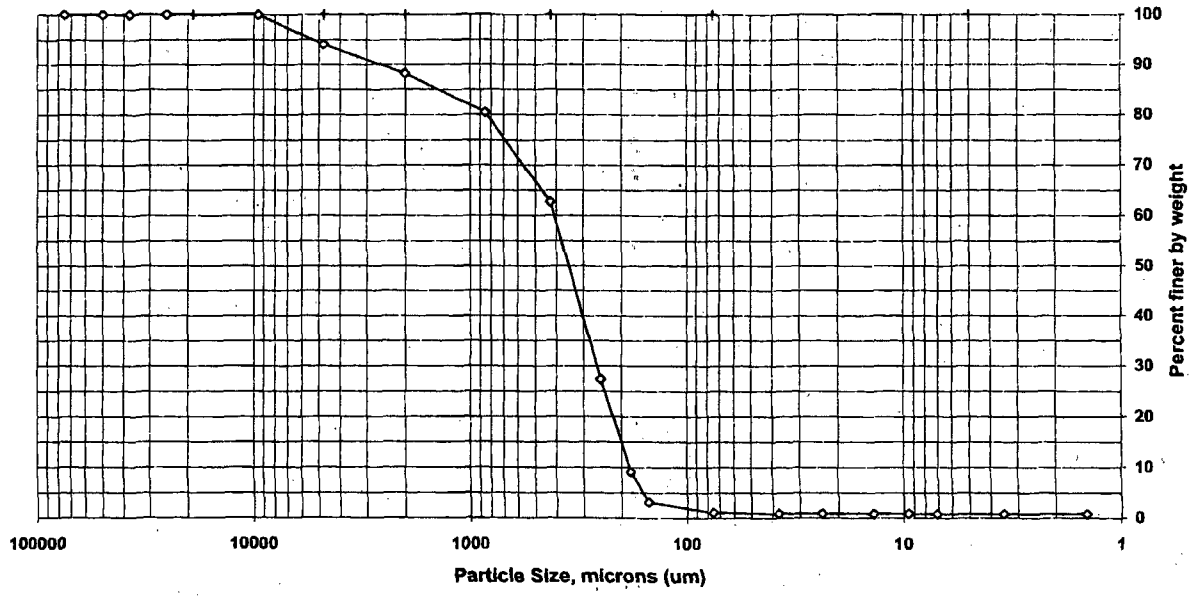
127611PS 10/2/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED48	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767573			**End Date:**	10/1/2008

Percent Solids:	82.4%		**Non-soil material:**	shells
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	94.1	5.9
#10	2000	88.2	5.9
#20	850	80.5	7.7
#40	425	62.8	17.8
#60	250	27.4	35.3
#80	180	9.1	18.3
#100	150	3.1	6.0
#200	75	1.1	2.1
Hydrometer	37.5	0.8	0.3
I	23.7	0.8	0.0
I	13.7	0.8	0.0
I	9.5	0.8	0.0
I	7.1	0.8	0.0
I	3.5	0.8	0.0
V	1.4	0.8	0.0

Soil Classification	Percent of Total Sample
Gravel	5.9
Sand	93.0
Coarse Sand	5.9
Medium Sand	25.4
Fine Sand	61.7
Silt	0.3
Clay	0.8

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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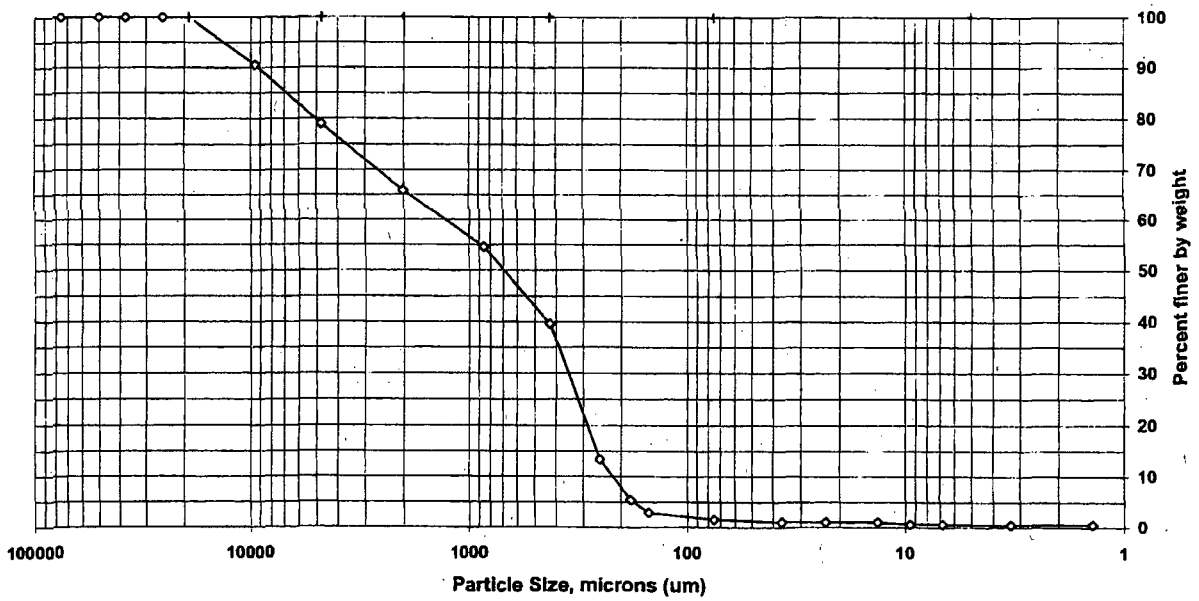
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED49	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767574			**End Date:**	10/2/2008

Percent Solids:	88.0%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	90.5	9.5
#4	4750	79.0	11.5
#10	2000	65.9	13.1
#20	850	54.5	11.4
#40	425	39.5	14.9
#60	250	13.4	26.2
#80	180	5.3	8.0
#100	150	2.9	2.5
#200	75	1.6	1.3
Hydrometer	36.4	1.0	0.5
|	23.0	1.0	0.0
|	13.3	1.0	0.0
|	9.5	0.6	0.5
|	6.8	0.6	0.0
|	3.3	0.5	0.1
V	1.4	0.5	0.0

Soil Classification	Percent of Total Sample
Gravel	21.0
Sand	77.4
Coarse Sand	13.1
Medium Sand	26.3
Fine Sand	38.0
Silt	1.0
Clay	0.6

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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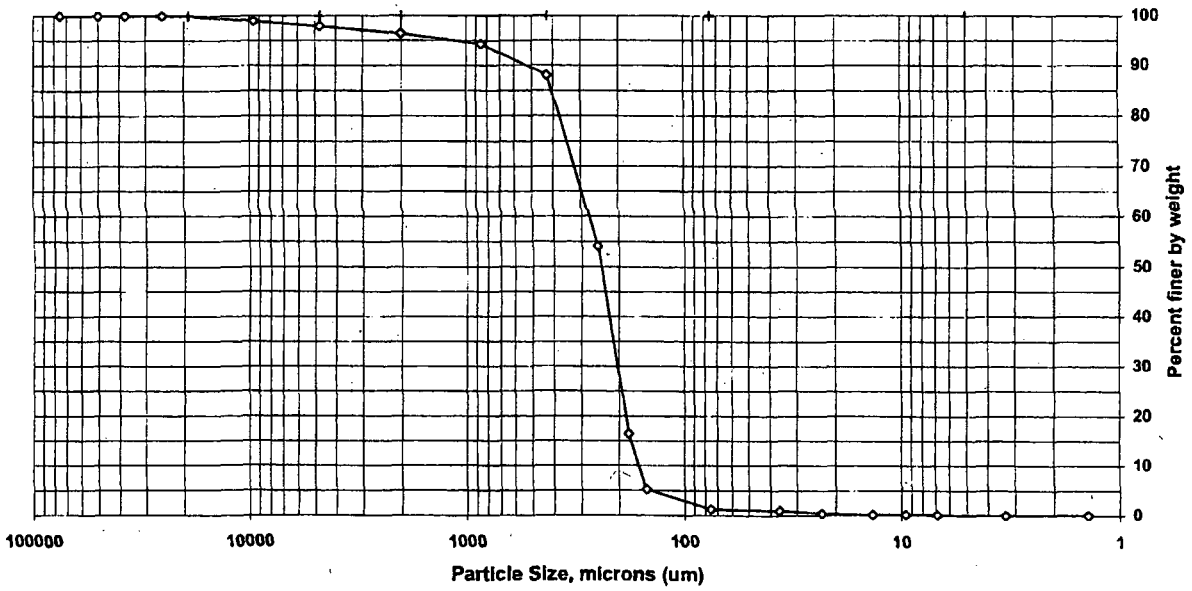
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED50	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767575			**End Date:**	10/2/2008

Percent Solids:	82.0%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	98.9	1.1
#4	4750	97.9	1.0
#10	2000	96.5	1.4
#20	850	94.3	2.2
#40	425	88.1	6.2
#60	250	54.1	34.0
#80	180	16.4	37.7
#100	150	5.2	11.2
#200	75	1.2	4.0
Hydrometer	36.4	0.9	0.3
|	23.1	0.4	0.5
|	13.5	0.3	0.2
|	9.6	0.3	0.0
|	6.9	0.3	0.0
|	3.3	0.1	0.2
V	1.4	0.1	0.0

Soil Classification	Percent of Total Sample
Gravel	2.1
Sand	96.7
Coarse Sand	1.4
Medium Sand	8.4
Fine Sand	86.8
Silt	1.0
Clay	0.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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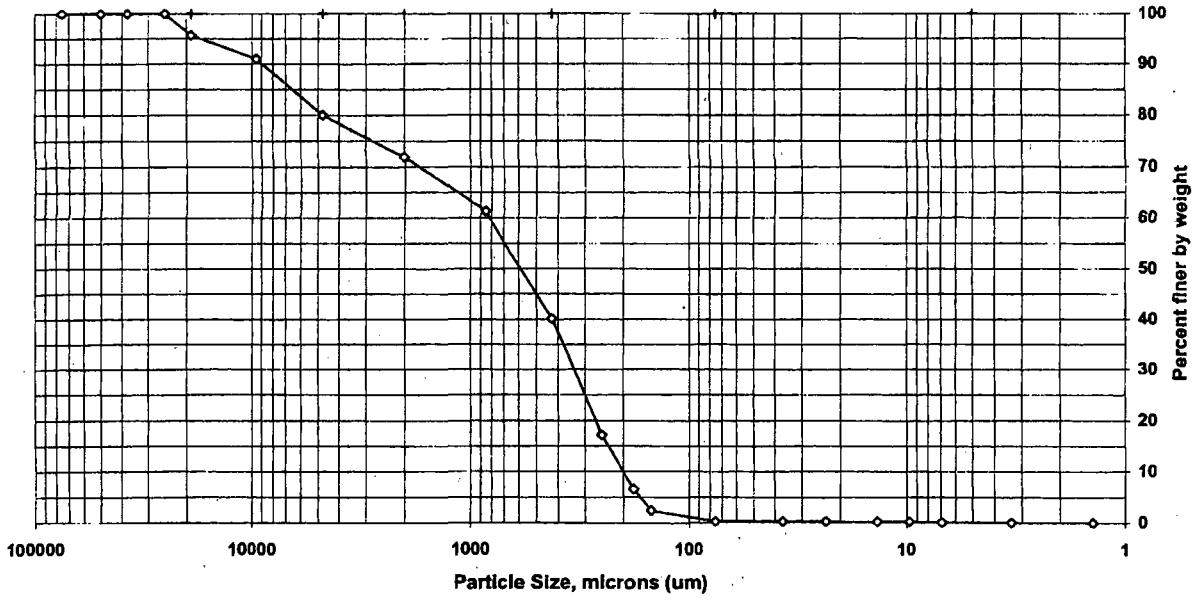
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED51	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767576			**End Date:**	10/2/2008

Percent Solids:	85.7%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	25 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	95.6	4.4
3/8 inch	9500	90.9	4.7
#4	4750	80.0	10.9
#10	2000	71.9	8.1
#20	850	61.3	10.6
#40	425	40.1	21.2
#60	250	17.2	22.9
#80	180	6.6	10.6
#100	150	2.3	4.2
#200	75	0.3	2.0
Hydrometer	36.8	0.3	0.0
|	23.2	0.3	0.0
|	13.5	0.2	0.1
|	9.7	0.2	0.0
|	6.9	0.1	0.1
|	3.4	0.1	0.1
V	1.4	0.0	0.1

Soil Classification	Percent of Total Sample
Gravel	20.0
Sand	79.7
Coarse Sand	8.1
Medium Sand	31.8
Fine Sand	39.8
Silt	0.2
Clay	0.1

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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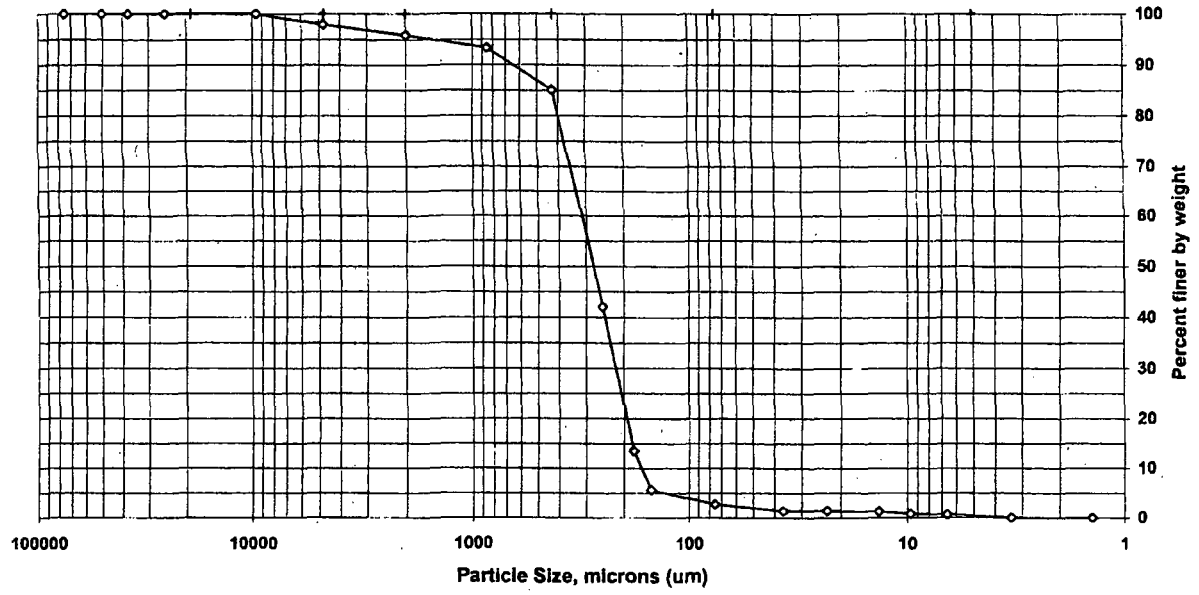
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED52	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767577			**End Date:**	10/2/2008

Percent Solids:	88.7%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	97.9	2.1
#10	2000	95.9	2.0
#20	850	93.4	2.6
#40	425	85.0	8.3
#60	250	42.0	43.0
#80	180	13.6	28.4
#100	150	5.6	7.9
#200	75	2.7	2.9
Hydrometer	36.4	1.4	1.3
|	23.0	1.4	0.0
|	13.4	1.3	0.1
|	9.7	0.8	0.5
|	6.6	0.7	0.1
|	3.4	0.1	0.6
V	1.4	0.0	0.1

Soil Classification	Percent of Total Sample
Gravel	2.1
Sand	95.2
Coarse Sand	2.0
Medium Sand	10.9
Fine Sand	82.3
Silt	2.0
Clay	0.7

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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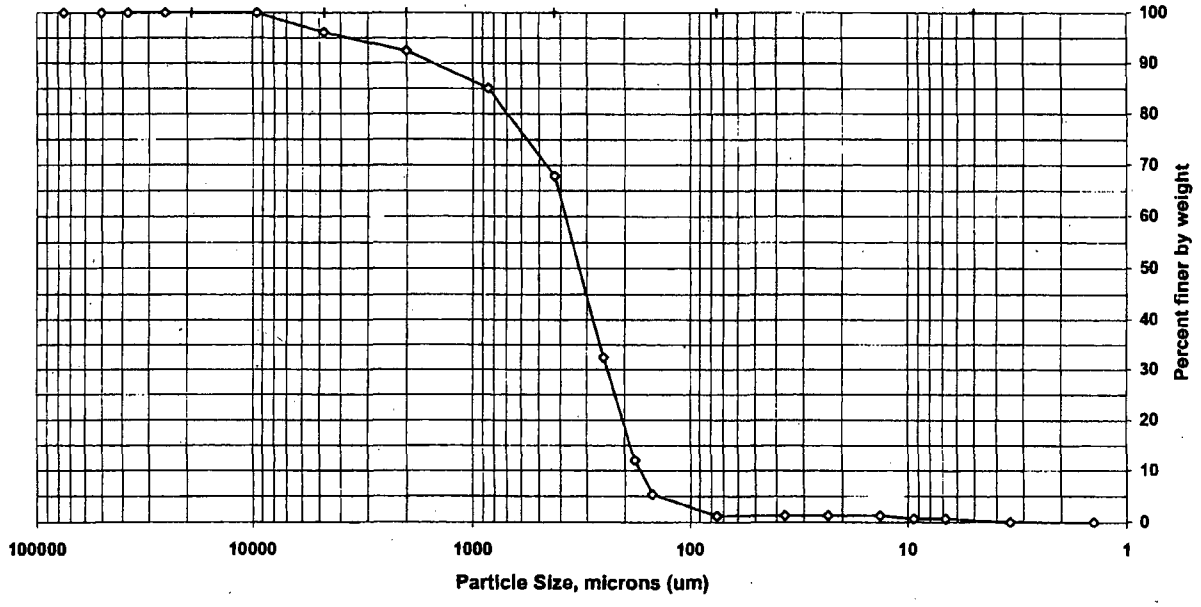
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED81	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767578			**End Date:**	10/2/2008

Percent Solids:	79.6%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	96.1	3.9
#10	2000	92.5	3.6
#20	850	85.1	7.4
#40	425	67.9	17.2
#60	250	32.4	35.5
#80	180	12.1	20.4
#100	150	5.3	6.7
#200	75	1.2	4.1
Hydrometer	36.7	1.2	0.0
|	23.2	1.2	0.0
|	13.4	1.2	0.0
|	9.4	0.7	0.6
|	6.8	0.7	0.0
|	3.4	0.0	0.7
V	1.4	0.0	0.0

Soil Classification	Percent of Total Sample
Gravel	3.9
Sand	94.9
Coarse Sand	3.6
Medium Sand	24.6
Fine Sand	66.7
Silt	0.6
Clay	0.7

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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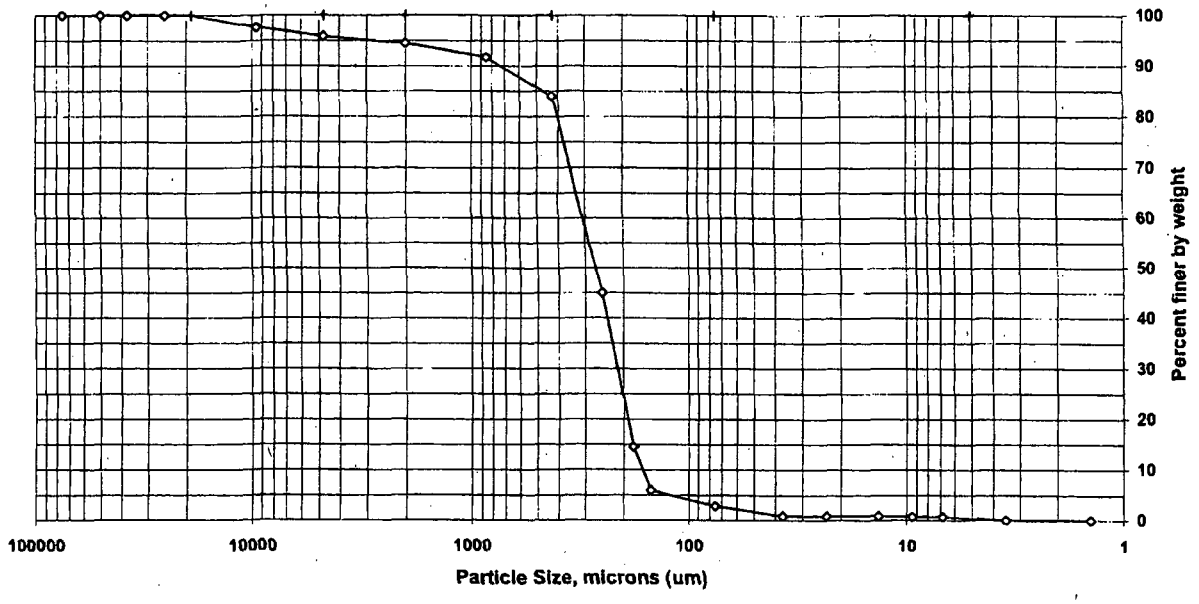
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED82	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767579			**End Date:**	10/2/2008

Percent Solids:	87.7%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subrounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.7	2.3
#4	4750	95.9	1.7
#10	2000	94.5	1.5
#20	850	91.7	2.8
#40	425	84.0	7.8
#60	250	45.0	39.0
#80	180	14.5	30.5
#100	150	6.0	8.6
#200	75	2.8	3.1
Hydrometer	36.8	0.8	2.0
|	23.3	0.8	0.0
|	13.4	0.8	0.0
|	9.4	0.7	0.1
|	6.8	0.7	0.0
|	3.5	0.0	0.7
V	1.4	0.0	0.0

Soil Classification	Percent of Total Sample
Gravel	4.1
Sand	93.1
Coarse Sand	1.5
Medium Sand	10.5
Fine Sand	81.1
Silt	2.1
Clay	0.7

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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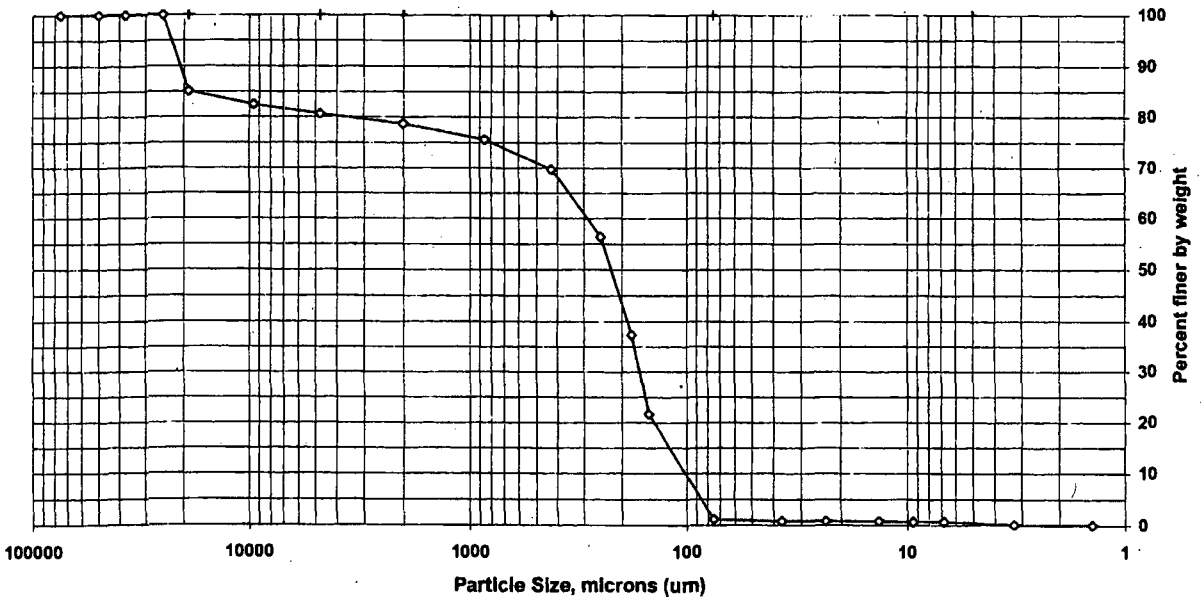
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED83	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767580			**End Date:**	10/2/2008

Percent Solids:	78.7%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subangular
Maximum Particle Size:	25 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	85.1	14.9
3/8 inch	9500	82.5	2.6
#4	4750	80.6	1.8
#10	2000	78.7	1.9
#20	850	75.6	3.1
#40	425	69.7	5.9
#60	250	56.4	13.3
#80	180	37.3	19.1
#100	150	21.7	15.6
#200	75	1.1	20.6
Hydrometer	36.8	0.8	0.4
|	23.3	0.8	0.0
|	13.4	0.8	0.0
|	9.4	0.7	0.1
|	6.8	0.7	0.0
|	3.3	0.1	0.6
V	1.4	0.0	0.1

Soil Classification	Percent of Total Sample
Gravel	19.4
Sand	79.5
Coarse Sand	1.9
Medium Sand	9.0
Fine Sand	68.6
Silt	0.4
Clay	0.7

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(LD)

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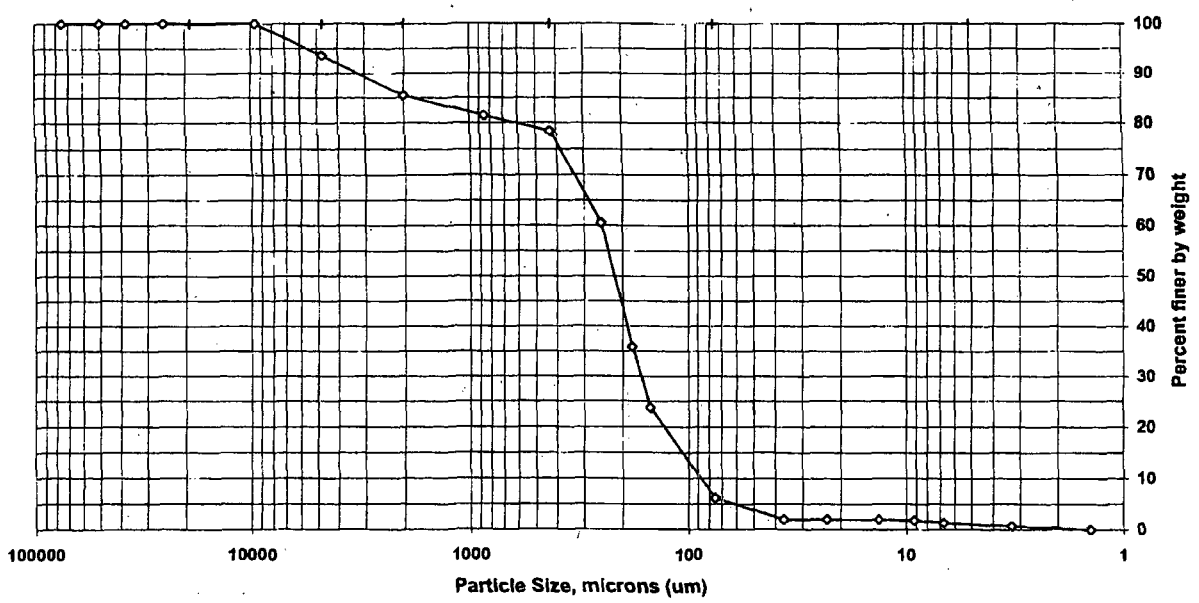
TestAmerica Burlington

127611BPS 10/2/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127611	**Date Received:**	9/15/2008
Sample ID:	RBS-SED19	**ETR(s):**	127611	**Start Date:**	9/15/2008
Lab ID:	767581			**End Date:**	10/2/2008

Percent Solids:	75.2%	**Non-soil material:**	shells,plant
Specific Gravity:	2.650	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	93.6	6.4
#10	2000	85.5	8.2
#20	850	81.4	4.0
#40	425	78.4	3.1
#60	250	60.5	17.9
#80	180	35.8	24.6
#100	150	23.7	12.1
#200	75	6.2	17.6
Hydrometer	36.5	2.0	4.2
|	23.1	2.0	0.0
|	13.3	2.0	0.0
|	9.2	1.9	0.1
|	6.7	1.3	0.6
|	3.3	0.7	0.7
V	1.4	0.0	0.7

Soil Classification	Percent of Total Sample
Gravel	6.4
Sand	87.5
Coarse Sand	8.2
Medium Sand	7.1
Fine Sand	72.2
Silt	4.9
Clay	1.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

LLL

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127611

Client Code: WESTN4
SDG: 127611
ETR(s): 127611

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 1-Oct-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 9/26/08 DJP 9/29/08	MAP 9/26/08	MNT 9/29/08	MAP 9/29/08 MAP 9/30/08	MNT 9/29/08 DJP 10/1/08	MAP 9/30/08 DJP 10/1/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767562	767563	767564	767565	767566	767567	767568	767569	767570	767571	767572	767573
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.0	20.0	20.0	20.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0035	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0035	1.0035	1.0040	1.0030	1.0035	1.0030	1.0035	1.0035	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** ELE **Hydrometer start time:** 17:13

Calibrations:

L temp, C	L read	H Temp, C	H read
17.0	1.0035	23.0	1.0030

Cal. Date: 09/09/07 **Hydrometer data entered:** DJP 10/1/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127611B

Client Code: WESTN4
SDG: 127611
ETR(s): 127611

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 2-Oct-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 09/29/08 MAP 09/30/08	MAP 09/29/08	DPS 09/30/08	DPS 09/30/08 DPS 09/31/08	DPS 09/30/08 DJP 10/2/08	MAP 10/1/08 DJP 10/2/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767574	767575	767576	767577	767578	767579	767580	767581				
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0050	1.0045	1.0040	1.0050	1.0050	1.0045	1.0045	1.0055				
Temperature, C	22.0	22.5	22.0	22.0	21.5	21.5	21.5	21.5				
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0050	1.0040	1.0040	1.0050	1.0050	1.0045	1.0045	1.0055				
Temperature, C	22.0	22.5	22.0	22.0	21.5	21.5	21.5	21.5				
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0050	1.0040	1.0040	1.0050	1.0050	1.0045	1.0045	1.0055				
Temperature, C	22.0	21.5	21.5	21.5	21.5	21.5	21.5	21.5				
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0045	1.0040	1.0040	1.0045	1.0045	1.0045	1.0045	1.0055				
Temperature, C	21.5	21.5	21.5	21.5	21.0	21.0	21.0	21.0				
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0045	1.0040	1.0040	1.0045	1.0045	1.0045	1.0045	1.0050				
Temperature, C	21.5	21.5	21.0	21.0	21.0	21.0	21.0	21.0				
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0045	1.0040	1.0040	1.0040	1.0040	1.0040	1.0040	1.0045				
Temperature, C	20.5	20.5	20.5	20.5	20.0	20.0	20.5	20.5				
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0045	1.0040	1.0040	1.0040	1.0040	1.0040	1.0040	1.0040				
Temperature, C	20.5	20.5	20.0	20.0	20.0	20.0	20.0	20.0				

Hydrometer used: 705151 **Model #:** ASTM 151H **Manufacturer:** HB Instrument **Hydrometer start time:** 10:31

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0	1.0045	23.0	1.0035

Cal. Date: 09/09/07 **Hydrometer data entered:** DPS 10/01/08

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Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127611

Client Code: WESTN4
SDG: 127611
ETR(s): 127611

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 10-1-08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MSP 9.26.08	MSP 9.26.08	MM 9/29/08	MSP 9.24.08	MM 9/29/08	MSP 9.30.08
DJP 9.29.08			MSP 9.30.08	DJP 10.1.08	DJP 10.1.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767562	767563	767564	767565	767566	767567	767568	767569	767570	767571	767572	767573
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0035	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0040	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.0	20.0	20.0	20.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0035	1.0035	1.0040	1.0035	1.0040	1.0035	1.0035	1.0035	1.0040	1.0030	1.0035	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0035	1.0035	1.0040	1.0030	1.0035	1.0030	1.0035	1.0035	1.0040	1.0030	1.0040	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

(114)

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** **Hydrometer start time:** 1713

Calibrations:

L temp, C	L read	H Temp, C	H read
17.0		23.0	

Cal. Date: **Hydrometer data entered:**

DJP 10-1-08

* MSP 9-29-08

FSL024:07.29.05:0
TestAmerica Burlington

127611PS 09/15/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127611B

Client Code: WESTN4
SDG: 127611
ETR(s): 127611

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 10.2.08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9.29.08 MAP 9.30.08	MAP 9.29.08	DPS 9/30/08	DPS 9/30/08 DPS 9/31/08	DPS 9/30/08 DJP 10.2.08	MAP 10-1-08 DJP 10.2.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767574	767575	767576	767577	767578	767579	767580	767581				
Time, min. (2)	2	DPS 9/30/08 2	2	2	2	2	2	2	2	2	2	2
Reading	1.0050	1.0045	1.0040	1.0040	1.0050	1.0045	1.0045	1.0055				
Temperature, C	22.0	~~22.0~~ 22.5	22.0	22.0	21.5	21.5	21.5	21.5				
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0050	1.0040	1.0040	1.0040	1.0050	1.0045	1.0045	1.0055				
Temperature, C	22.0	22.5	22.0	22.0	21.5	21.5	21.5	21.5				
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0050	1.0040	1.0040	1.0040	1.0050	1.0045	1.0045	1.0055				
Temperature, C	22.0	21.5	21.5	21.5	21.5	21.5	21.5	21.5				
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0045	1.0040	1.0040	1.0040	1.0045	1.0045	1.0045	1.0055				
Temperature, C	21.5	21.5	21.5	21.5	~~21.5~~ 21.0	21.0	21.0	21.0				
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0045	1.0040	1.0040	1.0040	1.0045	1.0045	1.0045	1.0050				
Temperature, C	21.5	21.5	21.0	21.0	21.0	21.0	21.0	21.0				
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0045	1.0040	1.0040	1.0040	1.0040	1.0040	1.0040	1.0045				
Temperature, C	20.5	20.5	20.5	20.5	20.0	20.0	20.5	20.5				
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0045	1.0040	1.0040	1.0040	1.0040	1.0040	1.0040	1.0040				
Temperature, C	20.5	20.5	20.0	20.0	20.0	20.0	20.0	20.0				

Hydrometer used: 151 | 151H | Model #: ASTM 151H | Manufacturer: | Hydrometer start time: 1031

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0		23.0	

Cal. Date:

Hydrometer data entered:

SDG: 127611

TestAmerica Burlington

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Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 | ETR(s): 127611 | SDG: 127611 | Date Rec: 15-Sep-08 | Start Date: 15-Sep-08 | End Date: 1-Oct-08

SET: 127611

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sieve (tares)		
Size	Mass, g	
3 inch		
2 inch		
1.5 inch		
1 inch		
3/4 inch		
3/8 inch	447.62	
#4	488.36	
#10	465.31	
#20	392.47	D
#40	356.67	D
#60	347.77	D
#80	336.45	D
#100	332.12	D
#200	324.24	D

Default SG 2.65

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767562	767563	767564	767565	767566	767567	767568	767569	767570	767571	767572	767573
Sample ID	RBS-SED36	RBS-SED37	RBS-SED38	RBS-SED39	RBS-SED40	RBS-SED41	RBS-SED43	RBS-SED44	RBS-SED45	RBS-SED46	RBS-SED47	RBS-SED48
Sample Prep	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217
Pan, g												
Pan/sample, g	175.78	177.72	175.77	197.42	208.69	183.26	183.06	158.65	239.61	174.94	218.30	186.39
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	1.04	1.02	1.01	1.05	1.05	1.03	1.04	1.02	1.02	1.04	1.02	1.05
Pan/sample, g	23.85	24.49	24.30	26.79	39.95	26.75	30.82	29.10	54.89	34.16	41.06	34.15
Pan/dry sample, g	23.03	23.68	23.51	26.38	32.55	26.03	28.13	27.51	46.57	31.44	34.67	28.31
HMCF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Description of >#10 particles												
Non-soil material	shells	shells	shells	shells	shells	shells	na	shell	shell	shell	shells	shells
Shape	subrounded	subrounded	subrounded	subrounded	rounded	subrounded	subangular	subrounded	rounded	rounded	subrounded	subangular
Hardness	hard	hard	hard	hard	hard	hard	hard	hard	hard	hard	hard	hard
Sample % Solids	96.4%	96.5%	92.7%	98.3%	82.2%	97.2%	91.0%	94.3%	84.6%	91.8%	83.8%	82.4%
Dry sample wt, g	169.44	171.44	163.02	194.12	171.63	178.13	166.52	149.67	202.60	160.57	182.92	153.50
Sieve + Sample Weights												
Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch												
3/8 inch		454.68		488.00	451.41	458.62		455.70	449.50	464.58	451.90	
#4	495.10	517.38	489.67	524.08	505.46	508.18	489.45	505.05	516.79	508.33	513.08	497.45
#10	479.40	490.25	473.33	479.85	470.12	482.21	468.72	475.63	491.51	472.65	493.72	474.39
#20	412.60	418.43	419.79	404.11	397.57	407.26	403.24	400.53	420.29	398.13	428.03	404.22
#40	408.48	390.99	411.44	383.62	383.12	387.98	424.31	377.28	422.53	372.79	420.80	383.93
#60	401.36	386.50	394.61	394.84	407.59	400.27	408.01	399.73	385.91	390.47	382.38	401.98
#80	352.99	344.81	350.88	349.91	370.81	359.70	350.16	358.76	344.38	367.60	341.55	364.58
#100	335.74	333.46	335.99	334.53	343.88	338.28	335.99	338.10	334.59	343.08	334.07	341.27
#200	325.21	325.02	328.45	325.29	328.98	325.99	325.56	326.38	328.02	328.42	325.81	327.41
Maximum Particle size	9.5 mm	19 mm	9.5 mm	19 mm	19 mm	19 mm	9.5 mm	19 mm	19 mm	19 mm	19 mm	9.5 mm
Specific gravity	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650
Sample Mass Parameters												
Sample Mass >#10, g	20.83	61.02	9.33	90.62	25.70	47.72	4.50	35.09	56.51	44.27	57.41	18.17
Sample mass <#10, g	148.61	110.42	153.69	103.50	145.93	130.41	162.02	114.58	146.09	116.30	125.51	135.33

SDG: 127611

Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 **ETR(s):** 127611 **SDG:** 127611

Date Rec: 15-Sep-08 **Start Date:** 15-Sep-08 **End Date:** 2-Oct-08

SET: 127611B

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 Inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sieve (tares)		
Size	Mass, g	
3 inch		
2 inch		
1.5 inch		
1 inch		
3/4 inch	457.97	
3/8 inch	447.66	
#4	489.41	
#10	465.34	
#20	392.51	D
#40	356.72	D
#60	347.77	D
#80	336.42	D
#100	332.10	D
#200	324.22	D

Default SG 2.65

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767574	767575	767576	767577	767578	767579	767580	767581				
Sample ID	RBS-SED49	RBS-SED50	RBS-SED51	RBS-SED52	RBS-SED81	RBS-SED82	RBS-SED83	RBS-SED10				
Sample Prep	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217				
Pan, g												
Pan/sample, g	235.12	189.87	209.35	177.56	204.99	167.88	198.90	188.79				
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	1.02	1.03	0.98	1.02	0.98	1.01	0.96	1.03				
Pan/sample, g	51.27	30.39	33.44	18.96	36.44	27.50	35.67	54.26				
Pan/dry sample, g	45.23	25.11	28.81	16.93	29.19	24.25	28.29	41.08				
HMCF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%				
Description of >#10 particles												
Non-soil material	shells	shells	shells	shells	shells	shells	shells	shells plant				
Shape	subrounded	subrounded	subrounded	subrounded	subrounded	subrounded	subangular	subangular				
Hardness	hard	hard	hard	hard	hard	hard	hard	hard				
Sample % Solids	88.0%	82.0%	85.7%	88.7%	79.6%	87.7%	78.7%	75.2%				
Dry sample wt, g	206.86	155.72	179.49	157.47	163.08	147.27	156.61	142.04				
Sieve + Sample Weights												
Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch			485.78				481.31					
3/8 inch	467.23	449.36	456.16			451.11	451.78					
#4	512.24	489.96	507.97	491.66	494.79	490.94	491.28	497.46				
#10	492.53	467.57	479.90	468.48	471.26	467.49	468.36	476.94				
#20	416.09	395.90	411.51	396.57	404.50	396.57	397.43	398.21				
#40	387.64	366.41	394.83	369.83	384.77	368.16	365.89	361.06				
#60	401.89	400.68	388.93	415.52	405.61	405.14	368.57	373.22				
#80	353.03	395.07	355.41	381.21	369.84	381.27	366.33	371.41				
#100	337.18	349.55	339.70	344.60	343.06	344.75	356.58	349.30				
#200	328.93	330.44	327.84	328.85	330.97	328.80	356.43	349.16				
Maximum Particle size	19 mm	19 mm	25 mm	9.5 mm	9.5 mm	19 mm	25 mm	9.5 mm				
Specific gravity	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650				
Sample Mass Parameters												
Sample Mass >#10, g	70.59	5.48	50.43	6.39	12.30	8.13	33.35	20.65	0.00	0.00	0.00	0.00
Sample mass <#10, g	136.27	150.24	129.06	151.08	150.78	139.14	123.26	121.39	#VALUE!	#VALUE!	#VALUE!	#VALUE!

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sample Handling

(118)

FedEx. US Airbill Express

FedEx Tracking Number 8541 0029 6897

Form ID No. 0200

1 From

Date 9/12/08

Sender's Name Scott Snyder Phone 732 417 5400

Company (illegible)

Address 205 Campus Dr. Dept/Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference

3 To

Recipient's Name Kirk Young Phone 802 660-1990

Company Test America Labs

Recipient's Address 30 Community Dr. Suite 11 Dept/Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

L

8541 0029 6897

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location — Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging. [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No. [ ]

- [X] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Total Packages	Total Weight	Total Declared Value†	Total Charges
2	10	$ .00	Credit Card Auth.

† Your liability is limited to $100 unless you declare a higher value. See back for details.

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. *Fee applies.*
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. *Fee applies.*

520

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9/15/08 0945

FedEx 0002/0002 MON - 15 SEP AA

PRIORITY OVERNIGHT

MPS# 0681 7955 1953 0567

Mstr# 8541 0029 6897 0200

KU BTVA

05403

VT-US

BTV

emp# 242637 12SEP08 17:10

(11a)

TestAmerica Burlington

SAMPLE RECEIPT & LOG IN CHECKLIST

Client:	WESTN 4	Date Received:	9/15/08	Log in Date:	9/15/08
ETR:	127611	Time Received:	0945	By:	JEG
SDG:	127611	Received By:	JEG	Signature:	
Project:	28000	# Coolers Received:	2	PM Signature:	
Samples Delivered By: X Shipping Service ☐ Courier ☐ Hand ☐ Other (specify)				Date:	09/17/08
List Air bill Number(s) or Attach a photocopy of the Air Bill:					

COOLER SCREEN	YES	NO	NA	COMMENTS
There is *no* evidence to indicate tampering	X			
Custody seals are present and intact	X			
Custody seal numbers are present		X		
If yes, list custody seal numbers:				

Thermal Preservation Type: ☐ Wet Ice ☐ Blue Ice X None ☐ Other (specify)

IR Gun ID: 96 Correction Factor (CF) = -1 °C

Cooler 1:	24.8 °C	Cooler 6	°C	Cooler 11	°C	Cooler 16	°C		
Cooler 2:	24.6 °C	Cooler 7	°C	Cooler 12	°C	Cooler 17	°C		
Cooler 3:	°C	Cooler 8	°C	Cooler 13	°C	Cooler 18	°C		
Cooler 4:	°C	Cooler 9	°C	Cooler 14	°C	Cooler 19	°C		
Cooler 5	°C	Cooler 10	°C	Cooler 15	°C	Cooler 20	°C		

Unless otherwise documented, the recorded temperature readings are adjusted readings to account for the CF of the IR Gun

EPA Criteria: 0-6°C, except for air and geo samples which should be at ambient temperature and tissue samples, which may be frozen.

Some clients require thermal preservation criteria of 2-4°C or other such criteria. The PM must notify SM when alternate criteria is specified.

SAMPLE CONDITION	YES	NO	NA	COMMENTS
Sample containers were received intact	X			
Legible sample labels are affixed to each container	X			

CHAIN OF CUSTODY (COC)	YES	NO	NA	COMMENTS
COC is present and includes the following information for each container:				
• Sample ID / Sample Description	X			
• Date of Sample Collection	X			
• Time of Sample Collection	X			
• Identification of the Sampler		X		
• Preservation Type			X	
• Requested Tests Method(s)	X			
• Necessary Signatures	X			
Internal Chain of Custody (ICOC) Required		X		
If yes to above, ICOC Record initiated for every Worksheet			X	

SAMPLE INTEGRITY / USABILITY	YES	NO	NA	COMMENTS
The sample container matches the COC JEG 9/15/08	X	X		See below
Appropriate sample containers were received for the tests requested	X			
Samples were received within holding time	X			
Sufficient amount of sample is provided for requested analyses	X			
VOA vials do not have headspace or a bubble >6mm (1/4" diameter)			X	
Appropriate preservatives were used for the tests requested			X	
pH of inorganic samples checked and is within method specification			X	
If no, attach Inorganic Sample pH Adjustment Form			X	

ANOMALY / NCR SUMMARY

Missing character (-) from sample ID of RB-SED19 on COC. Included missing character at login.

(120)

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THE LEADER IN ENVIRONMENTAL TESTING

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TestAmerica
South Burlington, VT

Extended Data Package

SDG: 127656

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Chain of Custody 2
Particle Size Results 4
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THE LEADER IN ENVIRONMENTAL TESTING

Case Narrative

(124)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

October 8, 2008

TestAmerica Laboratories, Inc.

Mr. Daniel Gaughan
Weston Solutions
205 Campus Drive
Edison, NJ 08837-3939

Re: Laboratory Project No. 28000
Case: 28000; SDG: 127656

Dear Mr. Gaughan:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 17th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/17/08 ETR No: 127656		
767844	RBS-SED53	09/16/08	SEDIMENT
767845	RBS-SED54	09/16/08	SEDIMENT
767846	RBS-SED55	09/16/08	SEDIMENT
767847	RBS-SED89	09/16/08	SEDIMENT
767848	RBS-SED90	09/16/08	SEDIMENT
767849	RBS-SED70	09/16/08	SEDIMENT
767850	RBS-SED71	09/16/08	SEDIMENT
767851	RBS-SED69	09/16/08	SEDIMENT
767852	RBS-SED72	09/16/08	SEDIMENT
767853	RBS-SED73	09/16/08	SEDIMENT
767854	RBS-SED74	09/16/08	SEDIMENT

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal.

The samples in this sample set were analyzed for particle size distribution by ASTM D422, and included both the sieve and hydrometer determinations.

Any reference within this report to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.) The analytical results associated with the samples presented in this test report were generated

30 Community Drive • Suite 11 South Burlington, VT 05403 tel 802.660.1990 fax 802.660.1919 www.testamericainc.com

under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk Young
Project Manager

KFY/hsf
Enclosure

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody

(127)

SDG: 127656

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No. 855410029 6441

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughen	Site Contact: D. Gaughen	Date: 9/16/08	COC No:
Your Company Name here: WESTON	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: FedEx	1 of ____ COCs
Address: 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip: Edison, NJ 08837	Calendar (C) or Work Days (W) ____			
(xxx) xxx-xxxx Phone	TAT if different from Below ____			SDG No.
(xxx) xxx-xxxx FAX	☒ 2 weeks			
Project Name: Raritan Bay Slag	☐ 1 week			
Site:	☐ 2 days			
PO#	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample (Grain Size)	Sample Specific Notes:
RBS-SED53	9/16/08	0915	G	Sed	1	X	
RBS-SED54		0945				X	
RBS-SED55		1056				X	
RBS-SED89		1140				X	
RBS-SED90		1240				X	
RBS-SED70		1450				X	
RBS-SED71		1452				X	
RBS-SED69		1445				X	
RBS-SED72		1457				X	
RBS-SED73		1458				X	
RBS-SED74		1500				X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☒

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
(Scan Signed)	WESTON	9/16/08 1645	FedEx	—	9/16/08 1645
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
				TA	9/17/08 1000
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

TestAmerica Burlington

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Particle Size Results

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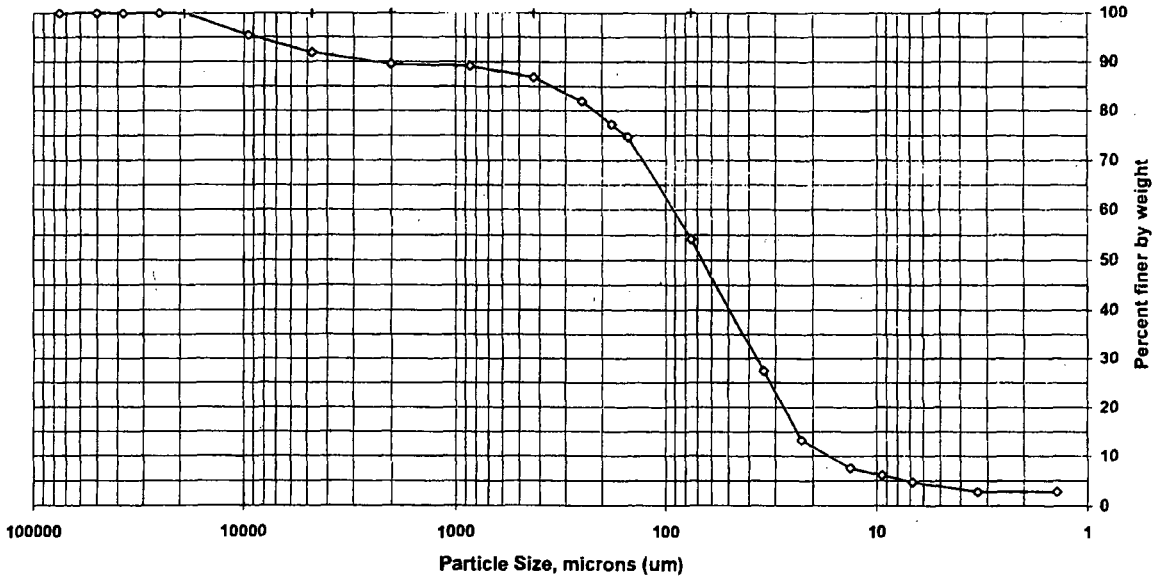
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED53	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767844			**End Date:**	10/7/2008

Percent Solids:	45.4%	**Non-soil material:**	plant,shell
Specific Gravity:	2.650	**Shape (> #10):**	n/a
Maximum Particle Size:	19 mm	**Hardness (> #10):**	n/a



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	95.5	4.5
#4	4750	91.8	3.6
#10	2000	89.6	2.3
#20	850	89.2	0.4
#40	425	86.9	2.3
#60	250	82.0	4.9
#80	180	77.2	4.8
#100	150	74.7	2.5
#200	75	54.1	20.5
Hydrometer	34.0	27.4	26.7
|	22.6	13.2	14.2
|	13.3	7.6	5.7
|	9.4	6.2	1.4
|	6.8	4.7	1.4
|	3.3	2.8	1.9
V	1.4	2.8	0.0

Soil Classification	Percent of Total Sample
Gravel	8.2
Sand	37.7
Coarse Sand	2.3
Medium Sand	2.7
Fine Sand	32.7
Silt	49.4
Clay	4.7

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

L30

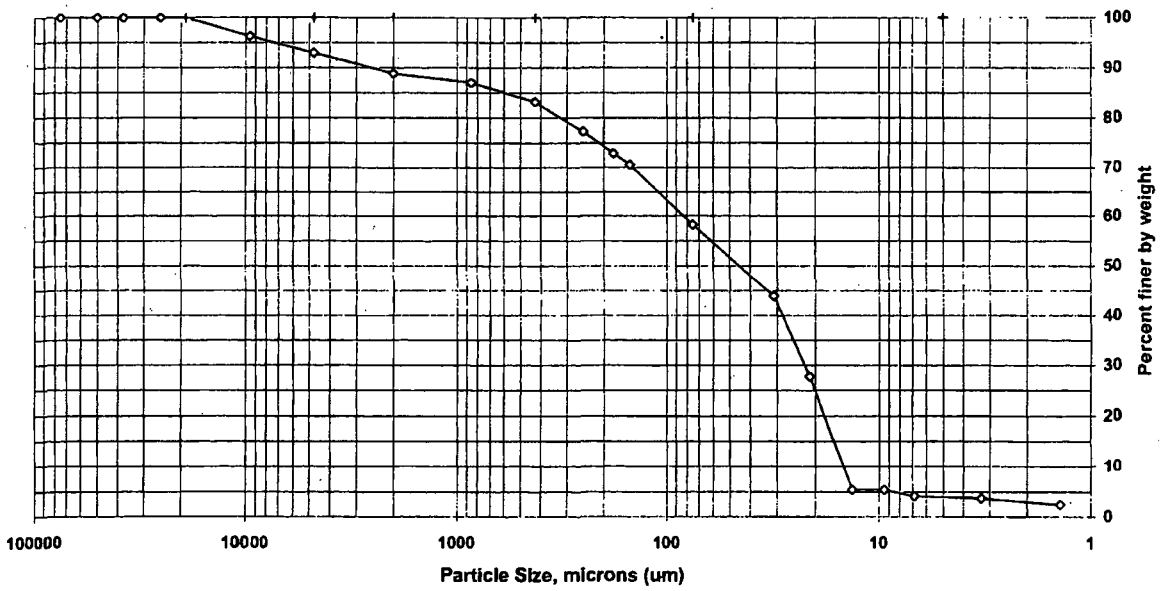
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED54	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767845			**End Date:**	10/7/2008

Percent Solids:	43.0%	**Non-soil material:**	plant,shell
Specific Gravity:	2.650	**Shape (> #10):**	n/a
Maximum Particle Size:	19 mm	**Hardness (> #10):**	n/a



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	96.3	3.7
#4	4750	93.0	3.3
#10	2000	88.8	4.2
#20	850	87.0	1.8
#40	425	83.2	3.8
#60	250	77.3	5.9
#80	180	72.9	4.4
#100	150	70.5	2.4
#200	75	58.3	12.2
Hydrometer	31.1	44.0	14.3
|	21.2	27.8	16.2
|	13.4	5.4	22.4
|	9.4	5.4	0.0
|	6.8	4.1	1.2
|	3.3	3.7	0.4
V	1.4	2.5	1.2

Soil Classification	Percent of Total Sample
Gravel	7.0
Sand	34.7
Coarse Sand	4.2
Medium Sand	5.6
Fine Sand	24.9
Silt	54.1
Clay	4.1

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(131)

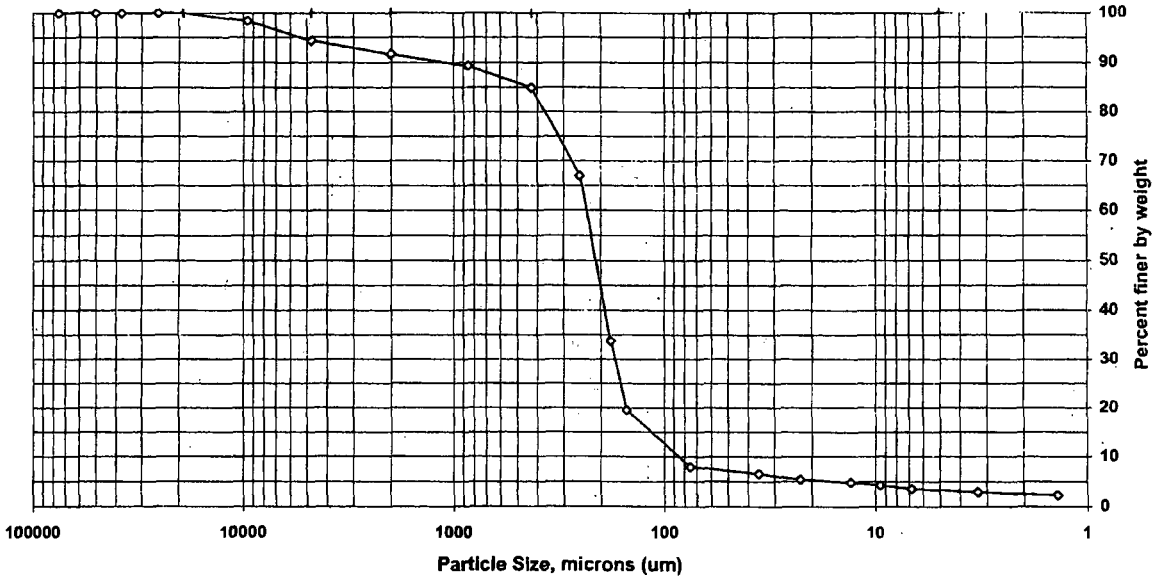
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED55	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767846			**End Date:**	10/7/2008

Percent Solids:	69.4%	**Non-soil material:**	plant,shell
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	98.4	1.6
#4	4750	94.3	4.1
#10	2000	91.6	2.7
#20	850	89.3	2.3
#40	425	84.9	4.3
#60	250	67.0	17.9
#80	180	33.8	33.2
#100	150	19.5	14.3
#200	75	7.9	11.6
Hydrometer	35.4	6.5	1.4
|	22.6	5.4	1.2
|	13.1	4.8	0.6
|	9.5	4.2	0.6
|	6.8	3.6	0.7
|	3.3	2.9	0.7
V	1.4	2.3	0.6

Soil Classification	Percent of Total Sample
Gravel	5.7
Sand	86.4
Coarse Sand	2.7
Medium Sand	6.7
Fine Sand	77.0
Silt	4.4
Clay	3.6

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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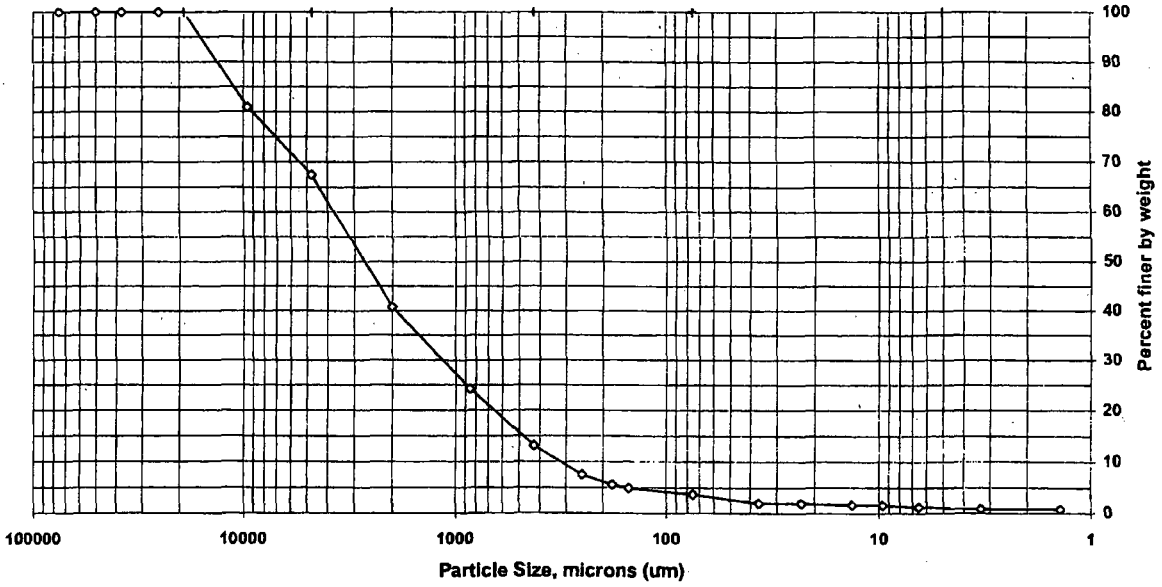
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED89	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767847			**End Date:**	10/7/2008

Percent Solids:	83.7%	**Non-soil material:**	glass,metal
Specific Gravity:	2.650	**Shape (> #10):**	angular
Maximum Particle Size:	19 mm	**Hardness (> #10):**	brittle



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	80.9	19.1
#4	4750	67.4	13.5
#10	2000	40.8	26.7
#20	850	24.3	16.5
#40	425	13.1	11.1
#60	250	7.5	5.7
#80	180	5.6	1.9
#100	150	5.0	0.6
#200	75	3.7	1.2
Hydrometer	36.4	2.0	1.7
I	23.0	2.0	0.0
I	13.4	1.6	0.4
I	9.6	1.6	0.0
I	6.5	1.3	0.4
I	3.3	0.8	0.4
V	1.4	0.8	0.1

Soil Classification	Percent of Total Sample
Gravel	32.6
Sand	63.7
Coarse Sand	26.7
Medium Sand	27.6
Fine Sand	9.4
Silt	2.4
Clay	1.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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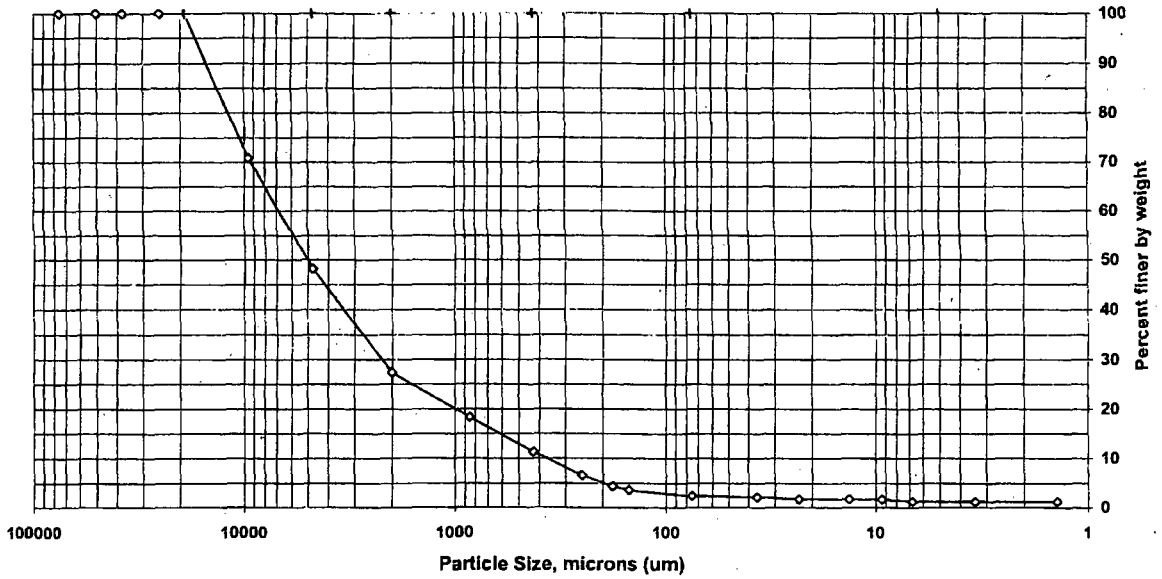
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED90	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767848			**End Date:**	10/7/2008

Percent Solids:	83.2%	**Non-soil material:**	glass,metal
Specific Gravity:	2.650	**Shape (> #10):**	angular
Maximum Particle Size:	19 mm	**Hardness (> #10):**	brittle



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	70.8	29.2
#4	4750	48.2	22.6
#10	2000	27.4	20.8
#20	850	18.4	9.0
#40	425	11.3	7.1
#60	250	6.6	4.7
#80	180	4.4	2.2
#100	150	3.6	0.7
#200	75	2.4	1.2
Hydrometer	36.4	2.2	0.3
|	23.1	1.7	0.4
|	13.4	1.7	0.0
|	9.3	1.7	0.1
|	6.7	1.3	0.4
|	3.4	1.2	0.1
V	1.4	1.2	0.0

Soil Classification	Percent of Total Sample
Gravel	51.8
Sand	45.8
Coarse Sand	20.8
Medium Sand	16.1
Fine Sand	8.9
Silt	1.1
Clay	1.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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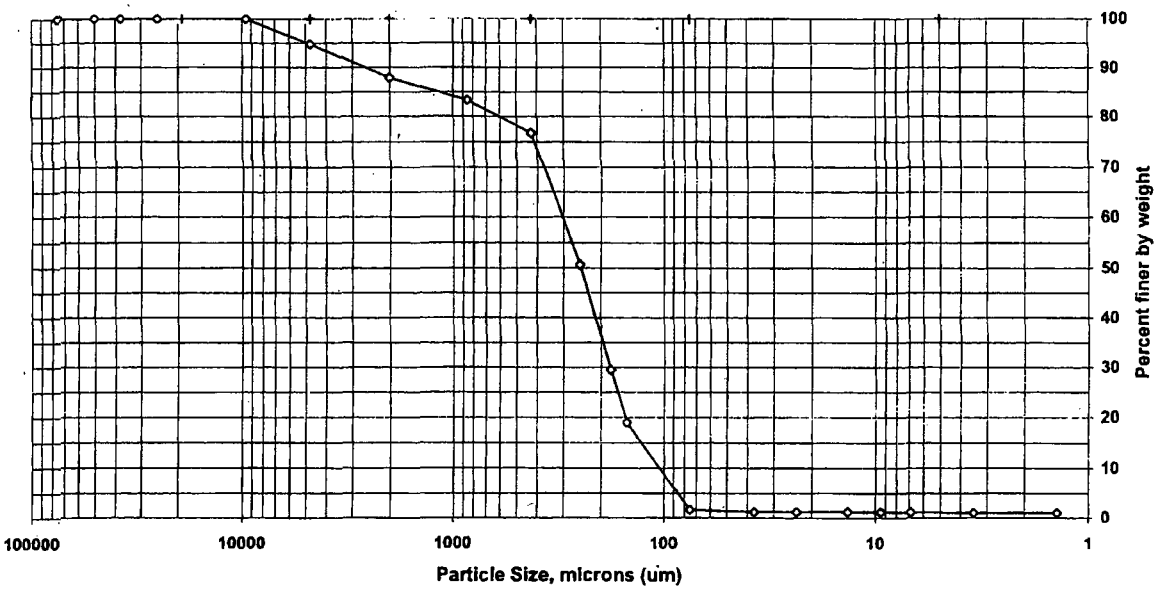
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED70	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767849			**End Date:**	10/7/2008

Percent Solids:	81.5%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	94.8	5.2
#10	2000	87.9	6.9
#20	850	83.3	4.5
#40	425	76.7	6.6
#60	250	50.7	26.1
#80	180	29.5	21.2
#100	150	19.0	10.5
#200	75	1.7	17.3
Hydrometer	36.9	1.2	0.5
I	23.3	1.2	0.0
I	13.5	1.2	0.0
I	9.4	1.1	0.1
I	6.8	1.1	0.0
I	3.5	1.0	0.1
V	1.4	1.0	0.0

Soil Classification	Percent of Total Sample
Gravel	5.2
Sand	93.1
Coarse Sand	6.9
Medium Sand	11.1
Fine Sand	75.0
Silt	0.6
Clay	1.1

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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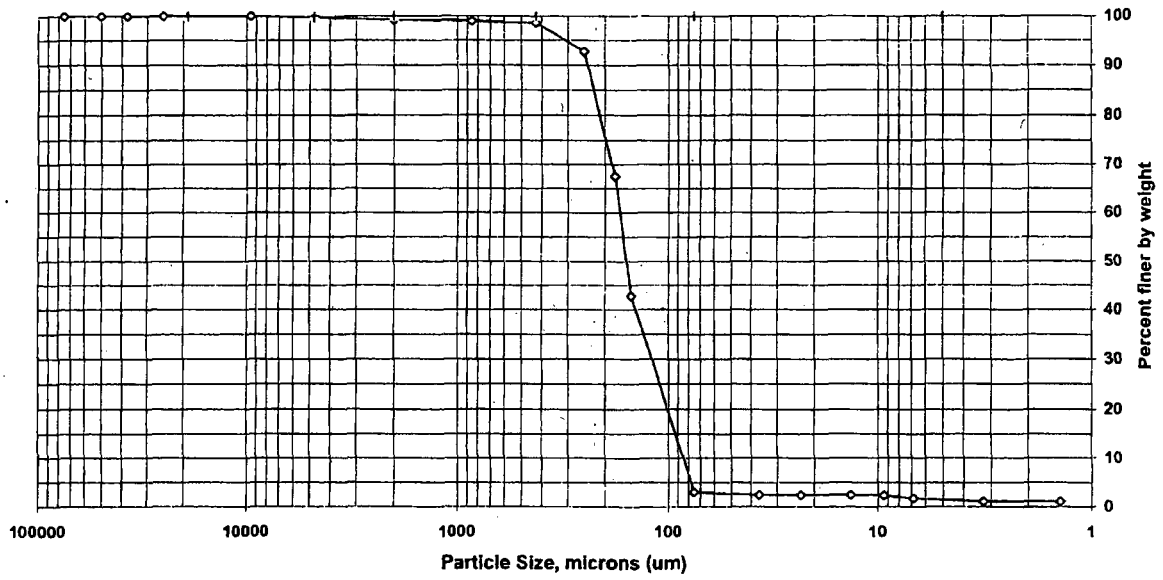
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED71	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767850			**End Date:**	10/7/2008

Percent Solids:	77.2%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	n/a
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	n/a



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.8	0.2
#10	2000	99.2	0.5
#20	850	99.0	0.2
#40	425	98.6	0.4
#60	250	92.8	5.8
#80	180	67.6	25.2
#100	150	42.8	24.8
#200	75	3.0	39.8
Hydrometer	36.6	2.4	0.6
|	23.1	2.4	0.0
|	13.4	2.4	0.0
|	9.3	2.3	0.1
|	6.8	1.8	0.6
|	3.2	1.1	0.6
V	1.4	1.1	0.0

Soil Classification	Percent of Total Sample
Gravel	0.2
Sand	96.7
Coarse Sand	0.5
Medium Sand	0.6
Fine Sand	95.6
Silt	1.3
Clay	1.8

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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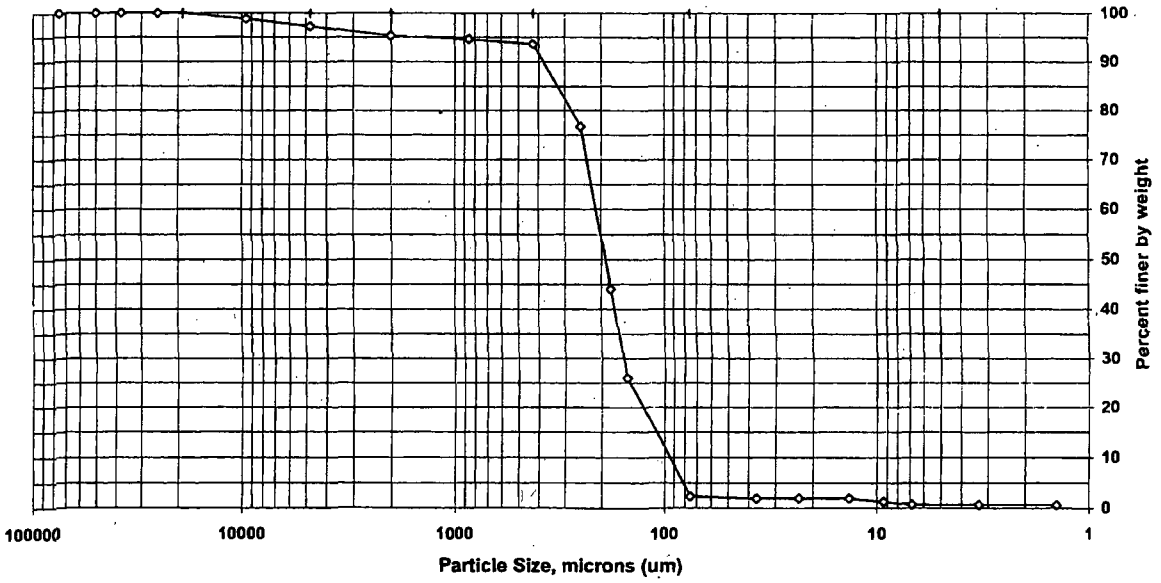
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED69	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767851			**End Date:**	10/7/2008

Percent Solids:	78.3%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	98.9	1.1
#4	4750	97.3	1.6
#10	2000	95.3	1.9
#20	850	94.7	0.6
#40	425	93.6	1.0
#60	250	76.7	16.9
#80	180	44.1	32.6
#100	150	26.0	18.1
#200	75	2.4	23.6
Hydrometer	36.7	1.9	0.4
|	23.2	1.9	0.0
|	13.4	1.9	0.0
|	9.3	1.3	0.7
|	6.8	0.7	0.6
|	3.3	0.6	0.1
V	1.4	0.6	0.0

Soil Classification	Percent of Total Sample
Gravel	2.7
Sand	94.9
Coarse Sand	1.9
Medium Sand	1.7
Fine Sand	91.3
Silt	1.7
Clay	0.7

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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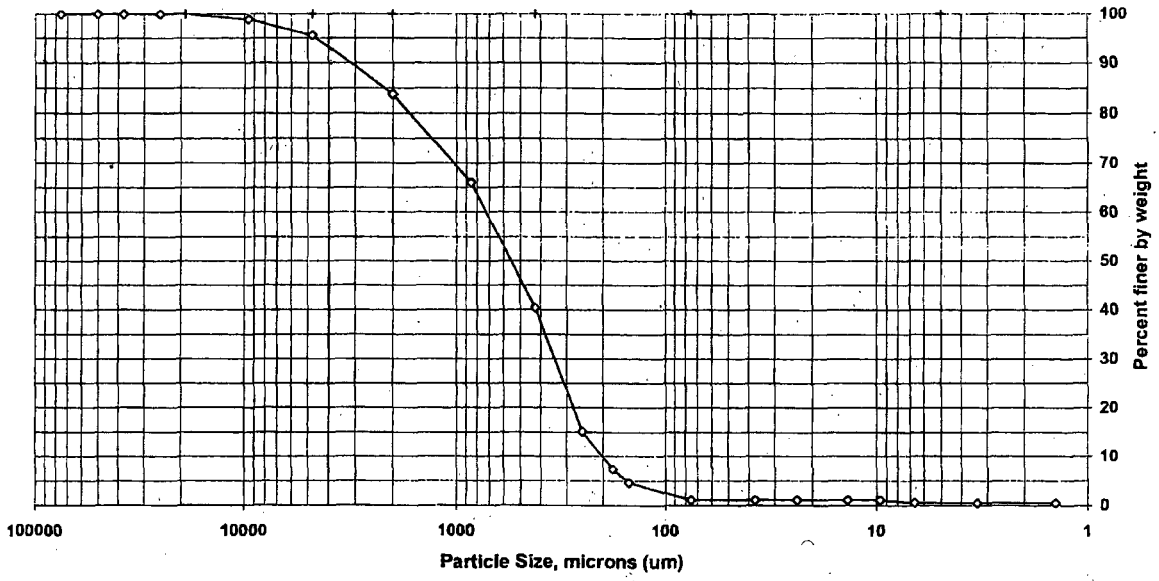
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127656	Date Received:	9/17/2008
Sample ID:	RBS-SED72	ETR(s):	127656	Start Date:	9/1/2008
Lab ID:	767852			End Date:	10/7/2008

Percent Solids:	82.8%	Non-soil material:	shell
Specific Gravity:	2.650	Shape (> #10):	rounded
Maximum Particle Size:	19 mm	Hardness (> #10):	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	98.8	1.2
#4	4750	95.6	3.3
#10	2000	83.8	11.8
#20	850	66.0	17.8
#40	425	40.4	25.7
#60	250	15.1	25.3
#80	180	7.4	7.8
#100	150	4.6	2.7
#200	75	1.1	3.6
Hydrometer	37.1	1.1	0.0
I	23.5	1.1	0.0
I	13.6	1.1	0.0
I	9.6	1.1	0.0
I	6.6	0.6	0.5
I	3.3	0.5	0.1
V	1.4	0.5	0.0

Soil Classification	Percent of Total Sample
Gravel	4.4
Sand	94.5
Coarse Sand	11.8
Medium Sand	43.4
Fine Sand	39.3
Silt	0.5
Clay	0.6

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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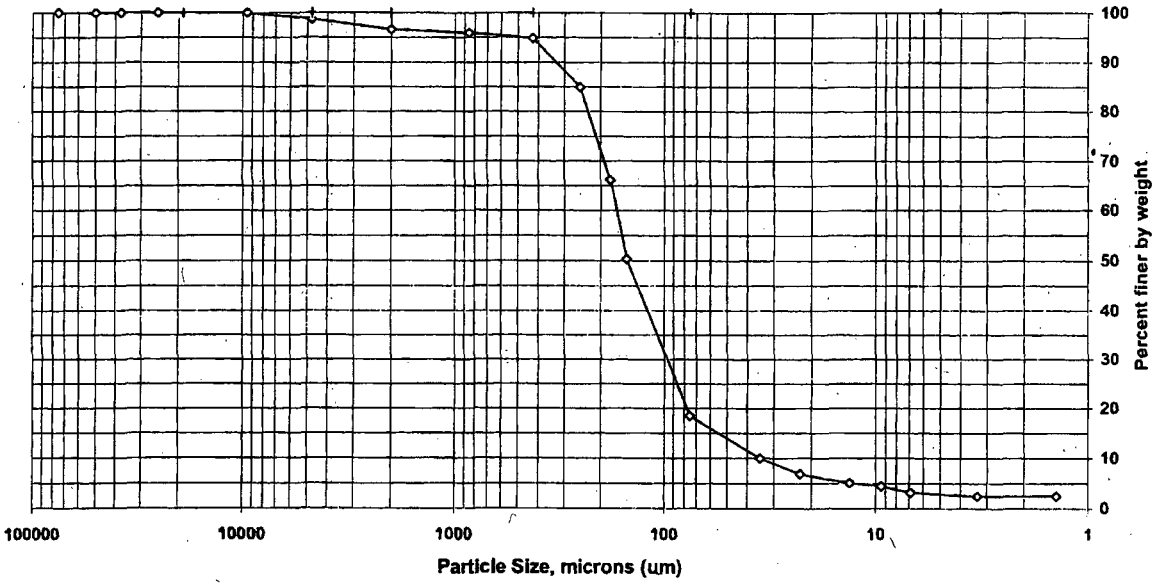
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED73	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767853			**End Date:**	10/7/2008

Percent Solids:	72.0%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.7	1.3
#10	2000	96.6	2.1
#20	850	95.9	0.7
#40	425	94.9	1.0
#60	250	85.0	10.0
#80	*180*	*66.2*	*18.8*
#100	150	50.4	15.8
#200	75	18.5	31.9
Hydrometer	34.8	10.0	8.5
|	22.5	6.9	3.1
|	13.2	5.1	1.9
|	9.4	4.4	0.6
|	6.9	3.2	1.2
|	3.3	2.5	0.7
V	1.4	2.5	0.0

Soil Classification	Percent of Total Sample
Gravel	1.3
Sand	80.2
Coarse Sand	2.1
Medium Sand	1.7
Fine Sand	76.4
Silt	15.3
Clay	3.2

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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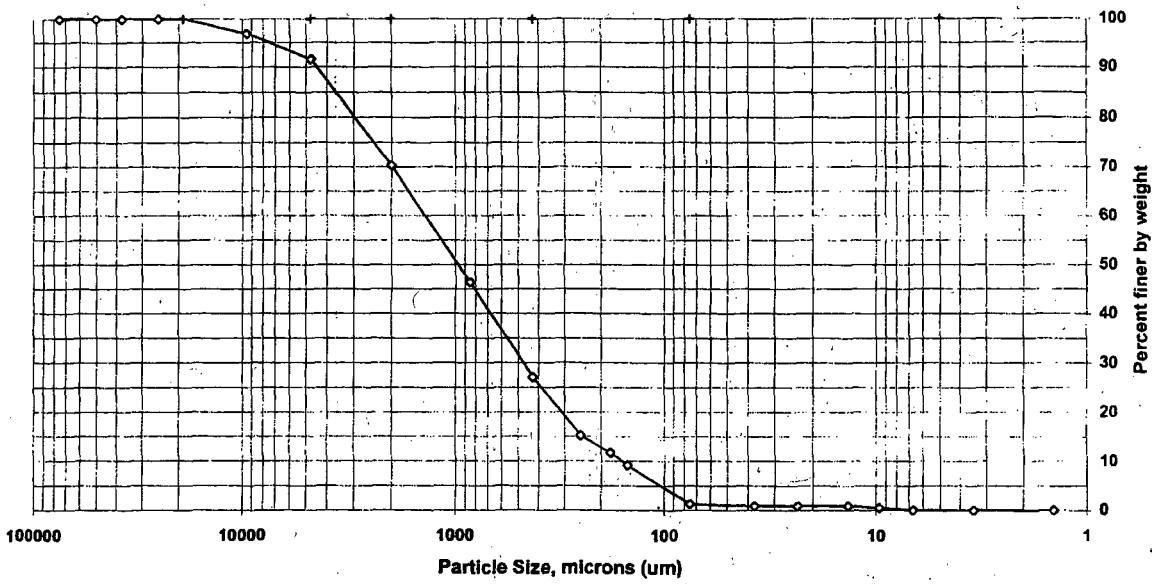
FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127656	**Date Received:**	9/17/2008
Sample ID:	RBS-SED74	**ETR(s):**	127656	**Start Date:**	9/1/2008
Lab ID:	767854			**End Date:**	10/7/2008

Percent Solids:	87.1%	**Non-soil material:**	shell
Specific Gravity:	2.650	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	96.9	3.1
#4	4750	91.5	5.4
#10	2000	70.3	21.2
#20	850	46.4	23.9
#40	425	27.1	19.3
#60	250	15.2	12.0
#80	180	11.7	3.4
#100	150	9.2	2.5
#200	75	1.3	7.9
Hydrometer	37.1	0.9	0.4
|	23.5	0.9	0.0
|	13.6	0.9	0.0
|	9.6	0.5	0.4
|	6.7	0.1	0.4
|	3.4	0.0	0.1
V	1.4	0.0	0.0

Soil Classification	Percent of Total Sample
Gravel	8.5
Sand	90.2
Coarse Sand	21.2
Medium Sand	43.2
Fine Sand	25.8
Silt	1.2
Clay	0.1

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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FSL024:07.29.05:0
TestAmerica Burlington

127656PS 10/7/2008

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127656

Client Code: WESTN4
SDG: 127656
ETR(s): 127656

Date Received: 17-Sep-08
Start Date: 1-Sep-08
End Date: 7-Oct-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 10/3/08 DPS 10/4/08	MAP 10/3/08	MNT 10/4/08	DPS 10/4/08 KDS 10/5/08	MNT 10/4/08 DJP 10/7/08	KDS 10/5/08 DJP 10/7/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767844	767845	767846	767847	767848	767849	767850	767851	767852	767853	767854	
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0135	1.0215	1.0095	1.0065	1.0065	1.0050	1.0060	1.0055	1.0050	1.0120	1.0050	
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0085	1.0150	1.0085	1.0065	1.0060	1.0050	1.0060	1.0055	1.0050	1.0095	1.0050	
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0065	1.0060	1.0080	1.0060	1.0060	1.0050	1.0060	1.0055	1.0050	1.0080	1.0050	
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0060	1.0060	1.0075	1.0060	1.0060	1.0050	1.0060	1.0050	1.0050	1.0075	1.0045	
Temperature, C	21.0	21.0	21.0	21.0	20.5	20.5	20.5	20.5	20.5	20.5	20.5	
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0055	1.0055	1.0070	1.0055	1.0055	1.0050	1.0055	1.0045	1.0045	1.0065	1.0040	
Temperature, C	21.0	21.0	20.5	21.0	20.5	20.5	20.5	20.5	20.5	20.5	20.5	
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0050	1.0055	1.0065	1.0050	1.0055	1.0050	1.0050	1.0045	1.0045	1.0060	1.0040	
Temperature, C	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0050	1.0050	1.0060	1.0050	1.0055	1.0050	1.0050	1.0045	1.0045	1.0060	1.0040	
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	

Hydrometer used: 705151 **Model #:** ASTM 151H **Manufacturer:** HB Instrument **Hydrometer start time:** 9:39

Calibrations:

L temp, C	L read	H Temp, C	H read
17.0	1.0045	23.0	1.0035

Cal. Date: 09/09/07 **Hydrometer data entered:** DJP 10/7/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127656

Client Code: WESTN4
SDG: 127656
ETR(s): 127656

Date Received: 17-Sep-08
Start Date: 01-Sep-08
End Date: 10-7-08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 10.3.08 DPS 10/04/08	MAP 10.3.08	MNM 10/4/08	DPS 10/6/08 KDJ 10.7.08	MNM 10/4/08 DJT 10.7.08	KDJ 10.7.08 DJT 10.7.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767844	767845	767846	767847	767848	767849	767850	767851	767852	767853	757854	
Time, min. (2)	DPS 10/04/08	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0135	1.0215	1.0095	1.0065	1.0065	1.0050	1.0060	1.0055	1.0050	1.0120	~~1.0045~~ 1.0050	
Temperature, C	~~20.5~~ 21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0085	1.0150	1.0085	1.0065	1.0060	1.0050	1.0060	1.0055	1.0050	1.0095	1.0050	
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0065	1.0060	1.0080	1.0060	1.0060	1.0050	1.0060	1.0055	1.0050	1.0080	1.0050	
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	
Time, min. (30)	30	30	29	~~1.0060~~ 29	31	31	31	32	30	30	30	31
Reading	1.0060	1.0060	1.0075	~~1.0055~~	1.0060	1.0050	1.0060	1.0050	1.0050	1.0075	1.0045	
Temperature, C	21.0	21.0	21.0	21.0	20.5	~~20.5~~ 21.0	20.5	~~21.0~~ 20.5	20.5	20.5	20.5	
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0055	1.0055	1.0070	1.0055	1.0055	1.0050	1.0055	1.0045	1.0045	1.0065	1.0040	
Temperature, C	21.0	21.0	20.5	21.0	20.5	20.5	20.5	20.5	20.0	20.5	20.5	
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0050	1.0055	1.0065	1.0050	1.0055	1.0050	1.0050	1.0045	1.0045	1.0060	1.0040	
Temperature, C	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0050	1.0050	1.0060	1.0050	1.0055	1.0050	1.0050	1.0045	1.0045	1.0060	1.0040	
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	

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Hydrometer used: 70151 Model #: ASTM 151H Manufacturer:

Calibrations:

L temp, C	L read	H Temp, C	H read
17.0		23.0	

Cal. Date:

Hydrometer start time: 0939
Hydrometer data entered: DJT 10.7.08

Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 | ETR(s): 127656 | SDG: 127656 | Date Rec: 17-Sep-08 | Start Date: 1-Sep-08 | End Date: 7-Oct-08

SET: 127656

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sieve (tares)		
Size	Mass, g	
3 inch		
2 inch		
1.5 inch		
1 inch		
3/4 inch		
3/8 inch	447.64	
#4	488.37	
#10	485.32	
#20	382.82	A
#40	380.60	A
#60	326.49	A
#80	335.01	A
#100	333.07	A
#200	323.22	A

Default SG 2.65

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767844	767845	767846	767847	767848	767849	767850	767851	767852	767853	767854	
Sample ID	RBS-SED53	RBS-SED54	RBS-SED55	RBS-SED89	RBS-SED90	RBS-SED70	RBS-SED71	RBS-SED69	RBS-SED72	RBS-SED73	RBS-SED74	
Sample Prep	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	
Pan, g												
Pan/sample, g	124.61	150.14	200.29	265.17	239.18	189.58	167.52	175.96	199.17	180.23	224.96	
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	0.97	0.96	1.01	1.04	1.02	1.05	0.99	1.00	0.97	1.00	1.01	
Pan/sample, g	28.59	26.00	25.56	46.02	55.30	21.92	24.93	27.68	33.60	35.12	37.20	
Pan/dry sample, g	13.51	11.72	18.05	41.27	46.17	18.06	19.46	21.87	27.99	25.86	32.54	
HMCF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Description of >#10 particles												
Non-soil material												
Shape	n/a	n/a	rounded	angular	rounded	n/a	n/a	rounded	rounded	rounded	rounded	
Hardness	n/a	n/a	hard	brittle	brittle	hard	n/a	hard	hard	hard	hard	
Sample % Solids	45.4%	43.0%	69.4%	83.7%	83.2%	81.5%	77.2%	78.3%	82.8%	72.0%	87.1%	
Dry sample wt, g	56.58	64.52	139.02	213.69	198.95	154.52	144.67	137.75	164.93	129.73	195.91	
Sieve + Sample Weights												
Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch												
3/8 inch	450.21	450.05	449.90	468.45	585.70			449.17	449.54		453.70	
#4	490.43	490.50	494.02	517.13	533.29	496.48	488.72	490.62	493.79	490.04	498.87	
#10	466.60	466.00	469.09	522.32	506.72	475.97	466.07	468.00	484.73	468.03	506.95	
#20	383.03	383.98	386.07	418.08	400.82	389.82	383.16	383.71	412.10	383.71	429.68	
#40	381.91	383.07	386.60	404.36	394.65	390.78	381.19	382.04	422.91	381.93	418.33	
#60	329.25	330.30	351.44	338.59	336.91	368.75	334.93	349.80	368.15	339.41	349.91	
#80	337.70	337.85	361.15	339.05	339.44	367.71	371.48	379.93	347.82	355.35	341.74	
#100	334.51	334.59	352.91	334.45	334.52	349.35	368.90	358.01	337.60	353.58	338.04	
#200	334.84	331.11	339.33	325.89	325.65	349.94	380.75	355.75	329.09	364.60	338.68	
Maximum Particle size	19 mm	19 mm	19 mm	19 mm	19 mm	9.5 mm	9.5 mm	19 mm	19 mm	9.5 mm	19 mm	
Specific gravity	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	
Sample Mass Parameters												
Sample Mass >#10, g	5.91	7.22	11.68	126.57	144.38	18.76	1.10	6.46	26.73	4.38	58.19	0.00
Sample mass <#10, g	50.67	57.30	127.34	87.12	54.57	135.76	143.57	131.29	138.20	125.35	137.72	#VALUE!

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sample Handling

144

9/17/08 1000

FedEx. US Airbill Express

FedEx Tracking Number 8541 0029 6441

Form ID No. 0200

From

Date 9/16/08

Sender's Name Scott Sawyer Phone 781-[redacted]

Company Eastern Analytical, Inc.

Address 205 Computer Dr.

Dept./Floor/Suite/Room

City Raynham State MA ZIP 02767

Your Internal Billing Reference 2mon1.035.010.1044

To

Recipient's Name Kirk Hanson Phone 802-660-1550

Company Test America Labs

Recipient's Address 30 Community Dr. Ste 11

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Dept./Floor/Suite/Room

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City South Burlington State VT ZIP 05403

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lbs.* * To most locations.

- [X] FedEx Priority Overnight — Next business morning.*
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lbs.* ** To most locations.

- [ ] FedEx 1Day Freight* — Next business day.**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day.**

* Call for Confirmation:

5 Packaging * Declared value limit $500.

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [X] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location — Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [X] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [X] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Obtain Recip. Acct. No. [ ]

Total Packages	Total Weight	Total Declared Value†	Total Charges
	20	$ .00	Credit Card Auth.

†Our liability is limited to $100 unless you declare a higher value. See back for details.

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may

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TestAmerica Burlington
SAMPLE RECEIPT & LOG IN CHECKLIST

Client: WESTN4	Date Received: 9/17/08	Log In Date: 9/17/08	
ETR: 127656	Time Received: 1000	By: JEG	
SDG: 127656	Received By: JEG	Signature:	
Project: 28000	# Coolers Received: 1	PM Signature:	
Samples Delivered By: ☐ Shipping Service ☐ Courier ☐ Hand ☐ Other (specify)		Date: 09/22/08	
List Air bill Number(s) or Attach a photocopy of the Air Bill:			

COOLER SCREEN	YES	NO	NA	COMMENTS
There is *no* evidence to indicate tampering	X			
Custody seals are present and intact	X			
Custody seal numbers are present		X		
If yes, list custody seal numbers:				

Thermal Preservation Type: ☐ Wet Ice ☐ Blue Ice ☒ None ☐ Other (specify)

IR Gun ID: 96 Correction Factor (CF) = -1 °C

Cooler 1:	19.6 °C	Cooler 6	°C	Cooler 11	°C	Cooler 16	°C
Cooler 2:	°C	Cooler 7	°C	Cooler 12	°C	Cooler 17	°C
Cooler 3:	°C	Cooler 8	°C	Cooler 13	°C	Cooler 18	°C
Cooler 4:	°C	Cooler 9	°C	Cooler 14	°C	Cooler 19	°C
Cooler 5	°C	Cooler 10	°C	Cooler 15	°C	Cooler 20	°C

Unless otherwise documented, the recorded temperature readings are adjusted readings to account for the CF of the IR Gun

EPA Criteria: 0-6°C, except for air and geo samples which should be at ambient temperature and tissue samples, which may be frozen.

Some clients require thermal preservation criteria of 2-4°C or other such criteria. The PM must notify SM when alternate criteria is specified.

SAMPLE CONDITION	YES	NO	NA	COMMENTS
Sample containers were received intact	X			
Legible sample labels are affixed to each container	X			

CHAIN OF CUSTODY (COC)	YES	NO	NA	COMMENTS
COC is present and includes the following information for each container:				
• Sample ID / Sample Description	X			
• Date of Sample Collection	X			
• Time of Sample Collection	X			
• Identification of the Sampler		X		
• Preservation Type			X	
• Requested Tests Method(s)	X			
• Necessary Signatures	X			
Internal Chain of Custody (ICOC) Required		X		
If yes to above, ICOC Record initiated for every Worksheet			X	

SAMPLE INTEGRITY / USABILITY	YES	NO	NA	COMMENTS
The sample container matches the COC	X			
Appropriate sample containers were received for the tests requested	X			
Samples were received within holding time	X			
Sufficient amount of sample is provided for requested analyses	X			
VOA vials do not have headspace or a bubble >6mm (1/4" diameter)			X	
Appropriate preservatives were used for the tests requested			X	
pH of inorganic samples checked and is within method specification			X	
If no, attach Inorganic Sample pH Adjustment Form			X	

ANOMALY / NCR SUMMARY

FSR002:12.19.07:3

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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TestAmerica
South Burlington, VT

Extended Data Package

SDG: 127612

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Particle Size Results 6
Sample Handling 29
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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Case Narrative

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

October 7, 2008

TestAmerica Laboratories, Inc.

Mr. Dan Gaughan
Weston Solutions
205 Campus Drive
Edison, NJ 08837-3939

Re: Laboratory Project No. 28000
Case: 28000; SDG: 127612

Dear Mr. Gaughan:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 15th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/15/08 ETR No: 127612		
767582	RBS-SED10	09/12/08	SEDIMENT
767583	RBS-SED08	09/12/08	SEDIMENT
767584	RBS-SED17	09/12/08	SEDIMENT
767585	RBS-SED21	09/12/08	SEDIMENT
767586	RBS-SED26	09/12/08	SEDIMENT
767587	RBS-SED20	09/12/08	SEDIMENT
767588	RBS-SED23	09/12/08	SEDIMENT
767589	RBS-SED09	09/12/08	SEDIMENT
767590	RBS-SED12	09/12/08	SEDIMENT
767591	RBS-SED18	09/12/08	SEDIMENT
767592	RBS-SED24	09/12/08	SEDIMENT
767593	RBS-SED25	09/12/08	SEDIMENT
767594	RBS-SED11	09/12/08	SEDIMENT
767595	RBS-SED07	09/12/08	SEDIMENT
767596	RBS-SED87	09/12/08	SEDIMENT
767597	RBS-SED88	09/12/08	SEDIMENT

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal.

(151)

30 Community Drive • Suite 11 South Burlington, VT 05403 **tel** 802.660.1990 **fax** 802.660.1919 **www.testamericainc.com**

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

The samples in this sample set were analyzed for particle size distribution by ASTM D422, and included both the sieve and hydrometer determinations.

Any reference within this report to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.) The analytical results associated with the samples presented in this test report were generated under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk Young
Project Manager

KFY/hsf
Enclosure

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody

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Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No 8541 0029 6897

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D Gaughan	Site Contact: D Gaughan	Date: 9/12/08	COC No:
Your Company Name here Weston Solutions	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: Fed Ex	1 of 3 COCs
Address 205 Campus Dr	Analysis Turnaround Time			Job No.
City/State/Zip Edison / NJ / 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			
(xxx) xxx-xxxx FAX	[X] 2 weeks			SDG No.
Project Name: Raritan Bay Slag	[ ] 1 week			
Site:	[ ] 2 days			
PO# 0064364	[ ] 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS-SED36	9/12/08	0927	G	S.A	1		X	
RBS-SED37		0935					X	
RBS-SED38		0936					X	
RBS-SED39		0942					X	
RBS-SED40		0942					X	
RBS-SED41		0948					X	
RBS-SED43		0948					X	
RBS-SED44		0951					X	
RBS-SED45		0956					X	
RBS-SED46		0957					X	
RBS-SED47		1004					X	
RBS-SED48		1002					X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification
[ ] *Non-Hazard* [ ] *Flammable* [ ] *Skin Irritant* *Poison B* [ ] *Unknown* [X]

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] *Return To Client* [ ] *Disposal By Lab* [ ] *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:

COPY - ORIGINAL ON FILE
SDG # 127611 ETR # 127611

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature] (Scott Snyder)	Weston	9/12/08 1630	Fed Ex	—	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by: [signature]	Company: TA	Date/Time: 9/15/08 0845
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Airbill No 8541 0029 6497

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: D Gaughan	Date: 9/12/08	COC No:
Your Company Name here: Weston Solutions	Tel/Fax: (732) 417-5800	Lab Contact:	Carrier: FedEx	2 of 3 COCs
Address: 205 Campus Dr.	Analysis Turnaround Time			Job No.
City/State/Zip: Edison / NJ / 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			
(xxx) xxx-xxxx FAX	[X] 2 weeks			SDG No.
Project Name: Raritan Bay Slag	[ ] 1 week			
Site:	[ ] 2 days			
PO# 0064364	[ ] 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS SED49	9/12/08	1004	G	Sed	1		X	
RBS-SED50		1008					X	
RBS-SED51		1012					X	
RBS-SED52		1015					X	
RBS SED81		1021					X	
RBS-SED82		1021					X	
RBS-SED83		1030					X	
RBS SED 19		1235					X	
RBS SED 10		1310					X	
RBS SED 08		1229					X	
RBS SED 17		1215					X	
RBS SED 21		1310					X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
[ ] Non-Hazard [ ] Flammable [ ] Skin Irritant Poison B [ ] Unknown [ ]

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] Return To Client [ ] Disposal By Lab [ ] Archive For _____ Months

Special Instructions/QC Requirements & Comments:

COF - ORIGINAL ON FILE
SDG # 127611 ETR # 127611

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	WESTON	9/12/08 1630	FedEx	—	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by: [signature]	Company: TA	Date/Time: 9/15/08 0945
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

SDG: 127612

TestAmerica Burlington

(156)

Anchorage
2000 W. International Airport Road
Suite A10
Anchorage, AK 99502
phone 907.563.9200 fax 907.563.9210

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Air bill No. 8511 0029 6897

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: D. Gaughan	Site Contact: DGaughan	Date: 9/12/08	COC No:
Your Company Name here: Weston Solutions	Tel/Fax: 732 417 5800	Lab Contact:	Carrier: Fed Ex	3 of 3 COCs
Address: 205 Campus Dr	Analysis Turnaround Time			Job No.
City/State/Zip: Edison NJ 08837	Calendar (C) or Work Days (W)			
(xxx) xxx-xxxx Phone	TAT if different from Below			SDG No.
(xxx) xxx-xxxx FAX	[X] 2 weeks			
Project Name: Raritan Bay Slag	[ ] 1 week			
Site:	[ ] 2 days			
PO# 00641364	[ ] 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Grain Size	Sample Specific Notes:
RBS SED 26	9/12/08	1345	G	Sed	1		X	
RBS SED 20		1250					X	
RBS SED 23		1325					X	
RBSSED 09		1250					X	
RBSSED 12		1330					X	
RBSSED 18		1220					X	
RBSSED 24		1332					X	
RBSSED 25		1341					X	
RBSSED 11		1305					X	
RBSSED 07		1222					X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
[ ] Non-Hazard [ ] Flammable [ ] Skin Irritant Poison B [ ] Unknown [ ]

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] Return To Client [ ] Disposal By Lab [ ] Archive For _____ Months

Special Instructions/QC Requirements & Comments:

COPY - ORIGINAL ON FILE
SDG # 127611 ETR # 127611

1630

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	WESTON	9/12/08	FedEx	--	9/12/08 1630
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
				TA	9/15/08 0945
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

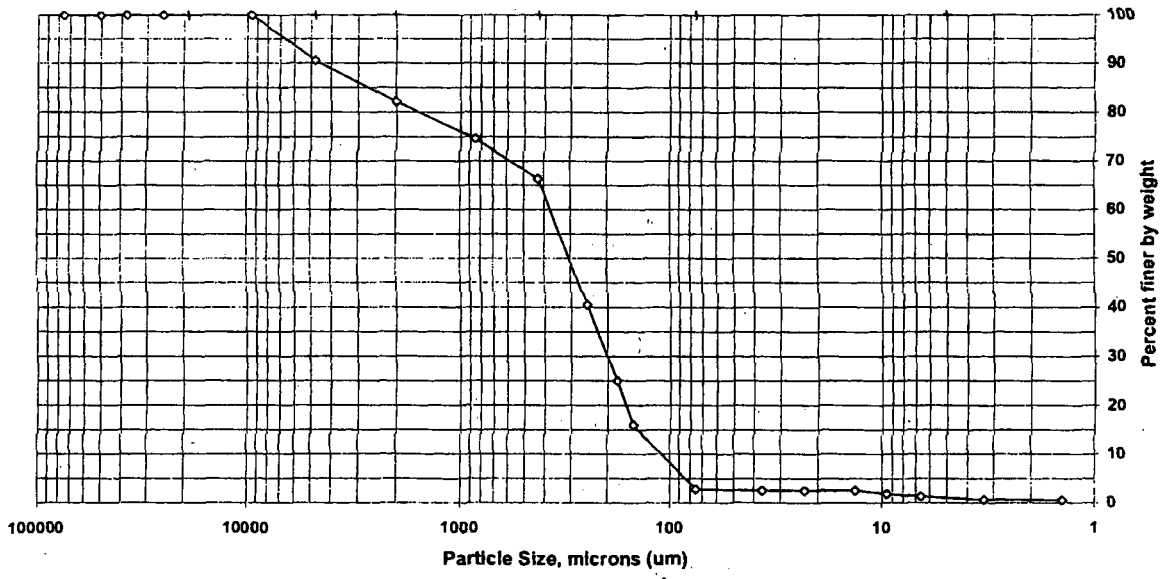
Particle Size Results

(57)

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED10	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767582			**End Date:**	10/2/2008

Percent Solids:	75.5%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	angular
Maximum Particle Size:	9.5 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	90.5	9.5
#10	2000	82.2	8.3
#20	850	74.6	7.5
#40	425	66.3	8.3
#60	250	40.5	25.8
#80	180	25.0	15.5
#100	150	16.0	9.0
#200	75	2.8	13.2
Hydrometer	36.3	2.5	0.3
|	23.0	2.5	0.0
|	13.3	2.5	0.0
|	9.5	1.9	0.7
|	6.6	1.3	0.6
|	3.3	0.7	0.7
V	1.4	0.6	0.1

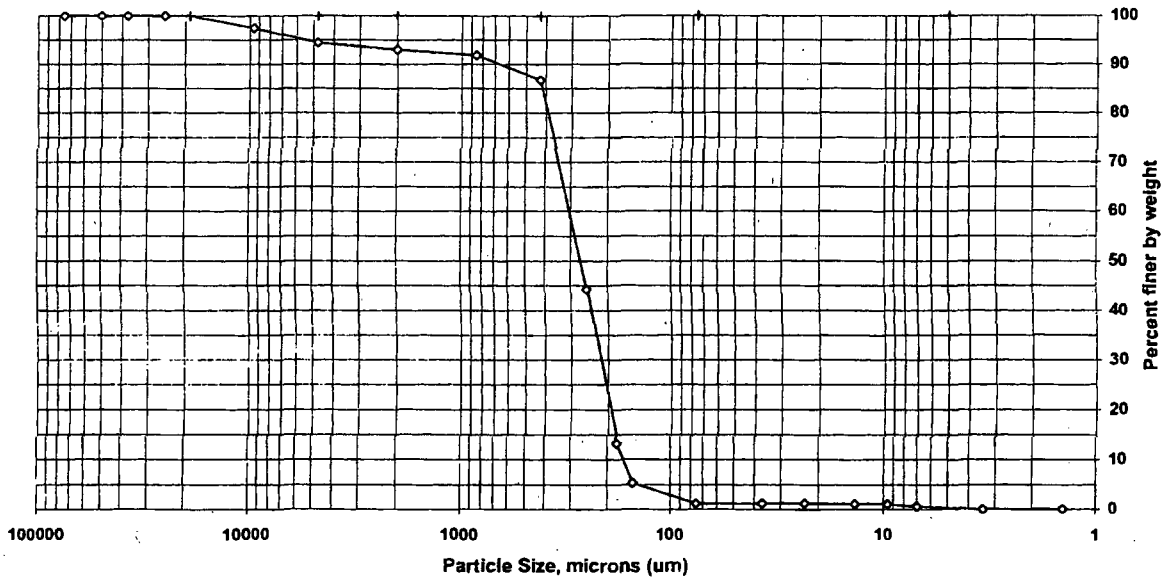
Soil Classification	Percent of Total Sample
Gravel	9.5
Sand	87.7
Coarse Sand	8.3
Medium Sand	15.8
Fine Sand	63.5
Silt	1.5
Clay	1.3

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED08	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767583			**End Date:**	10/2/2008

Percent Solids:	77.5%	**Non-soil material:**	shells
Specific Gravity:	2.650	**Shape (> #10):**	subangular
Maximum Particle Size:	19 mm	**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.5	2.5
#4	4750	94.4	3.1
#10	2000	93.0	1.4
#20	850	91.9	1.1
#40	425	86.7	5.1
#60	250	44.2	42.5
#80	180	13.2	31.0
#100	150	5.4	7.9
#200	75	1.2	4.1
Hydrometer	36.7	1.2	0.0
|	23.2	1.2	0.0
|	13.5	1.1	0.1
|	9.5	1.1	0.0
|	6.9	0.6	0.5
|	3.4	0.0	0.6
V	1.4	0.0	0.0

Soil Classification	Percent of Total Sample
Gravel	5.6
Sand	93.2
Coarse Sand	1.4
Medium Sand	6.2
Fine Sand	85.5
Silt	0.6
Clay	0.6

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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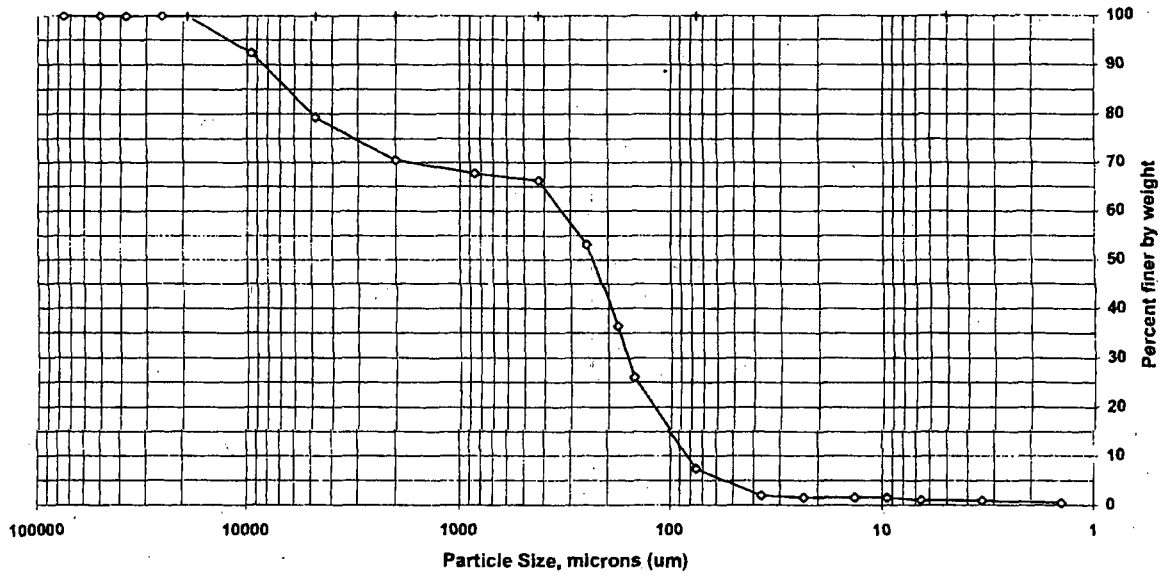
127612PS 10/4/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127612	Date Received:	9/15/2008
Sample ID:	RBS-SED17	ETR(s):	127612	Start Date:	9/15/2008
Lab ID:	767584			End Date:	10/2/2008

Percent Solids:	79.0%	Non-soil material:	shells
Specific Gravity:	2.650	Shape (> #10):	subrounded
Maximum Particle Size:	19 mm	Hardness (> #10):	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	92.4	7.6
#4	4750	79.3	13.0
#10	2000	70.5	8.8
#20	850	67.7	2.8
#40	425	66.3	1.5
#60	250	53.2	13.1
#80	180	36.3	16.8
#100	150	26.1	10.3
#200	75	7.4	18.7
Hydrometer	36.6	1.9	5.4
|	23.2	1.5	0.4
|	13.4	1.5	0.0
|	9.5	1.5	0.0
|	6.6	1.0	0.4
|	3.4	0.9	0.1
V	1.4	0.4	0.4

Soil Classification	Percent of Total Sample
Gravel	20.7
Sand	72.0
Coarse Sand	8.8
Medium Sand	4.2
Fine Sand	58.9
Silt	6.3
Clay	1.0

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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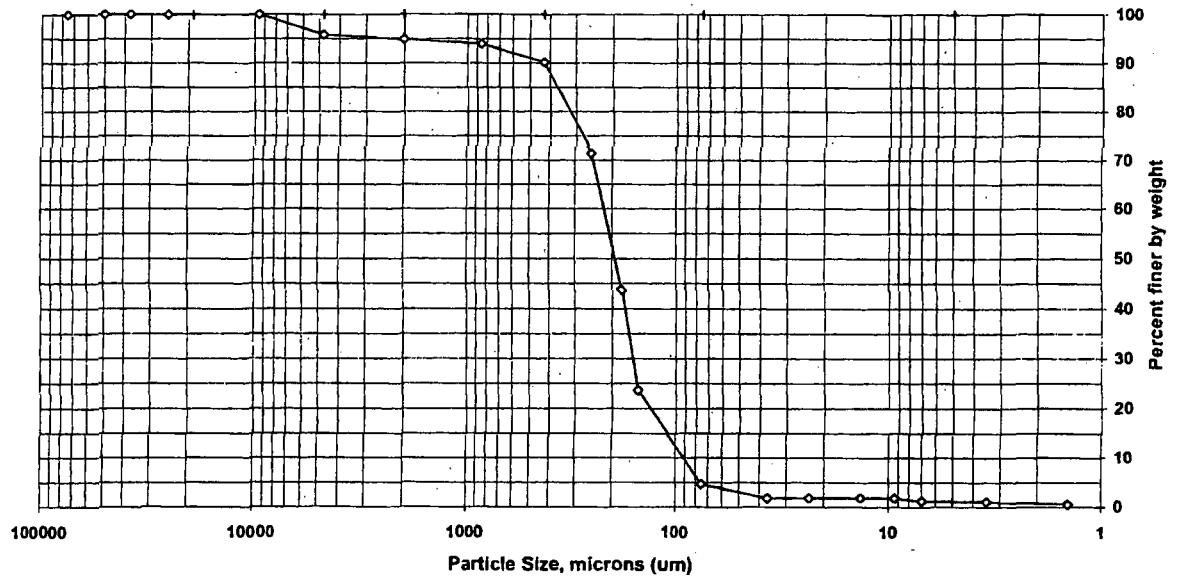
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127612	Date Received:	9/15/2008
Sample ID:	RBS-SED21	ETR(s):	127612	Start Date:	9/15/2008
Lab ID:	767585			End Date:	10/2/2008

Percent Solids:	75.8%	Non-soil material:	shells
Specific Gravity:	2.650	Shape (> #10):	subrounded
Maximum Particle Size:	9.5 mm	Hardness (> #10):	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	95.9	4.1
#10	2000	95.0	0.9
#20	850	94.0	0.9
#40	425	90.1	3.9
#60	250	71.4	18.8
#80	180	43.7	27.6
#100	150	23.6	20.1
#200	75	4.7	18.9
Hydrometer	36.7	1.8	2.9
I	23.2	1.8	0.0
I	13.4	1.8	0.0
I	9.3	1.8	0.0
I	7.0	1.2	0.6
I	3.4	1.1	0.1
V	1.4	0.5	0.5

Soil Classification	Percent of Total Sample
Gravel	4.1
Sand	91.2
Coarse Sand	0.9
Medium Sand	4.8
Fine Sand	85.4
Silt	3.5
Clay	1.2

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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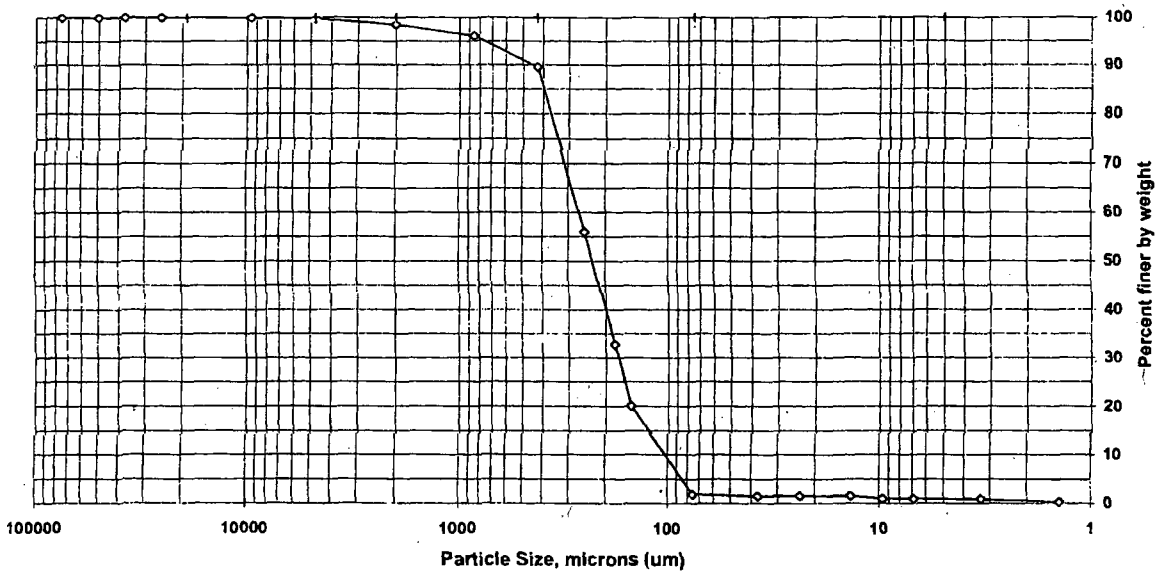
127612PS 10/4/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED26	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767586			**End Date:**	10/4/2008

Percent Solids:	78.9%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.8	0.2
#10	2000	98.5	1.3
#20	850	96.1	2.4
#40	425	89.6	6.6
#60	250	55.9	33.6
#80	180	32.8	23.2
#100	150	20.0	12.7
#200	75	1.9	18.2
Hydrometer	37.1	1.5	0.4
|	23.4	1.5	0.0
|	13.5	1.5	0.0
|	9.6	0.9	0.6
|	6.9	0.9	0.0
|	3.3	0.9	0.0
V	1.4	0.3	0.6

Soil Classification	Percent of Total Sample
Gravel	0.2
Sand	97.9
Coarse Sand	1.3
Medium Sand	8.9
Fine Sand	87.7
Silt	0.9
Clay	0.9

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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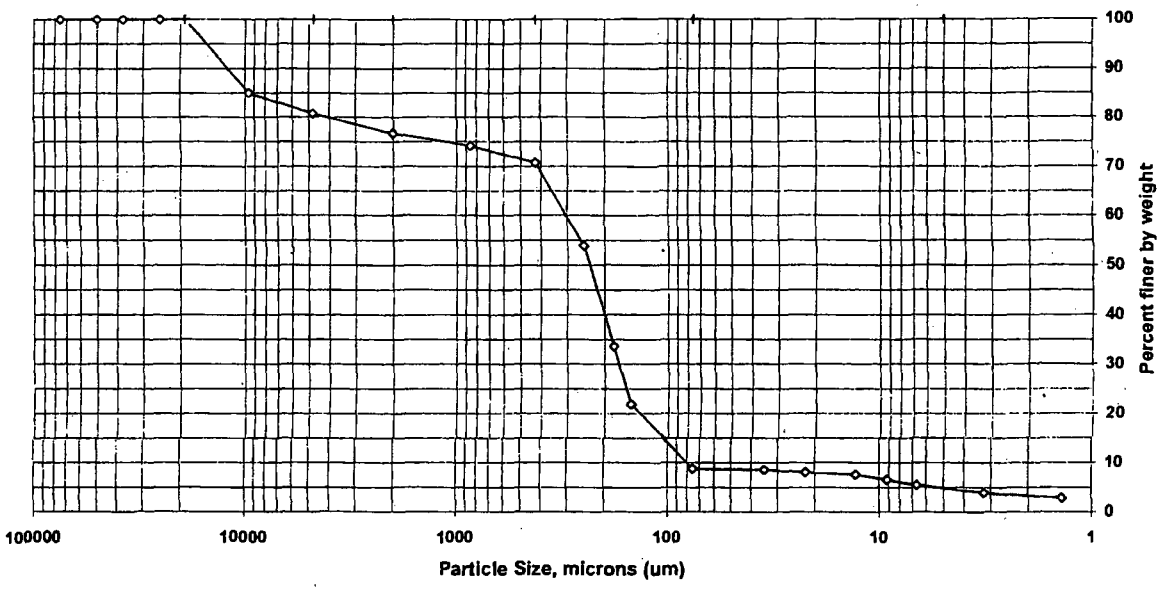
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED20	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767587			**End Date:**	10/4/2008

Percent Solids:	76.1%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	rounded
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	85.0	15.0
#4	4750	80.7	4.3
#10	2000	76.7	4.1
#20	850	74.1	2.5
#40	425	70.8	3.3
#60	250	53.9	16.9
#80	180	33.6	20.3
#100	150	21.9	11.7
#200	75	8.8	13.1
Hydrometer	34.7	8.6	0.2
|	22.1	8.1	0.5
|	12.8	7.5	0.5
|	9.1	6.5	1.0
|	6.6	5.5	1.0
|	3.2	3.9	1.6
V	1.4	2.8	1.1

Soil Classification	Percent of Total Sample
Gravel	19.3
Sand	72.0
Coarse Sand	4.1
Medium Sand	5.9
Fine Sand	62.0
Silt	3.3
Clay	5.5

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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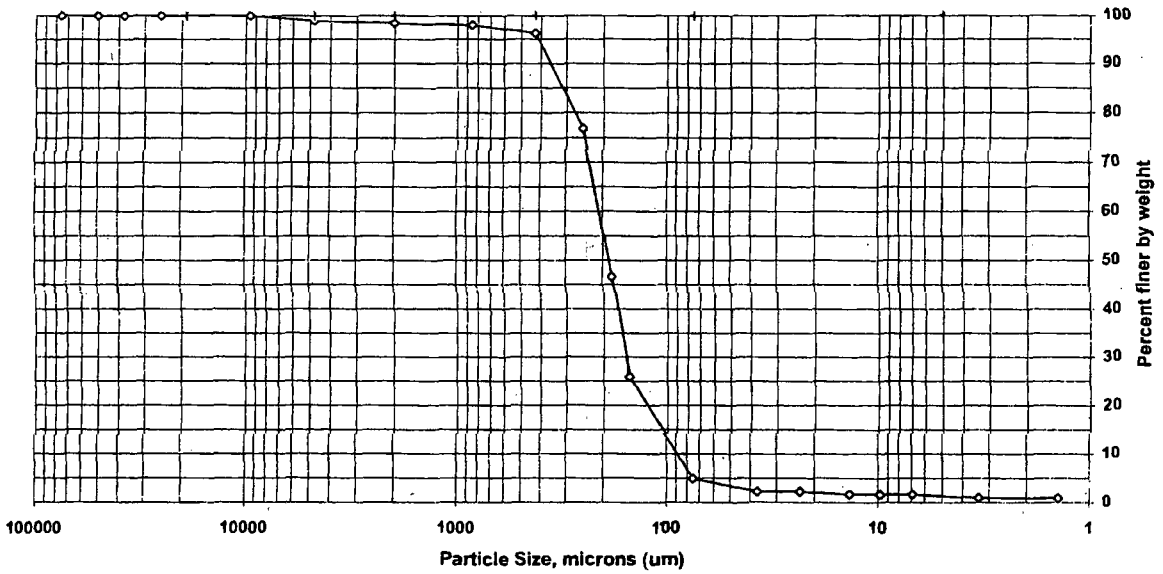
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED23	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767588			**End Date:**	10/4/2008

Percent Solids:	75.6%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.9	1.1
#10	2000	98.4	0.5
#20	850	98.0	0.4
#40	425	96.3	1.7
#60	250	76.8	19.5
#80	180	46.7	30.1
#100	150	25.9	20.7
#200	75	4.9	21.0
Hydrometer	36.9	2.2	2.7
|	23.3	2.2	0.0
|	13.5	1.6	0.6
|	9.7	1.6	0.0
|	6.9	1.6	0.0
|	3.4	1.0	0.7
V	1.4	0.9	0.1

Soil Classification	Percent of Total Sample
Gravel	1.1
Sand	94.0
Coarse Sand	0.5
Medium Sand	2.1
Fine Sand	91.4
Silt	3.3
Clay	1.6

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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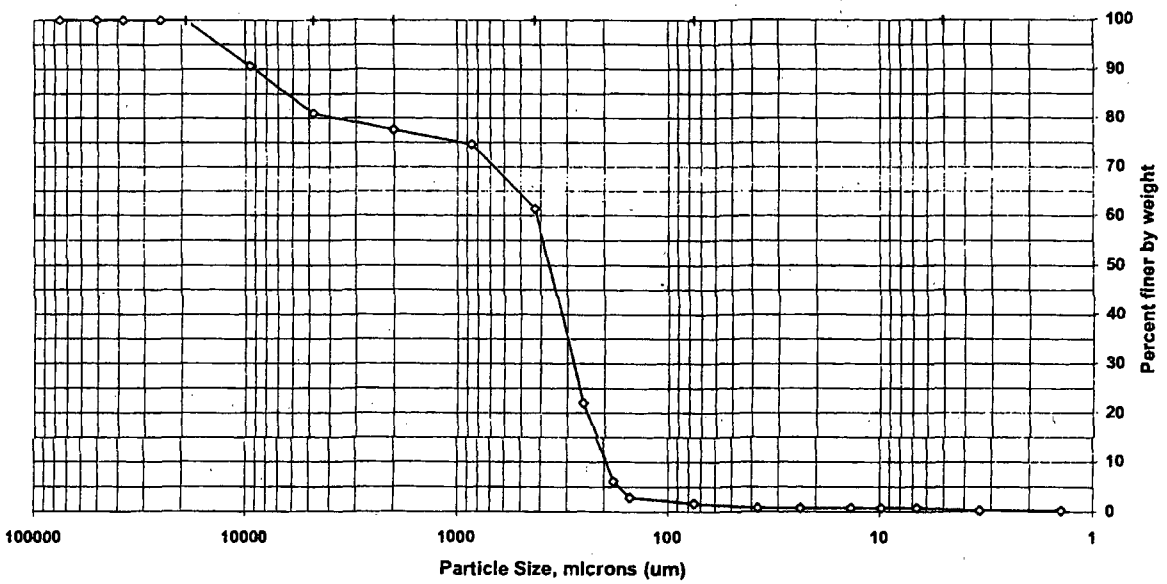
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127612	Date Received:	9/15/2008
Sample ID:	RBS-SED09	ETR(s):	127612	Start Date:	9/15/2008
Lab ID:	767589			End Date:	10/4/2008

Percent Solids:	85.5%		Non-soil material:	shell	
Specific Gravity:	2.650	(assumed)	Shape (> #10):	rounded	
Maximum Particle Size:	19 mm		Hardness (> #10):	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	90.6	9.4
#4	4750	81.0	9.6
#10	2000	77.6	3.4
#20	850	74.6	2.9
#40	425	61.4	13.2
#60	250	22.1	39.3
#80	180	6.1	16.0
#100	150	2.8	3.3
#200	75	1.7	1.1
Hydrometer	37.2	0.7	1.0
|	23.5	0.7	0.0
|	13.6	0.7	0.0
|	9.8	0.7	0.0
|	6.6	0.7	0.0
|	3.4	0.3	0.5
V	1.4	0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	19.0
Sand	79.3
Coarse Sand	3.4
Medium Sand	16.1
Fine Sand	59.7
Silt	1.0
Clay	0.7

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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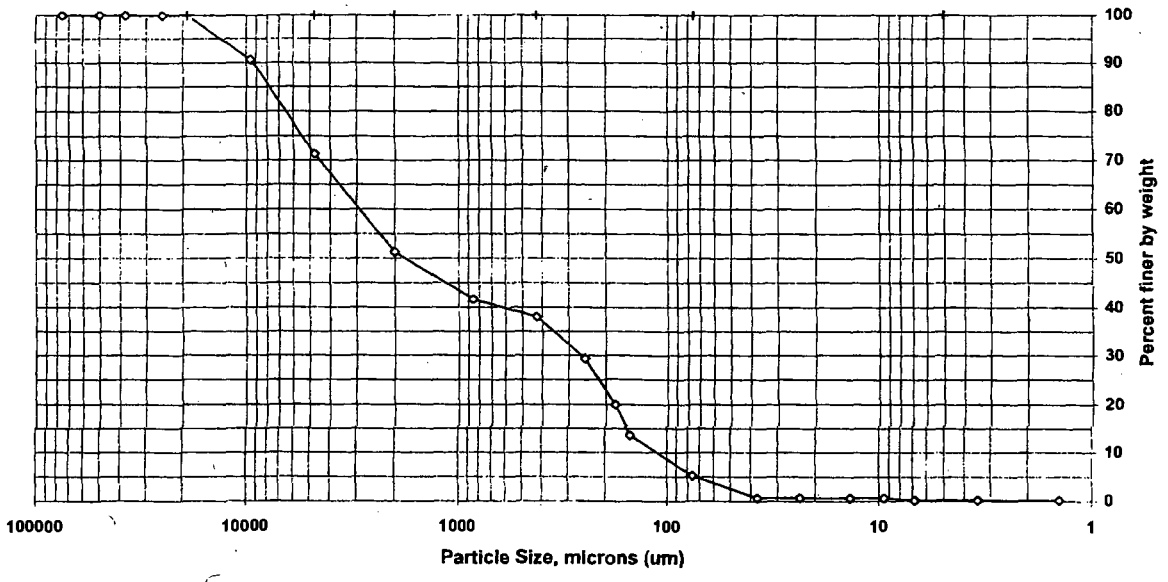
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED12	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767590			**End Date:**	10/4/2008

Percent Solids:	88.6%		**Non-soil material:**	shell	
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	rounded	
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	90.6	9.4
#4	4750	71.3	19.3
#10	2000	51.3	20.0
#20	850	41.7	9.6
#40	425	38.1	3.6
#60	250	29.3	8.7
#80	180	20.0	9.3
#100	150	13.6	6.4
#200	75	5.2	8.4
Hydrometer	37.2	0.6	4.6
|	23.5	0.6	0.0
|	13.6	0.6	0.0
|	9.5	0.6	0.0
|	6.8	0.3	0.4
|	3.4	0.2	0.0
V	1.4	0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	28.7
Sand	66.1
Coarse Sand	20.0
Medium Sand	13.3
Fine Sand	32.8
Silt	5.0
Clay	0.3

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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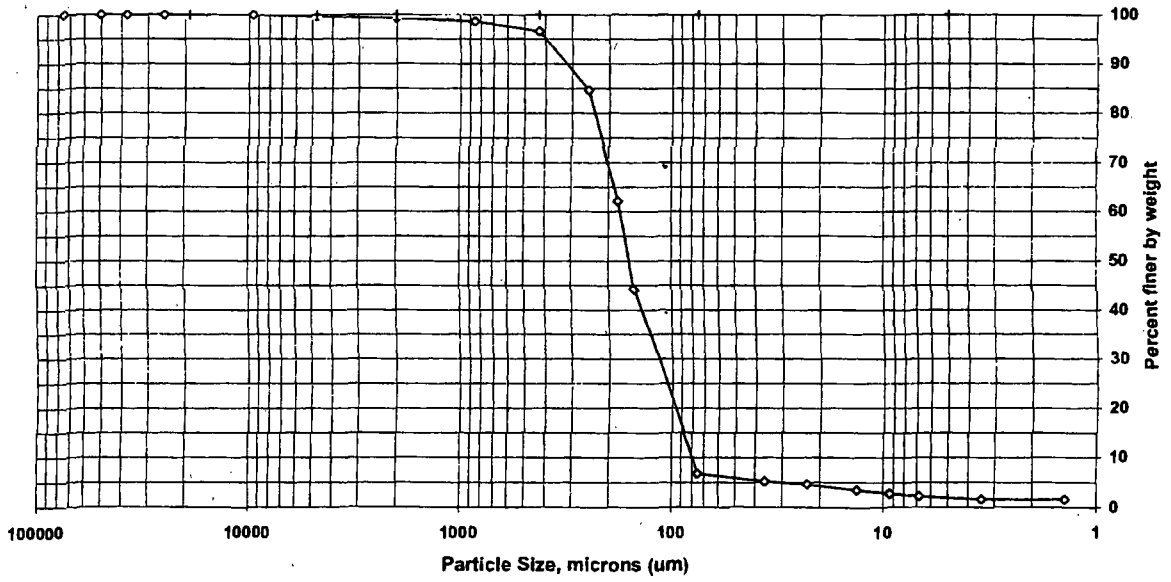
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED18	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767591			**End Date:**	10/4/2008

Percent Solids:	67.4%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	9.5 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.6	0.4
#10	2000	99.3	0.4
#20	850	98.6	0.6
#40	425	96.6	2.0
#60	250	84.6	12.0
#80	180	62.2	22.4
#100	150	44.3	17.9
#200	75	6.8	37.5
Hydrometer	36.1	5.2	1.6
I	22.9	4.6	0.6
I	13.4	3.4	1.2
I	9.3	2.8	0.6
I	6.8	2.2	0.6
I	3.4	1.6	0.7
V	1.4	1.6	0.0

Soil Classification	Percent of Total Sample
Gravel	0.4
Sand	92.8
Coarse Sand	0.4
Medium Sand	2.6
Fine Sand	89.9
Silt	4.6
Clay	2.2

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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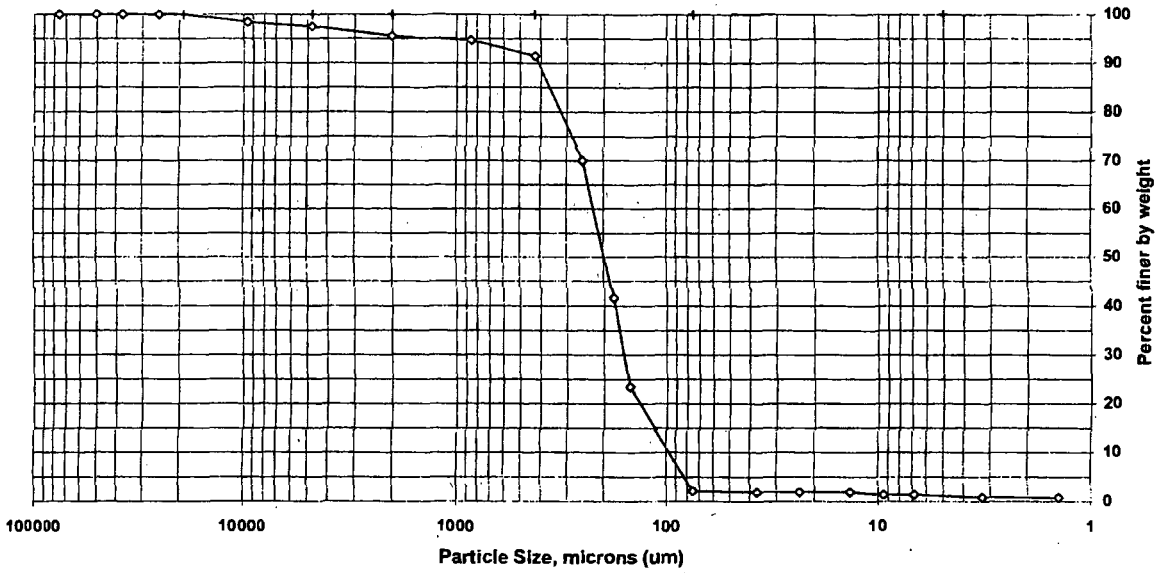
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED24	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767592			**End Date:**	10/4/2008

Percent Solids:	77.9%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subangular
Maximum Particle Size:	19 mm		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	98.5	1.5
#4	4750	97.6	0.9
#10	2000	95.5	2.0
#20	850	94.7	0.8
#40	425	91.5	3.2
#60	250	70.0	21.5
#80	180	41.6	28.3
#100	150	23.5	18.2
#200	75	2.2	21.3
Hydrometer	36.9	1.9	0.3
|	23.3	1.9	0.0
|	13.5	1.9	0.0
|	9.4	1.4	0.5
|	6.8	1.4	0.0
|	3.3	0.8	0.6
V	1.4	0.8	0.0

Soil Classification	Percent of Total Sample
Gravel	2.4
Sand	95.4
Coarse Sand	2.0
Medium Sand	4.0
Fine Sand	89.3
Silt	0.8
Clay	1.4

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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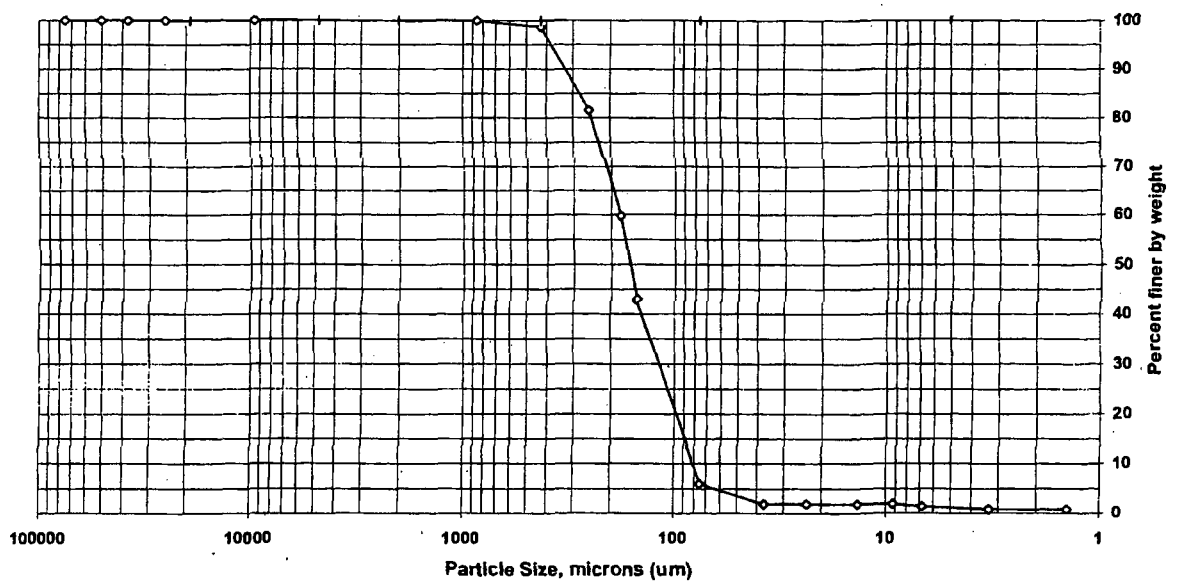
Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED25	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767593			**End Date:**	10/4/2008

Percent Solids:	76.6%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	n/a
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	n/a



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.9	0.1
#40	425	98.7	1.3
#60	250	81.6	17.1
#80	180	59.8	21.8
#100	150	43.0	16.8
#200	75	6.0	37.0
Hydrometer	36.9	1.9	4.2
|	23.3	1.9	0.0
|	13.5	1.9	0.0
|	9.2	1.9	0.0
|	6.8	1.4	0.5
|	3.3	0.8	0.6
V	1.4	0.8	0.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	94.0
Coarse Sand	0.0
Medium Sand	1.3
Fine Sand	92.6
Silt	4.7
Clay	1.4

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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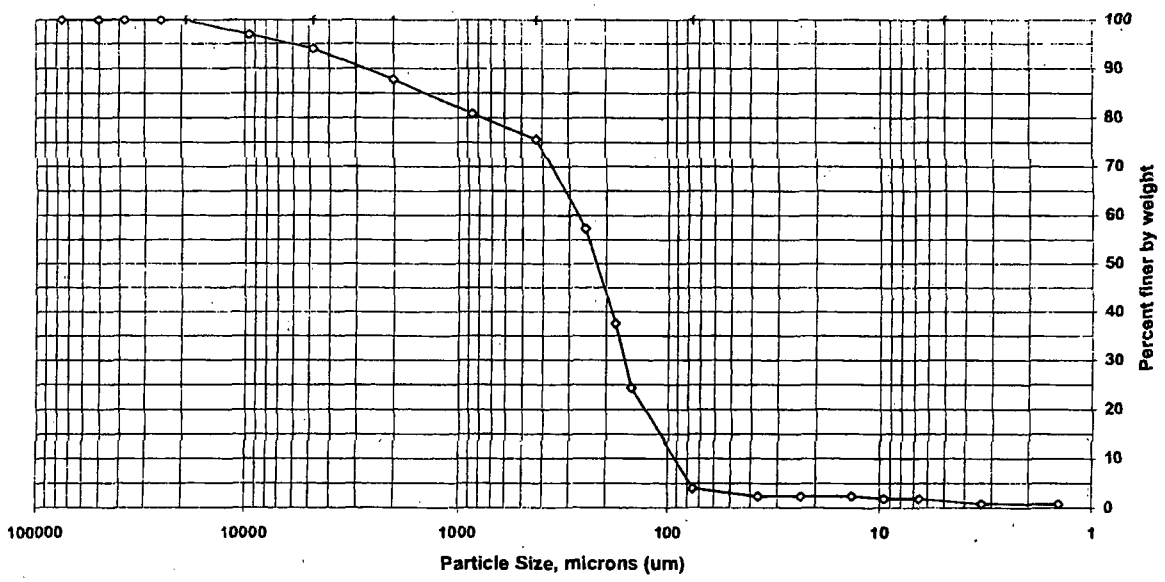
FSL024:07.29.05:0
TestAmerica Burlington

127612BPS 10/4/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127612	Date Received:	9/15/2008
Sample ID:	RBS-SED11	ETR(s):	127612	Start Date:	9/15/2008
Lab ID:	767594			End Date:	10/4/2008

Percent Solids:	81.2%		Non-soil material:	shell	
Specific Gravity:	2.650	(assumed)	Shape (> #10):	subrounded	
Maximum Particle Size:	19 mm		Hardness (> #10):	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	96.9	3.1
#4	4750	94.0	2.9
#10	2000	87.8	6.2
#20	850	80.9	7.0
#40	425	75.6	5.3
#60	250	57.3	18.3
#80	180	37.5	19.8
#100	150	24.3	13.2
#200	75	3.9	20.4
Hydrometer	36.7	2.4	1.6
|	23.2	2.4	0.0
|	13.4	2.4	0.0
|	9.5	1.9	0.5
|	6.6	1.9	0.0
|	3.3	0.8	1.1
V	1.4	0.8	0.0

Soil Classification	Percent of Total Sample
Gravel	6.0
Sand	90.1
Coarse Sand	6.2
Medium Sand	12.2
Fine Sand	71.7
Silt	2.1
Clay	1.9

Preparation Method: **D2217**
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(17 b)

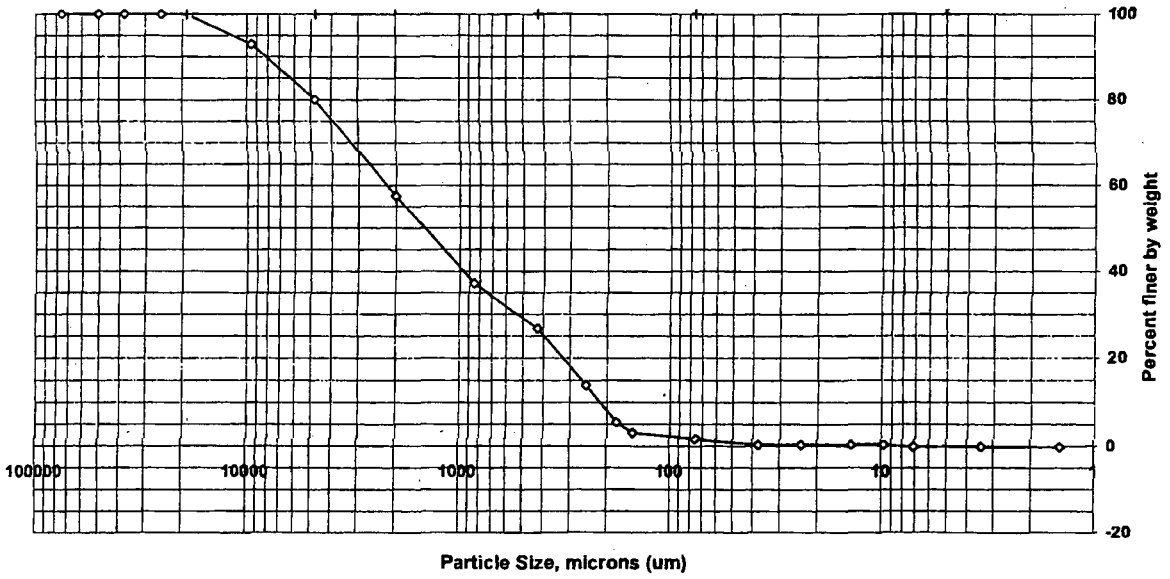
FSL024:07.29.05:0
TestAmerica Burlington

127612BPS 10/4/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127612	Date Received:	9/15/2008
Sample ID:	RBS-07	ETR(s):	127612	Start Date:	9/15/2008
Lab ID:	767595			End Date:	10/4/2008

Percent Solids:	90.9%		Non-soil material:	shell	
Specific Gravity:	2.650	(assumed)	Shape (> #10):	subrounded	
Maximum Particle Size:	19 mm		Hardness (> #10):	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	93.0	7.0
#4	4750	80.1	13.0
#10	2000	57.5	22.6
#20	850	37.1	20.3
#40	425	26.7	10.4
#60	250	13.9	12.8
#80	180	5.5	8.4
#100	150	3.0	2.5
#200	75	1.6	1.4
Hydrometer	37.4	0.3	1.3
I	23.6	0.3	0.0
I	13.7	0.3	0.0
I	9.7	0.3	0.0
I	7.0	-0.1	0.4
I	3.4	-0.2	0.0
V	1.4	-0.2	0.0

Soil Classification	Percent of Total Sample
Gravel	19.9
Sand	78.5
Coarse Sand	22.6
Medium Sand	30.8
Fine Sand	25.1
Silt	1.7
Clay	-0.1

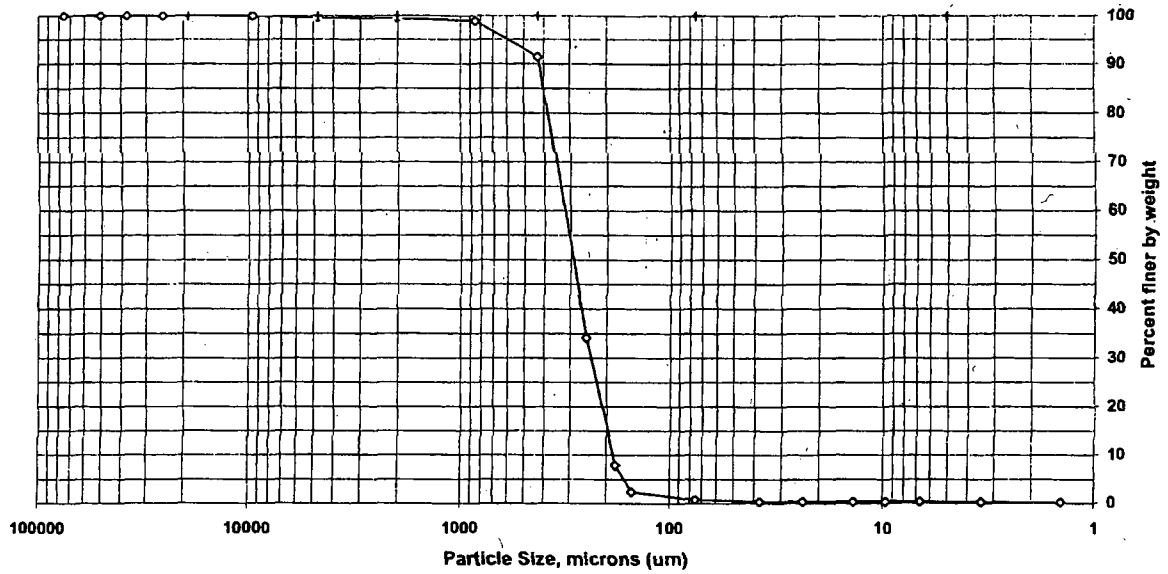
Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

(7L)

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	SDG:	127612	Date Received:	9/15/2008
Sample ID:	RBS-SED87	ETR(s):	127612	Start Date:	9/15/2008
Lab ID:	767596			End Date:	10/4/2008

Percent Solids:	79.9%		Non-soil material:	shell	
Specific Gravity:	2.650	(assumed)	Shape (> #10):	rounded	
Maximum Particle Size:	9.5 mm		Hardness (> #10):	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.6	0.4
#10	2000	99.4	0.2
#20	850	98.9	0.5
#40	425	91.4	7.5
#60	250	34.1	57.3
#80	180	7.9	26.2
#100	150	2.4	5.6
#200	75	0.8	1.6
Hydrometer	37.4	0.4	0.4
|	23.6	0.4	0.0
|	13.7	0.4	0.0
|	9.7	0.4	0.0
|	6.7	0.4	0.0
|	3.4	0.3	0.0
V	1.4	0.3	0.0

Soil Classification	Percent of Total Sample
Gravel	0.4
Sand	98.9
Coarse Sand	0.2
Medium Sand	8.0
Fine Sand	90.6
Silt	0.4
Clay	0.4

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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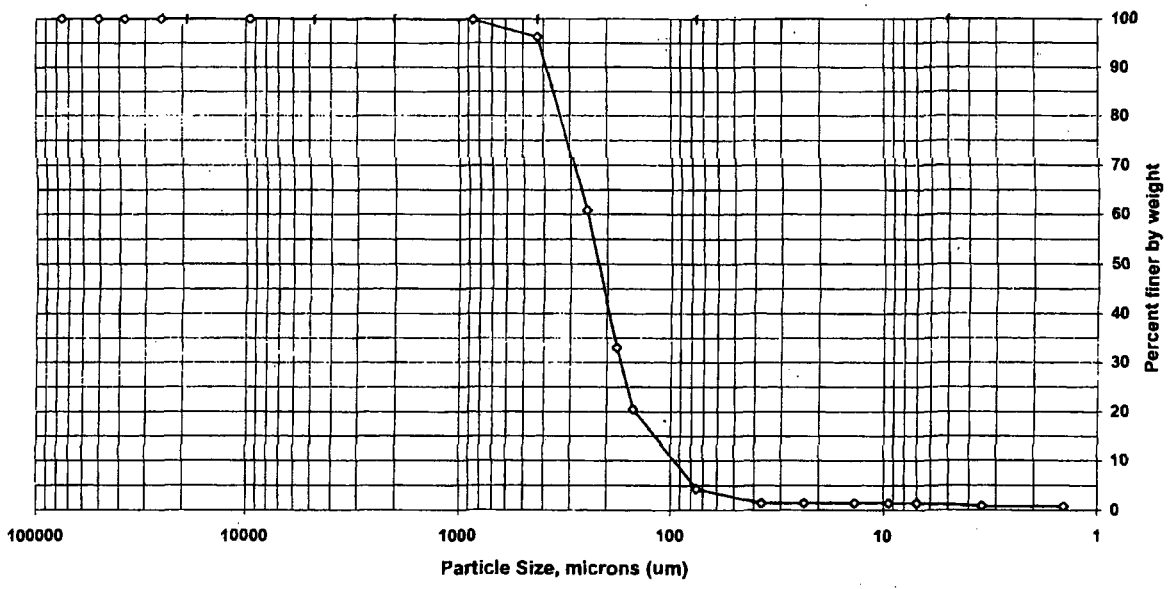
FSL024:07.29.05:0
TestAmerica Burlington

127612BPS 10/4/2008

Particle Size of Soils by ASTM D422

Client Code:	WESTN4	**SDG:**	127612	**Date Received:**	9/15/2008
Sample ID:	RBS-SED88	**ETR(s):**	127612	**Start Date:**	9/15/2008
Lab ID:	767597			**End Date:**	10/4/2008

Percent Solids:	75.1%		**Non-soil material:**	shell
Specific Gravity:	2.650	(assumed)	**Shape (> #10):**	subrounded
Maximum Particle Size:	Crs sand		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.8	0.2
#40	425	96.3	3.5
#60	250	60.9	35.4
#80	180	33.0	27.9
#100	150	20.5	12.6
#200	75	4.3	16.1
Hydrometer	36.8	1.5	2.9
|	23.4	1.4	0.0
|	13.5	1.4	0.0
|	9.4	1.4	0.0
|	6.9	1.4	0.0
|	3.5	0.8	0.6
V	1.4	0.8	0.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	95.7
Coarse Sand	0.0
Medium Sand	3.7
Fine Sand	92.0
Silt	2.9
Clay	1.4

Preparation Method: D2217
Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

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FSL024:07.29.05:0
TestAmerica Burlington

127612BPS 10/4/2008

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127612

Client Code: WESTN4
SDG: 127612
ETR(s): 127612

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 2-Oct-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 09/29/08 MAP 09/30/08	MAP 09/29/08	DPS 09/30/08	DPS 09/30/08 DPS 09/31/08	DPS 09/30/08 DJP 10/2/08	MAP 10/1/08 DJP 10/2/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number									767582	767583	767584	767585
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading									1.0060	1.0050	1.0060	1.0055
Temperature, C									21.5	21.5	21.0	21.0
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading									1.0060	1.0050	1.0055	1.0055
Temperature, C									21.5	21.5	21.0	21.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading									1.0060	1.0050	1.0055	1.0055
Temperature, C									21.5	21.0	21.0	21.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading									1.0055	1.0050	1.0055	1.0055
Temperature, C									21.0	21.0	21.0	21.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading									1.0050	1.0045	1.0050	1.0050
Temperature, C									21.0	21.0	21.0	20.5
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading									1.0045	1.0040	1.0050	1.0050
Temperature, C									20.5	20.0	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading									1.0045	1.0040	1.0045	1.0045
Temperature, C									20.0	20.0	20.0	20.0

Hydrometer used: 705151 **Model #:** ASTM 151H **Manufacturer:** HB Instrument **Hydrometer start time:** 10:31

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0	1.0045	23.0	1.0035

Cal. Date: 09/09/07 **Hydrometer data entered:** DPS 10/01/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127612B

Client Code: WESTN4
SDG: 127612
ETR(s): 127612

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 4-Oct-08

Date and Analyst

	Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
	MAP 09/29/08 MAP 09/30/08	MAP 09/29/08	MAP 09/30/08	MAP 09/30/08 MAP 10/1/08	MAP 09/30/08 MAP 10/2/08	MAP 10/01/08 MAP 10/2/08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767586	767587	767588	767589	767590	767591	767592	767593	767594	767595	767596	767597
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading	1.0045	1.0115	1.0050	1.0040	1.0040	1.0075	1.0050	1.0050	1.0055	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.5
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0045	1.0110	1.0050	1.0040	1.0040	1.0070	1.0050	1.0050	1.0055	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0045	1.0105	1.0045	1.0040	1.0040	1.0060	1.0050	1.0050	1.0055	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0040	1.0095	1.0045	1.0040	1.0040	1.0055	1.0045	1.0050	1.0050	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0040	1.0085	1.0045	1.0040	1.0035	1.0050	1.0045	1.0045	1.0050	1.0030	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0040	1.0070	1.0040	1.0035	1.0035	1.0045	1.0040	1.0040	1.0040	1.0030	1.0035	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0035	1.0060	1.0040	1.0035	1.0035	1.0045	1.0040	1.0040	1.0040	1.0030	1.0035	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** ELE **Hydrometer start time:** 18:16

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0	1.0035	23.0	1.0030

Cal. Date: 09/09/07 **Hydrometer data entered:** DPS 10/01/08

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127612

Client Code: WESTN4
SDG: 127612
ETR(s): 127612

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 10-2-08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9.29.08 MAP 9.30.08	MAP 9.29.08	DPS 09/30/08	DPS 9/30/08 DPS 9/31/08	DPS 09/30/08 JP 10.2.08	MAP 10/1/08 JP 10.2.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number									767582	767583	767584	767585
Time, min. (2)	2	2	2	2	2	2	2	2	2	2	2	2
Reading									1.0060	1.0050	1.0060	1.0055
Temperature, C									21.5	21.5	~~21.5~~ 21.0	21.0
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading									1.0060	1.0050	1.0055	1.0055
Temperature, C									21.5	21.5	21.0	21.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading									1.0060	1.0050	1.0055	1.0055
Temperature, C									21.5	21.0	21.0	21.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading									1.0055	1.0050	1.0055	1.0055
Temperature, C									21.0	21.0	21.0	21.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading									1.0050	1.0045	1.0050	1.0050
Temperature, C									21.0	~~20.5~~ 21.0	21.0	20.5
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading									1.0045	1.0040	1.0050	1.0050
Temperature, C									20.5	~~20.0~~	20.0	20.0
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading									1.0045	1.0040	1.0045	1.0045
Temperature, C									20.0	20.0	20.0	20.0

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Hydrometer used: 105151 Model #: ASTM 151H Manufacturer:

Calibrations:	L temp, C	L read	H Temp, C	H read
	17.0		23.0	

Cal. Date:

Hydrometer start time: 1031
Hydrometer data entered:

Particle Size Analysis of Soils
By ASTM D422
Hydrometer Data

Set Number: 127612B

Client Code: WESTN4
SDG: 127612
ETR(s): 127612

Date Received: 15-Sep-08
Start Date: 15-Sep-08
End Date: 10-4-08

Date and Analyst

Percent Solids	Weighed	Mixed	Hydrometer	Large sieves	Small sieves
MAP 9.29.08	MAP 9.29.08	MAP 9.30.08	MAP 9.30.08	MAP 9.30.08	MAP 10.1.08
MAP 9.30.08			MAP 10.1.08	MAP 10.2.08	MAP 10.2.08

Test number	1	2	3	4	5	6	7	8	9	10	11	12
Lab number	767586	767587	767588	767589	767590	767591	767592	767593	767594	767595	767596	767597
Time, min. (2)	2	2	1.0050 ✗	2	2	2	1.0050 ✗	2	2	1.0035 ✗	2	2
Reading	1.0045	1.0115	~~1.0045~~	1.0040	1.0040	1.0075	~~1.0045~~	1.0050	1.0055	~~1.0030~~	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.5	21.0	21.0	21.0	21.0	21.0	21.5
Time, min. (5)	5	5	5	5	5	5	5	5	5	5	5	5
Reading	1.0045	1.0110	1.0050	1.0040	1.0040	1.0070	1.0050	1.0050	1.0055	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.5	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (15)	15	15	15	15	15	15	15	15	15	15	15	15
Reading	1.0045	1.0105	1.0045	1.0040	1.0040	1.0060	1.0050	1.0050	1.0055	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (30)	30	30	29	29	31	31	31	32	30	30	30	31
Reading	1.0040	1.0095	1.0045	1.0040	1.0040	1.0055	1.0045	1.0050	1.0050	1.0035	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (60)	59	58	58	63	60	59	59	60	63	57	63	57
Reading	1.0040	1.0085	1.0045	1.0040	1.0035	1.0050	1.0045	1.0045	1.0050	1.0030	1.0035	1.0045
Temperature, C	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Time, min. (250)	256	256	250	250	240	234	265	259	253	247	241	235
Reading	1.0040	1.0070	1.0040	1.0035	1.0035	1.0045	1.0040	1.0040	1.0040	1.0030	1.0035	1.0040
Temperature, C	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Time, min. (1440)	1440	1440	1434	1434	1424	1418	1412	1406	1400	1394	1388	1382
Reading	1.0035	1.0060	1.0040	1.0035	1.0035	1.0045	1.0040	1.0040	1.0040	1.0030	1.0035	1.0040
Temperature, C	20.0	20.0	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0

Hydrometer used: 313119 **Model #:** ASTM 151H **Manufacturer:** **Hydrometer start time:** 1816

Calibrations:

L temp, C	L read	H Temp, C	H read
17.0		23.0	

Cal. Date: **Hydrometer data entered:**

UTPS 10.1.08

✗ MAP 9/30/08

FSL024:07.29.05:0
TestAmerica Burlington

127612BPS 09/15/08

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Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 | ETR(s): 127612 | SDG: 127612 | Date Rec: 15-Sep-08 | Start Date: 15-Sep-08 | End Date: 2-Oct-08

SET: 127612

Dry prep = D421
Wet prep = D2217

Standard Values

Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sieve (tares)

Size	Mass, g		
3 inch			
2 inch			
1.5 inch			
1 inch			
3/4 inch			
3/8 inch	447.66		
#4	489.41		
#10	485.34		
#20	392.61	D	
#40	358.72	D	
#60	347.67	D	
#80	336.42	D	
#100	332.10	D	
#200	324.22	D	

Default SG 2.65

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No									767582	767583	767584	767585
Sample ID									RBS-SED10	RBS-SED08	RBS-SED17	RBS-SED21
Sample Prep									D2217	D2217	D2217	D2217
Pan, g												
Pan/sample, g									188.48	219.99	227.96	195.29
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g									0.97	1.02	1.04	1.00
Pan/sample, g									26.44	47.29	59.28	35.72
Pan/dry sample, g									20.20	36.86	47.04	27.31
HMCF									100.0%	100.0%	100.0%	100.0%
Description of >#10 particles												
Non-soil material									shells	shells	shells	shells
Shape									angular	subangular	subrounded	subrounded
Hardness									hard	hard	hard	hard
Sample % Solids									75.5%	77.5%	79.0%	75.8%
Dry sample wt, g									142.30	170.40	180.05	147.99
Sieve + Sample Weights												
Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch												
3/8 inch										451.94	481.42	
#4									501.83	493.67	511.86	494.50
#10									477.18	487.79	491.27	486.72
#20									403.24	394.40	397.47	393.89
#40									368.53	368.43	359.98	362.47
#60									384.48	420.20	371.29	375.55
#80									358.58	389.24	366.75	377.30
#100									344.97	345.54	350.81	361.85
#200									342.97	331.26	357.80	352.24
Maximum Particle size									9.5 mm	19 mm	19 mm	9.5 mm
Specific gravity									2.650	2.650	2.650	2.650
Sample Mass Parameters												
Sample Mass >#10, g	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.36	11.99	53.14	7.47
Sample mass <#10, g	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	116.94	158.41	126.91	140.52

Particle Size Analysis of Soils By ASTM D422

Sieve Data

Client Code: WESTN4 | ETR(s): 127612 | SDG: 127612

Date Rec: 15-Sep-08 | Start Date: 15-Sep-08 | End Date: 4-Oct-08

SET: 127612B

Dry prep = D421
Wet prep = D2217

Standard Values	
Sieve	Opening, um
3 inch	75000
2 inch	50000
1.5 inch	37500
1 inch	25000
3/4 inch	19000
3/8 inch	9500
#4	4750
#10	2000
#20	850
#40	425
#60	250
#80	180
#100	150
#200	75

Sieve (tares)		
Size	Mass, g	
3 inch		
2 inch		
1.5 inch		
1 inch		
3/4 inch		
3/8 inch	447.61	
#4	488.36	
#10	465.35	
#20	392.49	D
#40	356.68	D
#60	347.83	D
#80	336.55	D
#100	332.15	D
#200	324.24	D

Default SG 2.65

Test	1	2	3	4	5	6	7	8	9	10	11	12
Laboratory No	767586	767587	767588	767589	767590	767591	767592	767593	767594	767595	767596	767597
Sample ID	RBS-SED28	RBS-SED20	RBS-SED23	RBS-SED09	RBS-SED12	RBS-SED18	RBS-SED24	RBS-SED25	RBS-SED11	RBS-07	RBS-SED27	RBS-SED08
Sample Prep	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217	D2217
Pan, g												
Pan/sample, g	182.22	205.07	174.64	218.74	236.73	198.17	197.37	204.98	194.76	199.27	191.20	200.97
Pan/dry sample, g												
Hygroscopic Moisture correction factor (HMCF) for dry prep / Percent Solids for dry and wet prep												
Pan, g	4.04	4.22	4.27	4.06	4.17	0.99	4.28	1.02	4.01	4.01	4.18	4.07
Pan/sample, g	125.57	118.36	122.77	106.78	112.04	39.13	91.59	28.19	129.03	129.74	130.30	141.80
Pan/dry sample, g	99.91	91.15	93.82	91.93	99.77	26.71	72.28	21.84	105.51	118.28	104.91	107.52
HMCF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Description of >#10 particles												
Non-soil material	shell	shell	shell	shell	shell	shell	shell	shell	shell	shell	shell	shell
Shape	subangular	rounded	subangular	rounded	rounded	subrounded	subangular	n/a	subrounded	subrounded	rounded	subrounded
Hardness	hard	hard	hard	hard	hard	hard	hard	n/a	hard	hard	hard	hard
Sample % Solids	78.9%	76.1%	75.6%	85.5%	88.6%	67.4%	77.9%	76.6%	81.2%	90.9%	79.9%	75.1%
Dry sample wt, g	143.75	156.16	131.97	185.41	209.80	133.64	153.72	157.07	158.12	181.11	152.71	150.95
Sieve + Sample Weights												
Size	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g	Mass, g
3 inch												
2 inch												
1.5 inch												
1 inch												
3/4 inch												
3/8 inch		471.01		465.02	467.28		449.99		452.49	460.23		
#4	488.71	485.02	489.80	506.25	528.92	488.85	489.72		492.88	511.87	488.96	
#10	467.17	471.72	465.98	471.67	507.29	465.64	468.48	465.39	475.10	506.22	465.62	465.38
#20	395.91	396.44	393.03	397.93	412.70	393.35	393.75	392.57	403.50	429.34	393.29	392.73
#40	356.11	361.91	358.91	361.14	384.26	359.93	361.61	358.69	364.99	376.58	359.15	362.00
#60	346.19	374.21	378.60	420.71	386.14	380.69	380.94	374.62	376.75	371.05	435.28	401.27
#80	369.85	368.28	378.52	388.25	358.11	386.55	380.10	370.85	367.61	361.77	378.53	378.60
#100	350.48	350.43	358.51	339.29	346.51	359.10	360.07	358.51	353.03	338.70	340.03	351.11
#200	350.33	344.89	351.99	329.31	341.84	374.31	356.66	382.29	356.50	326.77	326.75	348.60
Maximum Particle size	9.5 mm	19 mm	9.5 mm	19 mm	19 mm	9.5 mm	19 mm	Crs sand	19 mm	19 mm	9.5 mm	Crs sand
Specific gravity	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650
Sample Mass Parameters												
Sample Mass >#10, g	2.17	36.43	2.07	41.62	102.15	0.98	6.87	0.04	19.25	77.00	0.87	0.03
Sample mass <#10, g	141.58	119.73	129.90	143.79	107.65	132.66	146.85	157.03	138.87	104.11	151.84	150.92

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sample Handling

(180)

FedEx Express US Airbill

FedEx Tracking Number 8541 0029 6897

Form ID No. 0200

1 From

Date 9/12/08 [redacted]

Sender's Name Scott Snyder Phone 732-417-5800

Company Weston Solutions Inc

Address 205 Campus Dr Dept./Floor/Suite/Room

City Edison State NJ ZIP 08837

2 Your Internal Billing Reference

3 To

Recipient's Name Kirk Young Phone 802-660-1990

Company Test America Labs

Recipient's Address 30 Community Dr. Stall Dept./Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here

City South Burlington State VT ZIP 05403

8541 0029 6897

4a Express Package Service To add SATURDAY Delivery, see Section 6. *Packages up to 150 lb.* * To most locations

- [x] FedEx Priority Overnight — Next business morning *
- [ ] FedEx Standard Overnight — Next business afternoon.*
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.*
- [ ] FedEx 2Day — Second business day.*
- [ ] FedEx Express Saver — Third business day.*

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service To add SATURDAY Delivery, see Section 6. *Packages over 150 lb.* ** To most locations

- [ ] FedEx 1Day Freight* — Next business day**
- [ ] FedEx 2Day Freight — Second business day.**
- [ ] FedEx 3Day Freight — Third business day**

* Call for Confirmation:

5 Packaging * Declared value limit $500

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak
- [ ] FedEx Box
- [ ] FedEx Tube
- [x] Other

6 Special Handling Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location — Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry ice: ft. UN 1845 ____ x ____ kg
- [ ] Cargo Aircraft Only

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No. [ ]

- [x] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

[redacted]

Total Packages	Total Weight	Total Declared Value†	Total Charges
3	10	$ .00	Credit Card Auth.

Your liability is limited to $100 unless you declare a higher value. See back for details.

8 *NEW* Residential Delivery Signature Options If you require a signature, check Direct or Indirect

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. Fee applies.
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. Fee applies.

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9/15/08 0945

FedEx 0002/0002 MON - 15 SEP AA
PRIORITY OVERNIGHT

MPS# 0681 7955 1953 0567
Mstr# 8541 0029 6897 0200

KU BTVA

05403
VT-US
BTV

emp# 242637 12SEP08 17:10

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TestAmerica Burlington
SAMPLE RECEIPT & LOG IN CHECKLIST

Client:	WESTN4	Date Received:	9/15/08	Log In Date:	9/15/08
ETR:	127612	Time Received:	0945	By:	JEG
SDG:	127612	Received By:	JEG	Signature:	
Project:	28000	# Coolers Received:	2	PM Signature:	
Samples Delivered By: X Shipping Service ☐ Courier ☐ Hand ☐ Other (specify)				Date:	09/17/08
List Air bill Number(s) or Attach a photocopy of the Air Bill:					

COOLER SCREEN	YES	NO	NA	COMMENTS
There is no evidence to indicate tampering	X			
Custody seals are present and intact	X			
Custody seal numbers are present		X		
If yes, list custody seal numbers:				

Thermal Preservation Type: ☐ Wet Ice ☐ Blue Ice X None ☐ Other (specify)

IR Gun ID: 96 Correction Factor (CF) = -1 °C

Cooler 1:	24.8 °C	Cooler 6	°C	Cooler 11	°C	Cooler 16	°C
Cooler 2:	24.6 °C	Cooler 7	°C	Cooler 12	°C	Cooler 17	°C
Cooler 3:	°C	Cooler 8	°C	Cooler 13	°C	Cooler 18	°C
Cooler 4:	°C	Cooler 9	°C	Cooler 14	°C	Cooler 19	°C
Cooler 5	°C	Cooler 10	°C	Cooler 15	°C	Cooler 20	°C

Unless otherwise documented, the recorded temperature readings are adjusted readings to account for the CF of the IR Gun

EPA Criteria: 0-6°C, except for air and geo samples which should be at ambient temperature and tissue samples, which may be frozen.

Some clients require thermal preservation criteria of 2-4°C or other such criteria. The PM must notify SM when alternate criteria is specified.

SAMPLE CONDITION	YES	NO	NA	COMMENTS
Sample containers were received intact	X			See below
Legible sample labels are affixed to each container	X			

CHAIN OF CUSTODY (COC)	YES	NO	NA	COMMENTS
COC is present and includes the following information for each container:				
• Sample ID / Sample Description	X			
• Date of Sample Collection	X			
• Time of Sample Collection	X			
• Identification of the Sampler		X		
• Preservation Type			X	
• Requested Tests Method(s)	X			
• Necessary Signatures	X			
Internal Chain of Custody (ICOC) Required		X		
If yes to above, ICOC Record initiated for every Worksheet			X	

SAMPLE INTEGRITY / USABILITY	YES	NO	NA	COMMENTS
The sample container matches the COC		X		See below
Appropriate sample containers were received for the tests requested	X			
Samples were received within holding time	X			
Sufficient amount of sample is provided for requested analyses	X			
VOA vials do not have headspace or a bubble >6mm (1/4" diameter)			X	
Appropriate preservatives were used for the tests requested			X	
pH of inorganic samples checked and is within method specification			X	
If no, attach Inorganic Sample pH Adjustment Form			X	

ANOMALY / NCR SUMMARY

Sample RBS-SED87 and RBS-SED88 were not listed on the COC. Multiple samples missing a charactor (-), logged samples in with missing charactor.

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Table 5
Grain Size Distribution Results- Sediment Samples
September 10-16, 2008
Raritan Bay Slag

Field Sample ID	RBS-SED01	RBS-SED02	RBS-SED04	RBS-SED05	RBS-SED06	RBS-SED07	RBS-SED08	RBS-SED09	RBS-SED10	RBS-SED11
Comment										
Soil Classification	Percent of Total Sample									
Gravel	1.0	25.8	12.8	5.5	49.7	19.9	5.6	19.0	9.5	6.0
Sand	96.8	71.3	83.2	82.5	48.6	78.5	93.2	79.3	87.7	90.1
Coarse Sand	1.8	7.8	1.8	4.8	8.9	22.6	1.4	3.4	8.3	6.2
Medium Sand	17.8	9.3	3.2	5.7	9.8	30.8	6.2	16.1	15.8	12.2
Fine Sand	77.2	54.3	78.1	72.0	29.9	25.1	85.5	59.7	63.5	71.7
Silt	1.3	1.8	2.9	9.5	0.8	1.7	0.6	1.0	1.5	2.1
Clay	1.0	1.0	1.1	2.6	0.9	0.0	0.6	0.7	1.3	1.9

Field Sample ID	RBS-SED12	RBS-SED13	RBS-SED14	RBS-SED15	RBS-SED16	RBS-SED17	RBS-SED18	RBS-SED19	RBS-SED20	RBS-SED21
Comment										
Soil Classification	Percent of Total Sample									
Gravel	28.7	21.2	38.1	40.2	27.8	20.7	0.4	6.4	19.3	4.1
Sand	66.1	77.1	60.2	57.8	67.1	72.0	92.8	87.5	72.0	91.2
Coarse Sand	20.0	4.2	4.7	11.6	11.8	8.8	0.4	8.2	4.1	0.9
Medium Sand	13.3	14.4	8.0	5.6	10.2	4.2	2.6	7.1	5.9	4.8
Fine Sand	32.8	58.5	47.4	40.6	45.1	58.9	89.9	72.2	62.0	85.4
Silt	5.0	1.2	0.8	1.2	3.8	6.3	4.6	4.9	3.3	3.5
Clay	0.3	0.5	0.9	0.9	1.3	1.0	2.2	1.3	5.5	1.2

Field Sample ID	RBS-SED23	RBS-SED24	RBS-SED25	RBS-SED26	RBS-SED27	RBS-SED28	RBS-SED29	RBS-SED30	RBS-SED31	RBS-SED32
Comment										
Soil Classification	Percent of Total Sample									
Gravel	1.1	2.4	0.0	0.2	2.4	0.0	12.9	23.4	0.0	0.7
Sand	94.0	95.4	94.0	97.9	96.9	98.5	81.0	74.1	94.3	92.7
Coarse Sand	0.5	2.0	0.0	1.3	3.8	0.3	3.3	12.0	0.1	0.2
Medium Sand	2.1	4.0	1.3	8.9	15.4	1.9	3.6	39.2	1.5	1.5
Fine Sand	91.4	89.3	92.6	87.7	77.7	96.3	74.1	22.9	92.8	91.0
Silt	3.3	0.8	4.7	0.9	1.0	1.2	4.7	2.7	5.4	4.7
Clay	1.6	1.4	1.4	0.9	0.0	0.3	1.4	0.0	0.3	1.8

Field Sample ID	RBS-SED33	RBS-SED34	RBS-SED35	RBS-SED36	RBS-SED37	RBS-SED38	RBS-SED39	RBS-SED40	RBS-SED41	RBS-SED42
Comment										
Soil Classification	Percent of Total Sample									
Gravel	26.3	1.5	1.1	4.0	21.0	0.8	39.2	12.2	17.3	0.7
Sand	71.7	96.4	91.6	94.9	78.4	97.8	60.3	85.6	82.3	96.7
Coarse Sand	16.2	0.1	0.2	8.3	14.5	4.9	7.5	2.8	9.5	2.0
Medium Sand	27.7	2.0	1.8	42.5	35.2	50.4	19.9	18.4	25.9	47.1
Fine Sand	27.8	94.3	89.5	44.1	28.7	42.5	33.0	64.4	47.0	47.5
Silt	1.8	1.3	6.0	0.9	0.3	0.6	0.2	1.5	0.1	2.4
Clay	0.2	0.8	1.4	0.3	0.3	0.8	0.2	0.7	0.3	0.3

Table 5
Grain Size Distribution Results- Sediment Samples
September 10-16, 2008
Raritan Bay Slag

Field Sample ID	RBS-SED44	RBS-SED45	RBS-SED46	RBS-SED47	RBS-SED48	RBS-SED49	RBS-SED50	RBS-SED51	RBS-SED52	RBS-SED53
Comment										
Soil Classification	Percent of Total Sample									
Gravel	16.6	15.0	23.0	15.9	5.9	21.0	2.1	20.0	2.1	8.2
Sand	81.1	84.0	73.6	82.7	93.0	77.4	96.7	79.7	95.2	37.7
Coarse Sand	6.9	12.9	4.6	15.5	5.9	13.1	1.4	8.1	2.0	2.3
Medium Sand	19.2	46.2	13.6	54.5	25.4	26.3	8.4	31.8	10.9	2.7
Fine Sand	55.0	24.8	55.4	12.7	61.7	38.0	86.8	39.8	82.3	32.7
Silt	1.5	0.4	3.7	0.8	0.3	1.0	1.0	0.2	2.0	49.4
Clay	0.8	0.6	-0.3	0.7	0.8	0.6	0.3	0.1	0.7	4.7

Field Sample ID	RBS-SED54	RBS-SED55	RBS-SED56	RBS-SED57	RBS-SED58	RBS-SED59	RBS-SED60	RBS-SED61	RBS-SED62	RBS-SED64
Comment										
Soil Classification	Percent of Total Sample									
Gravel	7.0	5.7	0.0	0.0	0.0	0.0	6.6	22.1	1.7	30.2
Sand	34.7	86.4	56.3	64.6	90.2	57.7	80.1	69.8	46.5	65.7
Coarse Sand	4.2	2.7	37.2	1.4	1.9	3.0	0.3	7.5	0.1	6.1
Medium Sand	5.6	6.7	1.8	2.8	1.8	1.1	0.6	0.9	11.0	9.6
Fine Sand	24.9	77.0	17.4	60.5	8605.0	53.7	79.1	61.4	35.5	50.1
Silt	54.1	4.4	32.1	32.3	6.9	38.1	10.3	6.0	49.9	2.1
Clay	4.1	3.6	11.6	3.1	2.9	4.2	3.0	2.2	1.8	2.1

Field Sample ID	RBS-SED65	RBS-SED66	RBS-SED67	RBS-SED68	RBS-SED69	RBS-SED70	RBS-SED71	RBS-SED72	RBS-SED73	RBS-SED74
Comment										
Soil Classification	Percent of Total Sample									
Gravel	31.6	0.0	53.2	0.0	2.7	5.2	0.2	4.4	1.3	8.5
Sand	65.2	55.7	16.3	86.9	94.9	93.1	96.7	94.5	80.2	90.2
Coarse Sand	5.0	0.2	11.4	2.1	1.9	6.9	0.5	11.8	2.1	21.2
Medium Sand	13.1	15.1	1.9	4.3	1.7	11.1	0.6	43.4	1.7	43.2
Fine Sand	47.1	40.4	3.1	80.5	91.3	75.0	95.6	39.3	76.4	25.8
Silt	3.2	44.3	13.1	8.1	1.7	0.6	1.3	0.5	15.3	1.2
Clay	0.0	0.0	17.4	5.1	0.7	1.1	1.8	0.6	3.2	0.1

Field Sample ID	RBS-SED81	RBS-SED82	RBS-SED83	RBS-SED84	RBS-SED85	RBS-SED86	RBS-SED87	RBS-SED88	RBS-SED89	RBS-SED90
Comment										
Soil Classification	Percent of Total Sample									
Gravel	0.0	1.7	0.0	3.9	4.1	19.4	0.4	0.0	32.6	51.8
Sand	98.6	92.9	97.3	94.9	93.1	79.5	98.9	95.7	63.7	45.8
Coarse Sand	0.4	0.1	0.2	3.6	1.5	1.9	0.2	0.0	26.7	20.8
Medium Sand	4.0	1.0	1.3	24.6	10.5	9.0	8.0	3.7	27.6	16.1
Fine Sand	94.3	91.8	95.9	66.7	81.1	68.6	90.6	92.0	9.4	8.9
Silt	1.1	4.5	1.9	0.6	2.1	0.4	0.4	2.9	2.4	1.1
Clay	0.3	0.9	0.9	0.7	0.7	0.7	0.4	1.4	1.3	1.3

Note- RBS-SED84, RBS-SED85, and RBS-SED86 are incorrectly marked on the chain as RBS-SED81, RBS-SED82, and RBS-SED83.

REFERENCE 27

Chart: 12324 Edition: 33 Edition Date: 3/1/2008 Clear Dates: NM - 12/27/2008 LNM

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

RACING BUOYS

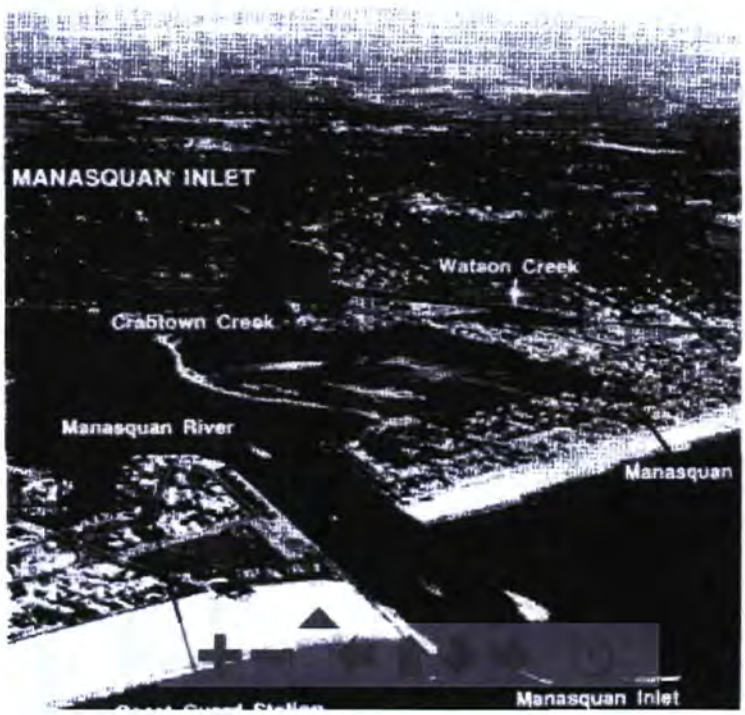
Racing buoys within the limits of this chart are not shown hereon. Information may be obtained from the U.S. Coast Guard District Offices as racing and other private buoys are not all listed in the U.S. Coast Guard Light List.

WARNING

The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

NAUTICAL CHART 12324
INTRACOASTAL WATERWAY

NEW JERSEY
SANDY HOOK TO LITTLE EGG HARBOR



- **Click the +/- buttons and drag the slider tool (solid triangle) to zoom in and out.**
- **Click the arrow buttons to pan left/right and up/down.**
- **Drag the navigation box in the upper left hand corner to move around the chart image.**

This chart display or derived product can be used as a planning or analysis tool and may not be used as a na

NOTE: Use the official, full scale NOAA nautical chart for real navigation whenever possible. These are ava

nautical chart sales agents. Screen captures of the on-line viewable charts available here do NOT fulfill chai regulated commercial vessels under Titles 33 and 46 of the Code of Federal Regulations.

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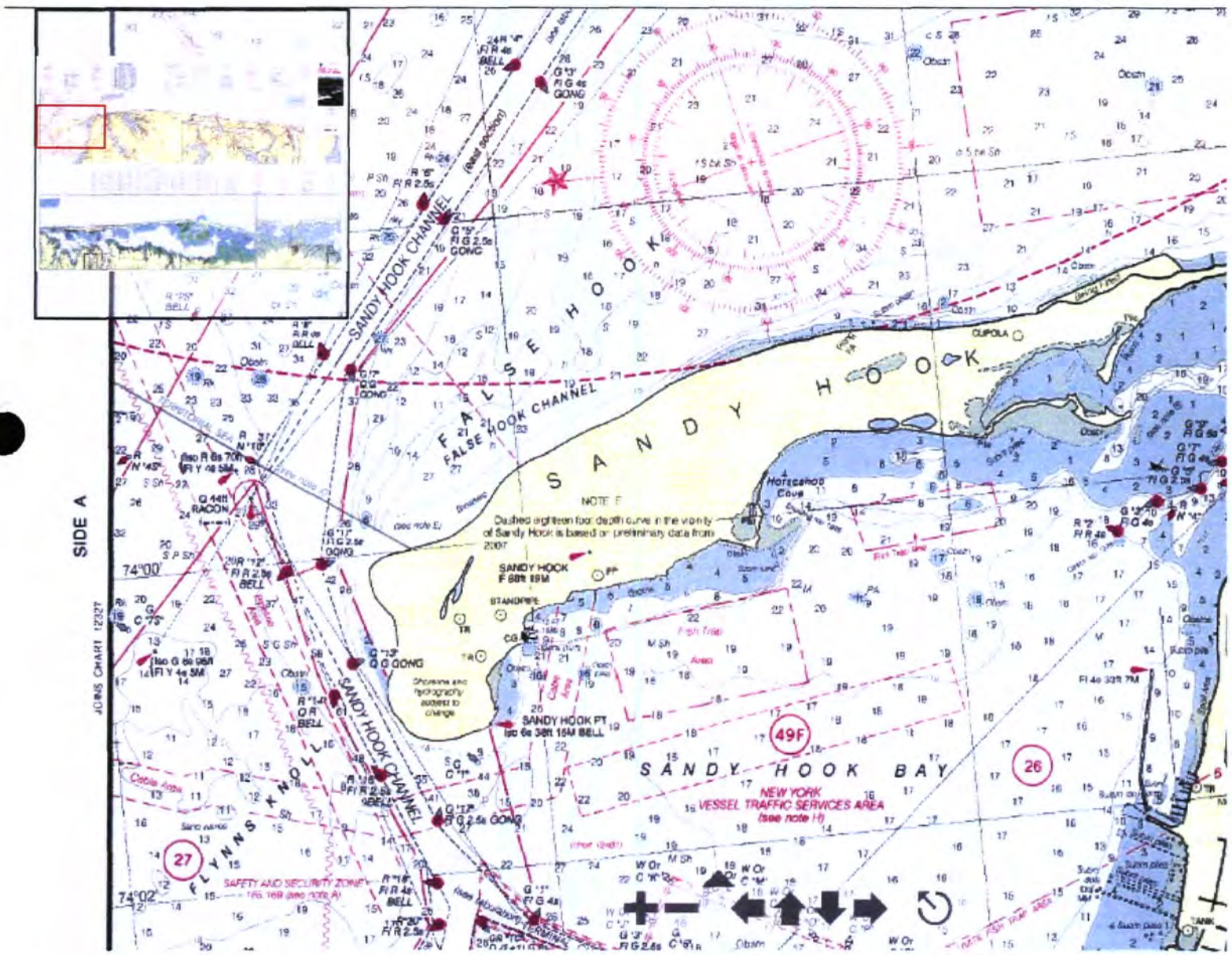
Chart: 12324 Edition: 33 Edition Date: 3/1/2008 Clear Dates: NM - 12/27/2008 LNM



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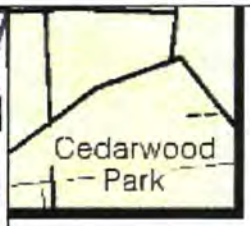

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

CAUTION

Improved channels shown by broken lines are subject to shoaling, particularly at the edges.

WARNING

The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

NEW JERSEY INTRACOASTAL WATERWAY

TABULATED FROM SURVEYS BY THE CORPS OF ENGINEERS REPORT OF NOV 1999 AND SURVEYS TO JUL 2001

CONTROLLING DEPTHS FROM SEAWARD IN FEET AT MEAN LOWER LOW WATER (MLLW)

- **Click the +/- buttons and drag the slider tool (solid triangle) to zoom in and out.**
- **Click the arrow buttons to pan left/right and up/down.**
- **Drag the navigation box in the upper left hand corner to move around the chart image.**

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6

REFERENCE 28

WESTON SOLUTIONS, INC.
SITE ASSESSMENT TEAM 2
PROJECT NOTE

TO: Raritan Bay Slag File
FROM: Dennis J. Foerter, CHMM
DATE: 6 January 2009

SUBJECT: Qualified Data - Raritan Bay Slag

With regard to qualified lead data (i.e., J value) for the sediment samples collected from Raritan Bay in September 2008, reasons for qualified data and associated biases (based on reasons for concentrations being qualified as estimated) were discussed with Yunru Yang, a data validation specialist with Weston Solutions, Inc.

The following reasons and associated biases were discussed:

1. *Reason for J value:* Matrix Spike - Matrix spike recovery was outside control limits of 75-125% (between 10-74) when sample concentration was less than 4 x spike concentrations. *Bias:* If recovery was lower than the lower end of the control limit, than the sample concentration is biased **Low**. If the recovery is over the high end of the control limit, than the sample concentration is biased **High**. All results used in scoring an observed release to surface water were had recoveries above the high end of the control limit.

2. *Reason for J value:* ICP Serial Dilution - ICP serial dilution analysis yielded percent differences greater than 10 but less than 100 and greater than 100 or equal to 100% when the initial concentration was equal to or greater than 50 x MDL. *Bias*: **Unknown**

3. *Reason for J value:* Percent Solids of Sediments - Percent solids in samples is less than 50%. *Bias:* **Low for the Soil matrix**

4. *Reason for J value:* Lab Duplicate - the RPD between sample and duplicate results was greater than or equal to 35% but less than 120% when both sample and duplicate results were greater than 5 x CRQL. *Bias:* **Unknown**

The attached table outlines the qualified samples (background and release) used in establishing an observed release of lead to surface water associated with the Laurence Harbor Seawall and the western jetty of the Cheesequake Creek Inlet.

Signature/Date Dennis J Foerter 1/6/09

Qualified Sediment Data – Raritan Bay Slag

Source 1: Laurence Harbor Seawall					
Sample No.	Type of Sample	Reason # for J Value (from p. 1)*	Estimated concentration**	Bias	Adjusted concentration (if necessary)***
SED01	Background	1	9.2 J	High	9.2
SED02	Background	1	7.3 J	High	7.3
SED13	Background	1	11.5	High	11.5
SED04	Release	1	60.9 J	High	42.3
SED05	Release	1	135 J	High	93.75
SED06	Release	1	252 J	High	175
SED16	Release	1	107 J	High	74.3
SED22	Release	2, 4	53.6 J	Unknown	37.2
SED23	Release	2, 4	90.7 J	Unknown	63
SED24	Release	2, 4	79.4 J	Unknown	55.1
SED25	Release	2, 4	458 J	Unknown	318
SED26	Release	2, 4	525 J	Unknown	364.6
SED87	Release	2, 4	1,100 J	Unknown	763.9
SED88	Release	2, 4	1,440 J	Unknown	1,000
Source 2: Western Jetty of Cheesequake Creek Inlet					
Sample No.	Type of Sample	Reason # for J Value (from p. 1)	Estimated concentration	Bias	Adjusted concentration (if necessary)
SED56	Release	3	1,770 J	Low	1,770
SED59	Release	3	251 J	Low	174.3

Notes:

* - Reasons for qualification located in Inorganic Data Review Narratives located in References 22 through 25 of this Documentation Record

** - Concentrations obtained from Form I's located in References 22 through 25 of this Documentation Record

*** - Adjusted concentrations in accordance with Quick Reference Fact Sheet titled "Using Qualified Data to Document an Observed Release and Observed Contamination", EPA 540-F-94-028, OSWER 9285.7-14FS, PB94-963311, November 1996.

REFERENCE 29

United States
Environmental Protection
Agency

Solid Waste and
Emergency Response

EPA 540-F-94-028
OSWER 9285.7-14FS
PB94-963311
November 1996

Using Qualified Data to Document an Observed Release and Observed Contamination

Office of Emergency and Remedial Response (5204G)

Quick Reference Fact Sheet

This fact sheet discusses the use of the U.S. Environmental Protection Agency's (EPA) Contract Laboratory Program (CLP) data and other sources of data qualified with a "J", "U", or "UJ" qualified or flag. This guidance provides a management decision tool for the optional use of qualified data to document all observed release and observed contamination by chemical analysis under EPA's Hazard Ranking System (HRS). The analyte and sample matrix (i.e., soil or water) specific adjustment factors given in this fact sheet allow biased CLP and non-CLP data to be adjusted to meet the HRS criteria documenting an observed release and observed contamination with data that are of known and documented quality. This fact sheet does not address using qualified data for identifying hazardous substances in a source.

INTRODUCTION

The EPA established the HRS to rank hazardous waste sites for National Priorities List (NPL) purposes under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). This fact sheet was developed in response to a need to determine the usability of qualified data for site assessment and HRS scoring purposes. This fact sheet illustrates that qualified data are often of sufficiently known and documented quality, and may be used in establishing an observed release and observed contamination. This fact sheet explains rationale for why some qualified data may be used for HRS purposes; presents the background information needed to use qualified data, with and without adjustment factors; provides examples of qualified data use, and discusses issues raised during the development of the adjustment factor approach.

Under the HRS, chemical analytical data we are often used to demonstrate an observed release and observed contamination when the release sample concentration is three times the background concentration and background levels are greater than or equal to the appropriate detection limit; or if the release sample concentration is greater than or equal to the appropriate quantitation limit when background levels are below the appropriate detection limit. The release must also be at least partially attributable to the site under investigation *(Hazard Ranking System, Final Rule, 40* CFR Part 300, App. A). The data used to establish the release must be of known and documented quality. *(Hazard Ranking System Guidance Manual,* Interim Final, November 1992, OSWER Directive 9345.1-07). Data that cannot be validated may not be of known and documented quality. For more information on observed release and observed contamination, refer to the fact sheets: *Establishing an Observed Release,* September 1995, PB94-963314; *Establishing Areas of Observed Contamination.* September 1995, PB94-963312; and *Establishing Background Levels,* September 1995, PB94-963313. The factor of three represents the minimum difference in sample results that demonstrate an increase in contaminant concentration above background levels, with reasonable confidence.

Although much of the analytical data used for identifying an observed release is generated under EPA's CLP, this fact sheet applies to all data regardless of the source of the data (non-CLP data). EPA procedures require that

CLP analytical data be reviewed, or validated by EPA or third party reviewers, to ensure the data are of known and documented quality and that the determination be discussed in a data validation report that accompanies the analytical results. Based on this data validation, CLP data are classified into three categories: (1) data for which all quality control (QC) requirements have passed contract required acceptance criteria, (2) data for which at least one QC requirement has not met acceptance criteria; and (3) data for which most or all QC requirements have not met acceptance criteria. Data in the first category typically are not qualified. Data in the second category are often qualified with a "J" qualifier and, as discussed in this fact sheet, are usually usable for HRS purposes. Data in the third category are usually qualified by an "R" qualifier and are not usable for HRS purposes.

Whether data are placed into the second or third category is determined by the amount of bias associated with. the analytical results. Data validation evaluates biases resulting from laboratory analytical deficiencies or sample matrices to determine whether the data are usable. Bias indicates that the reported concentration is either higher or lower than the am concentration, and the data validation report identifies the direction of the bias or if the bias is unknown.

The EPA CLP also sets minimum quantitation limits for all analytes; the Contract Required Quantitation Limit (CRQL) for organic analytes and the Contract Required Detection Limit (CRDL) for inorganic analytes. For HRS purposes and for this fact sheet, the term CRQL refers to both the contract required quantitation limit and am contract required detection limit. (40 CFR Part 300, App. A). The CRQLs are substance specific levels that a CLP laboratory must be able to routinely and reliably detection specific sample matrices (i.e.; soil, water. sediment). The CRQLs are usually set above most instrument detection limits (IDLs) and method detection limits (MDLs).

CONSIDERATIONS FOR NON-CLP DATA

Because various laboratories and analytical methods may be used to develop non-CLP data, the following list provides the general information, sufficient for determining whether non-CLP data are usable for HRS Purposes.

(1) Identification of the method used for analysis. Methods include RCRA methods, SW-846, EPA methods, etc.

(2) Quality control (QC) data. Check each method of analysis to determine if specific QC requirements are defined. If not, seek out another method.

(3) Instrument-generated data sheets for sample results. These data sheets would be the equivalent of Form I's in CLP data.

(4) MDLs and sample quantitation limits (SQLs). The analytical method should provide the MDL. The SQL is an adjusted MDL using sample specific measurements such as percent moisture and weight.

(5) Data validation report.

USE OF BIASED QUALIFIED DATA

In the past, all qualified data have been inappropriately perceived by some people as data of low confidence or poor quality and have not been used for HRS evaluation. With careful assessment of the nature of the analytical biases or QC deficiencies in the data on a case-by-case basis, qualified data can represent an additional resource of data for establishing an observed release. Further, the D.C. District Court of Appeals in 1996 upheld EPA's case-by-case approach to assess data quality. In reviewing the use of qualified data to identify an observed release, the Court stated that if there are deficiencies in the data, "...the appropriate response is to review the deficiencies an a 'case-by-case basis' to determine their impact on 'usability of the data.'" The Court also stated with regards to data quality that, "...EPA does not face a standard of absolute perfection .... Rather, it is statutorily required to 'assure, to the maximum extent *feasible*,' that it 'accurately assesses the relative degree of risk' posed by sites" [*Board of Regents of the University of Washington, et al., v. EPA,* No.95-1324, slip op. at 8-10 (D.C. Cir. June 25, 1996).]

As discussed in this fact sheet, the application of adjustment factors to "J" qualified data can serve as a management decision tool to "adjust," or take into account, the analytical uncertainty in the data indicated by the qualifier, thereby making qualified data usable for HRS evaluation. The use of adjustment factors to account for the larger uncertainty in "J" qualified data is a conservative approach enabling a quantitative comparison of the data for use in documenting an observed release. It should be noted that the use of

adjustment factors only addresses analytical variability and does not take into account variabilities which may be introduced during field sampling. Some guidelines for using the adjustment factor approach are discussed in Exhibit 1.

CLP QA/QC PROCEDURES

CLP qualifiers are applied to analytical data based on the results of various Quality Assurance/Quality Control (QA/QC) procedures used at the laboratory. EPA analytical methods use a number of QA/QC mechanisms during sample analysis in order to assess qualitative and quantitative accuracy *(Contract Laboratory Program Statement of Work for Inorganic Analyses,* Document No. ILM02.0; *Contract Laboratory Program Statement of Work for Organic Analyses,* Document No. OLM1.8; *Quality Assurance/Quality Control Samples,* Environmental Response Team Quality Assurance Technical Information Bulletin; *Test Methods for Evaluating Solid Waste (SW-846): Physical and Chemical Methods,* Document No. SW-846). To assess data quality, the laboratory uses matrix spikes, matrix spike duplicates, laboratory control samples , surrogates, blanks, laboratory duplicates, and quarterly blind performance evaluation (PE) samples. The Agency assumes that if biases are found in the QA/QC samples, the field sample concentrations may also be biased.

Surrogates are chemically similar to the analytes of interest. They are added or "spiked" at a known concentration into the field samples before analysis. Also, selected target analytes are "spiked" into samples at a specified frequency to assess potential interferences from the sample matrix. These samples are called matrix spikes. Comparison of the known concentration of the surrogates and matnx spikes with their actual analytical results reflects the analytical accuracy. Because the surrogates are expected to behave similarly to the target analytes, they may indicate bias caused by interferences from the sample matrices. These type of interferences from the sample matrix are known as matrix effects *(CPL National Functional Guidelines for Inorganic Data Review,* Publication, 9240.1-05-01; *CLP National Functional Guidelines for Orgainic Data Review,* Publication 9240.1-05; *Test Methods for Evaluating Solid Waste (SW-846): Physical and Chemical Methods,* Document No. SW-846).

Laboratory control samples are zero blind samples which contain known concentrations of specific analytes and are analyzed in the same batch as field samples. Their results are used to measure laboratory accuracy. Blanks are analyzed to detect any extraneous contamination introduced either in the field or in the laboratory.

Laboratory duplicates are created when one sample undergoes two separate analyses. The duplicate results are compared to determine laboratory precision. Quarterly blind PE samples are single blind samples that evaluate the laboratory's capability of performing the specified analytical protocol.

CLP and other EPA analytical methods include specifications for acceptable analyte identification, target analytes, and minimum and maximum percent recovery of the QA/QC compounds. Data are validated according to guidelines which set performance criteria for instrument calibration, analyte identification, and identification and recovery of QA/QC compounds *(CLP Statement of Work and SW-846).* The *National Functional Guidelines for Data R*eview, EPA validation, was designed for the assessment of data generated under the CLP organic and inorganic analytical protocols *(CLP Statement of Work; National Functional Guidelines for Data Review).* The guidelines do not preclude the validation of field and other non CLP data. Thus, many EPA Regions have also adapted the *National Functional Guidelines for Data Review* to validate non-CLP data. Data which do not meet the guidelines' performance criteria are qualified to indicate bias or QA/QC deficiencies. The data validation report usually explains why the data were qualified and indicates the bias direction when it can be determined. Validated data that are not qualified are considered unbiased and can be used at their reported numerical value for HRS evaluation.

QUALIFIER DEFINITIONS

Most EPA validation guidelines use the data qualifiers presented in Exhibit 2 *(CLP National Functional Guidelines for Data Review).* Other qualifiers besides these may be used; the validation report should always be checked for the exact list of qualifiers and their meanings.

It should be emphasized that not meeting one or some of the contract required QA/QC acceptance criteria is often an indication that the sample was difficult to analyze, not that there is low confidence in the analysis (i.e., the

EXHIBIT 1 GUIDELINES FOR THE USE OF ADJUSTMENT FACTORS	
!	The use of adjustment factors identified in this fact sheet is a management tool for the optional use of "J" qualified data generated under CLP or other sources of data to document an observed release.
!	Adjustment qualified data should be used with non-qualified data whenever possible.
!	EPA maintains a "worst sites first" policy for placing sites on the NPL (*Additional Guidance on "Worst Sites" and "NPL Caliber Sites" to assist in SACM Implementation,* OSWER Directive 9320.2-07).
!	EPA Regions should use adjustment factors with discretion on a case-by-case basis and should always carefully consider the use of qualified data in borderline cases.
!	Resampling and/or reanalysis may be warranted if qualified data do not appear adequate to document an observed release.
!	EPA Regions may substitute higher adjustment factors based on documented, justifiable reasons but may never use a lower adjustment factor value.
!	The adjustment factors should only be applied to analytes listed in the tables. These adjustment factors should not be interpolated or extrapolated to develop factors for analytes not listed in the tables.
!	The adjustment factors apply only to "J" qualified data above the CRQL.
!	Detection below the CRQL is treated as non-quantifiable for HRS purposes.
!	"UJ" data may be used under strict circumstances as explained in this fact sheet.
!	The adjustment factors only apply to biased "J" qualified data, not to other "J" qualified data.
!	The adjustment factors do not apply to "N", "NJ", or "R" qualified data. These data can not be used to document an observed release for HRS purposes.

analysis is "under control" and can be adequate for HRS decision making). Often "J", "U", and "UJ" qualified data fall into this category.

There are instances when qualified data cannot be used since the uncertainty of the results is unknown. For example, violations of laboratory instrument calibration and tuning requirements, and gross violations of holding times reflect the possibility that the results are of unknown quality (i.e., the analysis is "out of control"). Most often these data would be qualified with an "R" or an "N" (not usable for HRS purposes).

USING "U" QUALIFIED DATA

The "U" qualifier simply means that the reported concentration of the analyte was at or below the CRQL-- there can be confidence that the true concentration is at or below the quantitation limit. Therefore, "U" qualified data can be used for establishing background levels. If the release sample concentration is above this level, as specified in the HRS, an observed release can be established. The quantitation limit for that analyte could be used as a maximum background concentration if a more conservative background level seems appropriate.

USING "J" QUALIFIED DATA

As discussed previously, some "J" qualified data can be used in establishing an observed release if the uncertainty in the reported values is documented. Qualified data should always be carefully examined by the Regions to determine the reasons for qualification before use in HRS evaluation. Resampling and/or reanalysis may be warranted if qualified data only marginally document an observed release. Whenever possible, qualified data should be used in conjunction with non-qualified data.

As described in Exhibit 2, "J" qualified data indicates that bias has been detected in the sample analysis and although the analyte is definitively present, the reported concentration is an estimate. Depending on the reasons and the direction of bias, with the use of adjustment factors, "J" qualified data can represent data of known and documented quality sufficient for use in establishing an observed release and observed contamination under the HRS.

USING "UJ" QUALIFIED DATA

A combination of the "U" and "J" qualifiers indicates that the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample. Under limited conditions, "UJ" qualified data can be used to represent background concentrations for establishing an observed release. These conditions are: instances when there is confidence that the background concentration is not detectable above the CRQL, the background concentration is biased high, and the sample measurement establishing the observed release equals or exceeds the CRQL.

DIRECTION OF BIAS IN "J" QUALIFIED DATA

It is important to understand the direction of bias associated with "J" qualified data before using the data to document an observed release. Qualified data may have high, low, or unknown bias. A low bias means that the reported concentration is likely an underestimate of the true concentration. For example, data may be biased low when sample holding times for volatile organic compounds (VOCs) are moderately exceeded or when recovery of QA/QC compounds is significantly less than the amount introduced into the sample. Low surrogate recovery would also indicate a low bias. A high bias means the reported concentration, is likely an overestimate of the true concentration. For example, data may be biased high when recovery of QA/QC compounds is significantly higher than the amount in the sample. A bias is unknown when it is impossible to ascertain whether the concentration is an overestimate or an underestimate. For example, an unknown bias could result when surrogate recoveries exceed method recovery criteria and matrix spike/matrix spike duplicate compounds below method recovery criteria fail the relative percent difference (RPD) criteria in the same sample.

Despite the bias, certain qualified data may be used without application of adjustment factors for determining an observed release under certain circumstances. The following examples are of using "J" qualified data without adjustment factors:

- Low bias release samples are likely to be underestimates of true concentrations. If the reported concentration of a low bias release sample is three times above unbiased background levels, these release samples would still meet the HRS criteria. The true concentrations would still be three times above the background level.

- High bias background samples are likely to be overestimates of true concentrations. If the reported concentration of unbiased release samples are three times above the reported background concentration, they would still meet the HRS observed release criteria because they would still be three times above the true background concentration.

The above examples show that both low bias "J" qualified release samples at their reported concentrations and high bias "J" qualified background samples may be used at their reported concentrations in these situations.

High bias release samples may not be used at their reported concentrations because they are an overestimate of true concentrations in this situation; resampling and/or re-analysis of the release samples should be considered. The true difference in the background and release concentration may be less than the HRS criteria for establishing an observed release. The reported concentration for low bias background concentrations may not be compared to release samples because it is most likely an underestimate of background level; the release sample concentration may not significantly exceed the true background concentration. However, in lieu of re-sampling and/or re-analysis, high bias release data and low bias background data may be used with adjustment factors which compensate for the probable uncertainty in the analyses.

ADJUSTMENT FACTORS FOR BIASED "J" QUALIFIED DATA

Applying adjustment factors to "J" qualified data will enable EPA to be more confident that the increase in contaminant concentrations between the background and

EXHIBIT 2
EPA CLP DATA QUALIFIERS AND THEIR USABILITY FOR DOCUMENTING AN OBSERVED RELEASE

Usable*	Not Usable
"U" The substance or analyte was analyzed for, but no quantifiable concentration was found at or above the CRQL *(CLP National Functional Guidelines for Data Review).*	**"N"** The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification" *(CLP National Functional Guidelines for Data Review).*
"J" The analyte was positively identified-the associated numerical value is the approximate concentration of the analyte in the sample. The "J" qualifier indicates that one or more QA/QC requirements have not met contact required acceptance criteria but the instrumentation was functioning properly during the analysis. For example, a "J" qualifier may indicate that the sample was difficult to analyze or that the value may lay near the low end of the linear range of the instrument. "J" data are considered biased, but provide definitive analyte identification *(CLP National Functional Guidelines for Data Review).*	**"R"** The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte can not be verified and the result has been rejected. A sample result may be qualified with an "R" qualifier when the instrument did not remain "in control" or the stability or sensitivity of the instrument were not maintained during the analysis *(CLP National Functional Guidelines for Data Review).*
"UJ" The analyte was not quantifiable at or above the CRQL. In addition to not being quantifiable, one or more QA/QC requirements have not met contract acceptance criteria *(CLP Functional Guidelines for Data Review).*	**"NJ"** The analysis indicates the presence of the analyte that has een "tentatively identified" and the associated numerical value represents it's approximate concentration (CLP *National Functional Guidelines for Data Review).*

* Usable under certain circumstances as explained in this fact sheet.

release samples is due to a release. The adjustment factors are applied as "safety factors" to compensate for analytical uncertainty, allowing biased data to be used for determining an observed release. Dividing the high bias result by an adjustment factor deflates it from the high end of the acceptable range towards a low bias value. Multiplying a low bias concentration by an adjustment factor inflates it to the high end of the acceptable range.

Tables 1 through 4 (pages 11 - 18) present analyte and matrix-specific adjustment factors to address the analytical uncertainty when determining an observed release using high bias release samples and low bias background data. The factors am derived from percent recoveries of matrix spikes, surrogates, and laboratory control samples in the CLP Analytical. Results Database (CARD) from January 1991 to March 1996. A total of 32,447 samples were reviewed for volatile organic analytes; 32,913 samples for semivolatile organic analytes; 59,508 samples for pesticides/PCB analytes; and 5,954 samples for inorganic analytes.

The range of CARD data for each analyte includes 97 percent of all percent recoveries in the database, discarding outliers. The adjustment factors are ratios of percent recovery values at the 98.5 and 1.5 percentiles. The ratios generally show a consistent pattern.

Adjustment factors have been determined for all analytes in the CLP Target Compound List (organic analytes) and Target Analyte List (inorganic analytes). A tiered approach was used to derive the organic adjustment factors. Percent recoveries for surrogates were

examined first, followed by matrix spike recoveries. When both matrix spike and surrogate data were available for the same analyte, the larger adjustment factor (representing more extreme high and low percent recoveries) was used. Laboratory control samples were used to calculate the inorganic adjustment factors. Quarterly blind sample data were not used to determine adjustment factors because of the small data set available. A default adjustment factor of 10 was used for analytes when percent recovery data were unavailable.

Adjustment factors do not correct the biased sample concentration to its true value, as such "correction" is not possible. CARD data do not differentiate and quantify individual sources of variation. Instead, the ratio of percentile used to develop adjustment factors represent a "worst-case" scenario. Adjustment factors either inflate background values to the high end of the range or deflate release data to the low end. Therefore, adjustment factors compensate or adjust for the apparent analytical variability when comparing a high bias value to a low bias value (see Exhibit 3).

USING THE ADJUSTMENT FACTORS

This section of the fact sheet demonstrates how adjustment factors can be used with "J" qualified data for HRS scoring purposes, including documentation and detection limit issues.

Documentation Requirements for Using Qualified Data

In using "J" qualified data to determine an observed release, include a discussion of "J" qualifiers from the data validation report and cite it as a reference in the site assessment report or HRS documentation record. If adjustment factors are applied to "J" qualified data, reference and cite this fact sheet. These steps will ensure that the direction of bias is documented and will demonstrate how biases have been adjusted.

Detection Limit Restrictions

Adjustment factors may only be applied to "J" qualified data with concentrations above the CLP CRQL for organics or CRDL for inorganics. "J" qualified data with concentrations below the CRQL can not be used to document an observed release except as specified in the previous section entitled "Using "UJ" Qualified Data."

Application of Factors

Exhibit 3 shows how to apply the factors to "J" qualified data. Multiply low bias background sample results by the analyte-specific adjustment factor or the default factor 10 when analyte-specific adjustment factor is not available. The resulting new background value effective becomes a high bias value that may be used to determine an observed release. Divide high bias release sample data by the analyte-specific adjustment factor or the default factor of 10 when an analyte-specific adjustment factor is not available. The resulting new release sample value effectively becomes a low bias value that may be used to determine an observed release.

Note: High bias background data, low bias release data, and unbiased data may be used at their reported concentrations.

Note: Adjusted release and background values must still meet HRS criteria (e.g., release concentration must be at, least three times above background level) to determine an observed release.

Examples Using Trichloroethene in Soil and Water

1. *Release water sample is unbiased, background water sample is unbiased but all data are qualified with a "J" due to an contractual laboratory error no: analytical error.*

Background sample value: 12• g/L (J) *no bias*
Release sample value: 40 • g/L (J) *no bias*

The CRQL for trichloroethene is 10 • g/Kg for soil and 10 • g/L for water.

In this example, the qualification of the data is not related to bias in the reported concentrations. Thus, using adjustment factors is not needed and an observed release is established if all other criteria are met.

2. *Release soil sample data is biased low, background soil sample data is biased high.*

Background sample value: 12 • g/Kg (J) high bias
Release sample value: 40 • g/Kg (J) low bias

In this example, the direction of bias indicates that the. true release value may be higher and the true background value may be lower than reported values. The release sample concentration still exceeds background by more than three times, so an observed release is established, provided all other HRS criteria are met. Using adjustment factors is not needed.

EXHIBIT 3 USE OF ADJUSTMENT FACTORS FOR "J" QUALIFIED DATA		
Type of Sample	**Type of Bias**	**Action Required**
Background Sample	No Bias	None: Use concentration without factor
	Low Bias	Multiply concentration by factor
	High Bias	None: Use concentration without factor
	Unknown Bias	Multiply concentration by factor
Release Sample	No Bias	None: Use concentration without factor
	Low Bias	None: Use concentration without factor
	High Bias	Divide concentration by factor
	Unknown Bias	Divide concentration by factor

3. *Release soil sample data is unbiased, background soil sample is biased low.*

Background sample value: 12 • g/Kg (J) *low bias*
Release sample value: 30 • g/Kg *no bias*

In this example, the true background value is assumed to be less than the reported value; however, an observed release may still be possible. To use the data to establish an observed release, multiply the background sample data value by the adjustment factor given for trichloroethene in soil (2.11). No adjustment factor is needed for the release sample.

New background sample value:
(12 • g/Kg) x (2.11) = 25.32 • g/Kg (J) *high bias*

The release sample concentration does not meet or exceed the new background level by three time, so an observed release is not established.

4. *Release water sample data is biased high, background water sample data is unbiased.*

Background sample value: 15 • g/L *no bias*
Release sample value: 70 • g/L (J) *high bias*

In this example, the true release value may be lower than the reported value; however, an observed release may still be possible. To use the data to establish an observed release divide the release sample by the adjustment factor for trichloroethene in water (1.66). No adjustment factor is needed for the background sample.

New release sample value:
(70 • g/L) ÷ (1.66) • 42.17 • g/L (J) *low bias*

The new release sample concentration does not meet or exceed the background level by three times, so an observed release is not established.

5. *Release soil sample data has unknown bias; background soil sample data has unknown bias.*

The following example is the most conservative approach to using adjustment factors with qualified data.

Background sample value: 20 • g/Kg (J) *unknown bias*
Release sample value: 325 • g/Kg (J) *unknown bias*

In this example, it is not possible to determine from the reported values if an observed release is possible. To use the data to establish an observed release, divide the release sample value and multiply the background sample value by the adjustment factor given for trichloroethene in soil (2.11).

New release sample value:
(325 • g/Kg) ÷ (2.11) = 154.03 • g/Kg (J) *low bias*

New background sample value:
(20 • g/Kg) x (2. 11) = 42.2 • g/Kg (J) *high bias*

The new release sample is at least three times the new background concentration, so an observed release is established, provided all other HRS criteria are met.

ISSUES WITH USING ADJUSTMENT FACTOR APPROACH

Some issues were raised regarding the application of adjustment factors to qualified data during the Agency's internal review process.

One issue is that "J" qualifiers are added to analytical results for many reasons that may or may not affect the accuracy and precision of the analytical result. The application of an adjustment factor to "J" qualified data in which bias is not affected could be considered overly conservative.

All qualified data should be carefully evaluated to determine if the data are biased. Based on the reasons for bias, the use of an adjustment factor should only be considered as a management tool that provides a quick screening of the data for site assessment, not a means for correcting the biased value to a true value. Application of adjustment factors are intended for use with qualified data reported at or above the CRQL and may not be applicable to data which are qualified but technically sound. As stated previously, qualified data should always be carefully reviewed on a case-by-case basis prior to use in HRS evaluation.

Another issue is the validity of "10" as a default adjustment factor. A default adjustment factor of 10 was a policy decision based on the range of adjustment factors and an industry approach. The default was chosen in order to account for the maximum variability regardless of the direction of the bias. Therefore, the default value of 10 is generally considered to be a conservative adjustment factor. EPA reviewed the use of the default value of 10 and determined that this value was conservative.

Even if using adjustment factors is sometimes overly conservative, this approach is preferable to not using the data at all. EPA maintains a "worst sites first" policy that only the sites considered most harmful to human health and/or the environment should be listed. EPA considers the use of adjustment factors appropriate as a management decision tool. However, discretion is needed when applying adjustment factors. The use of adjustment factors may not be appropriate in all cases.

USE OF OTHER ADJUSTMENT FACTORS

EPA Regions may substitute higher, but never lower, adjustment factor values for the ones listed in this fact sheet on a case-by-case basis when technically justified. For example, other adjustment factors may be applied to conform with site-specific Data Quality Objectives (DQOs) or with Regional Standard Operating Procedures (SOPs) *(Data Quality Objectives Process for Superfund, Publication 9355.9-01).*

SUMMARY

For site assessment purposes, EPA Regions should not automatically discard "J" qualified data. However, site-specific data usability determinations may result in the data's not being used.

Data qualified under the EPA's CLP or from other sources of validated data may be used to demonstrate an observed release if certain measures are taken to ensure that the bias of the data qualifier is adjusted using the factor approach specified in this fact sheet. (This fact sheet provides a management decision tool for making qualified data usable for documenting an observed release.) The analyte and matrix-specific adjustment factors provided in Tables 1 through 4 of this fact sheet present these adjustment factors.

The scope of this fact sheet is limited to the situations described in Exhibit 1. The use of qualified analytical data without the adjustment factors presented in this fact sheet is limited. Higher adjustment factors may be substituted by EPA Regions on a case-by-case basis when technically justified by site-specific DQOs or SOPS.

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TABLE 1 FACTORS FOR VOLATILE ORGANIC ANALYTES				
VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
1,1,1-TRICHLOROETHANE	---	10.0	---	10.0
1,1,2,2-TETRACHLOROETHANE	---	10.0	---	10.0
1,1,2-TRICHLOROETHANE	---	10.0	---	10.0
1,1-DICHLOROETHANE	---	10.0	---	10.0
1,1-DICHLOROETHENE	7,031	2.71	5,015	2.35
1,2-DICHLOROETHANE-D4	32,446	1.52	25,516	1.38
1,2-DICLOROETHENE (TOTAL)	---	10.0	---	10.0
1,2-DICHLOROPROPANE	---	10.0	---	10.0
2-BUTANONE	---	10.0	---	10.0
2-HEXANONE	---	10.0	---	10.0
4-METHYL-2-PENTANONE	---	10.0	---	10.0
ACETONE	---	10.0	---	10.0
BENZENE	7,024	1.97	5,001	1.64
BROMODICHLOROMETHANE	---	10.0	--	10.0
BROMOFORM	---	10.0	---	10.0
BROMOFLUOROBENZENE	32,444	1.7	25,518	1.26
BROMOMETHANE	---	10.0	---	10.0
CARBON DISULFIDE	---	10.0	---	10.0

TABLE 1 FACTORS FOR VOLATILE ORGANIC ANALYTES				
VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
CARBON TETRACHLORIDE	---	10.0	---	10.0
CHLOROBENZENE	7,018	2.0	5,015	1.54
CHLOROETHANE	---	10.0	---	10.0
CHLOROFORM	---	10.0	---	10.0
CHLOROMETHANE	---	10.0	---	10.0
CIS-1,3-DICHLOROPROPENE	---	10.0	---	10.0
DIBROMOCHLOROMETHANE	---	10.0	---	10.0
ETHYLBENZENE	---	10.0	---	10.0
METHYLENE CHLORIDE	---	10.0	---	10.0
STYRENE	---	10.0	---	10.0
TETRACHLOROETHENE	---	10.0	---	10.0
TOLUENE-D8	32,447	1.63	25,526	1.21
TRANS-1,3-DICHLOROPROPENE	---	10.0	---	10.0
TRICHLOROETHENE	6,988	2.11	4,938	1.66
VINYL CHLORIDE	---	10.0	---	10.0
XYLENE (TOTAL)	---	10.0	---	10.0

TABLE 2 FACTORS FOR SEMIVOLATILE ORGANIC ANALYTES				
	SOIL MATRIX		WATER MATRIX	
SEMIVOLATILE ORGANIC ANALYTES	Number of CARD sample Reviewed	Factor	Number of CARD Samples Reviewed	Factor
1,2,4-TRICHLOROBENZENE	6,792	4.83	4,605	3.71
1,2-DICHLOROBENZENE-D4	32,848	4.22	21,506	3.0
1,3-DICHLOROBENZENE	---	10.0	---	10.0
1,4-DICHLOROBENZENE	6,796	6.0	4,599	3.85
2,2'-OXYBIS(1-CHLOROPROPANE)	---	10.0	---	10.0
2,4,6-TRIBROMOPHENOL	32,605	9.38	21,509	3.57
2,4,5-TRICHLOROPHENOL	---	10.0	---	10.0
2,4,6-TRICHLOROPHENOL	---	10.0	---	10.0
2,4-DICHLOROPHENOL	---	10.0	---	10.0
2,4-DIMEHYLPHENOL	---	10.0	---	10.0
2,4-DINITROPHENOL	---	10.0	---	10.0
2,4-DINITROTOLUENE	6,798	4.88	4,623	3.52
2,6-DINITROTOLUENE	---	10.0	---	10.0
2-CHLORONAPHTHALENE	---	10.0	---	10.0
2-CHLOROPHENOL-D4	32,798	4.08	21,506	2.92
2-FLUOROBIPHENYL	32,913	3.38	21,532	2.84
2-FLUORPHENOL	32,781	5.05	21,511	3.34
2-METHYLNAPHTHALENE	---	10.0	---	10.0
2-METHYLPHENOL	---	10.0	---	10.0
2-NITROANILINE	---	10.0	---	10.0
2-NITROPHENOL	---	10.0	---	10.0
3,3'-DICHLOROBENZIDINE	---	10.0	---	10.0
3-NITROANILINE	---	10.0	---	10.0
4,6-DINITRO-2-METHYLPHENOL	---	10.0	---	10.0
4-BROMOPHENYL-PHENYETHER	---	10.0	---	10.0

TABLE 2 FACTORS FOR SEMIVOLATILE ORGANIC ANALYTES				
	SOIL MATRIX		WATER MATRIX	
SEMIVOLATILE ORGANIC ANALYTES	Number of CARD Sample Reviewed	Factor	Number of CARD Samples Reviewed	Factor
4-CHLORO-3-METHYLPHENOL	6,715	6.26	4,609	4.46
4-CHLOROANILINE	---	10.0	---	10.0
4-CHLOROPHENYL-PHENYLETHER	---	10.0	---	10.0
4-METHYLPHENOL	---	10.0	---	10.0
4-NITROANILINE	---	10.0	---	10.0
4-NITROPHENOL	6,627	9.33	4,586	5.96
ACENAPHTHENE	6,773	4.68	4,600	3.63
ACENAPHTHYLENE	---	10.0	---	10.0
ANTHRACENE	---	10.0	---	10.0
BENZO(A)ANTHRACENE	---	10.0	---	10.0
BENZO(A)PYRENE	---	10.0	---	10.0
BENZO(B)FLUORANTHENE	---	10.0	---	10.0
BENZO(G,H,I,)PERYLENE	---	10.0	---	10.0
BENZO(K)FLUORANTHENE	---	10.0	---	10.0
BIS(2-CHLOROETHOXY)METHANE	---	10.0	---	10.0
BIS(2-CHLOROETHYL)ETHER	---	10.0	---	10.0
BIS(2-ETHYLHEXYL)PHTHALATE	---	10.0	---	10.0
BUTYLBENZYLPHTHALATE	---	10.0	---	10.0
CARBAZOLE	---	10.0	---	10.0
CHRYSENE	---	10.0	---	10.0
DI-N-BUTYLPHTHALATE	---	10.0	---	10.0
DI-N-OCTYLPHTHALATE	---	10.0	---	10.0
DIBENZ(A,H)ANTHRACENE	---	10.0	---	10.0
DIBENZOFURAN	---	10.0	---	10.0
DIETHYLPHTHALATE	---	10.0	---	10.0

TABLE 2 FACTORS FOR SEMIVOLATILE ORGANIC ANALYTES				
SEMIVOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Sample Reviewed	Factor	Number of CARD Samples Reviewed	Factor
DIMETHYLPHTHALATE	—	10.0	---	10.0
FLUORANTHENE	---	10.0	---	10.0
FLUORENE	---	10.0	---	10.0
HEXACHLOROBENZENE	---	10.0	---	10.0
HEXACHLOROBUTADIENE	---	10.0	--	10.0
HEXACHLOROCYCLOPENTADIENE	---	10.0	---	10.0
HEXACHLOROETHANE	---	10.0	---	10.0
INDENO(1,2,3-CD)PYRENE	---	10.0	---	10.0
ISOPHORONE	---	10.0	---	10.0
N-NITROSO-DI-N-PROPYLAMINE	6,725	4.92	4,513	4.0
N-NITROSODIPHENYLAMINE(1)	---	10.0	---	10.0
NAPHTHALENE	---	10.0	--	10.0
NITROBENZENE-D5	32,867	3.96	21,533	2.73
PENTACHLOROPHENOL	6,597	72.5	4,550	10.12
PHENANTHRENE	---	10.0	---	10.
PHENOL-D5	32,855	3.85	21,489	3.53
PYRENE	6,543	11.86	4,612	5.67
TERPHENYL-D14	32,899	4.35	21,541	6.32

TABLE 3 FACTORS FOR PESTICIDES/PCB ANALTYES				
VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
4,4'-DDD	---	10.0	---	10.0
4,4'-DDE	---	10.0	---	10.0
4,4'-DDT	5,343	12.82	3,850	7.14
ALDRIN	5,526	14.26	3,829	6.63
ALPHA-BHC	---	10.0	---	10.0
ALPHA-CHLORDANE	---	10.0	---	10.0
AROCLOR-1016	---	10.0	---	10.0
AROCLOR-1221	---	10.0	---	10.0
AROCLOR-1232	---	10.0	---	10.0
AROCLOR-1242	---	10.0	---	10.0
AROCLOR-1248	---	10.0	---	10.0
AROCLOR-1254	---	10.0	---	10.0
AROCLOR-1260	---	10.0	---	10.0
BETA-BHC	---	10.0	---	10.0
DECACHLOROBIPHENYL	57,315	17.79	33,592	10.0
DELTA-BHC	---	10.0	---	10.0
DIELDRIN	5,539	11.93	3,861	4.87

TABLE 3 FACTORS FOR PESTICIDES/PCB ANALYTES				
VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
ENDOSULFAN I	—	10.0	---	10.0
ENDOSULFAN II	—	10.0	---	10.0
ENDOSULFAN SULFATE	---	10.0	---	10.0
ENDRIN	5,521	14.13	3,850	5.33
ENDRIN ALDEHYDE	---	10.0	---	10.0
ENDRIN KETONE	---	10.0	---	10.0
GAMMA-BHC (LINDANE)	5,545	11.79	3,832	10.0
GAMMA-CHLORDANE	---	10.0	---	10.0
HEPTACHLOR	5,548	7.88	3,836	5.26
HEPTACHLOR EPOXIDE	---	10.0	---	10.0
METHOXYCHLOR	---	10.0	---	10.0
TETRACHLORO-M-XYLENE	59,508	8.5	33,787	5.29
TOXAPHENE	---	10.0	---	10.0

TABLE 4 FACTORS FOR INORGANIC ANALYTES				
VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
ALUMINUM	5387	1.66	6208	1.30
ANTIMONY	5392	1.98	6170	1.27
ARSENIC	5675	1.74	6303	1.35
BARIUM	5360	3.99	6201	1.25
BERYLLIUM	5399	1.28	6208	1.25
CADMIUM	5385	1.41	6166	1.29
CALCIUM	5383	1.28	6201	1.24
CHROMIUM	5389	1.29	6210	1.30
COBALT	5392	1.25	6212	1.27
COPPER	5394	1.22	6205	1.25
CYANIDE	3281	1.55	225	1.36
IRON	5391	1.34	6216	1.27
LEAD	5982	1.44	6384	1.31
MAGNESIUM	5397	1.23	6210	1.24
MANGANESE	5395	1.24	6214	1.28
MERCURY	5954	1.83	256	1.50
NICKEL	5400	1.35	6210	1.29
POTASSIUM	3874	17.49	6175	1.24
SELENIUM	5620	2.38	6278	1.14
SILVER	5392	1.74	6215	1.42
SODIUM	5024	25.43	6195	1.26
THALLIUM	5621	1.86	6253	1.37
VANADIUM	5393	1.34	6212	1.25
ZINC	5404	1.50	6224	1.29

REFERENCE 30

SITE INVESTIGATION REPORT
FOR
OLD BRIDGE TOWNSHIP – MARGARETS CREEK PROPERTY
OLD BRIDGE TOWNSHIP, MIDDLESEX COUNTY
April 18, 2007

1. Preliminary assessment. Review of available environmental records was completed. The property, Block 1, lot 54.12, located on Route 35, is not listed in the State's Known Contaminated Sites or Solid Waste Disposal Area databases. The local health department, Middlesex County Department of Public Health, had no records on the property. Old Bridge Township – the site's owner- has no knowledge of the nature of the fill material.

Fig. 1 Site Location

1.1 Review of historic aerial photography revealed the subject to be, in 1930, tidal marsh – with a road traversing southwest –northeast from Route 35 to a cluster of structures on Raritan Bay. In 1974 the filling of a ± 20 acre portion of the site is apparent.

Fig. 2 1930

Fig. 3 1974 (Showing land filling)

1.2 On December 13, 2006, a limited site investigation was completed to visually characterize fill material via excavation of test pits. Using a skid steer backhoe, representatives of the New Jersey Geological Survey completed 11 test pits biased (using historic aerial photography) to the thickest deposits of fill or based upon evidence of surficial waste materials. Test pits were excavated to native material. Only minor amounts of non-soil materials were encountered and in only one of 11 locations.

Waste materials were evident in numerous locations across the surface of the filled area, several of which included large quantities of what appeared to be shredded automotive battery casings, brick – including apparent refractory brick – and slag, suggesting possible disposal of industrial wastes (see Figures 4 & 5).

Fig. 4 Main access road, showing crushed car battery casings.

Fig. 5 Area of slag, refractory brick & miscellaneous solid waste.

2. Site Investigation.

2.1 Field work. On March 4, 2007, representatives of the Bureau of Environmental Measurements & Site Assessment collected 16 soil samples, biased to areas with accumulations of shredded battery casings and in areas devoid of vegetation in which refractory brick, slag and other waste materials were evident. Samples L-1 through L-13 were collected in areas of accumulated battery casings, for lead analyses. Samples S-1 through S-4 were collected in areas devoid of vegetation in which refractory brick, slag and other waste materials were evident, for the complete Target Analyte List/Target Compound List analyses. The lead and TAL samples were collected in the 0-6" interval beneath waste materials. The TCL samples were collected at 6-12" bgs. Samples for volatile organic compound analyses were collected using Encore coring devices from within the boring.

2.2 Results. Lead was detected in all lead-only sample locations (L-1 though L-13) and at one TCL/TAL location (S-1) at concentrations above the non-restricted future use and restricted future use Soil Cleanup Criteria (400 ppm/600 ppm) with a concentration range of 701 ppm to 146,000 ppm, with an average concentration of 50,482 ppm (See Figure 6.)

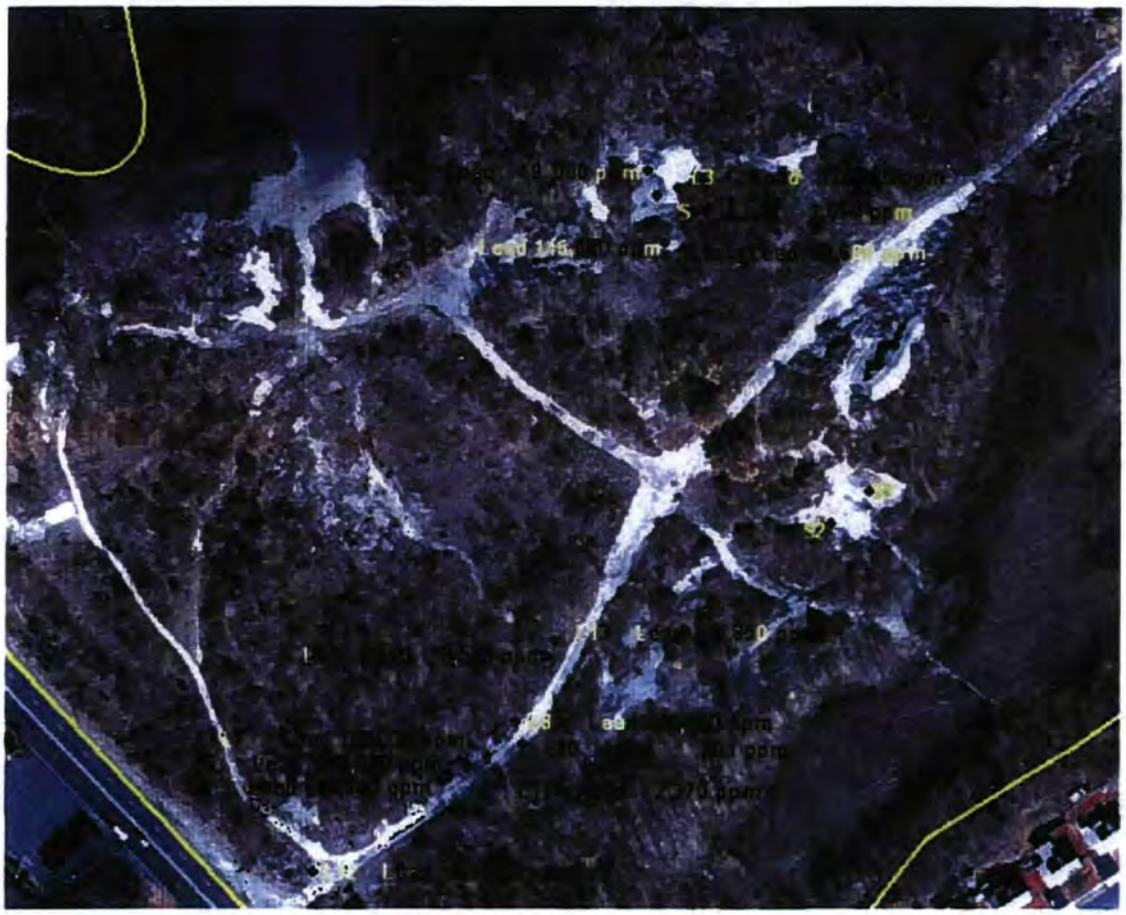

Fig. 6 Sample location map.

2.3 Discussion: The detected concentrations of lead significantly exceed the Department's human health-based Soil Cleanup Criteria. Ample visual evidence of human use of the site was observed during the site investigation, including footprints, bike/ATV tracks, campsites and promiscuous dumping.

In addition, the site is situated adjacent to sensitive environmental receptors – the wetlands and open water of the Margarets Creek and Raritan Bay. The site is mapped in the Department's Geographic Information System as "Critical Emergent Wetland" and as foraging habitat for a State-threatened species: the Black-Crowned Night Heron. The proximity of the contaminated areas to wetlands and open water suggests the possibility that contamination may be or may have migrated to these receptors via overland flow in surface runoff or via groundwater.

Given the sample results and potential receptors/exposures, this information was reported to the Department's Environmental Hotline and was assigned case # 07-04-18-1110-28.

3. Recommendation. It is recommended that Green Acres not purchase this property. Old Bridge Township should be advised of the results of the site investigation and be urged to enter a Memorandum of Agreement with the Site Remediation & Waste Management Program to address the contamination. Green Acres may reconsider acquisition of the site upon receipt by the Township of a No Further Action determination by the Site Remediation & Waste Management Program.

REFERENCE 31

DRAFT
REMEDIAL ACTION WORKPLAN

BLOCK 1 LOT 54.11
Township of Old Bridge
Middlesex County, New Jersey

Prepared For:
NL Industries, Inc.
Dallas, Texas

Prepared By:
Advanced GeoServices Corp.
West Chester, Pennsylvania

May 2008
Project No. 2007-1973

EXECUTIVE SUMMARY

Previous investigations of Lot 54.11, Block 1 of the Township of Old Bridge, Middlesex County, New Jersey which is 47.55 acres have shown elevated lead levels in localized surficial soil samples from 0 to 1-foot below the ground surface (bgs). The soil with elevated lead is typically gravelly sand that comprises the surface of existing dirt roadways and contains varying amounts of battery casing chips. No correlation is evident between the groundwater quality at the Site and the surficial soils with lead; lead was below the Class IIA standard in each of the three groundwater samples taken.

Soils with battery casing chips and debris in a limited area of the Site have been excavated, treated, and removed by Contractors for the Old Bridge Municipal Utilities Authority (OBMUA) installing a sewer pipe during late 2007 and 2008. This workplan describes a methodology to continue the removal of the visually identifiable soils with battery casing chips and debris.

To quickly and efficiently continue the removal and mitigate the potential for exposure to surficial materials with elevated concentrations of lead at the Site, this Remedial Action Workplan presents the plans developed by Advanced GeoServices Corp. (Advanced GeoServices) on behalf of NL Industries, Inc (NL). Proposed activities include excavation and off-site disposal of any shredded battery casings or demolition debris with greater than 600 mg/kg lead, a level appropriate and protective for anticipated future property uses. Post-excavation sampling will be performed to document the effectiveness of the remediation. Excavated areas will be backfilled and graded as necessary to promote drainage.

The proposed remedy approach is consistent with Superfund Lead-Contaminated Residential Sites Handbook (EPA, 2003). Implementation of this remedial action will result in a remedy which is fully protective of human health and the environment and which eliminates exposure pathways in a cost-effective, quick and efficient manner. The remedy approach also minimizes

impacts on wetland areas facilitating implementation of a reasonable solution for all parties in less than a construction season.

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APPENDICES

APPENDIX

A Select Pipeline Drawings

1.0 INTRODUCTION

This workplan has been prepared by Advanced GeoServices Corp. (Advanced GeoServices) on behalf of NL Industries, Inc. (NL) for removal of surficial materials with elevated concentrations of lead on Block 1, Lot 54.11 (the Site), located on Route 35 in Old Bridge Township, New Jersey.

The Site is 47.55 acres and is currently owned by the Township of Old Bridge. Localized surficial areas of the Site have been found to have elevated levels of lead. Past investigations have indicated the areas with lead are localized, the lead is surficial and found primarily in battery casing chips in roadway areas. Lead was also found in demolition debris observed in piles at the Site. This workplan provides background information from previous investigations of these materials and provides an approach to expeditiously address these materials.

Following New Jersey Department of Environmental Protection (NJDEP) approval of this workplan, NL will attempt to secure access from the current site owner, Old Bridge Township and begin planned remedial activities described in this workplan.

2.0 PROPERTY DESCRIPTION AND PHYSICAL SETTING

2.1 LOCATION

The Site is located in the Laurence Harbor section of Old Bridge Township, in Middlesex County, New Jersey and fronts on Route 35 North (Figure 1 and Figure 2). The Site is identified on Old Bridge tax maps as Lot 54.11. Block 1, Lot 54.12, which borders the Raritan Bay, is on the northeast side of the Site.

An existing dirt road extends through the Site from a gate on Route 35 northeast toward the Raritan Bay. Access is also available to the Site through the adjacent Old Bridge Municipal Utilities Authority (OBMUA) sewage pump station facility located on Boulevard West through the adjacent Lot 54.12.

2.2 TOPOGRAPHY AND DRAINAGE

Based on the Topographic Survey of the Township of Old Bridge existing surface elevations range from near sea level to 28 feet above mean sea level (msl) (NGVD 1988). Margaret's Creek is located in the northern portion of the Site and near the western boundary of the Site. Margaret's Creek flows northward and discharges to the Raritan Bay. Coastal and freshwater wetlands are present in substantial portions of the Site.

2.3 GEOLOGY AND HYDROGEOLOGY

Surface materials mapped in the project area include estuarine deposits, beach deposits, and artificial fill. Estuarine deposits are mapped over a majority of the Site and are typically comprised of salt marsh sediments including silt and clay, fine sand, and peat. Beach deposits are comprised of sand and pebble gravel, and are mapped along Raritan Bay. Artificial fill is

mapped above the marsh deposits in the central-western portion of the Site, as well as along the dirt road that leads to the beach on the Raritan Bay.

Surficial soils in the project area are underlain by the upper Magothy Formation. The Magothy Formation generally consists of sand interbedded with dark gray clays and silts, and is often characterized by rapid lateral and vertical changes in composition.

2.4 ZONING

The Site is currently zoned C-M. The purpose of this zoning classification is to provide an opportunity for continued development of marine and resort activities that have direct access to navigable waterways.

3.0 PREVIOUS INVESTIGATIONS

3.1 SITE HISTORY AND OPERATIONS

Previous studies by the NJDEP of the Site included a review of historical aerial photography of the project Site. The following is a summary of reported observations from these studies and observations of the aerial photographs.

In a 1930 photograph, the property is dominantly tidal marsh. A dirt road traversed the property from Route 35 northeast to Raritan Bay. Several buildings of unidentified use were located along the beach on Raritan Bay. Significant clearing and possible soil filling is observed on the 1954 aerial photograph of the Site. Clearing is also noted in the 1961 aerial photograph with evidence of soil filling observed on a 1969 aerial photograph. In a 1974 photograph, fill is evident in an approximately 20 acre area of former marshland in the southwestern portion of the Site. Residential developments of single family homes are located to the northwest and southeast of the Site.

The Site is currently vacant and is generally comprised of woodland and marshland. The existing Laurence Harbor interceptor sewer located beneath the property surface is maintained by the OBMUA and is in the process of being upgraded with a new interceptor pipe.

3.2 ENVIRONMENTAL SAMPLING

Five previous investigations have been conducted at the Site. In July 2004, a geotechnical investigation was performed by Icon Engineering on behalf of the township to characterize the subsurface conditions along the proposed pipeline route. Eight (8) soil borings were performed in the sewer easement. In addition, three (3) monitoring wells were installed to measure shallow groundwater levels. The geotechnical investigation included limited environmental testing of

soil and groundwater to provide a preliminary characterization of waste material that might be generated during construction. Two surficial soil samples (0 to 2 feet bgs) were collected and analyzed for priority pollutants (PP+40). All targeted parameter concentrations were below the most stringent soil cleanup criteria. One groundwater sample was collected from each of the three wells, and a single composite sample was analyzed for PP+40. The targeted parameters were either not detected or were detected at concentrations below the New Jersey Class IIA Groundwater Quality Standards.

In April 2005, a limited investigation was performed by Icon Engineering to characterize approximately 200 cubic yards (CY) of soil stockpiled in roughly 40 individual piles in the central portion of the Site, to the north of the construction easement. The stockpiled soil was being considered as potential backfill material for the sewer installation project. Six (6) soil samples were collected and analyzed for PP+40. No contaminant concentrations exceeded the most stringent NJDEP soil cleanup criteria.

In December 2006 and March 2007, the NJDEP conducted the third and fourth limited Site investigations of fill materials on the property. Eleven (11) test pits were excavated to visually characterize the fill material; the test pits were biased to the thickest deposits of fill or to areas with evidence of surficial waste materials. Waste materials observed at several locations in the fill included shredded automotive battery casings, refractory brick, and slag. In March 2007, sixteen (16) soil samples were collected from the fill layer targeting materials of concern. Lead exceeded the non-restricted future use soil cleanup criteria (400 parts per million (ppm)) in these targeted samples and the restricted use soil cleanup criteria (600 ppm) in fourteen (14) samples (L-1 through L-13 and S-11). In the samples that exceeded the remedial standards, the lead level ranged from 701 ppm to 146,000 ppm, with an average concentration of 50,482 ppm.

For the fifth investigation, the scope of work for the Site investigation was based on a Limited Site Investigation Workplan prepared by Icon Engineering (May 2007) and approved by the NJDEP. The main objective of the investigation was to characterize the composition and

environmental quality of fill materials within the 40- foot wide construction easement. This information was used to evaluate the need for any remediation that might be required in order to implement the sewer construction project. Sampling was performed in general accordance with the NJDEP Field Sampling Procedures Manual (August 2005). Select drawings associated with this site investigation workplan are provided in Appendix A.

The analytical results for both the XRF field screening and laboratory soil testing were compared to the New Jersey Soil Cleanup Criteria (SCC; last revised May 12, 1999). Based on both the XRF and the laboratory analyses, the following observations regarding contamination in the fill soils were noted. Elevated lead levels were observed in surficial soil samples from station 7+00 to station 9+00 of the planned OBMUA pipeline route. Lead levels ranged up to 24,000 mg/kg (Sample B-4E), compared to the direct contact soil cleanup criterion of 400 mg/kg for residential use and 600 mg/kg for non-residential use. The samples with high lead levels were reported to correspond to the sandy soils that contained trace amounts of battery casing chips.

The report stated elevated lead concentrations appear to be limited to surficial soils. The highest laboratory confirmed lead concentration in the easement was 24,000 mg/kg at sample location B-4E from 0 to 6-inches bgs. The lead concentration was 610 mg/kg in a sample from 6 to 12-inches bgs at the same location. Antimony and arsenic levels were below the SCC in this sample. The targeted metal levels in deeper fill soils throughout the area of investigation were generally below the most stringent SCC, except one slightly elevated arsenic level in one sample which may reflect a naturally occurring condition.

The XRF results for lead, the main constituent of concern at the Site, were generally consistent with the analytical laboratory confirmation results. The XRF results compared less favorably for other potential metal contaminants, including mercury, cadmium, and arsenic. Based on the laboratory results, these metals were determined not to be contaminants of concern at the Site.

No surficial or deep contamination in the fill layer was indicated from pipeline station 0+00 through station 6+00 or 10.25 to 27+00, as shown on drawings provided in Appendix A including Figure 8.

The lead and antimony contamination appeared to be restricted to surficial soils in a limited area of the construction easement. The contaminated area extends from some point prior to pipeline station 7+00 to some point after station 9+00, and is near the intersection of two existing dirt roads. The lead contaminated soil was reported to be typically gravelly sand that comprises the road surface and contains varying amounts of battery casing chips. The investigation indicated that elevated lead levels were commonly associated with soils containing crushed battery debris. The battery chips were likely placed as a type of substitute for gravel to stabilize portions of the roadway, or may have been tracked along the roadway from a source area. More abundant battery chips are evident at the surface along the main site roadway near the Route 35 Site entrance, in one of the areas previously investigated by the NJDEP. In that area of the Site, lead levels as high as 106,000 mg/kg were reported in surface soils. Regardless of how the contamination originated, in the area of investigation, no battery casing debris was observed below the upper one foot of soil.

Representatives of NL visited the Site on April 1, 2008. NL spoke with contractors conducting sewer pipeline installation work at the Site and providing oversight. The contractors confirmed the presence of lead was localized and confined primarily to the top 1 foot of soil. Pictures of the observable debris are provided as Figures 3 through 6.

3.3 SOIL QUALITY SUMMARY

Five soil investigations have been conducted at the Site. The first two did not identify lead in soil in the limited soil testing conducted. The third, fourth, and fifth investigations were targeted

towards the areas with visually identifiable debris and the proposed pipeline route and lead was documented in surficial soils and select debris piles found at the Site.
The lead was generally found to be surficial, visually distinguishable debris which had been placed at the Site.

Representatives of NL visited the Site on April 1, 2008 and discussed the observations of fill with the OBMUA sewer pipe installation contractor and OBMUA oversight representatives. They confirmed sampling of the soils has shown the lead to be surficial and associated with battery casings or select piles of debris which were placed at the Site. Pictures of the observable debris are provided as Figures 4 through 7.

3.4 GROUNDWATER QUALITY

No correlation is evident between the groundwater quality and the surficial soil contamination that is locally present in the easement or in other areas of the Site. The primary contaminant of concern at the Site is lead, and lead was below the Class IIA standard in each of the three wells sampled. This finding also supports the presumption of surficial deposition of contaminated materials with no anticipated metals migration.

Due to the Site location adjacent to the saline waters of Raritan Bay, the shallow groundwater at the Site is likely not suitable for potable use. The actual classification for the Site groundwater would likely be Class III.

4.0 REMEDIAL ACTION WORKPLAN

4.1 REMEDIAL ACTION SELECTION

Fill material with elevated concentrations of lead is present within limited portions of the Site. Upon excavation, the contaminated soil/fill would become a regulated waste material and managed appropriately. Due to the apparent limited extent of contamination on the Site, excavation of the surficial materials with battery casings or demolition debris with lead concentrations exceeding project standards to depths of 12", on-site stabilization, and off-site disposal of the contaminated fill is a feasible remedial approach to mitigate the potential for exposure to Site materials. This remedial approach is consistent with the remedial approach described in the Superfund Lead-Contaminated Residential Sites Handbook (EPA, 2003).

4.2 CONTAMINANTS OF CONCERN AND REMEDIAL STANDARDS

Previous Site investigation findings indicated that contaminated soil is only present in limited sections of the Site and appears to be surficial. Based on the laboratory analytical results, the contaminants of concern are metals with lead being the primary indicator parameter. The lead concentration exceeds the appropriate soil remediation standards. The applicable remediation standards for this project are the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC; last revised May 12, 1999) as follows:

PARAMETER	NRDCSCC (mg/kg)
Lead	600

This clean-up level is consistent with the property zoning for marine and resort activities and anticipated future land use planning.

4.3 EXCAVATION LIMITS

A topographical survey for the entire Site will be completed or provided. Limits of wetlands will be field delineated and shown on the topographic survey.

The entire property will be subdivided into gridded 0.5 acre increments or exposure areas (EAs). Each non-wetland EA will be carefully inspected for visually distinguishable battery casing chips or demolition debris believed to have lead concentrations in excess of 600 mg/kg. Visually identifiable isolated areas of battery casing chips and debris believed to have lead concentrations in excess of 600 mg/kg based on XRF screening will be identified, visually delineated and excavated to 6 inches within gridded EAs. Post-excavation bottom sampling of grids will be completed using a 5 point composite grid on a frequency of one test (i.e., a 5 point composite) every 10,000 square feet at excavation, to confirm all soil which may exceed 600 mg/kg have been excavated. Areas with bottom sampling containing lead concentrations exceeding 600 mg/kg will be excavated an additional 6" and a 5 point composite bottom sample will be completed in the area of investigation from 6-12". The composite samples will consist of grab samples (aliquots) collected from at least 5 randomly-located areas within each EA.

Each aliquot will be collected from the bottom of excavations using trowels, hand augers, and/or shovels. The aliquots will be placed in a mixing bowl and homogenized to generate one composite sample that represents the entire removal area. Standard sampling and decontamination procedures will be followed in the field. XRF testing will be used for determination of the lead concentration. Past XRF testing has been confirmed with off-site ICP analysis. A minimum of 10 samples will be sent off-site for ICP analyses to confirm the XRF data is reliable and to establish a correlation as necessary between the XRF being used for sampling and the ICP data.

In the event contamination is identified in the post excavation sample at 12", a visible marker barrier will be installed to identify the presence of possible impacted soil below the marker barrier. Barriers that will be used are orange construction fence, snow fence, or a geofabric.

4.4 TREATMENT, TRANSPORTATION AND DISPOSAL

4.4.1 Stockpile Characterization Sampling

Once material is excavated, if it has not been direct loaded to the disposal facility, it will be taken to the soil staging area, and placed in stockpiles for characterization purposes. It is anticipated that the stockpiles will be approximately 1,000 cy in volume and that one composite sample will be collected from each stockpile. The composite samples will consist of aliquots collected from at least five randomly-located surface locations from each stockpile. Each aliquot will be collected using trowels, hand augers, and/or shovels. The aliquots will be placed in a mixing bowl and homogenized to generate one composite sample that represents the entire stockpile. Standard sampling and decontamination procedures, which will be followed in the field, are described in a Quality Assurance Project Plan (QAPP) provided following workplan approval. The waste characterization samples will be sent to an approved off-site laboratory for TCLP lead analysis. If the sample result exceeds 5.0 mg/L lead, the stockpile will be stabilized on-site by the Contractor and retested; this process will be repeated until passing results (i.e., TCLP leachate is less than 5.0 mg/L) are achieved. If the waste characterization result is less than 5.0 mg/L, the material will not require treatment, prior to off-site disposal.

In-situ characterization sampling may be performed instead of the stockpile characterization described above. In-situ characterization will be utilized if the Contractor prefers to transport the excavated soil directly to the disposal facility. This will consist of determining the need for treatment from a localized area within an area scheduled for removal. The composite samples will consist of grab samples (aliquots) collected from at least 5 randomly-located areas within each EA. Each aliquot will be collected from the ground surface to the excavation depth using

trowels, hand augers, and/or shovels. The aliquots will be placed in a mixing bowl and homogenized to generate one composite sample that represents the entire removal area. Standard sampling and decontamination procedures will be followed in the field. The waste characterization samples will be sent to an approved off-site laboratory for analysis of TCLP lead. If the sample result exceeds 5.0 mg/L lead, the excavated soil will be placed in the soil staging area and the stockpile characterization sampling will be implemented. If the sample result is less than or equal to 5.0 mg/L lead, the material will not require treatment and may then be loaded onto trucks for direct transport to the disposal facility.

4.4.2 Soil Stabilization/Treatment

In the event that soil stabilization/treatment is warranted, the soil stockpile will be stabilized in the soil staging area. The stabilization process will be accomplished by mechanical means (e.g., pug mill, trackhoe mixing within a contained area). The stabilization reagent and mixture ratios will be determined by the Contractor based on several effective proprietary and non-proprietary reagents and processes available on the market. Following stabilization of the stockpile, a sample will be collected following the procedures described above and sent to the approved laboratory.

It is understood that this work plan will effectively act as the permit for NJDEP to approve any necessary stabilization treatment of soils required as part of the remedy.

4.4.3 Transportation and Disposal

Following testing (and treatment as necessary) to confirm that the material is non-hazardous (i.e., less than 5.0 mg/L TCLP lead), the material will be loaded into trucks for transportation to one or more pre-approved off-site disposal facilities. Air monitoring and dust control will be conducted in accordance with the Health and Safety Plan (HASP) which will be developed following approval of this workplan. Once loaded, the trucks will be tarped and the material

transported to the disposal facility. Appropriate local, state, and federal regulations will be followed for documentation, placarding, and transporting of the material. All material will be tracked in accordance with federal, state, and local regulations (e.g. bills of lading or manifests, as appropriate). A summary tracking spreadsheet will be generated at the start of the project and will be updated as soil is exported. At a minimum, the spreadsheet will contain the date and time of shipment, trucking company, truck number, and soil tonnage weighed by a certified scale.

4.4.4 Debris/Temporary Structures

During the excavation activities, any debris encountered will be segregated and stockpiled separately. This debris may consist of vegetation, wood, concrete, or brick found below the soil surface which exceeds the established standards for lead. This debris will be disposed of separately from the excavated soil, if requested by the disposal facility.

4.5 BACKFILL

The Contractor shall plan on backfilling to pre-excavation grades within 10 calendar days of receipt of confirmatory sample results or following soil removal if the excavation extends to 12 inches. In some cases, the Respondent may elect to extend this period to prevent materials from being placed in areas of standing water or frozen material. Vegetative materials will be removed from within excavation areas prior to backfill. Backfill materials will be temporarily stored in clean areas of the Site or in the soil staging area, as needed. Both structural soil fill and topsoil will be used as backfill as described below.

In some cases, where areas with elevated lead concentrations exceeding project standards are broad and shallow, confirmation samples indicate soil lead concentrations are less than 600 mg/kg and backfill is not necessary to manage surface water, only 2" of topsoil will be placed. The decision on backfilling will be made by the oversight contractor in consultation with the owner.

4.5.1 Structural Soil Fill

Structural soil fill material will be used to achieve backfill grades to within two inches of final grade. Structural soil fill samples will be collected prior to use and submitted by the Contractor for laboratory analysis. The results of analysis of these soils will not exceed New Jersey clean fill concentrations. Soil fill materials will be free from roots and other organic matter, trash, debris, and stones larger than three inches in any dimension. Soil fill materials will be placed in loose lifts and compacted by mechanical methods.

4.5.2 Topsoil Fill

Topsoil material will be a natural, friable soil with organic content of at least 2.5% and nutrients sufficient to sustain grass growth and free of any trash or other deleterious debris. The maximum particle size will be 3/4 inch and rocks greater than 1/8 inch shall not be greater than 5% total by weight. The Contractor will screen the topsoil, if necessary, so the maximum particle size is not exceeded. Topsoil samples will be collected prior to use and submitted by the Contractor for laboratory analysis and the results will be compared to NJDEP clean fill concentrations and also tested to confirm that the topsoil has appropriate soil nutrients and organic content. Topsoil materials will be placed to an approximate 2-inch depth over the structural soil fill material. Once topsoil is placed, it shall be lightly compacted by mechanical methods approved by the QA official and tilled for placement of seed, fertilizer, and mulch.

4.6 RESTORATION

All fill replacement areas and areas disturbed by soil removal operations will be uniformly smooth-graded to mimic the pre-excavation grades, except as necessary to permit adequate drainage with the notification and acceptance of the property owner. Grade control will be performed by the Contractor to confirm the appropriate grades and to make modifications as necessary.

Since the battery casings were used as a gravel substitute it is anticipated that most of the areas with elevated lead concentrations will be open areas with minimal trees. Care will be taken to minimize damage to trees. Field XRF screening will be conducted around individual trees to confirm materials that exceed the 600 ppm project standard for lead and the need for any tree removal.

4.7 SEEDING

The Contractor will apply a native grass seed mix tolerant to the local conditions which will expedite restoration activities. Straw mulch will be applied upon completion of seeding. The Contractor may opt to use a hydroseed mix which will consist of seed, fertilizer and straw mulch to protect the seed from erosion and predation. Erosion control devices will remain in-place until vegetation has been established in disturbed areas. The Contractor will be responsible for vegetation establishment and will prepare a maintenance schedule to allow vegetation to be established before the onset of inclement weather.

4.8 DUST CONTROL

Due to the potential for elevated lead levels in the soil, airborne dust monitoring shall be performed during remedial activities. Dust monitoring will be performed using a particulate meter (TSI DustTrak Aerosol Monitor; MIE pDR-4000 Data Ram; or equivalent) to monitor dust

concentrations. Dust monitoring will be performed at least hourly in work area locations and at the downwind site boundary. The monitoring frequency may be increased or decreased by the site health and safety officer based on conditions in the work areas and the results of monitoring. Site-specific action for the dust monitoring will be defined in the HASP submitted after this workplan is approved. Dust suppression procedures will include wetting the ground surface or source of dust. A water truck or equivalent source will be maintained on-site for this purpose.

4.9 CONSTRUCTION STAGING, STORAGE, AND ACCESS AREAS

Construction storage and staging areas, and haul roads have been situated outside of known contaminated zones. The construction entrance and tracking pad will be located at the northern Site entrance near Route 35.

4.10 DECONTAMINATION

A vehicle tracking pad and equipment decontamination zone will be setup at the boundary of the remediation area. The tracking pad will be comprised of clean stone placed over a suitable geotextile. Equipment will be steam cleaned upon leaving the remediation area. A temporary decontamination water collection system will be installed, including an impermeable base. Decontamination water will be infiltrated since the contamination is not water soluble. At the end of the remediation, the tracking pad material will be collected, tested and disposed of properly based on test results. A personnel decontamination zone will also be setup at the boundary of the remediation area, including a wash station and drums for disposable personal protective equipment.

4.11 POST-REMEDIAL CONSTRUCTION MONITORING

Following completion of the soil remedial action the vegetation will be monitored until excavated areas are stabilized.

4.12 PERMITTING

A Soil Erosion and Sediment Control Plan will be prepared and submitted to the Freehold Soil Conservation District for certification. A companion soil sampling plan and HASP (see Section 4.14) will be submitted to NJDEP for approval.

4.13 GROUNDWATER MANAGEMENT

Groundwater is not expected to generally be encountered during the remedial activities, since the excavation will only extend to approximately 1-foot bgs. If groundwater is encountered, excavations will be terminated. Five point composite samples will be taken in excavations and a visible marker barrier will be placed in any areas which exceed the 600 mg/kg standard for lead.

4.14 HEALTH AND SAFETY

A site specific HASP for remedial activities associated with the removal action will be prepared in accordance with applicable standards (NJAC 7:26E-1.9; 29 CFR 1910 8t 29 CFR 1926) to address potential job hazards specifically related to the handling of contaminated soils, and will specify minimum safety training requirements, safety responsibilities, control measures, monitoring requirements, appropriate personnel protective equipment, decontamination procedures, and emergency procedures. The HASP will be applicable to all personnel working at the Site, and will supplement individual contractor's health and safety plans for specific activities as well as industry safety standards. Prior to mobilization, copies of the HASP will be provided to all construction contractors, consultants, and any other field personnel.

4.15 SCHEDULE

The remediation will be performed after NJDEP approval of this workplan. The remediation, including setup, excavation, and soil disposal, is expected to be completed in approximately 16-24 weeks, approximately 1 construction season.

5.0 REFERENCES

Icon Engineering, August 7, 2007. Limited Site Investigation Report and Remedial Action Workplan.

New Jersey Department of Environmental Protection, April 20, 2007. Site Investigation Report Old Bridge Township - Margarets Creek Property) Old Bridge Township, Middlesex County.

EPA, August 2003. Superfund Lead-Contaminated Residential Sites Handbook.

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